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From July 1, 1914 to December 31, 1914.

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WE GUARANTEE, that of this issue 9,000 copies were printed; that of these 9,000 copies, 7,462 were mailed to regular paid subscribers to the weekly edition, 250 were provided for counter and news companies' sales, 1,173 were mailed to advertisers, exchanges and correspondents, and 115 were provided for samples and office use; that the total copies printed this year to date were 252,700, an average of 9,359 copies a week.

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*Illustrated.

On Monday of last week the Supreme Court put its stamp of disapproval on one of Mr. Brandeis' theories, namely, that the Interstate Commerce Commission did not have the power to prescribe a general scheme of rates. On Thursday the failure of the Claflin company contradicted in a quite dramatic way one of the fundamental assumptions on which Mr. Brandeis made his argument in the rate case.

Mr. Brandeis Wrong Again

What is the explanation of this remarkable fact that in other businesses, subject alike with the railroads to increase in wages and governmental regulation, increase in taxes and increase in cost of money, and increased supplies and increased cost of coal, there is blooming health, and with the railroads there is said to be a condition of morbidity?

The blooming health of other business is not very well demonstrated by the largest commercial failure in the history of the United States, but the particular point which railroad men are especially interested in is the demonstration of Mr. Brandeis' inability to draw correct conclusions from the indications in the business outlook. Almost patronizingly Mr. Brandeis assured the assembled railroad presidents that they were being stampeded into a panic by their friends in Wall street, that there was no immediate necessity for an increase in rates, even allowing that the railroad managers were right in that something would eventually have to be done to increase railroad revenues as well as decrease their expenses. Month by month the earnings of the roads demonstrate more clearly that Mr. Brandeis was wrong.

Minority stockholders of the Lake Shore & Michigan Southern are trying to block the consolidation of the New York Central & Hudson River and the Lake Shore & Michigan Southern by an appeal to the New York Public Service Commission, Second district, to refuse their approval of the merger. If newspaper accounts of the argument before the commission are correct, the minority holders claim first, that by giving collateral bondholders a 4 per cent. bond in place of a 3½ per cent. bond the railroad company is offering them an illegal consideration for their consent to the consolidation, and, secondly, that the extension of the present New York Central mortgage over the Lake Shore works a detriment in some way to the minority stockholders of the Lake Shore. The two arguments from a common sense point of view, regardless of the legal niceties involved, are inconsistent, as is also the argument that the New York Central is in effect mortgaging the property of the Lake Shore to purchase the stock of the Lake Shore. It is not a question of buying the stock of the Lake Shore, but of buying the property itself by the issue of new 4 per cent. bonds and of canceling the stock, and it would certainly appear to be legitimate to place property bought outright under a mortgage by means of which the needs of both the Lake Shore and New York Central for the permanent refunding of very large issues of notes are to be carried out.

New York Central Merger Plans

Twenty-four papers were received in the contest on The Operation of Large Classification Yards which closed June 1. These papers were turned over to A. M. Schoyer, vice-president of the Pennsylvania Lines; A. C. Ridgway, vice-president of the Chicago, Rock Island & Pacific, and H. O. Dunkle, assistant to the president and general manager of the Erie, who awarded first prize to A. M. Umshler, general yardmaster of the Illinois Central, Centralia, Ill., and second prize to C. A. Pennington, supervisor of terminals of the Cleveland, Cincinnati, Chicago & St. Louis and the Chesapeake & Ohio, Louisville, Ky. Other papers accepted for publication were contributed by R. M. Baker, Bellwood, Pa.; D. F. Stevens, trainmaster, New York, New Haven & Hartford, New York; Fred P. Grossman, general yardmaster, Chicago, St. Paul, Minneapolis & Omaha, Minneapolis, Minn.; G. O. Sarvis, assistant trainmaster, Philadelphia & Reading, Philadelphia, Pa.; I. T. Tyson, assistant trainmaster, Philadelphia & Reading, Philadelphia, Pa.; E. W. Brown, assistant superintendent, Lake Shore & Michigan Southern, Chicago; H. T. Murray, general yardmaster, Chicago, Burlington & Quincy, Galesburg, Ill.; J. B. Warrington, division superintendent, Phila-

Awards in Yard Operation Contest

delphia & Reading, Philadelphia; G. F. Garrison, general yardmaster, Baltimore & Ohio, Martinsburg, W. Va.; F. Lincoln Hutchins, Baltimore, Md.; W. B. Henricks, superintendent of terminals, Chicago, Milwaukee & St. Paul, Milwaukee, Wis.; J. D. Schaefer, city passenger agent, Chicago, Milwaukee & St. Paul, Pittsburgh, Pa., and Nelson J. Flocker, Bessemer & Lake Erie, Pittsburgh; Geo. C. Duffy, general yardmaster, Boston & Albany, West Springfield, Mass.; F. E. Ramsdell, freight trainmaster, Pittsburgh & Lake Erie, McKees Rocks, Pa.; J. L. Coss, assistant chief despatcher, Chicago, Rock Island & Pacific, Haileyville, Okla.; O. C. Hill, assistant superintendent, Chicago, Burlington & Quincy, Kansas City, Mo.; J. P. Kavanagh, assistant superintendent, Baltimore & Ohio, Baltimore, Md., and E. C. Tucker, general yardmaster, Norfolk & Western, Portsmouth, Ohio. Because of the intention of inaugurating a similar contest on The Operation of Large Terminal Yards, with their industry, interchange and team track problems, at a later date, all references to these problems were eliminated from the papers received in this contest, and it was limited purposely to the operation of large classification yards for the purpose of concentrating attention at this time upon this subject. The two prize-winning and a number of other papers are published in this issue, and others will appear in the paper at an early date.

Cincinnati, Hamilton & Dayton Default

The Cincinnati, Hamilton & Dayton has defaulted the July 1 interest payments on $1,677,000 unguaranteed first and refunding mortgage bonds, $4,727,000 Cincinnati, Indianapolis & Western first and refunding 4's, and $3,162,000 Indiana, Decatur & Western 5's. This means that the Cincinnati, Hamilton & Dayton will go back into receivership and that the Baltimore & Ohio will have to wait through the slow process of reorganization for the $50,000,000 which is supposed to represent roughly that company's investment in Cincinnati, Hamilton & Dayton. But at least it will mean that the Baltimore & Ohio will no longer be called upon to make advances, except its guarantee of interest on the $7,500,000 first and refunding 4 per cent. bonds which are outstanding in the hands of the public with the Baltimore & Ohio's guarantee on them, and will lose the interest on the, approximately, $18,000,000 4 per cent. bonds held in the Baltimore & Ohio treasury. A receivership and reorganization have been inevitable ever since the floods of last year. The floods, however, were a contributing cause only. Ever since the Cincinnati, Hamilton & Dayton took over the Pere Marquette and guaranteed interest on about $10,000,000 Pere Marquette bonds it was estimated that the only things that would avert a thorough scaling down of capital securities would be a purchaser for the Pere Marquette and a long period of uninterrupted prosperity and good luck for the Cincinnati, Hamilton & Dayton itself. The now defunct firm of Hollins & Co., New York, after experimenting in Cincinnati, Hamilton & Dayton and burdening it with the Pere Marquette guarantee, transferred it to J. P. Morgan & Company, who were on the point of transferring it to the Erie when the true condition of affairs became apparent. This was in 1905. After holding it for four years, during which time it went through a receivership, Morgan & Company sold their interest in the reorganized company to the Baltimore & Ohio, and at that time it was probably hoped that the Canadian Pacific would buy the Pere Marquette. This hope never materialized. The trouble with the Cincinnati, Hamilton & Dayton reorganization, like the trouble with a number of other reorganizations under the auspices of Morgan & Company, was that everybody's interest was so well kept in mind and preserved that the underlying and fundamental difficulties of the company involved were merely glossed over instead of being entirely eradicated.

THE ROCK ISLAND REORGANIZATION PLAN

THE Rock Island reorganization plan, if carried through, will wipe out $141,000,000 nominal railroad capitalization, outstanding in the hands of the public exchange $71,000,000 collateral trust bonds for stock, and raise $30,000,000 new capital—actual money for investment in new physical property—through the issue of 7 per cent. preferred stock. To effect this much needed reform the holding company stockholders are asked to put up all or part of the new money, and the collateral trust bondholders are asked to give up part of the securities for their bonds and take possession of the remainder.

The question of whether or not the debenture bondholders are being fairly treated under this tentative plan hinges upon the worth of the Railway stock which forms the collateral for these bonds. The Railroad collateral trust 4 per cent. bondholders collectively hold a mortgage on nearly all the stock of the Chicago, Rock Island & Pacific Railway Company, which is the operating and owning company of the 8,048 miles of line. These bondholders are asked under the reorganization plan to give without direct compensation 37½ per cent. of the Railway company stock to be used in raising new capital. A new preferred stock is to be created which is to be sold at par, a bonus of the common stock being given with the new preferred stock, the bonus being provided not by the company but by the collateral bondholders.

The justification for this scheme is that were the collateral bondholders required to furnish all of the new capital, estimated at $30,000,000, which the company is in need of, they would have to pay an assessment of 40 per cent., and that there is no earthly possibility of any very large proportion of them subscribing 40 per cent. to a new issue of preferred stock; neither, it is argued, could an issue of 7 per cent. preferred stock of the Chicago, Rock Island & Pacific Railway Company be sold to the general public at par. The collateral bondholders are, therefore, asked in lieu of a compulsory cash assessment to give up more than a third of their collateral, with the privilege, however, of buying back a part of this collateral, together with new preferred stock, on the same terms at which the preferred stockholders of the holding company are to have the privilege of subscribing, namely, par for the preferred, with the common thrown in. If it is strictly accurate to say that the Rock Island property is in imperative immediate need of $30,000,000, then the debenture bondholders have made as good a bargain as they well could have expected to make. They will receive $62.50 par value of Railway common for each $100 face value of bonds and will not be required to put any cash into the property. They will, however, not only have the face value of their security scaled down 37½ per cent., but will also have a 7 per cent. preferred stock placed ahead of the common which they are left. If new capital is to be raised, however, something has got to be placed ahead of the common stock of the Railway company, and it might better be preferred stock than debentures. The very fact that the holding company stockholders have lost heavily and their only chance of getting back any of this loss is through the investment of more money in the property gives the collateral bondholders a club which they have apparently used to compel the holding company stockholders to furnish the new capital which is needed for the property.

The Chicago, Rock Island & Pacific Railway Company earned a surplus of a little over $4,000,000 in the fiscal year ended June 30, 1913, after the payment of fixed charges, interest and rentals. If the property could be run in such a way as to necessitate capital expenditures for the next five years of not more than $4,000,000 a year, in addition to the necessary purchase of equipment—which it would seem could be financed through the sale of equipment trust notes—there would seem to be no reason why the collateral bondholders, who are really the Railway company common stockholders, should give up any of their collateral. The experts, however, who have examined the property have placed the minimum capital requirements for the next five years at $30,000,000. The stockholders of the holding companies, on

the chance that they can recoup themselves to some extent for former losses, are offering to provide this $30,000,000, asking, however, that the collateral holders give them in exchange 37 per cent. of the common stock.

Unless this money is provided there is, of course, the possibility of a receivership for the Railway company; but from the earnings and from the physical condition of the property this possibility does not appear to be imminent. Still as a possibility it has unquestionably a strong effect upon the attitude of mind of the security holders of the old Railway company. Their paramount concern is that some plan shall be devised by which new capital shall be put into the property and their own equity strengthened. They do not care at all as to whether the holding company stockholders or collateral bondholders provide the money. Their feeling presumably is that the collateral bondholders have no moral right to jeopardize the Railway company; that they themselves may preserve intact the collateral securing their bonds. They might well argue that the collateral bondholders have already been receiving for four or five years interest through the payment of dividends on the Railway company stock which property should have been put back into the strengthening of the equity of the other security holders.

There is another way to look at this question, however. The collateral bondholders are the owners of a potentially very valuable railroad. Phelps, Dodge & Company were willing to pay $65 for holding company preferred stock not many years ago, with no prospect of any interest at all on their investment, and simply in order to have a share in the management of the Rock Island and, of course, to promote advantageous relations between their own road—the El Paso & Southwestern—and the Rock Island. Times have changed, of course, very much since the Phelps, Dodge purchase, and it may be perfectly true that were it not for the incentive to recoup themselves—which the holding company stockholders have, an issue of preferred 7 per cent. stock of the Chicago, Rock Island & Pacific Railway Company, which might conceivably carry voting control of the property, could not be sold for par; still it would seem that part of it might be taken by the collateral bondholders, and therefore, it narrows itself down to a question of how immediate and how pressing are the needs for the entire $30,000,000 new capital. Despite many arguments to the contrary, it does not appear as if the holding company stockholders and the collateral trust bondholders should be classed as in the same boat. This is arguing that the railway company stock—the collateral for the bonds—is worthless unless the full $30,000,000 new capital is raised immediately.

The scheme which has been suggested for the reorganization has nothing in it that is against sound public policy insofar as the security holders of the Railway company are concerned, or of the general public served by the road. There will be under this plan a very large scaling down of the par value of securities outstanding; new money will be put into the property through the issue of non-cumulative stock, and the two holding companies will be entirely wiped out. This is a drastic and commendable reorganization plan, and a very shrewd one.

LOCKING THE STABLE BEFORE THE HORSE IS STOLEN

"SAFETY-FIRST" is a term, comparatively new, which has been used mostly in connection with precautionary measures which have been recommended to employees with reference solely to their own acts, as related to their own lives and limbs; but it has a wider application, of course. The most comprehensive safety scheme in the railway service is that which has to do with the safety of trains—the prevention of collisions and derailments of trains running at speed. In this aspect "safety-first" has no novelty; it has always been the watchword. But in this field, as in the other, we are not beyond the need of learning. Vice-president W. L. Park, of the Illinois Central, has done a notable thing in this connection; he has had reprinted for the employees of his road a circular or bulletin on safety-first, as related to the management of trains, which has been issued by the Nashville, Chattanooga & St. Louis. We would not say that railway officers are narrow and short-sighted, or slow to learn from others; but it is a fact that Mr. Park, in thus borrowing, bodily, an important circular from another road, is doing a thing which is quite unusual. How much good do we miss by neglecting to investigate with care the practices of our neighbors? Mr. Park, if we remember correctly, did a similar thing when he was on the Union Pacific several years ago; he reprinted entire the lessons concerning the causes of collisions and derailments as they were set forth, in concise form, in one of the government's quarterly accident bulletins.

The Nashville, Chattanooga & St. Louis bulletin is in some respects unique. Parts of it are reprinted on another page. In the first place, this matter of safety in train movement, which, in other words, is the education of the men to intelligent knowledge of and obedience to the train rules, is made the whole business of one officer, the train-rule examiner. He is not distracted by other important duties. Not only that; this officer is given a free hand. He does not have to have some other officer's name appended to his deliverances. He must take the responsibility for his own mistakes, and he is entitled to the full credit for what is useful in his work. As in his book, "Rights of Trains," this examiner does not hesitate to admit that he is "lecturing." Lecturing is liable to be too much like preaching and too little like teaching, and for that reason has fallen into disrepute; but, properly treated, a lecture has its uses. Often, it can accomplish things that an oral or written examination, in the usual formal way, could not accomplish, provided only that it is followed up, to make sure that it has been understood. A lecture frankly deals with the future. In that from which we quote, there are numerous passages beginning with a postulate which assumes that there are or have been bad practices on the road; but the lecture does not deal with the past. The practice on the Nashville, Chattanooga & St. Louis is not worse than on other roads. Judging by the reports, its record for safety is high. The lectures are given for the purpose of keeping it high, and making it better. They are preventive measures in the real sense. No road can count or measure the accidents which have been prevented in a given time; but the officers of the Nashville, Chattanooga & St. Louis can find satisfaction in two facts: (1) the number of train accidents has decreased and (2) the methods adopted for prevention are based on principles universally accepted as the best.

These written lectures are to be commended because, on the one hand, they avoid the brevity and the stilted language of ordinary rules and examination papers, while, on the other, they are far superior to the impromptu lecture or informal talk which otherwise would be employed with men whose knowledge of or obedience to the rules needs freshening. It is well to acknowledge, definitely, that many of our rules are too brief. The fault acknowledged, it is more surely cured. Informal talks, usually so informal as to be inexact in many particulars, always call for great caution on the part of the trainmaster or other officer who deals with the matter. The best way to exercise the necessary caution is to write things down in black and white, as does Mr. Forman. Our extracts are fragmentary. We have not space for the whole lecture. Neither are we endorsing everything that is said in it. It is the idea embodied, and the general style of the work, that it is desired here to emphasize. We cannot warrant every superintendent that he will find Mr. Forman's lectures exactly fitted to his own needs; but it is clear that they are based on very careful and thorough study of every possible contingency; and that, in them, any American superintendent can find the fundamentals of that kind of teaching which will put the rules that are in the book into the heads of the men, so far as words can do it.

This method of correcting bad practices is in decided contrast to that exemplified in the government reports on train accidents. The government investigators must set out to cure some one particular sore spot and must deal mainly with the past; the railroad officer deals with the present and future, and he can address the whole force of his argument to the individual

employee. He makes use of constructive criticism, designed to correct the whole of the employee's conduct, as related to all of his duties. A report on a train accident is useful as showing the need of better instruction of trainmen; the actual giving of that instruction is another matter. The accident lectures of Commissioner McChord and Inspector Belnap, like those of Mr. Brandeis in another field, are useful to arouse the indifferent railway officer; but the officer who wishes definitely to improve the safety of his train operations, and who wants aid in carrying out his purpose, will find much more useful assistance in lectures like Mr. Forman's. These lectures, *with the record of the responses which he gets,* mark real progress.

IS GOVERNMENT OWNERSHIP INEVITABLE?

WIDELY different views have been expressed recently by a number of prominent railway men regarding the prospects of the adoption of government ownership of railways in this country. E. P. Ripley, president of the Santa Fe, and Newman Erb, president of the Minneapolis & St. Louis, have said that they believe that government ownership is likely to come within a comparatively few years. Daniel Willard, president of the Baltimore & Ohio, takes a decidedly opposite view. In a recent letter to the Philadelphia *Public Ledger* Mr. Willard said: "I do not agree with Presidents Ripley and Erb that the time has arrived for government ownership and operation of railroads in this country; neither do I believe that at the present time there is any general demand or desire on the part of the public for such a radical change. If the only alternative to government ownership were private ownership and management as exemplified in certain notable instances in recent past, I might agree that the time for government ownership had arrived, but fortunately that is not the situation. There are very many large railroad systems in this country wisely, honestly and ably managed, among which number is the Santa Fe, of which President Ripley is at the head, and I can think of no good reason for substituting government ownership and control for private ownership and control of that character."

When such eminent doctors disagree so widely it is manifestly hazardous for others to express opinions. Nevertheless, the *Railway Age Gazette* ventures to believe that Mr. Willard reads the signs of the times better than Messrs. Ripley and Erb. If there should continue to be mismanagement of railways, here and there, which should lead to other scandals as bad as some of those that recently have been aired, and if government regulation should continue to be as prejudiced and unjust as it generally has been for some time, government ownership doubtless would be the result. It would come because regulation would disable the railways from performing their functions satisfactorily and because the investors in their securities and their owners would be so disgusted that they would enlist among the advocates of government ownership.

But it cannot be assumed that developments are going to take this course. The people of this country have a strong tendency to look with disfavor and fear on projects for state socialism. The number of railways in whose management the dictates of honor, sound business sense and public opinion are disregarded is rapidly becoming smaller, while the realization on the part of railway financiers and executive officers of the imperative need for action on their part to make all railway managements conform to a high standard is becoming keener. Evidences multiply that the public and the regulating authorities are beginning to realize that the story of the man who fed his horse on sawdust has its application to railway regulation. It will be recalled that just as the horse got used to living on the sawdust he died. The public and the regulating authorities are awakening to the fact that similar dieting of the railways must have similar consequences. This we believe is especially true of the federal authorities, including the Interstate Commerce Commission; and the Shreveport decision apparently has given the federal government all the power that it needs to control not only the managements of railways, but all who seek to regulate them. All these influences are operating to arrest the drift toward government ownership.

It is probable that the decision of the commission in the rate advance case will have a very great influence on the discussion of this subject. If the decision should be entirely adverse to the railroads it would intensify the feeling of discouragement among railway managements. If it should demonstrate in a practical way a disposition on the part of the commission to recognize the great difficulties with which the managements of the railroads are confronted and to help to cope with those difficulties, it probably would tend greatly to reduce the feeling that government ownership is inevitable. What is needed is evidence that the commission is determined not only to eradicate abuses in the railway business and protect the rights and interests of the public, but that it is equally determined to see that every honestly and prudently managed road gets a square deal. We confidently believe that such evidences will be forthcoming.

SUPERVISION IN YARD OPERATION

IT is instructive to note that the one point most frequently emphasized in the contributions to the contest on The Operation of Large Classification Yards, the first of which are published in this issue, was the importance of sufficient intelligent supervision, and the fact that this was referred to so often is an indication that the men in charge of the operation of large freight terminals are awake to its importance. With the elaborate network of tracks and the multiplicity of movements of cars it is not surprising that some are occasionally lost sight of. As one writer states, the problem of car movement is not so much that of the 90 per cent. of the cars which move regularly through the yards as with the 10 per cent., or less, which move out of the regular channels to the repair tracks or other parts of the terminal. Here is one place where supervision is important to keep *all* the cars moving, for as another contributor states, a yard is not intended as a place to store cars, but rather as a place to move cars out of.

Attention is also frequently given to the loaded car to the detriment of the car moving empty, especially in times of heavy business and consequent car shortage. While not detracting in the least from the importance of keeping loaded cars moving to their destination, it must also be remembered that each day an empty car is delayed in returning for a load is a day's less revenue derived from that car.

Aside from the importance of the prevention of delays to cars, supervision is essential to secure economical operation. When one considers that the annual cost of operation of a switch engine is equal to the fixed charges on an investment of $250,000, he can realize the necessity of so arranging the operation of the yard as to cause the least interference and delay to all movements, thereby keeping the number of engines required to the minimum. As in all other branches of railway operation, money spent to secure sufficient supervision is economy in the end.

Another point brought out in these papers which deserves special emphasis is that of the personnel of the yard forces. If each clerk, messenger and switchman is imbued with the idea that he is in training to become a yardmaster he will do better work. The yardmaster who exercises care in the selection of his employees, endeavoring to secure those who will be eligible for promotion, and who then develops each employee to bring out the best that is in him, is not only increasing the efficiency of his organization for the present, but is creating a corps of men upon which he can draw when filling positions of greater responsibility in the future.

The problem of securing more movement from cars is essentially one of reducing the time spent by these cars in the large terminals. It is in this feature that one of the greatest opportunities for increased economies exists today. With the concentration of attention at this point during the last two or three years important improvements have been made, but even greater advances can still be made.

The Operation of Large Classification Yards

Prize Winning and Other Papers Received in Contest; A Practical Discussion of This Important Subject

FIRST PRIZE—THE OPERATION OF LARGE YARDS

By A. M. Umshler

General Yardmaster, Illinois Central, Centralia, Ill.

There are many details in the successful operation of a classification yard which can be included in two divisions, i. e., organization and facilities. By organization I include not only the direct head of the yard, but all departments forming the organization on which successful operation is dependent. This includes not only the general yardmaster of the yard with his assistants and the engine foremen and switchmen, but comprises as well the organization of other departments on which successful yard operation is directly dependent, prominent among which are the mechanical department; the transportation department; other yards on the division, and the train despatchers and trainmen.

It has been my observation in years of service as a trainman, a mechanical employee, and a yardman that a great deal is dependent on a yardmaster. He must be a man with a personality who can handle men and who understands all details and branches of railroading and he must be thoroughly conversant with the official as well as the practical side of the work. In other words, he must be a man of education and one who knows how to get the most out of a man. In order to do this he must have the good will of every employee under him, and he must, above all, enjoy the good will and the support of the officers in all his undertakings.

In his organization he must be the head. A mistake is made by many railroad officers in ignoring the head of the yard in handling investigations and discipline. All correspondence should be addressed to and handled by him. All investigations should be conducted by him and his recommendations should be acted upon in yard matters.

It is a mistake to have too many semi-officials presiding over a yard or any part of it. While a general yardmaster cannot preside over any large yard and cover all details of the work, he should limit his assistants to the lowest possible number and still have the proper supervision over each part of the work. These men should possess all the qualifications of a general yardmaster and above all must be absolutely loyal to the general yardmaster and consult him frequently in the daily operation of a yard.

While the yard may be so large that a general yardmaster cannot govern it as he should, he should have a competent organization in his yard office to handle that part of the work and enable him to go about the yard frequently and keep in touch with what is going on. Each of his assistants should preside over a designated part of the yard and wherever possible should have charge of the movement of a designated traffic in a certain direction so that there will not be a division of responsibility.

He should use care in selecting his switchmen, ever keeping his organization in mind and the fact that each man forms a link in his chain and that the chain is no stronger than the weakest link. He should have a satisfactory system of discipline. He should impress upon his subordinate employees, particularly his engine foremen, the necessity of doing their work promptly and properly and should not allow them to lose sight of the absolute necessity of handling all equipment carefully. It is an established fact that considerable damage to equipment occurs in a yard, not always of such consequence that a car must be sent to a repair track before it is in condition to go forward, but the draft gear may be so weakened in handling that it cannot carry its part of the weight and sooner or later the weakened part will give way. This is one of the paramount questions of successful yard operation, as a great deal of the delay to cars is directly due to the manner in which they are handled, and as a result considerable time is lost by each car in the course of repairs.

In a successful yard organization a great deal is dependent upon the office where the records and way bills are handled. This is an organization in itself, which must be presided over by a competent chief clerk, who should be a man of detail and who should be competent to handle men. He must use care in picking his employees, as a great deal is dependent upon a yard clerk who is accurate and quick in his work. The chief clerk should arrange for the various yard clerks to take a daily check of the yard and to report to him all cars which are being delayed in their respective yards or districts for any reason, so that he can follow them up to ascertain what is delaying them and make necessary arrangements to move them forward with the least possible delay.

The general yardmaster should keep in close touch with the chief despatcher regarding the time of arrival of trains, and should outline the work with his yardmasters so that they will be prepared to handle them promptly on arrival. It has been my custom in handling through time freight trains where the cars are not properly switched to the outgoing track to require the engine foreman to mark the car from the switch list showing the station for which it is destined, the date of arrival, and where the shipment contains live stock or perishable freight he should note this on the side of the car. In this way not only the engine foreman carrying the switch list, but anyone else may be fully conversant with the nature and importance of the shipment contained so that it may not be lost sight of and unnecessarily delayed.

A great deal is also dependent on the facilities. These include not only the tracks and their location, but the motive power and other conveniences for the prompt handling of trains through the yard. Important among these are the facilities for repairing bad order cars and for the prompt inspection of incoming and outgoing trains. Much depends upon the co-operation of the mechanical department. That means not only furnishing first class power, but also an organization of inspectors who can be depended upon to do their work thoroughly and expeditiously and with enough men to inspect each train promptly on arrival while the switch list and way bills are being checked in the yard office. The yard should be equipped with a system of air lines so that prompt inspection of the trains can be made while they are being made up. This greatly expedites the movement of fast trains through the yard.

The facilities for repairing bad order cars should be up-to-date and complete in every particular. I have always found it convenient to have a track adjacent to the train yard arranged for making quick repairs, such as applying yoke bolts and making minor draw head and safety appliance repairs which cannot be made in the yard, and for the changing of wheels under loaded cars. I have also found that having designated repair tracks for the various running repairs with an assigned force of men on each has enabled me to handle cars more expeditiously than to have the cars placed on one or two tracks where they are handled as they come.

Certain tracks in the train yard should be designated for receiving bad order cars, the time freight cars requiring quick repairs being promptly switched to the quick repair tracks by the yard engine while switching the train. A yard engine should be assigned to serving the repair tracks and it should be required to remove all bad order cars from the train

yard to the shop tracks and do all spotting and switching of mechanical department tracks.

While, of course, a great deal depends on the size of the yard and the manner in which it is laid out, I have always designated certain tracks to receive a particular kind of freight for a given destination or district, separating the tracks as between time freight, dead freight and empties where they do not go forward on connecting trains.

A great deal depends upon local conditions as to the movement of empty cars, which are the ones that generally meet with more delay. In many cases equipment must be held to protect coal, stock or cotton loading, depending upon the class of business served. Practically every railroad yard has some special kind of equipment to hold, for which ample provision should be made in the way of storage tracks. In switching a train, storage cars should be thrown to a designated track and moved to the storage yard, where they can be classified and made ready to send out on orders.

The prevention of terminal overtime is largely dependent upon the yardmaster and the engine foreman. The yardmaster should know the amount of work required for each train and the length of time it will take to do that work and a first class yardman can generally tell within a very few minutes the approximate time required and should govern himself accordingly in the ordering of trains. It has been my practice not to order dead freight trains, or trains of minor importance, until they are made up so, nearly that there is no possibility of a failure to have them ready before the time called to leave. A yardmaster must also work in conjunction with the train despatcher, calling trains at a time when there will be no interference with incoming or outgoing trains.

It has been my idea to assign engines in a classification yard to a special service or part of the yard and to look to the engine foremen and yardmasters to handle their part of the work, always keeping it lined up with all cars in their proper place. The practice of leaving work until business is slack has proved a mistake, as in the railroad of today the slack time seldom comes and conditions then go from bad to worse.

The handling of bad order loads which require heavy repairs is another question which should never be lost sight of. Where a car is shopped for such defects that repairs cannot be made promptly, or where transfer is required, there should be no delay in promptly switching the car to the transfer track, together with a suitable empty car into which to make the transfer, and a designated force should be maintained for this purpose, although, of course, the size of this force should be regulated with the amount of business.

It should be borne in mind by the general yardmaster and thoroughly impressed by him upon all subordinates that each day's delay to an empty or loaded car represents a certain loss to his employers, who are always entitled to his best services. Furthermore, they should be made to appreciate that every car made bad-order by them causes several times the amount of work in handling that car that it would had the proper care been exercised in handling it in the first place. We must also be ever alive to the fact that the more room we have in the yard the less work there is in handling cars and the less liability there is of cars being overlooked or delayed, and to this end the general yardmaster himself is the one to whom the officials of the railroad company look for the prompt despatch and movement of trains through the yard.

We use a switch list in handling trains over the hump at Centralia, the foreman keeping the original list as a check. As an assistant to the hump foreman we have assigned a clerk, whose duty it is to mark switch lists as well as keep a record of the individual cars and rides made by each rider so that if any damage results or any questions come up regarding any special car ridden from the hump it is easy to find out who rode the car from the hump to the classification yard. We also use this check sheet to determine whether the riders are riding their proportion of cars passing over the hump, and if we find they are not keeping up their riding average, it is an easy matter to discipline the party at fault. At the end of each month a statement is compiled showing the number of rides made by each rider and their daily average for the month. We find that this causes a great deal of interest among the men, as they know that they are being checked up and each man is anxious to keep his average up to the standard. This clerk's duties include also the reporting of all damage done to cars while being humped, seeing that proper "478" and "903" reports are made by all parties concerned in any accident resulting in car damage. We have also two yard clerks in the northbound and southbound yards whose duty it is to inspect all seals and to make a record, as well as to apply new seals when cars are found unsealed, and to inspect cars of merchandise and other perishables when found unsealed to ascertain whether there is any shortage in the cars. This enables the claim department to locate the point and the division on which pilfering was done.

Terminal overtime is a live subject at Centralia. When I took charge some 15 months ago this terminal was one of the worst offenders on the system in this regard, the average terminal overtime being from 30 to 55 hours daily. I immediately started a campaign, and in the course of 60 days this terminal overtime was cut down very much. For March, 1914, which is an average month, we ran 1,200 freight trains with a total of 18 hours' terminal overtime. This reduction was brought about by personal supervision and impressing upon the assistant yardmasters, engine foremen and switchmen that the making of terminal overtime was entirely uncalled for, and that by the proper listing of trains and having them made up they could eliminate this annoying feature of yard operation. I also talked personally with outgoing enginemen and trainmen on this subject, with the result that they now take as much interest in the matter as any of the yard force. What little terminal overtime we have is caused by unavoidable accidents, which are the fault neither of the crew nor of the yard force.

I have received the best results in regard to switch engine mileage by making the matter as nearly a personal one as I can between the different yardmasters, pointing out to them which engines were doing the most work and where I thought they could get better results from them. By going over the details of the work they have to perform, I am getting much more work out of the engines at the present time than heretofore.

With the surplus of power that we find on nearly every railroad in the country at the present time, the blockading of large yards seems to me to be entirely uncalled for. The majority of blockades are caused by the chief train despatchers and general yardmasters not looking far enough ahead in order to anticipate any congestion at least 24 hours in advance. A great many blockades are also caused by the general yardmaster not working enough switch engines to handle the extra heavy run of business through his yard promptly. This is poor economy.

SECOND PRIZE—ESPRIT DE CORPS IN YARD OPERATION

By C. A. Pennington

Supervisor of Terminals, C. C. C. & St. L. and C. & O., Louisville, Ky.

The framing of a set of rules to suit operating conditions in all yards would be a task compared to which the feats of the demigods of Greek mythology pale to insignificance. However, despite the many differences, there are some things common to all terminals and some operating principles that can be applied in general.

Most terminals are (and all should be) constructed so that the inbound and outbound business can be handled with little interference and it is important that yardmasters see that such

interference does not exist, or at least exists only to the least extent consistent with the yard layout. Where several divisions of a road reach one terminal this problem is a serious one, and co-operation among the heads of the different sections of a yard is essential to satisfactory operation. Many short cuts are possible when a man thoroughly understauds what the other fellow will do with a string of cars when they reach his territory. Ten minutes additional time consumed in one yard may mean a saving of 30 minutes or more in another.

The outbound freight must be kept bunched, with the manifest, of course, separated from dead freight. If the tracks are of different length the shortest should be used for the business running lightest between trains. When the elevation and curvature of tracks in a non-gravity yard are different, a careful selection of tracks should be made so that those most easily used will be applied to handling the classifications that run the heaviest.

Attention should be given to the lowest classes of dead freight. Manifest loads with their car cards and colored bills demand attention from yard clerks, switchmen, and yardmasters, but the low grade freight is like an actress without a press agent. As an example of what is done to dead freight, a train will be given perhaps 40 dead freight cars out of a 50-car track, and the remaining ten cars will be covered with a "cut" of new freight. This may be done three or four times and delay will ensue, whereas a few minutes spent in placing the old cars ahead or "doubling over" the contents of several partly filled tracks of old freight would result in the prompt movement of such freight with a corresponding increase in the reputation of the road. This need not be carried to extremes, but should receive more attention than is usually given.

As a rule shippers haven't the speed mania, although our freight solicitors insist on inoculating them. Leaving out of consideration livestock and highly perishable freight, the greater number of shippers do not care whether freight is received in three days or four, but the demand is that the movement be reasonably regular so that dependence can be placed on its approximate arrival. Possibly some day less attention will be given to the manifest freight which demands light tonnage trains, speedy runs and other net revenue killing features, and more attention will be given to moving the general business with more regularity. Such a condition would lessen the difficulties in some yards and would doubtless result in a better general handling of business in all yards. However, now is the time for superintendents, agents, yardmasters, yard clerks and yardmen to watch the dead freight and see that unnecessary delays do not occur.

Shop tracks should be closely watched and pulled regularly, and so far as possible cars for heavy repairs should be separated from the light repair cars. If a superintendent has his repairmen and yard force working in close co-operation, the total number of bad order cars can be kept down and much per-diem saved. If cars are thrown into shop tracks indiscriminately and are repaired the same way the number of cars moved will be decreased and many times important cars for a manifest train will be marooned behind a jacked up "cripple," when by a little foresight delay to such freight could have been avoided.

In transferring cars from one yard to another or between connections (if such work is done) reciprocal arrangements should be made, when possible, to avoid light mileage. However, prompt movement of through business must not be sacrificed.

If the classification yard is located in a large city, the operation of that yard can be seriously handicapped by the failure of consignees to promptly handle team track business in the bulking yard. Leaving out of consideration the extra work in the team track yard, if such tracks are not being operated to a high degree of efficiency and cars accumulate this condition is bound to re-act on the classification yard which must take care of the accumulation and the work incident to keeping old and important business cut ahead. A few terminals have put into effect a team track storage charge which in some instances trebles the ordinary car service charge and acts as a penalty on consignees doing business on speculation and using box cars as warehouses. It is the consensus of opinion that this charge will increase the efficiency of valuable team track facilities and in turn improve conditions in the inbound yards. During a recent rather heavy perishable season one road with a team track yard of about 200 cars capacity was holding back in its working yard from 25 to 100 cars, while the average number of cars unloaded daily amounted to about 30. Officials who have not considered this question should give it some investigation.

Yardmasters should keep in close touch with despatchers and be prepared to receive inbound trains promptly. While terminal overtime is important it is not the only thing to be considered. It is just as important to give road men fair treatment. Men will sometimes work like Trojans to reach a terminal on time, not only because they may be actuated by a desire to expedite the movement of the company's business, but on account of some personal reason such as a desire to attend a ball game or a matinee, or to reach their hotel before meal time is over. Under such conditions failure to be taken into the yard promptly is often taken as a personal affront. This may seem inconsequential but it is a factor in handling the business. A friendly road crew can do many little things to help a yardmaster, and incidentally the road he represents, while a crew with a grouch can do many little mean things without violating any rule.

In small yards it is impossible to avoid all delays. With equal facilities, however, there can be a wide difference as between different types of yardmasters—the type that is wide awake and ready to take advantage of every possible move to get the best out of the available facilities and the type that operates in a more or less haphazard manner, depending on the lack of facilities as a stock-in-trade excuse. It is also important to have outbound trains ready on time. Crews are sometimes called on a guess figure. The freight should be in some shape before crews are called and despatchers should be given definite figures.

By far the most important feature in considering economic and satisfactory yard operation is that of organization. Consider first the yard clerks—a class whose importance is often underestimated. A few minutes' conversation with the various yard clerks of a terminal will reveal the standard of efficiency in that terminal. That is rather a broad statement but try it out. See how much each man knows about his work and the interest he takes in that work—but more important still see what he knows about the other fellow's work and what interest he takes in the general business of keeping cars moving. Interest and careful teaching on the part of the department head begets interest and knowledge on the part of the staff. It may be that the personnel is of rather low grade despite all the head of the department may be trying to do, but that will not disprove the fact that the standard of efficient yard operation is usually measured by the general ability of the staff of yard clerks.

Unfortunately in some instances rates of pay have fallen so low that it is extremely difficult to get men with experience and proper character to accept clerkships. Young boys of questionable ability at times have to be employed, without any assurance that they will not desert and waste several months of patient and careful teaching.

The yard clerks should be under the jurisdiction of the yardmaster rather than the agent, as the former is vitally dependent on the work of the clerks. There is a difference of opinion on this question, but assuming the position to be a correct one without extensive argument, what can the yardmaster do to obtain the best results from the available timber? To begin with, the general yardmaster and chief yard clerk must follow up every error and make that error worth something as a lesson in prevention—not only so far as the man interested is concerned but with respect to the entire staff. The yardmaster is in close touch with all cases of loose work and feels the effect and he must not assume an indifferent attitude unless he wants that attitude reflected in the yard clerks' actions.

A highly important and almost universally neglected feature of high class yard operation is a yard clerks' school. I mean by

that, meetings at convenient times of as many yard clerks as can be present in the yardmaster's office to discuss with him and the chief yard clerk new features of the work and new phases of old features. At such schools yard clerks can get some idea of work other than their own and they can also be taught to handle their specific duties in a satisfactory manner. Here can be discussed the proper methods of marking and listing trains with regard to destination of the cars, the disposition of empty equipment in line with orders from the car distributors, the best methods of checking foreign cars and securing home routes showing specific delays that have occurred, with a rough comparison taken from daily checks, showing the degree of efficiency in different sections of the yard; in short, by personal contact the men can be taught to drop a mechanical attitude and handle their work in a positive manner. If the yard clerks are not "on the job" all the time not only will delays occur and unnecessary per diem be paid, but some already overburdened switch engine will do double work owing to the fact that cars are not properly listed when first handled. Teach the boys to think, explain to them the "why" of the thing, solicit suggestions and create interest. Some yardmasters may think this impracticable, but it isn't a theory; it has been tried out and found valuable. Let me repeat—keep everlastingly drilling the yard clerks! It costs something but it is worth the price. A well trained yard clerk often means a future A-1 yardmaster and he certainly means a present source of considerable satisfaction.

Now as to the switchmen. Terminal officials must know their men—their habits, peculiarities, likes and dislikes, and something of their outside interests. A speaking acquaintance with a man isn't knowing him. Individual attention and the application of methods peculiarly fitted to the man under consideration are necessary to produce satisfactory results in handling the yardmen to the end that a high standard may be maintained both as to quantity and quality of the work. A plain command may produce results but an order couched in terms that appeal especially to the individual often strikes a responsive chord that results in double effort. This is especially true during periods when facilities are taxed to the utmost and yards are fighting off congestion. An appeal to a conductor's pride, a challenge to an engineer as to the ability of his locomotive, encouraging some men to think of the work somewhat in the nature of a sporting contest rather than in plain terms of box cars and trains—these things will often work wonders on days when a terminal is about "swamped" with business.

It should also be borne in mind that a little pleasant conversation has the same effect on a grouch that sunshine has on disease germs. A yardmaster should not forget that a hungry man can't be very efficient and a man who breakfasts at 5 a. m. is hungry at noon. The better men will not kick about missing a meal occasionally when necessity demands, but they are rather discriminating judges of what constitutes a necessity. Physical discomfort often prevents an ordinarily loyal man from "playing fair." In the matter of granting short leaves of absence preference should not be given the regular loafers to the extent of placing a penalty on ability.

A yardmaster should not lose sight of the fact that it is human nature to follow a leader and to pattern after that leader to some extent. A quiet, courteous man, but with plenty of fighting spirit is the one best fitted to hold his organization intact and to instill confidence into the men during times when confident fighting men are needed.

The yardmen should be taught an interest in their territories and then that interest broadened until a co-operative spirit exists with respect to the general business of the company. Conductors should be encouraged to explain the yard work to the switchmen. A man cannot be highly interested in his work when he has only a hazy idea of what it is all about. Not only will the men be better switchmen when they understand just why they do certain things, but the yardmaster is entitled to have the conductor's work understudied. This does not mean that there should be two or three men trying to run one crew, as that always results disastrously, but the conductor can boss the job and explain things if the yardmaster will see that it is done.

A terminal official should certainly run the job and not let it run him. Discipline is absolutely necessary but should be given careful study. It isn't a bad thing to think a little from the other fellow's standpoint, and if he doesn't reciprocate, he is a good one to drop at the first opportunity. If possible to create the "family spirit," the men will help weed out the undesirables, although they might not be willing to acknowledge it openly. The esprit de corps has carried many a man through a period of trying times and such times have a tendency to bob up in a railroad yard. There are times when it is necessary to impress some lesson on the mind of a young conductor or engineer, but it is doubtful whether suspensions have the desired effect. As a rule in a terminal organization best results are secured when the men understand that they are to be judged by their general ability and conduct, and a disposition to further the company's interests, and that a tendency to get out of a walk in doing the work is not apt to be followed by punishment for some trifling error. It should be equally well understood that an employee who does not care to observe the rules and do his full share of the work will be quickly dropped from the organization, as unfair to the company and unfair to the men with whom he is associated. Instill the proper spirit into the yardmen, start them thinking along the right lines with respect to the question of discipline, show them where they are personally interested, and they will help maintain a high standard and assist in the elimination of the "bad actors."

There are many short cuts and methods of operation peculiarly fitted to local conditions and terminal officials are usually prompt in the adoption of such methods, but the success of any plan of operation depends primarily on the constant teaching and training of the men in the ranks. Where clerks and yardmen are cooperating to move cars promptly, safely, and economically, backed up by proper supervision on the part of the yardmasters, such a terminal will show results, and while the class of traffic and number of trains run may prevent a very low *average* car delay, there will be a minimum of specific delays that are annoying, costly and of considerable influence in establishing the reputation of the road.

PRACTICAL HINTS ON YARD OPERATION AND SUPERVISION

By R. M. Baker
Bellwood, Pa.

If the most optimistic view which can be taken of the transportation situation shows the average freight car moving only 2½ hours out of each 24, and that during the other 21½ hours its value as a revenue producer is zero, one-half of which dead time is spent in yards, we are certainly forced to the conclusion that our old friend Atlas as a monopolizer of responsibility has nothing on the present day yardmaster, and that the prompt movement of cars through yards forms a problem beside which the speed of trains on the road sinks into insignificance.

While extensive changes in yard layouts are not practicable at present, any changes in methods of operation which tend to economy are attractive to everybody. The first consideration for the yardmaster to consider is whether or not his office is properly located in the yard. Each yard has its busy point, possibly that at which the crews go on and off duty, the gauntlet between classification tracks or the track scales; if located at such a point he can give much personal supervision to his work without going beyond call of his desk. Further than this, he should have telephones in booths or boxes located at each end of his yard, at or near the switches leading from the main track to the receiving or forwarding tracks, and at such intermediate switches or points as will make it possible for his subordinates to get into quick communication with him. Being

so equipped he should not go beyond call of his desk without leaving a substitute capable of directing the work in his place. I wish to particularly emphasize this latter point: Instructions to a crew do not always work out smoothly, and it frequently becomes necessary to quickly communicate with the general, if much valuable time is not to be lost, in which case he should not be "At Winchester, 20 miles away."

The three steps in the operation of a classification yard are receiving, classifying and forwarding, which steps of course double themselves where it is necessary to handle the traffic in both directions.

Upon receipt of a train the first object is to clear the main track as promptly as possible. If any instructions are necessary regarding the putting away of the train they should be issued to the conductor at some office en route so that he may have a chance to issue the necessary instructions to his crew without detention. If at all possible the switches leading from the main track to the receiving yard should be set up by the operator, switchman or other employee whose duties require him to be at or near that point; more than the overtime of the crew is saved if an extra stop by a heavy train can be avoided.

After the train is put away all time made by the crew is non-revenue producing, and for this reason the cabin track and the point at which the enginemen are relieved should be as near the loaded receiving yard as possible, and the time of relief should be certified to by the yardmaster or a subordinate located at or near this point where the crews are so relieved. The manifests, time cards, etc., should be delivered to their proper destination by a messenger, rather than by the conductor, which latter plan sometimes means that the entire train crew is paid to deliver them.

In this connection, next to the yardmaster himself one of the most important members of a successful yard organization, and possibly the one who produces the biggest return on the money invested is the messenger; be careful that high priced employees, possibly the yardmaster himself, are not doing work that could be done quicker and better by a $20 messenger who expects to be a yardmaster himself some day. Don't have any other kind.

The question of the proper classifications to be made at each point should be thoroughly thrashed out at meetings in which the several yards are competently represented, after which the entire system should be blue printed, and a copy placed in the hands of each yardmaster with the understanding that suggestions from him regarding improvements in the system will be given careful consideration, and within proper time replied to, whether favorably acted upon or not. I believe that many yardmasters are too slow in making suggestions to their superiors regarding all matters in which they have an interest—not half-baked suggestions upon subjects of which they have no knowledge, but suggestions which have been carefully thought out, and which, after being viewed from all standpoints look good.

The same comments regarding standardizing of classifications apply to the blocking of cars in trains forwarded; no more of this work should be done than is necessary, nor should any be avoided that can be done to advantage, the entire question being that of where the work can be done with the least delay and expense.

As much advance information as possible should be given the roundhouse and train despatchers as to when trains will be ready. This statement may be thought superfluous, but how often there is a lack of team work between the road and yard people. This lack of team work applies also to work between connecting divisions and roads at junction points. Why has not the receiving division a right to expect fairly accurate information as to amount of tonnage which will be delivered and the time of its arrival, at least some little time in advance of actual delivery? Expecting this they must be willing to give as good as they receive.

One money and time saver under present methods of operation is an air line to the head of the forwarding yard by which trains may be pumped up and tested, and defective equipment repaired by inspectors before the road crew takes charge, materially cutting down the time consumed in getting out of yards.

How to keep stray cars from being delayed is a question upon which both time and money have been spent with not as good results as could be desired. A system of car records which provides for a record of every car moved costs perfectly good money, and usually accumulates more stray records than it moves stray cars. In every yard upon possibly 90 per cent. of its trackage a car could not be lost if it wanted to, and possibly the same percentage of cars moved through the yard do not leave those tracks. What is the use in a car record force spending 90 per cent. of its time and accumulating a mass of unnecessary information in looking after individual cars which cannot help but get the normal movement through the yard, and only 10 per cent. in looking after those which may be delayed. The cars on hold and stub tracks, and those awaiting loading and unloading are the ones which must be looked after, and this must be done daily; "last weekly" is about the best one can expect of the average system of car records. For this reason I feel that for the use of the yardmaster daily checks of hold tracks and duplicate "put" cards for cars placed at industries, or memoranda in smaller yards, secures the best results; in other words a system which patrols the banks and keeps the logs moving in midstream.

As a check on the normal movement nothing which I have seen equals periodical audits; that is, taking a bunch of possibly 200 cars and timing their actual movement through the yard, first eliminating cut out cars. It is sometimes possible to time them at several intermediate points, and easily locate just where the delay if any is occurring. Such audits should be made as often as possible, and the results given careful study by the yardmaster, not forgetting to commend where commendation is due, as well as to reprimand.

Are there any particular traits of character which can be developed by the yardmaster himself which will help him to success in this most responsible and trying of positions? I believe there are. First is that described by that good old comprehensive word "rectitude," which Webster says means in its broadest sense "absolute conformity to the rule of right in principle and practice." After this comes courtesy, already referred to, but get the first one first, and the second will not be so hard to practice. If these two elements are conscientiously striven for—not rubbed on the outside, but rather taken inwardly and sweated out—a yardmaster will have the respect of both those above and below him.

In the successful operation of their yards the railroads might learn much from a study of army rules and methods, for there the control and direction of large forces from one central point sees its most perfect example. In the selection of yardmasters it has been the custom to some extent to place local knowledge ahead of other qualifications, whereas I believe executive ability and practical experience in any yard easily rank ahead of local knowledge, which can be gotten in a short time. In fact the advancement of yardmasters and assistants from one yard to another has its definite advantages in bringing into the organization new ideas, and at the same time furnishing the incentive to faithful work by deserved promotion.

REDUCING CAR DETENTION

By Geo. C. Duffy

General Yardmaster, Boston & Albany, West Springfield, Mass.

During the month of January, 1910, 63,829 cars were handled through the yard of the Boston & Albany at West Springfield, Mass., at a cost of 12.5 cents per car. During the month of March, 1914, 90,895 cars were handled at an expense of 10.9 cents per car, an increase of 27,066 cars handled, and a decrease of 1.6 cents per car in cost of handling, and this notwithstanding the fact that a general increase in wages was granted to all employees effective April 1, 1910, with one increase in wages to

enginemen and two increases to conductors and trainmen since, together with the increases granted to the other yard forces at different times, which of course are reflected in the operating expenses of the yard.

The following methods are employed in reducing car detention to other than perishable and high class freight: Any car of merchandise requiring repairs must be transferred and forwarded within 12 hours if the car cannot be repaired within that time. Ordinarily this has to be done at the freight house, but on several occasions, with the assistance of one or two trackmen, and perhaps a yardmaster and clerk and myself, this has been accomplished at the yard, mainly through the spirit of co-operation and harmony that exists between the maintenance of way and the operating departments at this yard. With other freight not considered quite as important 24 hours is allowed for repairs to be completed, and cars delivered to the yard, or a transfer will be made.

A track is assigned for cars requiring light or minor repairs in the eastbound receiving yard and also in the eastbound classification yard, and the same arrangement is made for westbound cars in their respective yards. The necessity for the prompt placing of cripple cars on their respective tracks is impressed upon yardmasters and yard conductors by frequent get-together talks with the conductors, and by personal meetings with the yardmasters. I consider these meetings one of the main factors in the efficient handling of this particular branch of the service. Of course it is understood by all concerned that perishable and high class freight requiring repair attention will be given immediate consideration, and if necessary contents will be transferred at once and properly ventilated or iced cars used as the occasion may require.

We have a normal average of 26 eastbound and 30 westbound trains daily, although this has run as high as 45 trains eastbound and 48 westbound in 24 hours during different busy periods. We classify 14 separate groups eastbound, and 12 distinct groups westbound, and any delay to any loaded car that shows as high as 10 hours, has to be explained to the superintendent. With the exception of six fast freight trains in each direction, these trains will average 20 switches each, so the necessity of close supervision by all concerned at all times can readily be seen.

Every card manifest is time stamped on the arrival of the car which it accompanies, and these cars are constantly under the supervision of the yardmaster or his clerk, and the manifest can be readily examined by the general yardmaster, or by the trainmaster, which occurs frequently. I think this open inspection has a great tendency to keep the car detention down to a minimum.

PRACTICAL HINTS ON YARD OPERATION

By J. B. Warrington

Division Superintendent, Philadelphia & Reading, Philadelphia, Pa.

One of the chief factors in the successful operation of large yards designed for the classification and breaking up of trains is organization, combined with the efficiency of those who compose it. The next factor is the method of applying that organization to the various tasks, and the measure of discipline that must be administered to maintain its power.

All classification yards should be so arranged that cars inbound and outbound are handled at different ends to keep the traffic moving in its proper direction, and to prevent delay by reason of the first cars in being the first out. Sufficient trackage should be provided outside of the yard proper to permit road crews to set out their trains when for any reason they cannot be handled promptly in the yard, and at the same time to keep open the main tracks to handle the perishable and fast freight trains, which take preference over the usual run of business.

The repair of bad order cars is an important feature of all yards. I find it more advantageous in times of congestion to transfer the contents of bad order cars, as this prevents delay and the handling is practically the same, for a loaded car requires preference over empty equipment at the repair shop, and it has to be handled again after repairs are completed. Cars containing fragile material should not be transferred if avoidable, as a claim for breakage usually follows. A place to dump hopper bottom cars that require reloading is a necessary feature of a large yard. Shop cars should be put on separate shop tracks and repaired in the yard or sent to the nearest shop, loaded cars being given preference. At any point where large numbers of cars are required daily for loading purposes there should be shop men to make light repairs, and to keep all cars possible out of the shop.

In my opinion the prevention of blockades depends on the efforts made by those in charge to avoid same. The use of good judgment is most essential. Quite often the same old method of handling in vogue years before is being used, which is no doubt entirely unsuited to present day conditions. The men or man in charge must be up to date. When a blockade exists no set rule or method can apply, other than some man with a definite knowledge of what is required must get on the job and stay there, and make the movements fit in with the existing conditions. Prevent blockades by close attention to the business, and this trouble cannot occur. The trainmaster should be on hand in person as much as possible and center the power there, if necessary sending cars to other yards for classification. A very important element in connection with this is to try to get the foreign road, which connects with you, to move its traffic more promptly.

An on-time movement of scheduled trains and drafts of cars must be insisted upon. The reduction of switching to a minimum in classification yards and elsewhere should be the constant endeavor on the part of the yard force handling. The matter of car distribution should be thoroughly supervised to avoid any unnecessary handling and movement of cars. Personal supervision of these varied details of operation by the officers in charge, together with educational meetings for the dissemination of knowledge necessary to promote efficiency, and also to profit from errors, will materially assist in attaining desired results.

To secure efficiency, however, organization is necessary with some one in authority to see that there should be intelligent interpretation and rigid enforcement of the instructions. Of course while all the various problems pertaining to tonnage, power, inadequate facilities, failure to keep pace with modern conditions, etc., will have to be met, it must be recognized that efficiency failure may be due to weakness in the human element, as well as to the lack of facilities to keep pace with heavier power and largely increased train tonnage. It should be the aim of operating officials to give the rank and file such treatment by personal touch as will stimulate the employee to such efforts as will bring out the best that is inherent, and redound to the railway company's welfare and best interests. Another method to attain human efficiency is to require strict compliance with total abstention from intoxicating liquors.

Successful terminal operation would therefore seem to rest upon adequate facilities, vigilant supervision on the part of operating officials combined with loyalty of the employee, and the highest human efficiency attainable to both employee and official.

KEEPING CARS MOVING IN A LARGE YARD

By H. T. Murray

General Yardmaster, Chicago, Burlington & Quincy, Galesburg, Ill.

The problems presented in the successful operations and handling of large yards are many, and are governed by traffic conditions, track facilities, and the geographical location of the yards. An outline of the C. B. & Q. yard at Galesburg, Ill., will possibly be of interest in this connection.

We have two humps and two flat yards built parallel with each other, and connected with interchange tracks. With smaller auxiliary yards serving the passenger station, etc., there is a total car capacity of 8,979 cars.

The lines leading out of Galesburg in four directions are double track, while one line has three tracks, and one a single track. Also a double track freight cut off leads out for the West. Crews of four divisions run in and out of Galesburg

yard. All trains except merchandise and meat trains come into Galesburg, with the cars mixed. Time and expedite cars come in on the head or rear end of the trains. Galesburg yard has 72 classifications to switch against, and all trains leave the yard with cars in station order in the train.

We have 76 regular passenger trains daily, and when freight traffic is normal we average 130 freight trains per day, with an average train movement every seven minutes. When business is normal 32 engines a day are worked in the yard. We have handled 7,300 cars in 24 hours, and have maintained a record of 6,800 cars per day for 90 days.

Trains are blue flagged, and gone over by the car inspectors. Car markers make out car tags from the list, way bills are left by incoming conductors, and a card is put on each car showing the destination. A carbon copy of the list of the train is tacked on the head car for the hump foreman's information. Cars are pushed up on the hump, and the track number is put on the head end of the car with chalk. The number of the track for the next cut is put on the rear end of the last car of each draft for the information of the switch tenders. The divide switch tenders give the track signal to the lead switch tenders who line the switchers for the cars.

Both hump yards and the flat yard are equipped with air pipe lines supplied from one main air compressor operated by electric power with an automatic starter and shut off. The air pipe lines are provided with upraisers between the tracks so that the air pressure can be cut in on the train lines to locate leaks. If a broken train line is found the car is reported, and switched out of the train to the shop tracks. When the train is made ready with the way car on, it is ordered. Bill clerks check out the train from the car checker's list, then copy it, retain the original list in the office for file, and place the way bills and a carbon copy of the list of train in way car.

Hump engine foremen cut the cars off, and work from 10 to 14 hump riders, with one switch tender at the divide, one at the crossover, and one on each lead on the lower tracks. The rules for hump riders require that cars must be stopped at least two feet from cars standing on tracks they ride in on. This saves damage to cars and contents when carried out to the letter. The yard is provided with sufficient light 50 lb. skid shoes to catch cars that get away from the riders.

Time and expedite freight are handled in separate groups, and are allowed to be mixed with dead freight. Time and expedite bad order cars are given special handling to the repair yards, and are placed and pulled from time freight tracks in the repair yard to make the first connection out. Bad order dead freight loads are given preference movement to the repair yard, with foreign empties next, and home empty cars next. Bad order cars are moved from the bad order tracks in the train yards to the repair track district four times a day, and between 4 a. m. and 6 a. m., by the night crews. The dead freight tracks in the repair yard are pulled at noon and at night. Loads set out of out-going tracks in bad order are given time freight handling to and from the repair yard, and are marked time freight. A dead freight car which is 24 hours from time in until time out is charged as an old load, with 6 hours for time freight, and 12 hours for expedite freight.

All way bills are stamped with a time stamp. The yard is checked for old loads, for cars out of line and for foreign empties. The old load clerk verifies the yard check, and checks the bill boxes each morning for old loads, and the assistant yardmasters are given a list of old loads. Bill clerks check over the bill boxes when coming on duty to see that no way bills are out of line or in the wrong boxes. They also check all time, stock and expedite freight on a list for each direction, and see that they are on checks of trains brought to the office so not to lose the first connection out.

We make a 5 a. m., an 8 a. m., and a 4 p. m. check of cars on hand for all directions from an accurate check of bill boxes, and also check the engine and train crews on hand and ready. This check is necessary to keep the cars on hand moving, and when pounded constantly the cars on hand in yards will be kept down to the lowest possible number, and there will be no lost engine power.

TRAIN DESPATCHERS' ASSOCIATION

The twenty-seventh annual convention of the Train Despatchers' Association of America met at the Hotel Seminole, Jacksonville, Fla., on Tuesday, June 16, and was called to order by H. W. Purvis (S. A. L.), chairman of the entertainment committee. After the usual courtesies President J. P. Finan took the chair and appointed a credentials committee, which reported sixty-eight members present. Fourteen members have withdrawn during the past year and 55 applications for membership and reinstatement were approved. Later there were other applications, and in all 61 members were added. The report of the executive committee showed a total membership of 1,155. The total receipts during the year were $3,603, and total disbursements $3,814.

The principal business of the convention was the discussion of the report of the Train Rules Committee, the same that was discussed by the American Association of Railroad Superintendents last August, at Chicago, and printed in the superintendents' proceedings. This was noticed in the *Railway Age Gazette*, August 29. The Jacksonville discussion, which filled two days, was too detailed for reproduction in this place.

On Tuesday, the convention was addressed by W. L. Stanley, general claim agent of the Seaboard Air Line, on the subject, "Does the prosperity of the railroads interest me personally?" The address evoked great applause. On the same day W. H. Potter, superintendent of telegraph of the Southern Railway, addressed the convention on the subject of telephone train despatching. On Thursday the convention completed its discussion of the Train Rules Committee report and elected C. A. O'Connor (Boston & Albany), Springfield, Mass., president; T. W. Fitzgerald (Southern Pacific), Sparks, Nevada, vice-president, and O. L. Taylor (Atlantic Coast Line), Sanford, Fla., member of the executive committee for four years. J. F. Mackie was re-elected secretary-treasurer and editor for the term of two years. Minneapolis, Minn., was selected as the place of meeting for 1915, and June 15 the day. A proposed constitutional amendment providing for the raising of a fund of $1,000 to be used for the relief of disabled members was defeated.

Numerous entertainments were provided between sessions and for the ladies, and on Friday there was a special train over the Florida East Coast Railway to St. Augustine. The visitors from the north were agreeably surprised to find that the prevailing temperatures in Jacksonville and vicinity were no higher than they had experienced at their homes before starting for the convention.

FREE TRANSPORTATION ON THE EGYPTIAN STATE RAILWAYS — At the present time there is much talk of extending the pass privileges on the railways of Egypt. It is said that the government intends to grant free passes for railway travel to all members of the legislative assembly and that in addition, the provincial members are asking for passes for their wives and families. In the next place, the editors of the vernacular newspapers have revived an old agitation for free passes for themselves and half fare tickets for their sub-editors and reporters. At the present time Sheikhs and Ulemas (Mohammedan religions) are entitled to travel at half fare, as are also officers of the army of occupation (on some lines), military nursing sisters, while the Egyptian army travels at quarter fare. In addition the half fare privilege is granted to practically all recognized Christian clergy of all denominations and wives of high government officials travel free. The company's lines also give free passes to the press. In the aggregate, all these concessions must cost the combined railways of the country many thousands of dollars annually.

Pennsylvania Mikado and Pacific Type Locomotives*

The Design Follows the Lines Employed in Developing the Latest Atlantic Type; Many Parts Interchangeable

During the past few years there has arisen a need for a larger freight locomotive for use on the main line of the Pennsylvania Railroad between Altoona and Pittsburgh. The employment of such a locomotive is desirable in order to reduce double heading to a minimum and to avoid the necessity of breaking up trains which arrive at Altoona and Pittsburgh and sending them forward over the Pittsburgh division in sections. At the same time it was thought desirable to experiment with a heavy Pacific type locomotive for passenger service on this division. There has accordingly been designed and built a Mikado type locomotive which bears the railway company's classification L1s and a Pacific type designated as class K4s.

Pennsylvania Mikado Type Locomotive

It was necessary to keep the locomotives within certain limits and to make the revolving and reciprocating parts as light as possible consistent with the necessary strength because of restrictions in road clearance and because the weight per pair of driving wheels is limited to 65,000 lb. with a 5 per cent. margin for scale variations; there is also a limitation for dynamic augment due to counterbalance for reciprocating weights of 30 per cent. of the weight on drivers, at 70 miles an hour for passenger locomotives and at 294 revolutions per minute for freight locomotives. Interchangeability of parts between the two locomotives has been carried out as far as possible, as well as the use of many of the parts which are embodied in the class E6s Atlantic type locomotive.‡

BOILER

The boilers of the Pacific and Mikado locomotives are interchangeable, and an interesting feature is the flanging of the throat sheet in an integral piece with the lower half of the rear barrel sheet. This has permitted of lowering the boiler 1⅞ in. and at the same time allows sufficient clearance for the rear driving wheels. The boiler is of the Belpaire type and has 237 2¼ in. tubes and 40 5½ in. superheater flues, all of which are 19 ft. long The firebox is 126 in. long by 80 in. wide and is fitted with a combustion chamber; the grate area is 70 sq. ft. The inside diameter of the boiler at the forward end is 78½ in. with an inside diameter of 87 in. at the dome course. The dome is flanged in one piece. The design of smokestack employed is the result of much study and as will be seen from the engraving, an inside extension is used extending below the center line of the smoke box.

Latest Development of Pacific Type Locomotive on the Pennsylvania

FRAMES AND RUNNING GEAR

The frames are of cast steel, 6 in. wide, and reinforced to 8 in. over the driving boxes. Heat treated steel has been used wherever possible, following the same lines in this respect as in the E6s Atlantic type locomotive previously referred to; among the parts in which this material has been employed are the driving axles, crank pins and piston rods

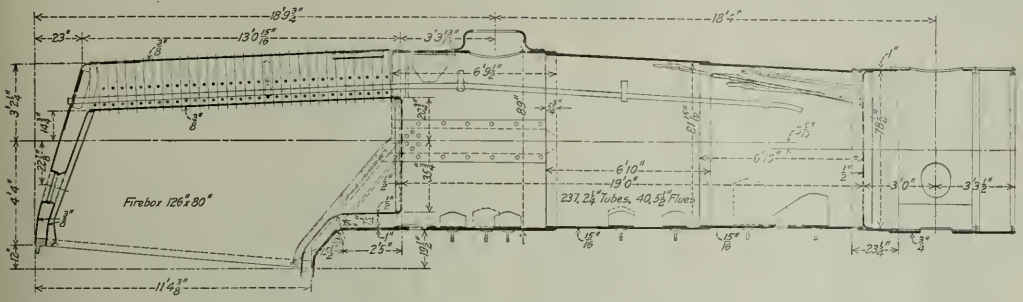
*A brief description of the Pennsylvania Mikado and Pacific type locomotives, classes L1s and K4s, was published in the *Daily Railway Age Gazette* for June 15, 1914, page 1411. Some of the data given in this article were approximations, which were all that could be obtained at that time and will be found to differ slightly from the present figures, which are correct.

‡For description of the Pennsylvania class E6s Atlantic type locomotive see *Railway Age Gazette*, February 20, 1914, page 356.

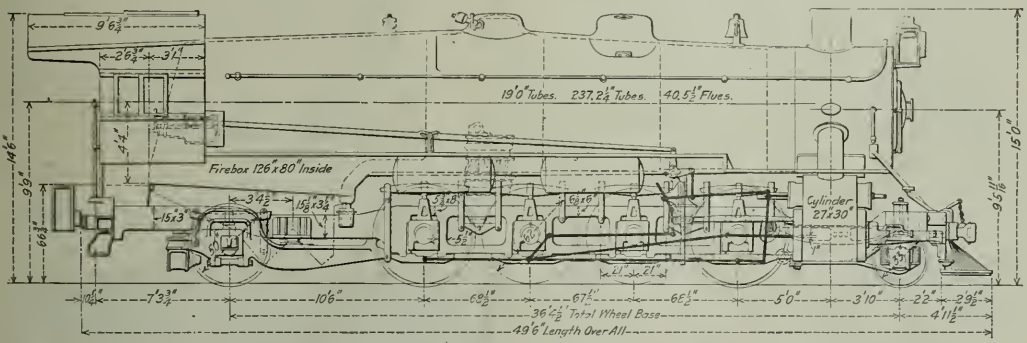
as well as the main and side rods.† In order to reduce the weight as much as possible and at the same time facilitate the heat treatment, the axles, crank pins, wrist pins and piston rods are bored through at the center.

The piston rods are of the extended type and are 4½ in. in diameter with a 2½ in. hole through the center except at the points where the rods are reinforced for the piston and crosshead fits. The driving axles have a 3 in. hole through the center and the journals are 11 in. by 15 in. The main rods are of I-section, 8¼ in. deep at the rear end and 7¾ in. at the forward end, the flanges tapering from 1⅜ to 1⅛ in. The depth of 5½ in. for the milled section of the rod is maintained throughout and the flanges are 3⅜ in. wide, while the web is 7/16 in. thick. The side rods of the Mikado are of I-section, 5 in. deep with a 2½ in. by ⅝ in. flange and a ⅜ in. web.

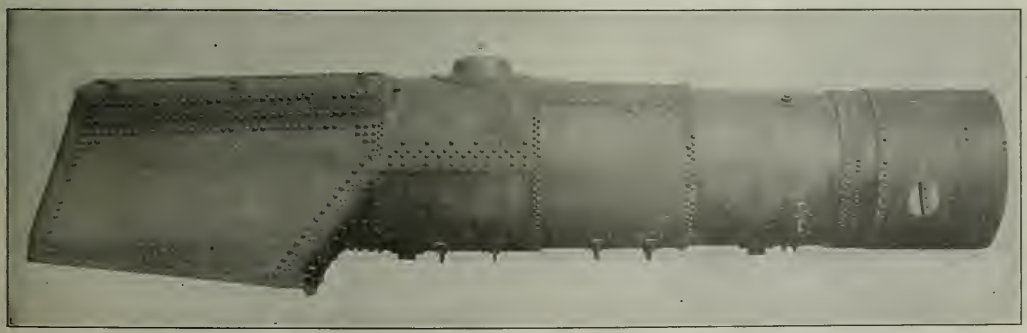
The arrangement of the valve gear is similar to that employed on the Atlantic type locomotive and the crosshead of the Pacific type is also very similar, but a two-bar arrangement of guides with an alligator crosshead is employed on the Mikado. The same design of trailer truck is employed on all three locomotives, the trailing spring gear being equalized with that of the two rear pairs of drivers on the Mikado and Pacific types. The trailing truck frame is a substantial steel casting, all in one piece, and constitutes the trailing equalizer as well as the truck frame.



The Boilers of the Pacific and Mikado are Interchangeable



Side Elevation of the Pennsylvania Mikado Type Locomotive



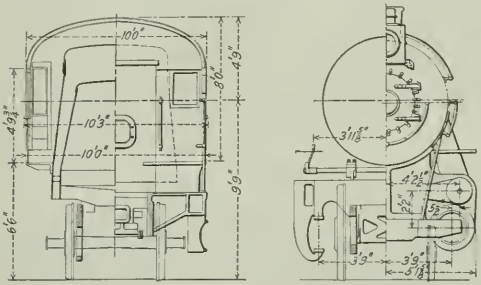
Boiler of the Pennsylvania Pacific and Mikado Type Locomotives

†The methods employed in connection with the crank pins and piston rods were described in the article on the Pennsylvania Atlantic type locomotive in the issue of February 20, 1914, page 357.

One of the illustrations shows the arrangement of the driver brake cylinders. It was found necessary to use two 16 in. cylinders and because of space limitations the arrangement shown was employed.

OTHER DETAILS

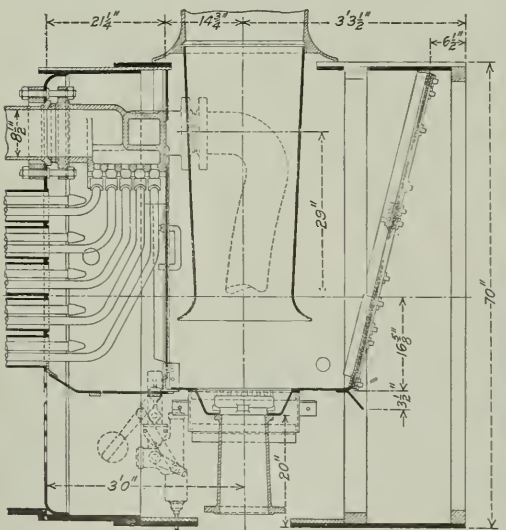
The locomotives are equipped with Schmidt superheaters and Security brick arches. Screw reverse gear is used and because of its not being necessary to provide space to move



End Elevations and Cross Sections of the Mikado Type

the reverse lever the cab has been considerably shortened. It is also believed that the shorter cab will give the engine crews a better opportunity to observe signals. The tender truck is of the same design as that used on the E6s Atlantic type locomotive. The tank is of the water bottom type with 36 in. wheels and 5½ in. by 10 in. journals. The water capacity is 7,000 gal. and the coal capacity 12½ tons.

These locomotives, as well as the latest design of Atlantic



Front End Arrangement

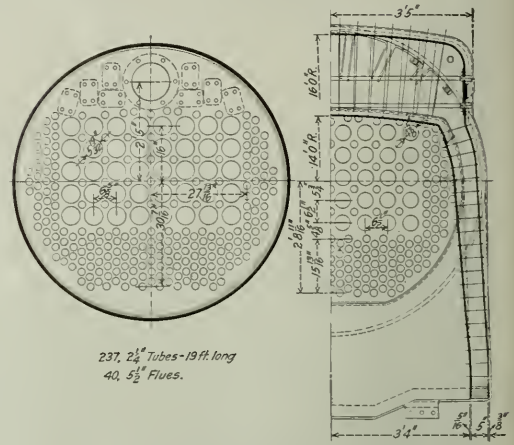
type, were designed in the office of the mechanical engineer of the Pennsylvania Railroad at Altoona and built in the Juniata shops. The E6s class Atlantic type locomotives are now hauling very heavy trains on most exacting schedules and the service results are amply justifying the design. It is expected that equally satisfactory results will be obtained from the new Mikado and Pacific types.

Tabular comparisons are given below between the Mikado type and the Pennsylvania consolidation type of the H9s class, as well as between the new Pacific type and the E6s Atlantic type:

CONSOLIDATION AND MIKADO TYPES

General Data

	H9s	L1s
Railroad classification	Consolidation	Mikado
Type	4 ft. 9 in.	4 ft. 9 in.
Gage		



Cross Sections Through the Boiler

	Freight	Freight
Service	Bit. coal	Bit. coal
Fuel	46,290 lb.	57,850 lb.
Tractive effort	250,000 lb.	315,000 lb.
Weight in working order	220,000 lb.	238,000 lb.
Weight on drivers		
Weight of engine and tender in working order	408,000 lb.	471,000 lb.

The Lower Half of the Dome Course is Flanged in One Piece with the Throat Sheet

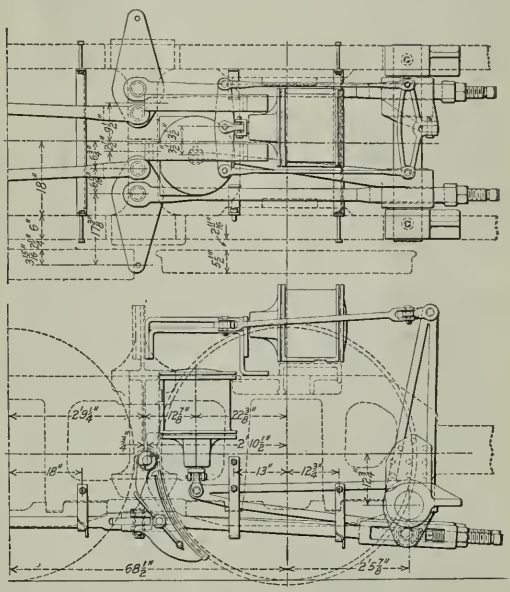
Wheel base, driving	17 ft. 0½ in.	17 ft. 0½ in.
Wheel base, total	25 ft. 9½ in.	36 ft. 4½ in.
Wheel base, engine and tender	62 ft. 5⅞ in.	72 ft. 3 in.

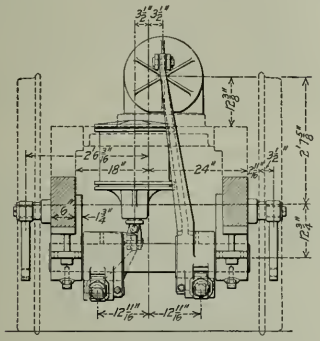
Ratios

Weight on drivers ÷ tractive effort	4.75	4.12
Total weight ÷ tractive effort	5.40	5.44
Tractive effort × diam. drivers ÷ total equivalent* heating surface	683	622
Total equivalent* heating surface ÷ grate area	76.21	82.38
Firebox heating surface ÷ total equivalent* heating surface, per cent	4.45	5.05
Weight on drivers ÷ total equivalent* heating surface	52.3	41.27
Total weight ÷ total equivalent* heating surface	59.4	54.63
Volume both cylinders, cu. ft.	15.91	19.88

Ratios—Continued		
Total equivalent* heating surface ÷ volume both cylinders	264.1	290.0
Grate area ÷ volume both cylinders	3.46	3.52
Cylinders		
Kind	Simple	Simple
Diameter and stroke	25 in. x 28 in.	27 in. x 30 in.
Valves		
Kind	Piston	Piston
Diameter	12 in.	12 in.
Greatest travel	6 in.	6 in.
Outside lap	⅞ in.	⅞ in.
Wheels		
Driving, diameter over tires	62 in.	62 in.
Driving, thickness of tires	3½ in.	3½ in.
Driving journals, main, diameter and length	10½ in. x 13 in.	11 in. x 15 in.
Engine truck wheels, diameter	33 in.	33 in.
Engine truck, journals	5½ in. x 10 in.	6½ in. x 12 in.
Trailing truck wheels, diameter	.....	50 in.

Heating surface, total	3,028.2 sq. ft.	4,035.4 sq. ft.
Superheater heating surface	782.2 sq. ft.	1,153.9 sq. ft.
Total equivalent heating surface	4,201.5 sq. ft.	5,766.3 sq. ft.
Grate area	55.13 sq. ft.	70.0 sq. ft.
Center of boiler above rail	9 ft. 9 in.	9 ft. 9 in.

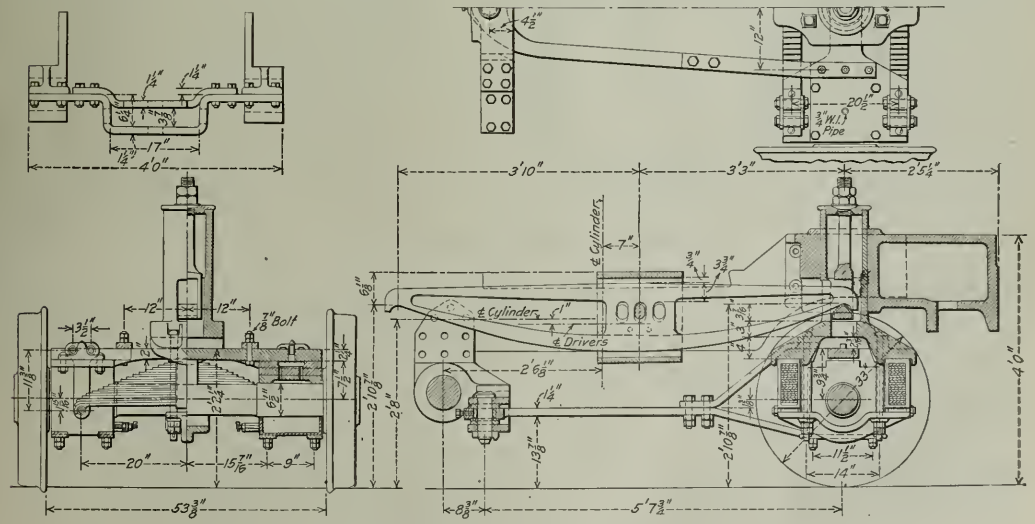




Arrangement of the Driver Brake Cylinders of the Mikado

Boiler		
Style	Belpaire	Belpaire
Working pressure	205 lb.	205 lb.
Firebox, width and length	72 in. x 110¼ in.	80 in. x 126 in.
Firebox plates, thickness	⅜ in. & 5/16 in.	⅜ in. & 5/16 in.
Firebox, water space	5 in.	5 in.
Tubes, number and outside diameter	265—2 in.	237—2¼ in.
Flues, number and outside diameter	36—5¾ in.	40—5½ in.
Tubes, length	15 ft.	19 ft.
Tubes, thickness	.125 in.	.125 in.
Flues, thickness	.148 in.	.148 in.
Heating surface, tubes	2,841.2 sq. ft.	3,746.8 sq. ft.
Heating surface, firebox	187 sq. ft.	288.6 sq. ft.

Tender		
Tank	Water bottom	Water bottom
Wheels, diameter	36 in.	36 in.
Journals, diameter and length	5½ in. x 10 in.	5½ in. x 10 in.
Water capacity	7,000 gal.	7,000 gal.
Coal capacity	12½ tons	12½ tons
ATLANTIC AND PACIFIC TYPES		
General Data		
Railroad classification	E6s	K4s
Type	Atlantic	Pacific
Gage	4 ft. 9 in.	4 ft. 9 in.



Leading Truck of the Pennsylvania Mikado

General Data—Continued

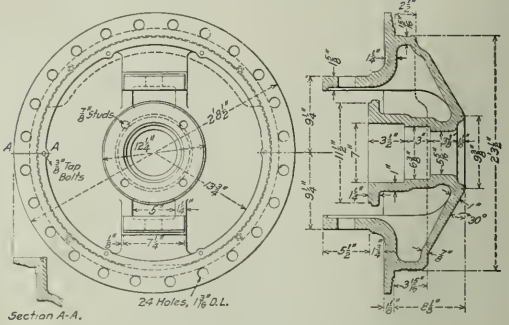
	Passenger	Passenger
Service	Bit. coal	Bit. coal
Fuel	Bit. coal	Bit. coal
Tractive effort	29,427 lb.	41,845 lb.
Weight in working order	240,000 lb.	305,000 lb.
Weight on drivers	133,100 lb.	200,000 lb.
Weight of engine and tender in working order	398,000 lb.	463,000 lb.
Wheel base, driving	7 ft. 5 in.	13 ft. 10 in.
Wheel base, total	29 ft. 7½ in.	36 ft. 2 in.
Wheel base, engine and tender	63 ft. 10½ in.	71 ft. 10 in.

Ratios

Weight on drivers ÷ tractive effort	4.52	4.78
Total weight ÷ tractive effort	8.15	7.28
Tractive effort × diam. drivers ÷ total equivalent* heating surface	599.00	580.50
Total equivalent* heating surface ÷ grate area	71.30	82.38
Firebox heating surface ÷ total equivalent* heating surface, per cent	4.93	5.05
Weight on drivers ÷ total equivalent* heating surface	33.80	34.68
Total weight ÷ total equivalent* heating surface	61.00	52.9
Volume both cylinders, cu. ft.	13.10	18.55

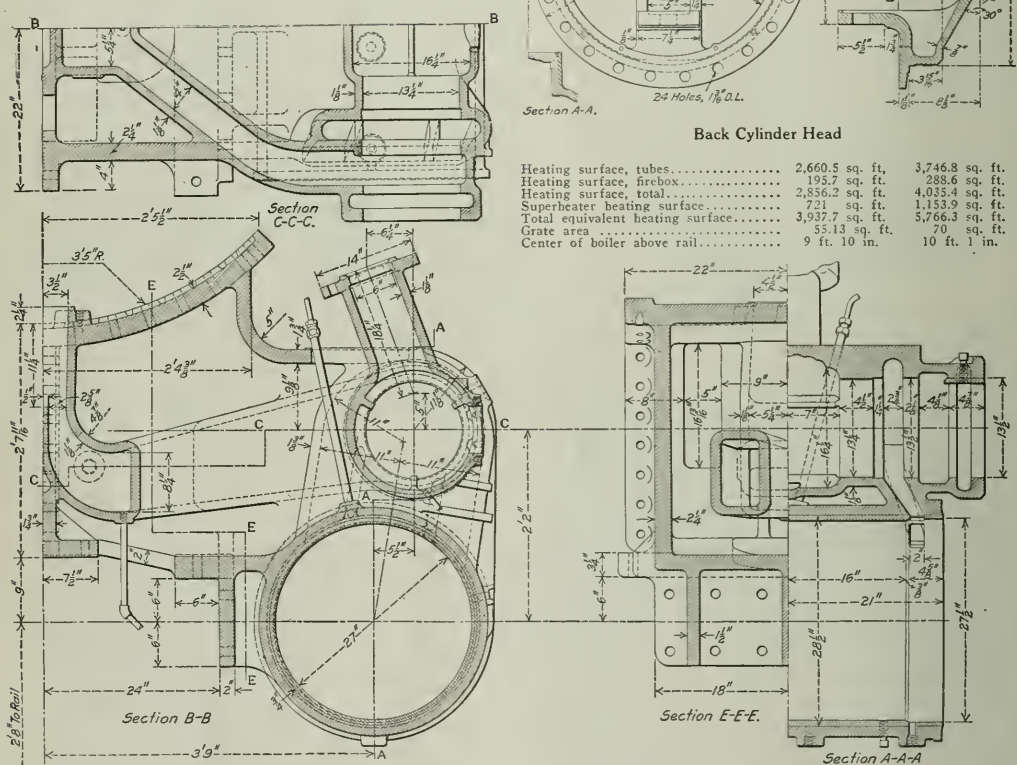
Boiler

Style	Belpaire	Belpaire
Working pressure	205 lb.	205 lb.
Firebox, width and length	72 in. x 110⅛ in.	80 in. x 126 in.
Firebox plates, thickness	⅜ in. & 5/16 in.	⅜ in. & 5/16 in.
Firebox, water space	5 in.	5 in.
Tubes, number and outside diameter	242—2 in.	237—2¼ in.
Flues, number and outside diameter	36—5⅜ in.	40—5½ in.
Tubes, length	15 ft.	19 ft.



Back Cylinder Head

Heating surface, tubes	2,660.5 sq. ft.	3,746.8 sq. ft.
Heating surface, firebox	195.7 sq. ft.	288.6 sq. ft.
Heating surface, total	2,856.2 sq. ft.	4,035.4 sq. ft.
Superheater heating surface	721 sq. ft.	1,153.9 sq. ft.
Total equivalent heating surface	3,937.7 sq. ft.	5,766.3 sq. ft.
Grate area	55.13 sq. ft.	70 sq. ft.
Center of boiler above rail	9 ft. 10 in.	10 ft. 1 in.



Arrangement of the Cylinders for the Mikado

Total equivalent* heating surface ÷ volume both cylinders	300	310.80
Grate area ÷ volume both cylinders	4.21	3.77
Cylinders		
Kind	Simple	Simple
Diameter and stroke	23½ in. x 26 in.	27 in. x 28 in.
Valves		
Kind	Piston	Piston
Diameter	12 in.	12 in.
Greatest travel	7 in.	7 in.
Outside lap	1 5/16 in.	1 5/16 in.
Wheels		
Driving, diameter over tires	80 in.	80 in.
Driving, thickness of tires	4 in.	4 in.
Driving journals, main, diameter and length	9½ in. x 13 in.	11 in. x 15 in.
Engine truck wheels, diameter	36 in.	36 in.
Engine truck, journals	6½ in. x 12 in.	6½ in. x 12 in.
Trailing truck wheels, diameter	50 in.	50 in.

Tender

Tank	Water bottom	Water bottom
Wheels, diameter	36 in.	36 in.
Journals, diameter and length	5½ in. x 10 in.	5½ in. x 10 in.
Water capacity	7,000 gal.	7,000 gal.
Coal capacity	12½ tons	12½ tons

*Total equivalent heating surface = total evaporative heating surface + 1.5 times superheater surface.

Railway Construction in India.—The Darjeeling-Himalayan Railway is planning to construct a line connecting Kishungung with Siliguri. This extension will give the people of Bihar a short cut to Darjeeling and Kurseong, in the neighborhood of which lies one of the spots under consideration for the future summer residence of the Bihar government.

THE VALUATION OF RAILWAY PROPERTY AND THE DISTRIBUTION OF EARNINGS AND EXPENSES ACCORDING TO USE

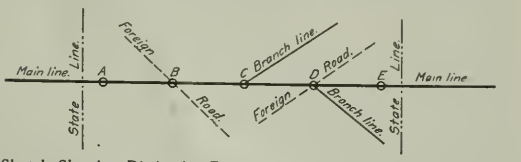
Because of the passenger rate case, and in accordance with the instructions of the Corporation Commission and the law department of the state of Oklahoma, the railroads of that state have endeavored to separate their properties and accounts according to the uses made of them, in this way also carrying out the suggestion made by Justice Hughes in the Minnesota rate case. After elaborate studies the roads have worked out a method by which the separation of property and revenues has been accomplished with a fair degree of accuracy. During the past year the various roads have prepared valuations and have made divisions of earnings and expenses based upon this method, which findings will be reviewed by the court this year. Many railway men have maintained that it is impossible to separate freight and passenger facilities and likewise to differentiate between state and interstate traffic and between "line" and "terminal" property. While the method outlined in Oklahoma is subject to revision in many details, it is an attempt to separate the property and accounts according to use, and in this respect it is a distinct mark of progress.

The plan provides for the allocation of property and accounts as between states; the separation of state property and accounts between terminal and line; the apportionment of both line and terminal property and accounts between freight and passenger; the separation of main line and branch line property and accounts, showing the data for each main and branch line separately, both as to line and terminal; and the apportionment of main and branch line freight and passenger accounts, both line and terminal, between intrastate and interstate.

The accompanying sketch shows the distinction which has been made between line and terminal facilities and those common to both. By line facilities are meant those which are used in the transportation of traffic from the place of receipt (one terminal) to the point of delivery (another terminal). Any facilities required in, or expenses incident to, the movement of traffic between these termini are line facilities and accounts. Terminal facilities and charges are those which are connected with, or occasioned by, securing, receiving, loading or otherwise preparing traffic for movement, and the unloading, delivery and other outlay incident to the disposition of the traffic after arriving at the destination terminal.

As an example, the facilities required in making up a passenger train at a terminal are line facilities because they are required for the movement of passengers throughout the entire route and would be necessary even if no passengers were moved from this terminal. Likewise, the facilities required at any station to let passengers on or off constitute a terminal expense because they serve the public at that station. The facilities required for the switching, distribution and collection of freight cars at any station are a terminal outlay occasioned by the existence of that station. The facilities at a junction with a foreign line are considered terminal facilities because such a station is the terminal for such freight as is received or delivered to the connecting road. On the other hand, the facilities required to handle traffic through a station which is a junction with a branch line of the same road are line facilities, since they would be required if there were no station at this point.

Thus, property classed under line would include main and passing tracks, tracks at division or train terminals used exclusively or almost exclusively in the making up and breaking up of trains, and in reclassifying and storing through cars and through trains, coach-cleaning tracks, tracks used for storing caboose cars and wrecking outfits, tracks to and from coal chutes, engine houses and turntables at points where no regular switching service is maintained, and a suitable proportion of such tracks at points where switching service is maintained, based on the relative use made thereof, bridges, trestles, culverts, signals, and other property outside of station grounds, etc. Property classified as terminal includes depots, house, storage, industry, team, transfer and scale tracks, as well as tracks used exclusively for classifying station and transfer cars, loading platforms, stockyards, elevators, coal and ore docks, etc.



Sketch Showing Distinction Between "Line" and Terminal Property and Accounts

A. Local station.
B. Junction with foreign road. Interchange point.
C. Junction with branch line.
D. Junction with both foreign road and branch line.
E. Divisional terminal. Local.

Facilities and expenses for train orders, crossing flagmen, passenger switching and interlockers are "Line." Otherwise all facilities and expenses at "A" station are "Terminal." All facilities and expenses at "B" station are "Terminal." All facilities and expenses required for or attaching to traffic *passing through* "C" station going to and coming from branch line points are "Line." All other, i. e., those which originate or terminate at this station, are "Terminal." All facilities and expenses required for or attaching to traffic *passing through* "D" station to or from branch line points are "Line." All others, including those incident to going to or from the connecting foreign road, are "Terminal." All facilities and expenses required for or attaching to traffic *passing through* "E" station are "Line." All others are "Terminal."

Before undertaking the valuation or the separation of accounts it was necessary for all tracks to be classified between (a) line tracks and facilities; (b) terminal tracks and facilities; (c) tracks and facilities used in common. Each of these three groups is further sub-divided between (1) exclusive freight tracks and facilities; (2) exclusive passenger tracks and facilities, and (3) tracks and facilities used in common in freight and passenger service. In making these classifications the primary use of the facilities governed and the exceptional or occasional use of other classes of service was ignored. In distributing the expenses all charges were distributed on the basis of the Interstate Commerce Commission system of accounts as far as possible, divided under the classifications referred to above.

Before apportioning the various classes of common expense it was necessary to secure a large amount of information, including the number of intrastate and interstate tickets sold and the pieces of baggage checked; the number of intrastate and interstate consignments of freight received and forwarded, including that interchanged with connecting lines; the number of cars handled and the method of handling by local or other trains; the number of passengers taken on or put off through and local trains, etc.

The scheme worked out for dividing expenses* was comprehensive and based not on theory but on a desire to let the facts develop the theory on which the accounting should be done.

DIVISION BETWEEN STATES

In the first place all expenses were allocated as between the states. Maintenance of way expenses are apportioned directly wherever possible, and in general, common expenses, such as superintendence, are apportioned on the basis of the assigned charges for all the maintenance of way accounts. Supervision, ballast, etc., across state line is apportioned on a mileage basis, and telegraph and telephone lines are apportioned on the basis of railroad and joint wire mileage in each state, while electric power transmission is apportioned on the basis of power transmission wire mileage in each state. Buildings, fixtures and grounds are all allocated direct, except that general office ex-

*The division between states and between line and terminal only are described here; the division between freight and passenger will be described in a later issue.

penses and general shops and all stores are on the basis of total maintenance of equipment. Maintaining joint tracks and yards are allocated direct where possible, and common expenses are apportioned on the basis of allocated labor charges to facilities involved.

The theory on which the allocation of maintenance of equipment expenses is based is shown by the instructions for steam locomotive repair costs. These costs are assigned to states on the basis of the mileage of the individual locomotives in the current month and the cost of the general repairs of locomotives is assigned to states on the basis of the mileage of the individual locomotives since the last general repairs. The costs of repairing damage caused by collision and derailment or similar accidents are charged to the state in which they occur. Renewals and depreciation are charged on exactly the same basis. Repairs, renewals and depreciation of passenger and freight cars, with the exception of Pullman cars, are on the same basis as locomotives, as is also electric equipment and work equipment. Shop machinery and tools, injuries to persons, stationery and printing, and other expenses are allocated in the same proportion as the total of locomotive and car repairs.

Traffic expenses are divided as between states only after the division has been made between freight and passenger expenses, and then apportioned on the basis of revenue net ton miles and revenue passenger miles.

Transportation expenses are all allocated direct wherever possible, and common expenses, such as superintendence, are divided on the basis of directly allocatable expenses. Despatching trains is allocated direct to state on the basis of the smallest available territorial operating unit. Overlapping units are subdivided on the basis of the total train mileage of such units in each state. Station employees and expenses, docks, yards, interlocking, crossing and joint tracks and facilities are allocated according to location, while such expenses as road enginemen, fuel for road locomotives, etc., are allocated direct where the run is within a state, and on the basis of locomotive mileage where the run is across state lines. Engine house expenses—road are apportioned on the basis of total road locomotive mileage by states. Train supplies and expenses are first divided as between freight and passenger, and then apportioned to states on the basis of the respective car mileage of each class in each state. Clearing wrecks, loss and damage to freight, property, and stock on right-of-way, and injuries to persons are in general divided on the basis of the states in which the wreck, loss or injury occurs. General expenses, except such as law, insurance and valuation expenses, and general administration of joint tracks, are divided proportionately to all expenses other than general expenses. The exceptions are assigned directly where this is possible, and valuation expenses which are common are apportioned on the basis of track mileage.

DIVISION BETWEEN LINE AND TERMINAL

All expenses are divided as between line and terminal expenses. The greater part of the maintenance of way expenses are, of course, easily directly assignable to line or terminal, tracks being grouped as (a) train tracks, consisting of main and passing tracks; (b) station tracks, consisting of all station service tracks not used for train or engine service; (c) yard tracks, consisting of classification tracks and storage tracks; (d) shop tracks, consisting of tracks to and about shops, also storehouse and repair tracks; and (e) engine house turntable, wye, fuel and water tracks. *A* and *C* are allocated direct to line and *B* direct to terminal. *D* is divided between line and terminal on the basis of repair charges assigned to line and terminal of locomotive passenger and freight car cost. *E* tracks are treated separately for each train terminal and apportioned on the basis of respective engines handled at such terminals.

Repairs, renewals and depreciation of locomotives and of cars are apportioned as between line and terminal after the division has been made between freight and passenger, and the freight in the ratio the time in line service and the time in switching service bears to the total time on road for road locomotives. For passenger locomotives, in the same proportion as determined for passenger cars, and for switching locomotives on the basis of the time employed in switching line and terminal cars respectively. "The amount of repairs to passenger train cars attributable to line or terminal service (except accident repairs) is wholly a matter of opinion which must be determined by experts who, because of their experience, are properly qualified to make such estimates. It is therefore recommended that the question be submitted by letter ballot by the chairman of the General Managers' Association to its members as to the proportions properly chargeable to line and terminal, the average of such expressed opinions to be used in the assignment under these two classes. The submission of the question should be accompanied by a full explanation of exactly what, under this formula, constitutes line and terminal service respectively."

Traffic expenses are all assigned to terminal.

Transportation expenses are assigned on an analysis of each account, road enginemen being typical. Apportionment of these expenses between line and terminal is made on the basis of the ratio that the time devoted by passenger locomotives and by freight locomotives respectively to station service bears to the total time of such locomotives on the road.

General expenses are apportioned as between line and terminal in the same way as general expenses are apportioned as between states.

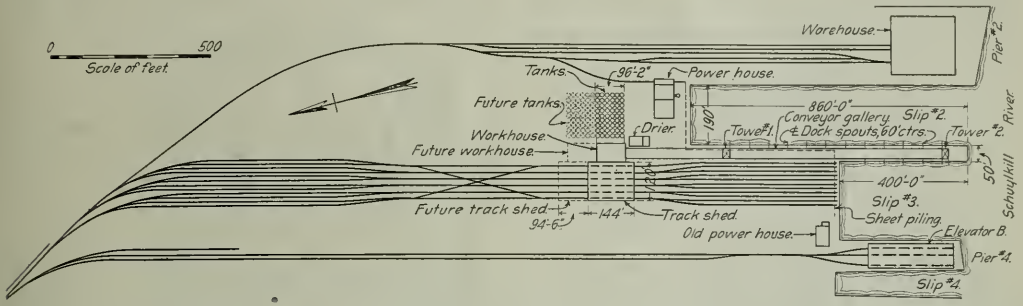
In a state such as Oklahoma, where the lines are practically all single track and where there are no large cities or important terminals, a very large proportion of the facilities are common to freight and passenger traffic. However, the method adopted which was worked out in much detail would apply also in more highly developed eastern states, with their separate freight and passenger tracks and with their large terminals devoted exclusively to the one class of traffic. While this separation of properties and accounts according to use has involved considerable additional work, this will be reduced materially by the decision to pro rate the valuations and accounts from year to year on the basis of the original or modified valuation, so that it will not be necessary to determine anew the exact use of the property each year.

Russian Railways and Foreign Material.—The ministry of ways of communication has approached the council of ministers on the subject of allowing the railway department to order reserve parts of rolling stock abroad, such parts to consist of locomotive wheels, wheel centers, axles and tires, in case these cannot be had in the national factories for one reason or another during the years 1914, 1915 and 1916, or if the terms offered by the national producers should prove to be unacceptable owing to high prices or absence of guarantee in respect to time of delivery. The necessity for granting this right to the railway department, says the memorandum of the ministry, has been obvious since May, 1913, owing to the difficulties in delivery, and also because of the trouble respecting tenders that obtained last year for reserve parts to be supplied in 1914. The railway department experienced particular difficulty at the time, which, in the opinion of the ministry will become greater still as the present year advances, when it will be necessary to order, besides the ordinary goods for current exploitation purposes in 1914, the parts required for new rolling stock, consisting of 98 locomotive wheels, 330 tender wheels and 4,556 pairs of freight car wheels, which will make a total costing about $700,000, while the total productivity of the Russian factories is already fully occupied, excepting some of the factories to which the department cannot give the orders because of their exorbitant prices. Finally, the measures taken by the manufacturers for the extension of their producing plant according to information received by the minister of ways of communication, have been delayed, and advantage cannot be taken of them before a year or two hence, and only then in the event of an increase in the productivity of the metallurgical works.

New Pennsylvania Elevator at Philadelphia

Export Shipping Plant with Storage Capacity of 1,000,000 Bu. and Loading Capacity of 60,000 Bu. Per Hour

A large amount of American and Canadian wheat for export is hauled by the Pennsylvania from connecting railroad lines reaching the western wheat belt and from Buffalo and Erie, where it is received from lake steamers, to Girard Point at the mouth of the Schuylkill river near Philadelphia. This grain is there loaded directly on ocean going vessels or stored temporarily in the new reinforced concrete elevator which was put in service this week, replacing an old frame elevator which had been in use about 30 years. The unloading and storage facilities are similar to those provided in the large fireproof elevators built in recent years at the ports at the head of the Great Lakes. In contrast, however, to those plants, which are usually arranged to load the boats directly from the workinghouse bins, the Girard Point layout provides a loading gallery extending from the workinghouse to the end of a long pier. This allows the loading of the ship to be completed without moving and also admits of better track facilities and more stable foundations for the building.

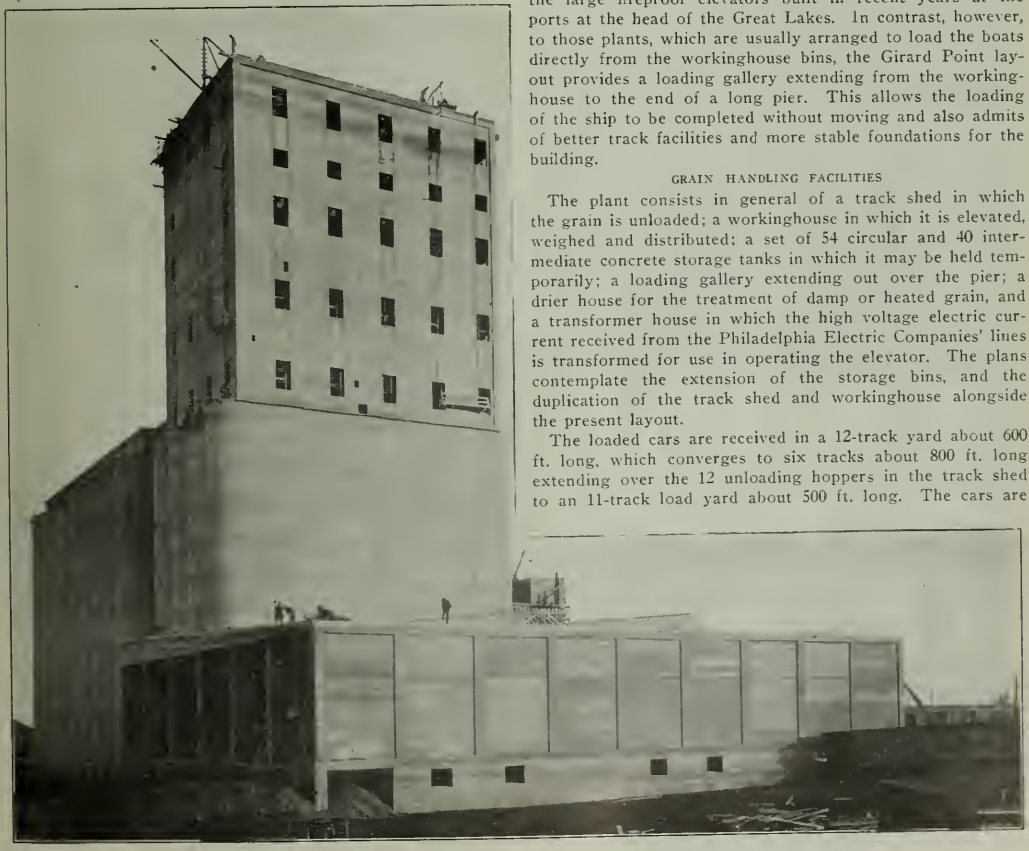


Layout of the New Pennsylvania Elevator Showing Track Arrangement, Piers and Slips

GRAIN HANDLING FACILITIES

The plant consists in general of a track shed in which the grain is unloaded; a workinghouse in which it is elevated, weighed and distributed; a set of 54 circular and 40 intermediate concrete storage tanks in which it may be held temporarily; a loading gallery extending out over the pier; a drier house for the treatment of damp or heated grain, and a transformer house in which the high voltage electric current received from the Philadelphia Electric Companies' lines is transformed for use in operating the elevator. The plans contemplate the extension of the storage bins, and the duplication of the track shed and workinghouse alongside the present layout.

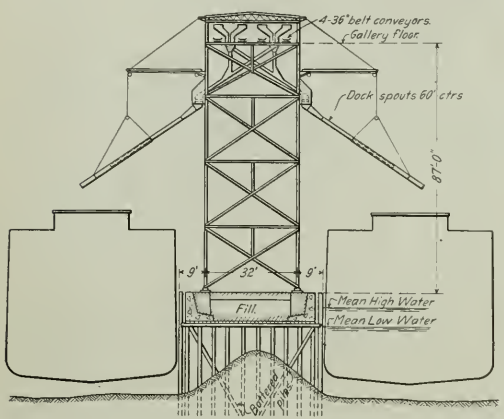
The loaded cars are received in a 12-track yard about 600 ft. long, which converges to six tracks about 800 ft. long extending over the 12 unloading hoppers in the track shed to an 11-track load yard about 500 ft. long. The cars are



General View of New Elevator Nearing Completion, Track Shed in the Foreground

pushed through to the load yard south of the track shed by a locomotive and are pulled back, as required for unloading, by a six-drum Webster car puller. After unloading, the cars are given a kick by the puller which starts them down the two per cent. grade to the main yard. A double set of cross-overs with double slip switches between the track shed and the yard allows the empties from any unloading track to be set in on any yard track.

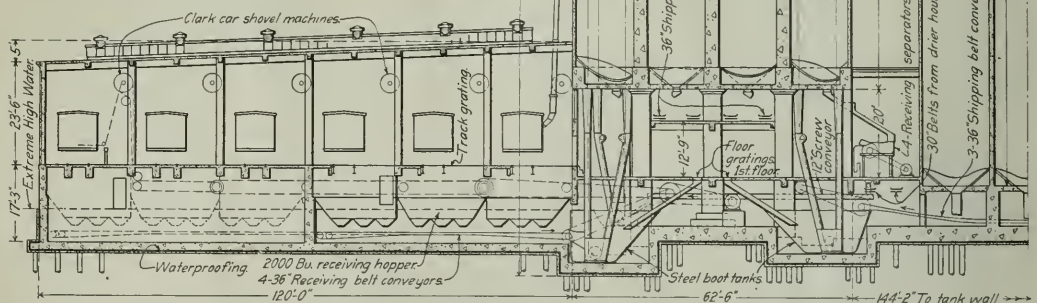
The track shed consists of a reinforced concrete slab roof 120 ft. by 144 ft. in size covering six unloading tracks spaced 20 ft. center to center, and supported at an elevation of 23 ft. 6 in. on the low side, by rows of concrete columns between



Cross Section of Loading Pier Showing Conveyor Gallery and Dock Spouts

the tracks. Each of the six tracks passes over two unloading hoppers in the track shed into which the grain is dumped by Clark car shovel machines. The track hoppers are arranged in four transverse rows of three each, served by four belt conveyors in the basement below the hoppers. The unloading facilities are designed to handle 250 cars in 10 hours.

The workinghouse is a concrete building 62 ft. 6 in. by 94 ft. 6 in. adjacent to the track shed. It is 202 ft. 6 in. high

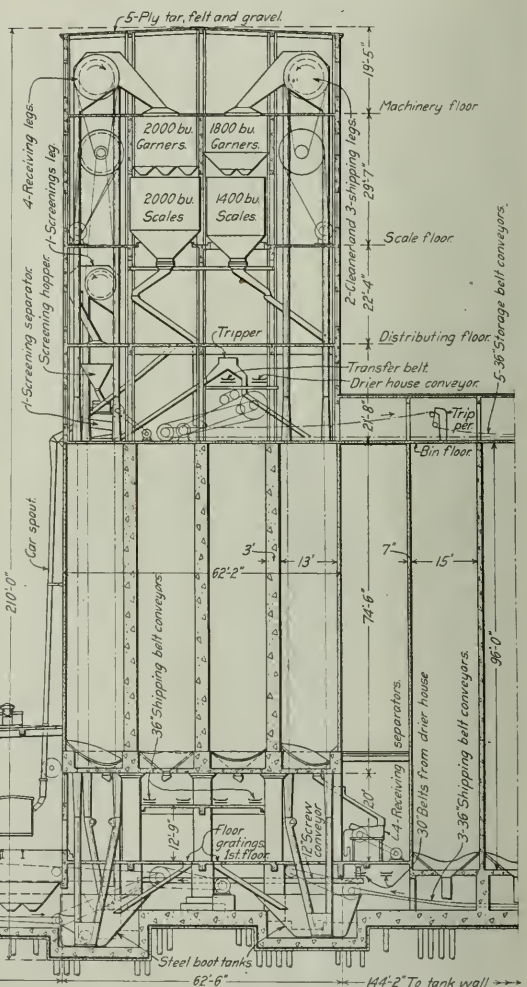


Cross Section Through Track Shed, Working House and One of the Storage Bins, Showing All Conveying Machinery

and contains a basement, first floor, working bins 74 ft. 6 in. high, and a four-story cupola. Each of the receiving conveyors dumps the grain into a steel boot tank, from which it is elevated by one of the four receiving legs to the top of the workinghouse at a maximum rate of 15,000 bu. per hour for each leg. All elevating legs are operated by rope drive from electric motors.

The receiving legs empty into 2,000 bu. concrete garners at the level of the top floor in the cupola, which deliver the grain to 2,000 bu. hoppers on 60-ton standard scales. After weighing, the grain may be distributed to the storage bins, to the drier house or the separators, to a car for reshipment, or to the workinghouse bins for loading on boats.

Five belt conveyors on the bin floor carry grain from the workinghouse out over the storage tanks. If the distributing spout under any particular scale hopper will not reach the conveyor serving the bin which it is desired to fill, a reversible transfer belt just below the distributing floor may be used to transfer the grain to the proper conveyor. Self-



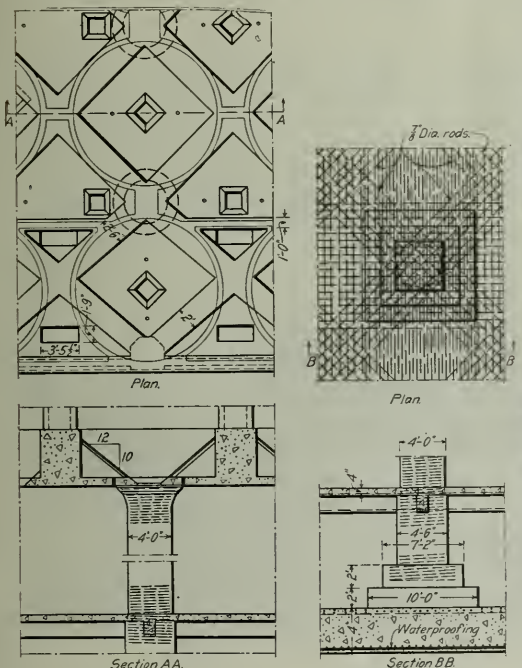
propelled trippers dump the grain from the conveyor belts into the desired tanks.

In shipping from storage, the tanks are emptied on one of three belt conveyors in the basement under the storage annex, which dump into the boots at the bottom of the three shipping legs. These shipping legs and the two cleaner legs, located on the same side of the workinghouse, empty into 1,800 bu. garners over 1,400 bu. scale hoppers. The distributing spouts under these hoppers may be set to direct

the grain to the drier house or the separators, directly to cars, or into the workinghouse tanks for loading on boats.

Wet or heated grain can be taken from any of the spouts on the distributing floor of the workinghouse on a conveyor belt to the driers or coolers located in a separate building alongside the workinghouse, which also contains the main switchboard. The drying and cooling installations are each designed to handle about 3,000 bu. per hour. The grain is returned from the drier house by a conveyor reaching the basement under the workinghouse.

Grain that requires cleaning is dumped into certain tanks in the workinghouse from which it can be drawn off to four separators on the first floor, which make five separations according to grade. Each machine will clean 5,000 bu. per hour. The cleaned grain is elevated again by the two cleaner legs, each having a capacity of 11,000 bu. per hour, and the screenings are transferred to the other side of the working-



Part Plans and Sections Showing Reinforced Concrete Construction in the Working House

house by a screw conveyor and elevated in a screening leg having a capacity of 3,000 bu. per hour.

Grain intended for reshipment by car is chuted directly from the distributing pipes to the car spout, which ends in a bifurcated Sandmeyer car loader serving the first track in the track shed. In loading boats, certain workinghouse tanks are filled, from which the grain can be drawn onto four belt conveyors on the first floor of the workinghouse which extend out over the pier. By filling all of the tanks which serve these belts it is possible to weigh 100,000 bu. of grain and ship it at any time without elevating again. The four shipping conveyors have a total capacity of 60,000 bu. per hour.

The conveyors are carried up from the first floor of the workinghouse on a steel frame gallery 300 ft. long to a level gallery on the pier 700 ft. long. This supporting structure is 32 ft. wide, the belts being 87 ft. above the pier deck. Self-propelled trippers are provided to dump the grain at any desired point and it is conveyed into the boat by telescoping spouts spaced 60 ft. center to center along both sides of the shipping gallery. The pier is 895 ft. long and 50 ft. wide with 1,260 ft. of docking space on the two sides, allowing three boats to be loaded at once. The largest vessel ever loaded at this point had a capacity of about 400,000 bu.

CONSTRUCTION OF BUILDINGS AND TANKS

The Girard Point plant was made both fireproof and permanent by the use of concrete throughout. The few necessary windows have metal sash and wire glass and the gutters and cornice are of galvanized iron. Great care was taken to secure a stable foundation as the load to be carried when the tanks are full is very great. The adopted design, involving a solid four-foot concrete slab on piles under the entire structure is conservative, but was considered justifiable under the circumstances. The surface soil at the site is black mud to a depth of about 50 ft., the underlying strata being

A Portion of the Storage Annex, Showing Yokes Carrying Circular Forms

sand and still lower gravel. More than 5,000 yellow pine piles 60 ft. to 70 ft. long were driven on 2 ft. 3 in. centers under the workinghouse and storage bins and on 5 ft. centers under the track shed. These piles were designed to carry 16½ tons each, although tests showed that a load of 54 tons would not cause a perceptible settlement.

The piles were cut off at the elevation of the bottom of the slab and earth was packed around their heads. After laying the lower 9 in. of the slabs over the pile heads, a six-ply felt and pitch waterproofing membrane was laid, on which the remainder of the 4 ft. slab was placed. This waterproofing membrane was carried up the outside of the walls well above high water level and was protected by a single course brick wall laid in cement. The slab under the workinghouse was reinforced by ⅞ in. bars laid parallel to both edges and also diagonally, crossing under the column footings.

The intermediate columns supporting the bins and upper floors of the workinghouse are 4 ft. in diameter with spiral reinforcement. The diagonal girder system of supporting the working bins, which was developed by James Stewart &

Company in 1905, and has been adopted for several of the new elevators, was used. This arrangement of girders has the advantages over the more common rectangular construction that the unsupported length of girder is decreased, thus reducing the section; the walls of the intermediate bins can be supported continuously and the interspace can be more fully utilized for grain storage and elevator legs. The standard beams are 2 ft. 6 in. wide by 5 ft. deep. The working bins are arranged in four rows of six each, the internal diameter of each tank being 13 ft. and the thickness of walls for the inside tanks 6 in. All of the interspaces are used either for storage or elevator legs, the space being divided in some cases by a wall so that one interspace may carry a leg and also accommodate some grain. As one of the circular tanks is occupied by a freight elevator, spiral stairway and ticket elevator, 23 circular bins with a capacity of 7,400 bu. each are available for storage. Five interspaces have a capacity of 5,400 bu. each, and ten, 4,400 bu., making a total storage capacity in the workinghouse of 241,200 bu.

dumped from this conveyor into separate stock piles and cement was stored in a shed 28 ft. by 100 ft. Two mixer plants equipped with two ¾ yd. Smith mixers were installed between these stock piles and the building. A 140 ft. distributing tower at one of the plants was used to place the storage tanks and a 230 ft. tower served the workinghouse bins and cupola. The concrete had to be hauled about 100 ft. in buggies to the base of this tower.

The jacking method of handling forms was used throughout except for the drier house and the track shed. Steel yokes, patented by R. H. Folwell and W. R. Sinks, of James Stewart & Company, were raised by hollow screw jacks on five 1 in. rods set vertically in the tank walls in 15 ft. sections and made continuous by sleeves at the joints between the sections. These yokes carry 4 ft. sections of forms with a working platform over the top. This working platform serves as a form for the floor over the tanks when the full height is reached. All tank walls were built continuously to eliminate joints in the concrete. By the use of the special

Contractor's Material Unloading Plant, Belt Conveyor to Storage Piles and One of the Distributing Towers

The storage tanks are 15 ft. in inside diameter and 96 ft. high with 7 in. walls. They are supported on rectangular concrete piers resting on the continuous slab. The walls are reinforced with steel hoops and vertical rods. The total capacity of these storage tanks, including interspaces, is as follows:

27 circular tanks at 12,900 bu.	348,300 bu.
27 circular tanks at 13,200 bu.	356,400 bu.
24 interspaces at 3,400 bu.	81,600 bu.
16 interspaces at 3,200 bu.	51,200 bu.
Total	837,500 bu.

The tanks are covered by a concrete slab forming the floor of the cupola in which the conveyors from the workinghouse are located. The roof is a 5½ in. concrete slab covered by a four-ply tar and felt coating.

The contractor shipped in the sand and gravel used for concrete in barges, which were unloaded in the slip opposite the site by a clam shell bucket, the material being loaded on a belt conveyor carried on a temporary frame trestle reaching nearly to the new building. The sand and stone were

form jacks it was possible to raise the forms as soon as desired, in contrast to the system in which each course of concrete is allowed to set to serve as a bearing for jacking up the forms. In some cases concrete was uncovered in 12 hours after pouring. The 54 storage tanks were poured in 14 working days of two ten-hour shifts each; the working bins in seven days and the cupola in 20 days. The storage tanks required 51 cu. yd. of concrete per vertical foot.

This elevator was designed and built by James Stewart & Company, Chicago, with J. C. Johnson, superintendent, under the direction of the engineering department of the Pennsylvania. A. C. Shand, chief engineer; E. B. Temple, assistant chief engineer; W. H. Cookman, architect, and J. F. Cullen, assistant engineer. The actual construction work above the pile foundations was started in February, 1913.

Railways in German Africa.—The budget commission of the Reichstag has approved the vote of $7,750,000 for the Tabora-Ruanda Railway in German East Africa.

"SAFETY-FIRST" IN TRAIN MOVEMENT*

By H. W. Forman

One of our conductors wrote me as follows: "This thing of trusting to Providence on a railroad will not work. The fact that men exercise poor judgment, or none at all, is because they do not think, in advance, of their troubles. Good judgment is not always born with one; generally it is the result of experience, careful observation, investigation, thought and discussion with others." Quite often I have a caller, who, after reciting a case of neglect or risk, of course on the part of some other employee, remarks, "*Something* must be done." When I ask if he reported the facts to the proper officer, or talked with and corrected the erring one at the time, I am usually answered in the negative. Men seem to think that officers can always be at the place where rules are violated, and at that particular moment. Employees are not helping out, as they should, by keeping us posted concerning irregularities needing attention, particularly such as come to their notice during the absence of an officer. It is a fact that rules are better respected when an officer is present, and this often misleads him. It is equally true that if men would report violations of certain important rules the service could be greatly improved. In so reporting, employees are doing no more than their plain duty. To enable officers to positively identify the offending parties, reports must be made promptly, giving date, location, names, trains, engines, etc.

The words "Safety First" are far more important than may be at once realized. . . . As applied to rules, they closely relate to the ordinary risks and chances some men are taking almost daily, such as failing to respect fixed signals, fusees and torpedoes; running too fast through yards; approaching obscured stations and certain water tanks at unsafe speed, more especially during fog; indulging in the unnecessary and foolhardy practice of following a train too closely; rounding obscured curves, or approaching stations too rapidly, when an order is held giving notice that a train will run ahead; exceeding the limit of speed as prescribed by time-table; failing to flag promptly and efficiently; and disregarding the clearance prescribed by the rules. The time-clearance rule is of vital importance since watches never have and probably never will keep absolutely correct time. . . .

Do not blame me for dim, poorly written, improperly worded orders if not sent to me by conductors after using, as required by Rule 387. When you decline to act on such imperfect orders, operators will discontinue offering them to you. I cannot prevent operators from giving you a signal to come to the office on the main track, when you should go on the siding to meet a train at his station, unless you report such incidents and give me an opportunity to find out why these unsafe and unauthorized practices are being indulged in.

I have seen trains running after sunset, or in dense fog, without having up their night signals, both front and rear. Certainly you know that this is unsafe, and that you should not neglect this important requirement. Put them up too early, rather than too late.

We try to keep fixed signal lights burning brightly. When found smoking, or otherwise in bad shape, or not burning at all, and you are standing nearby and can, without much inconvenience, adjust the light, or call the attention of some employee to its condition, you should do so. You should report the absence of lights, or dim lights, more especially those noticed in that condition oftener than once.

Rule 93.—Are enginemen of third class and extra trains so approaching and moving within yard or station-limit signs that they can, if necessary, stop within a few car lengths—within the distance that is seen to be clear?

Electric Headlights.—When you have stopped your train at a meeting point, the electric headlight, on both passenger and freight trains, must be reduced until it is not more brilliant than an oil headlight. This must be done without regard to whether it be a freight or passenger train you are to meet. Should you take the siding and the opposing train is seen approaching, at once reduce your headlight; do not wait until you reach the end of siding and stop before doing so. Should boiler pressure increase after having stopped, the dynamo will speed up and cause the light to again burn brightly. It may be necessary to cut it back a second time. I recall one case of an unnecessary delay of seventeen minutes to a passenger train meeting a freight. The passenger electric headlight so blinded the freight engineman that he could not definitely locate the switch where he was required to take siding, and he had to approach it at a snail's pace. Another case: Nos. 2 and 94 were ordered to meet No. 5 at Fosterville, and No. 2 to back in behind No. 5 to permit No. 94 to pass. No. 5 on siding, headlight burning brightly. No. 94 was delayed because the engineman was unable to locate No. 2. Their rear might have been just beyond No. 5's engine, although they actually were on the siding. Should the engineman of No. 94 have assumed that No. 2 was out of the way, and not greatly reduced speed, he would have been considered an unsafe man. In this circumstance, failing to turn down a headlight delayed three passenger trains. It is impossible to see markers, flagmen or persons who may be on the track beyond so brilliant a light.

Torpedoes and Fusees.—It is impracticable to prescribe the exact number of torpedoes and fusees that should be kept on hand; much depends upon what experience in the past has demonstrated that you may require. Generally speaking, more are ordered than are needed, and this results in loss, as they soon become unserviceable. Local freights need more than other freights. Branch crews do not require as many as main line crews. Passenger crews do not need green fusees. Engine boxes are supplied with six torpedoes and four red fusees, to be used when necessary to send a man ahead, or to enable a red fusee to be thrown off when the engineman discovers that he must soon stop on account of engine trouble, when the engineman should take the initiative. Keep four torpedoes attached to all lanterns, not excepting the red lanterns kept on engines. Many fusees and torpedoes which have been on hand for some time are found to be in bad condition. Place waste about them, and they will not so soon be rendered unfit for service. Passenger signal-cases and torpedo and fusee boxes on engines must be checked up at least twice a year. Do not order or keep on hand more torpedoes and fusees than you actually need. They will deteriorate, and no one has yet discovered a way to prevent. Do not place wet flags with fusees or allow them to become damp from other causes. If you have never lighted a fusee do so at once. Do not wait until an emergency arises, and then discover that you do not know how. If the cap is missing try lighting by placing end against fire box door or scraping on rail. Hold the end to be lighted away from you. Know that the fusee is burning well before throwing it on the ground. Place torpedoes against the angle bar or rail splices; then they will not be knocked off when a wheel strikes them. It is of course better practice to place torpedoes on the engineman's rail and fusees on his side of the track, but they must be respected without regard to this, except on double track an engineman should not be governed by a fusee seen on the engineman's side of the opposing track.

Report all enginemen who do not at once get their trains under proper control when a caution fusee is seen, or caution torpedoes are exploded by them. When an engineman observes a burning fusee, he at least knows that a train may have passed that point less than ten minutes before, and it is his duty to observe Rule 11. When he explodes torpedoes, he is not permitted to assume anything beyond what is prescribed by Rule 15.

Rule 99.—Were we to meet in convention and discuss this one matter for a week I doubt if every condition could be anticipated and provided for any better than in the rule itself.

*Extracts from a lecture by the Train-Rule Examiner of the Nashville, Chattanooga & St. Louis, printed for circulation among the road's employees.

Broadly speaking, it has been my experience that flagmen too often look upon the wrong side of the proposition; instead of going back when there is doubt or a reasonable possibility of their trains being struck, they hesitate too long, hoping that they will soon start. In many cases enginemen do not promptly blow back flagmen when they alone know that their train must soon stop, or be delayed. They do not always signal flagmen to return to their trains, although they have every reason to believe that one has gone back.

Flagmen have been found on obscured curves so near their trains that emergency application was necessary to avoid a collision. Fusees have been displayed in like manner. Flagmen must continue back until they reach straight track, or until they reach a point where they can be plainly seen for a reasonable distance by an approaching train.

If every man, who may hereafter be required to protect a train by flag, is as conscientious and energetic in the performance of this duty as John Cooper, flagman on Nos. 48 and 49 between Dalton and Chattanooga, there will be no more rear collisions that can be charged to inefficient flagging.

Investigation has often shown that the flagman was riding in the smoker, instead of the last car in train, and had to travel 450 feet to reach the rear of train. Ride in the rear car whenever possible, instead of from four to seven cars from the rear.

Perhaps there are no more efficient flagmen anywhere than those to be found on the Georgia Railroad. When one of their passenger trains stops the flagman hurries back to rear and secures his flagging outfit. If delayed a minute or more, and there is not a clear view for a safe distance to rear, he goes back, running rapidly. When ready to start, engineman calls in flagman, and waits until he knows he has returned to the train before starting.

On the Missouri Pacific passenger trains the flagman gives one air signal to advise that he has returned to his train. Conductor and engineman then look back, if not already looking, and when conductor sees his flagman he, and not the flagman, gives the proceed signal.

A constant lookout must be maintained in the direction in which a train or engine is moving; this also refers to switch engine movements. Firemen must constantly look ahead, except when firing. There is no reason why front brakeman cannot look ahead on the fireman's side practically at all times. It is highly important that a constant lookout be kept on both sides of the engine when a train is given a caution block signal, or holds an order that an inferior train may run ahead of it.

No excuse should be offered for failure to observe and call fixed signals before reaching them, not even the excuse that it was necessary to at that time shovel in coal.

While rules do not so instruct, men on the caboose should call fixed signals to each other as they come into view.

Conductors.—Freight conductors should ride in cabooses except when necessary to go forward to get orders, or for other reasons. Under no circumstances may conductor ride elsewhere than in caboose unless it is positively known that an experienced and dependable brakeman, and one who is employed on the train, is on the rear, and that he is awake and in condition to protect the train in case of need. It is better practice to have two men on the rear. While running, keep a lookout ahead.

Do you not know that it is unsafe to permit any freight train to pass a station without stopping, unless "Proceed" signal is given from rear? Conductors, are you seeing to it that this signal is given? Enginemen, are you looking back or having some one do so, and invariably getting it? If not received, what action do you take? Do you appreciate the necessity of receiving a proper start signal after having stopped at a station?

Conductors, brakemen and firemen, should you be on engine and have reason to believe that your engineman is approaching a switch, where you must take siding for an opposing train, at a speed that creates doubt as to whether or not he will be able to stop in time, do you take the necessary action at that moment to insure against his not passing such switch?

When you find a switch unlocked do you lock it and report the fact?

When directed to display signals, are you seeing that they are put up before you give the start signal? When given Form 28, are you personally delivering a copy to your engineman, as heretofore instructed?

Are you *conductor* in the fullest sense of the word? For instance, do you assume full responsibility for the proper government and protection of your train at all times and under all circumstances? When an employee on your train neglects his duty or violates a rule, do you appreciate that you owe it to the company, as well as the public, to yourself then and there remedy the matter, or if unable to do so, promptly report such employee to the proper officer?

THE BEST RAILROAD SERVANT*

A railroad is first of all a public servant. It follows that the success of a railroad as a business enterprise depends, in very large measure, not only upon the efficiency of the transportation it affords, but upon the personal treatment which those doing business with the railroad receive at the hands of the officers and employees. Therefore, in addition to doing everything in his power to promote the physical efficiency of our service, each officer and employee, whatever may be his rank or duty, must at all times consider the moral efficiency, and this means first of all that he should treat all patrons of the company and others with whom he may come into contact with politeness and courtesy. This is a primary rule of management of the Southern Railway Company, but it is no more than each officer or employee himself expects of every one from whom he buys. This rule should be observed regardless of the amount of business that the individual may give to the company, not only because that is the part of a gentleman, but from self interest, for the occasional traveler or the small shipper of today may be the constant traveler or the large shipper of tomorrow. A nursed grudge growing out of a surly answer has been responsible for many of the troubles of the railroads. Let us then all try to please the public.

The station agent should remember that at his station he is the Southern Railway Company and that public opinion regarding the company in his community is very largely his responsibility. In addition to maintaining the highest efficiency at his station, he should see to it that he and his subordinates maintain pleasant and agreeable manners in meeting the public and that all questions, even unreasonable questions, are answered with politeness and courtesy.

It is equally important that trainmen shall observe the rule of courtesy and politeness, giving full, responsive and intelligent information to those passengers who solicit it about anything that may happen on the road. The operation of a railroad is interesting to every intelligent man, and the more information such a man has about actual conditions the more he will understand the difficulties encountered in operation and so contribute to sound public opinion.

I am proud to believe that the general average of courtesy and politeness in the Southern Railway organization will compare most favorably with that of any railroad in the United States. Good manners are traditional in the South and our men are southern men. This is attested by many letters which are received by the management commending individual employees for conspicuous acts of courtesy and painstaking efforts to serve our patrons.

Occasionally, however, letters are received complaining of instances of discourtesy. These may be entirely eliminated if each officer and employee will adopt as his rule of conduct the declaration by the late President Finley that "He serves the railroad best who serves the public best."

*A circular on politeness and courtesy, issued June 23, by Fairfax Harrison, president of the Southern Railway, addressed to "all officers and employees" of the company.

TRANSPORTATION AND CAR ACCOUNTING OFFICERS

The summer meeting of the Association of Transportation and Car Accounting Officers was held at the Hotel Chalfonte, Atlantic City, N. J., June 18 and 19, with 116 members in attendance.

The meeting was called to order at 10:30 a. m., by F. Price, president, following which the association listened to an address by Ivy L. Lee of the Pennsylvania Railroad. Mr. Lee referred to the present political unrest prevailing not only in the United States, but all over the world, due to the demand by all classes of labor for a more general distribution of wealth, and dwelt for a time upon the difficulty of so adjusting the various situations as to preserve equity in the distribution of wages for service performed. He referred to the unfair and confiscatory legislation which is being continually directed at the railroads by the various legislatures, tending to increase the cost of operation and decrease efficiency. The general public must be convinced of the honesty and sincerity of railroads before much relief can be expected, and every railroad man should be a missioner to retrieve the good name of the profession before the public.

The association did not approve the recommendation of the Committee on Car Service that per diem rule 5 be amended so as to eliminate the five days' limitation for per diem switching reclaims at present prescribed by this rule; and after the addition of the clause limiting the reclaim to five days, the recommendation of the committee was adopted for submission to the American Railway Association. This recommendation provides for having the reclaim determined by the roads directly interested for each local switching territory; and also, would permit reclaims in connection with intermediate switching movements of cars, which is at present prohibited by Rule 5.

The association adopted for submission to the American Railway Association proposed amendment to per diem rule 13, to provide that per diem reclaims under Rule 5, or on account of special conditions, shall be presented within one year, the same as reclaims presented under rules 14 and 15. A proposed amendment to per diem rule 14 was also adopted for submission to the American Railway Association. This provides that where a road fails to take promptly from a connection cars on which it has laid no embargo, the responsibility of the receiving line for per diem shall, subject to local agreement, continue over midnight when the hour of resumption of receipt of cars does not permit of delivery by midnight of cars held. The proposed rule also provides that the holding road shall, in such manner as may be agreed upon locally, notify the delinquent line each day of the cars which it is holding.

The committee is of the opinion that a regulated pool of car equipment would offer substantial relief in the handling of car equipment as between railroads, but recognizes certain obstacles which will have to be overcome before a pool can be made workable, viz.:

(1) The manifest necessity that equipment be controlled by neutral parties, where now the responsibility for such control rests with the executive of each owning road.

(2) A large proportion of the equipment has been placed in service under car trust obligations that should be adequately conserved in any transfer of control.

(3) The variation in age, design, condition, capacity and dimensions of each class of equipment.

(4) Special equipment necessitated by variety of traffic peculiar to various sections of the country.

(5) The necessity for each carrier to provide its quota of equipment.

The committee suggested the following possible features of a pool as points for discussion:

(1) Carriers to form a holding company empowered to purchase or lease equipment.

(2) Ownership or car trust obligation to be indicated by plates attached to car.

(3) Pool to be started with so-called legal tender box cars.

(4) Special equipment to be handled strictly in accordance with Car Service Rules.

(5) A per diem charge to be determined upon which shall defray the recognized costs of car ownership, plus an amount that will cover all overhead and general expenses incident to pool operation.

(6) Operation of the pool to be divided into zones, under local management, the general manager reporting to the executive committee of the holding company.

(7) Pool storage and repair yards to be located at convenient points.

(8) Surplus and bad order cars to be delivered to nearest storage yard, per diem ceasing upon such delivery. All cars leaving storage yard to be in first class, serviceable condition.

(9) All repair and maintenance chargeable to owners to be assumed by holding company. Repairs due to unfair usage to be charged as at present.

(10) Movement of cars empty from storage yards to be paid for at tariff rates by the holding company.

These were thoroughly discussed and the subject returned to the committee for further consideration.

The list of accepted assignments of reporting marks for cars of private ownership, presented by the Committee on Office Methods and Accounting, was adopted for submission to the American Railway Association. Approximately 365 owners of private cars have accepted assignments.

The committee is also engaged in assigning reporting marks to cars of railroad ownership, with a view to preventing duplicate marks. Assignments of marks have been made to every standard gage railroad in the United States, Canada and Mexico, and, in due time, it is expected that all cars will be stenciled with the assigned reporting marks. The marks are limited to three letters, except in certain instances, where the short "&" is used to enable car owners to use reporting marks which correspond to the corporate initials of the owner. Up to date 350 railroads have accepted the marks assigned, and will apply them to their cars as they pass through shops.

The Master Car Builders' Association (at the request of the Transportation Association) having designated a location on each car for the application of reporting marks and car numbers, viz., the lower left hand corner of each car, it is believed that the assignment by the committee of separate and distinct reporting marks for cars of each ownership in operation on American railways will prove of inestimable value in preventing errors and confusion.

The association approved the action of the committee in recommending to the American Railway Association the elimination of the footnote reference to per diem rule 1. It is now understood that reporting roads shall have six months from the last day of the month in which the per diem is earned to report the same to car owner, failing in which the per diem rate shall be increased five cents per car per day.

The association adopted for submission to the American Railway Association the form recommended by the committee for use by the holding road in reporting cars held under per diem rule 14. The amended form of "summary of per diem reports," presented by the committee, was adopted for submission to the American Railway Association with a slight amendment. It was also decided to recommend to the American Railway Association that per diem rule 11 be amended to provide that the use of A. R. A. prescribed form "G" shall be mandatory in reporting per diem to car owner.

The Committee on Conducting Freight Transportation reported that several roads which have taken advantage of the recommendations of the committee with reference to methods for reducing delays to cars in yards, have obtained very gratifying results; one road reporting a net saving in per diem alone of $2,494 in two weeks, in a single yard, and an increase in the average miles per car per day for the division of 48.1 per cent. over the same month of the previous year.

The Committee on Conducting Passenger Transportation re-

ported a proposed code of rules to govern the interchange of passenger cars, which was referred to letter ballot.

The Committee on Joint Interchange and Inspection Bureaus reported that it is ready to furnish assistance to any railroad in making surveys of junction points with a view to the establishment of joint interchange and inspection bureaus. It also reported that to date joint interchange and inspection bureaus have been established at Chicago (stock yards district), Denver, Des Moines, Dallas, Peoria, Pueblo, also at Shreveport

The election of officers for the ensuing year resulted as follows: President, J. M. O'Day (Illinois Central); first vice-president, J. T. King (Atlantic Coast Line); second vice-president, F. E. Higbie (Central of New Jersey); secretary, G. P. Conard, 75 Church street, New York City; treasurer, F. M. Luce.

It was decided to hold the next meeting at Richmond, Va., December 8 and 9, 1914.

THE RAILWAY CLAIM AGENT*

By W. B. Spaulding

Claims Attorney, St. Louis & San Francisco

The Railway Claim Agents' Association has passed through a quarter of a century of life and experience. Beginning with a membership of 27, representing nine western and southwestern railroads, in a few years it expanded into a membership of 865, representing 107 of the railway systems of United States and Canada. This body of men is unsurpassed in energy, ability or any other of the virile qualities of manhood by any group of men anywhere. The importance to the vast systems of transportation to which you are attached of efficient and intelligent service in the positions you occupy makes this so necessarily.

In the past 25 years a great change has come about in the manner and method of carrying on the railroad business, and no body of railroad men better represent this transition than the claim agents. Under the old view the railroad business was regarded as a private business in the same sense that any other business was private and its internal affairs closed to inquiry by any but the owners and managers. Under the new view the concern of the public is admitted and full information freely furnished.

In former years the claim agent strove to make settlements as cheaply as possible; in recent years his effort has been to make settlements that would stand the test of fairness; fairness to the claimant—fairness to his company. His insistence has been for the "square deal." Having no arbitrary power by which his wishes might be enforced, as was possessed to a greater or less degree by other officers in respect to the exercise of the functions of their office, being under the necessity of winning the consent of claimants to his proposals that he might perform the duties of his position, the claim agent made greater speed along the road of progress from the old to the new view than any other railroad officer, because he sooner learned (if he was capable of learning anything) that his most valuable asset—his most powerful ally—was a reputation for the consideration of the rights of others and a willingness to be just as he had the light to see justice.

The genuinely successful claim agent, the man who is recognized as of real value to his company, is ever ready to declare the facts in this possession; to seek for and give just consideration to the claimant's side of the story and be straightforward with those with whom he deals. It is true there may have been from time to time claim men who pursued the opposite course and by doing so effected unconscionably low settlements for a time, boasted of their achievements and thought themselves entitled to the praise of the managing officers. There may be some such claim men still, but I think them very few in number. If praise was ever given under such circumstances, it was not sincere and it is only praise that is sincere—approbation that is based on worthy acts—that is of ultimate benefit to any man.

It must be remembered that the men in the chief executive positions of our big railroads have attained those positions because they were themselves big men, both morally and intellectually. The world does not afford examples of higher types of character than can be found at the head of the great transportation systems, and, naturally, such men endeavor to select, as their aids in the immediate management of the property, men of like character. Unfair settlements of claims are repugnant to men of this type and the man responsible for such settlements cannot retain their respect. Therefore, in my judgment, the claim agent who is satisfactory to his company and who is of real value to it is the man who is always willing to accord justice to those with whom he deals and who can secure just treatment for his company from them. The claim agent who once establishes a reputation for the former will in the majority of cases find little difficulty in obtaining the latter. As for the minority of cases he should have the ability and energy to fight valiantly for the right like a good soldier.

An incident came to my knowledge a few weeks ago that illustrates the value to a railroad of having its claim agents possess reputations for honest dealing. A man was killed in a train accident; his widow resided in a distant city; at an appropriate time the claim agent called upon her. The first thing she said to him was to ask what he thought of the case. He replied that in his judgment his company was legally responsible for the death of her husband, but if they could agree on reasonable terms for settlement they could both keep out of court. She said that was what she wanted. A proposition was made. She took overnight to consult a woman friend in whose business judgment and acumen she placed great reliance and to consider the matter for herself. She went to the office next day and accepted the proposition. After the money was paid (a moderate sum) she handed the claim agent a letter she had received from the coroner who held the inquest, telling her, in confidence he said, that she had a good case; that claim agents and lawyers would call upon her; that he wanted to see that the company did her justice; that he wrote her, though a stranger to him, because he knew the way they did business. She also said attorneys had solicited her case by letter and in person; that one of them told her she would have to have a lawyer if she got more than funeral expenses out of it: that the claim agent would not pay her hardly anything, to which she said she answered, "Why the claim agent has already told me the company is responsible. Don't you think he will do as much for me as he will for you?"

It is obvious this lady had at some time heard favorable reports of some claim agent and was inclined to believe all of them were governed by the same standard of business principles. What if the claim agent had denied the responsibility of his company or made an evasive answer to her direct question? Would he have gotten this settlement? Would she have trusted herself to deal with him? I do not believe so, because she told him after the settlement he had dealt with her exactly as she had thought he would do.

Many years ago the president of a railroad, on learning I was to take the position of claim agent on his railroad, said to me—The only advice I have to give you is: "Be firm and keep your promises. If you make a bad promise, keep it." You can see in that remark that this president recognized that a claim agent was a potent molder of public opinion toward the railroad with which he was connected and his advice was based on what he believed was to the best interest of the railroad company, because it was in harmony with honor. I have never known an executive officer of any railroad who

*President's address at the twenty-fifth annual convention of the Association of Railway Claim Agents, St. Paul, Minn., on May 20.

expected or desired his claim department to do more than to prevent the company being imposed upon in claim settlements.

Claim agents, as a class, are not paid salaries commensurate with the importance and value of their work to their companies, nor in reasonable proportion to the responsibilities placed upon them. I think this is, largely, perhaps almost wholly, due to the status the claim agent has gotten into officially. There is hardly any subordinate officer who does not assume to outrank a claim agent. This fact was recognized by this association many years ago and it was agreed that strong efforts should be made to bring the claim agent out of the official obscurity into which he had been consigned by his ambitious and forward associates in business and secure for him the official recognition to which the importance of his work justly entitles him. I do not believe the claim agent's compensation will be what it should be until this recognition is secured. I believe if every claim agent within and without this association will live and act in accordance with the high code of business ethics and honor his chief executive officer would wish him to do and insist on all other persons taking cognizance of that fact the day of such official recognition will be greatly hastened.

Radical, indeed, have been the changes during the life of this association in the laws governing the liability of railroads for damages for injury and death of their employees in the course of their employment. These changes were brought about largely by the instrumentality of a class of lawyers whose chief business it was and is to foment litigation between employer and employee in such cases for their own profit. So greatly did these men enrich themselves that a class of business theretofore regarded with disfavor by reputable lawyers has been eagerly sought in recent years by the most of them.

So corrupting is the love of money that any defenses left the railroads to such actions are commonly sworn away by witnesses procured and drilled for the purpose, or are ignored by judges more concerned about their own political future than about the administration of the law they were sworn to uphold. The worst feature of this damage suit industry (for it has attained the proportions of an industry) is not that it despoils the companies of their money of which the victims of the accident get but a small part, but that it despoils the companies of the loyalty and allegiance of their employees and creates a hostility which indirectly causes much greater pecuniary loss to the companies and is disastrous to efficient service to the public.

A southern lawyer of ability and force who obtained, because of his success, a monopoly on the damage suit business arising in his vicinity against three railroads sensed this latter effect many years ago and said to me at the time that his experience had convinced him that when once an employee had brought a damage suit against his employer the relation that must exist between employer and employee was so greatly strained as to render the man unfit to return to his former employer's service and that such a man ought not be taken back.

The evil effects of this system on the courts of the country; its sinister and insidious influence on the judges is notorious everywhere. General recognition of these facts has served the purpose of developing the idea strongly and widely that a system of liability, as between employer and employee, based on fault was fundamentally wrong and inimical to the interest of the employee and his family and the public. That production was carried on for the benefit of society. That society in general should pay the cost of production and included in that cost should be the reasonable compensation, on a fixed and predetermined scale, of those who are injured and the dependent ones of those who are killed in industrial pursuits.

The inherent justice and soundness of this idea; the glaring defects of the old system and the intolerable conditions it was creating; the humanity in the system proposed and based as it is on a common and well-settled principle of business, has appealed so strongly to legislative bodies that it has crystallized into law in nearly one-half the states of the Union and is being considered in many others, as well as in Congress. It is true most of the workmen's compensation acts passed by the states are limited in their scope and in the opinion of political and social economists of high standing and others who have made exhaustive study of the subject are open to other vital criticism, yet these laws constitute a beginning—the first step as it were in bringing in a new and better system.

I wish, in closing my remarks, to speak of the recent movement for the prevention of injuries and the phenomenal rapidity of its spread among the railroads of the country, as well as among the big industrial plants. The results it has already achieved are equally phenomenal—the best proof that the idea underlying it is correct and has stood the test in practice. The salient idea is that injury prevention is the work of the men who are the victims of these occurrences, because they control the majority of the causes of accidents; that in this work they should have the sympathetic support and active co-operation of the companies by which they are employed and of every one of its officers. For obvious reasons the initiatory steps in the inauguration of this movement have had to be taken by the companies and the co-operation has thus far been from the men, but I am sure the men who do the work of the railroads are beginning to realize that the protection of themselves and their associates in work from death and injury is of vastly more consequence to them and their families than any matter of higher wages or change in working conditions can possibly be; that considerations of their own safety have higher and more urgent demands on them than can be urged by any reckless member of their labor order who invokes their aid to save him from discharge, because of the violation of safety rules by which he has imperiled the life and limbs of others, and since they control (substantially speaking) the causes of injury they should control and dominate the movement for the elimination of those causes.

It is my firm belief that the greatest success in the prevention of injury and death of railroad men will not be attained until the men take actual charge of the "Safety First" movement, being given, of course, at all times the active support and co-operation of their companies and everyone of their officers.

THE RELATIONS OF THE YARDMASTER AND DESPATCHER

By J. L. Coss

Assistant Chief Despatcher, Chicago, Rock Island & Pacific, Haileyville, Okla.

If there are any two persons connected with a railroad who should work together at all times they are the despatcher and yardmaster. There always has been and no doubt to a certain degree there always will be more or less conflict between them. Why, we cannot explain, unless it be ignorance.

A yardmaster should possess higher qualifications than the average switchman. He should have a fair education and some executive ability to enable him to handle his correspondence intelligently; to maintain an organization among his men and to command their respect. He must be able to show his men that he has confidence in them and their work and that he relies on their ability to perform the work mapped out for them. It should not be necessary for the yardmaster to give a foreman a job and then feel that he must personally check him up to see that it has been done.

The yardmaster should be paid approximately $150 per month. His pay should at least be more than that of an engine foreman. It does not look right for an engine foreman

to draw a check for $130 and the yardmaster one for $125 or perhaps less. He should devote a portion of his time each day to personally going over the yard records with the clerk to see that foreign cars are being promptly moved according to instructions, that old loads and empties are not allowed to lie around the yard and get buried and that the rip track, roundhouse and storehouse switching is being cared for. In a first class yard he is a busy man, and his responsibilities are great. He is sometimes handicapped for room, especially during a brisk run of business, the clerical force may not be up to the requirements and many other things of an aggravating nature confront him. Therefore, he should be given all the support possible by the despatcher and other officials as well. It's one thing to tell how to run a yard and another to run it. Consists of incoming trains as well as pick-ups made on the road should be given preference by the telegraph department so that they will reach the yardmaster at the earliest possible moment in order that he may figure on the break-up and make-up of trains in the yard. Without this advance information he is badly handicapped.

The despatcher is also a busy man with possibly two or three yards and from 200 to 500 miles of main track to cover. Terminal overtime is an item of expense without any returns whatever; therefore, it should have the closest watching by all concerned and the greatest reduction can be made by the despatcher and yardmaster. A train should not be ordered unless the yardmaster is satisfied beyond any doubt, barring accidents, that he can have it ready at the appointed time, and the despatcher must know he can move it. However, the despatcher must go a little further and be sure that by taking the train at the time specified he will not block incoming trains to such an extent that they will run into road overtime. The simple matter of moving a train out of a terminal is not all by a great deal; of course, if the yard is blocked this is another question, but men who keep in touch with the situation will guard against blocked yards.

Here is where the hard feeling starts. The average yardmaster thinks that when he gets ready to run a train it should be moved at once. He does not figure on what it will encounter out on the line. Many do not care just so they get the train out of the yard and make a showing for themselves. Some despatchers, on the other hand, think that when they want a train all they have to do is to whistle at the yardmaster and the train and engine crew will assemble in front of the yard office in a few moments. I have known cases where the call boy had been instructed to call a crew with an engine and caboose and run out of the yard without even telling the yardmaster that it was wanted.

It takes time to make up a train in the yard. If an extra is wanted by a despatcher at a given time he should be willing to give the yardmaster time to get it and not rush him. If he has not been given reasonable advance notice it may be that his engines are engaged on other important work that he cannot well leave at the time or that some of the engines have turned in for the meal hour. He must be given an opportunity to keep down yard overtime and expense. Above all things, give the yardmaster advance notice concerning what is wanted. Don't have him at work making up a train for the west and decide the next moment that you want one east in preference; this will mix everything up and nothing is gained. Above all things avoid having him tear up a train after it is built. Outside of regular scheduled trains there should not be such a rush about other trains that all concerned cannot have time enough to do properly the necessary work in connection therewith. When a train is thrown together hurriedly nine times out of ten something is found wrong which will result in an hour or two of terminal overtime for the road crew. Then each blames the other.

The yardmaster should realize that the conditions on the road have something to do with the handling of outgoing trains and the despatcher should understand that the yard conditions have something to do with expediting the movement of cars through it. The yardmaster should be so situated that he can go to the despatcher's office and talk over the line-up in advance, and the despatcher should not be so burdened with work that he cannot take a few moments to go over the situation with him and arrange to cover any loop holes that may crop out. Then if any of the plans fail, on either's part, or by accident, each should take it as in the general course of business and not censure the other. Just as soon as these two officials become more closely associated in a business way and work in absolute harmony we will see better work done all around.

WAREHOUSE TRUCKS MADE BY OXY-ACETYLENE WELDING

A striking example of the application of the oxy-acetylene welding process to manufacturing operations is shown in the steel truck made by the Standard Improved Truck Company of Chicago.

Trucks of the type shown in the accompanying illustration were previously made by drilling and riveting all the joints. Welding by the Oxweld process was proposed and a test truck made by this method. The results were so much in favor of this system that it was adopted.

Welding not only produces a one piece truck with great

Truck with Oxy-Acetylene Welded Joints

strength at the joints, but has increased the output per man about 20 per cent. with a saving of over 30 per cent. of the previous cost of manufacture. Comparative tests of three methods of connection were made by Robert W. Hunt & Company, engineers. Connection *A* was the oxy-acetylene welded joint. Connection *B* was riveted with two ¼ in. diameter rivets in double shear, one in the stringer tube and one in the cross tube. Connection *C* was riveted with a ¼ in. rivet in double shear through the cross tube and a ¼ in. riveted reduction of inserted plug through the stringer tube, the head being in tension.

Tested to destruction connection *A* failed at the weld under a maximum load of 25,460 lb. Connection *B* failed by shearing the rivet in the stringer tube under a load of 4,740 lb. At a load of 5,800 lb. connection *C* failed by shearing the rivet in the cross tube and pulling through the rivet connection in the stringer tube.

General News Department

Daniel Willard, president of the Baltimore & Ohio, is now Doctor of Letters, that degree having been conferred upon him by the University of Maryland in Baltimore, June 1.

Wells Fargo & Company have declared a semi-annual dividend of 3 per cent., making their annual dividend rate 6 per cent. instead of 10 per cent., which has been paid for the last seven years.

E. Moody Boynton and his monorail project are still alive; and in the lower House of the Massachusetts Legislature last week a bill to aid him with the credit of the state to the extent of several million dollars was passed by a vote of 105 to 98.

Senator Works of California has introduced in Congress a bill forbidding the payment of tips to porters and waiters on interstate railroad rains and steamboats. Mr. Works proposes to compel employers to pay wages high enough to make tips unnecessary.

The New York, New Haven & Hartford has raised the price of the dinners served on its dining cars from $1 to $1.25. For luncheon the price will still be $1. On the Federal Express, the Boston-Washington train, breakfasts are served at 50 cents, 75 cents and $1.

The Pennsylvania Railroad has issued instructions that the rule forbidding the hiring of men for the service of the road without evidence of satisfactory physical condition, as shown by a physician's examination, is to be observed even in the case of temporary employees, when practicable.

Francis F. Flagg, vice-president of the American Express Company, has been elected president of the National Express Company, succeeding J. C. Fargo, resigned. George C. Taylor, president of the American Express Company, has been elected also president of the Westcott Express Company.

Statements to the effect that the Southern Railway purposes to dispense with ticket collectors on its passenger trains are without foundation; though collectors have been taken off some of the trains on which traffic does not justify their retention. Collectors are to be continued on the important trains on the main line, and no further reductions are contemplated.

The New York State Civil Service Commission announces examinations July 25 for the position of inspector of track installation, under the Public Service Commission of the First district; salary $1,500 to $1,800 yearly. Applicants must have had five years' experience as foreman, supervisor or otherwise in responsible charge of the installation and construction of special track work on steam railroad terminals or high speed electric lines.

W. P. Warner, assistant general passenger and freight agent of the Chicago, Milwaukee & St. Paul at Spokane, Wash., was elected president of the "Milwaukee Puget Sound Pioneer Club" at the annual meeting of the club at Seattle June 24. This club was organized last year, and is composed of men who were identified with the construction of the St. Paul from Mobridge, S. D., to Seattle and Tacoma. The secretary is E. H. Foster, Deer Lodge, Mont.

The Baltimore & Ohio has taken on several hundred men in its shops to repair freight cars in preparation for the expected heavy autumn traffic—regular employees who have been on furlough for a considerable time. The Pennsylvania also has ordered that every available freight car be made ready for use. The Atchison, Topeka & Santa Fe has increased its forces in the shops at San Bernardino and at other places, and made the working hours per week 55 instead of 40.

The Northern Pacific has just finished at Seattle a new commissary building. With equipment it has cost approximately $30,000. A large trade mark, in the shape of a baked potato, 40 ft. long and 18 ft. in diameter, surmounts the roof. The potato is electric lighted and its eyes, through the electric mechanism, are made to wink constantly. A cube of butter thrust into its split top glows intermittently. The potato can be seen from the windows of all transcontinental trains entering Seattle.

The New York State Workmen's Compensation Law went into effect on July 1. By this law employers of men engaged in so-called hazardous occupations—which term, under this law, includes most outdoor work on railroads—are required to pay compensation in all cases of deaths and injuries occurring to employees in the course of their work, disregarding the question of blame or responsibility. Employers are required either to insure themselves, so as to provide sums for payment of claims to which they may become liable, or else to give to the State Workmen's Compensation Commission satisfactory evidence of ability to pay any probable claim or claims; but it is said that all of the railroad companies of the state have thus far refrained from taking action. It is understood that probably some one or more railroads will test the law in the courts. An accident to an employee engaged in interstate commerce must be dealt with according to the provisions of the federal compensation law and the question of whether or not an employee, in a given situation, should be classed as engaged in intrastate commerce, and therefore subject to the New York law, is likely to be a complicated one.

A Correction

G. E. Sisco, assistant engineer of motive power of the Pennsylvania Lines West, advises that the statement made in his discussion of the paper on Front End Design and Air Openings of Grates and Ash Pans, before the International Railway Fuel Association, and reported in the *Railway Age Gazette*, May 22, 1914, page 1150, giving the evaporation per hour for the locomotive with elliptical nozzle as 58,882 lb., should have been 53,882 lb.

A Non-Stop Journey of Twelve Hundred Miles

According to a press despatch from Berlin June 29, a German aviator, Landmann, flying in a military biplane, has remained on the wing 21 hours 49 minutes, traveling in that distance about 1,200 miles, or at an average rate of 55 miles an hour. This flight was begun at 8:30 p. m. June 27. Another German aviator recently remained on the wing 18 hours 10 minutes. In France, according to a report published the same day, a dirigible balloon belonging to the army made a flight of 35 hours 39 minutes without a stop. The balloon flew steadily at a height of about a mile and a half. It was equipped with wireless telegraph apparatus and was in frequent communication with the station in the Eiffel tower.

British Railway Employees

The Bureau of Railway News and Statistics has issued a statement showing that, according to the British Board of Trade, there were 643,135 wage earners employed on the railways of the United Kingdom on December 31, 1913. Of these 594,088 were classed as adults and 49,047 as boys, i. e., under 18 years of age. The total is 44,385 more than in 1910, but only 21,794 over the number reported in 1907. The figures do not include the salaried staff. In the United States in 1913 the total was 1,714,603, also exclusive of general and other officers.

The compensation of British railway employees between 1901 and 1912, for which figures are available, increased from £29,354,000 to £34,912,000, or 19 per cent., where the number of persons increased 11 per cent. During the same period the compensation of American railway employees, exclusive of general and other officers, increased from $588,517,000 to $1,227,933,000, or 108.5 per cent., against an increase of 61.5 per cent. in numbers.

The average pay of British railway men in 1901 was approximately $255 a year and $271 in 1912; that of American railway employees in 1901 was $555 and $716 in 1912. These figures are exclusive of salaried officers in both cases.

Charges of Conspiracy in Connection With the Hampden Railroad

In the Middlesex County Court at Cambridge, Mass., June 29, the grand jury reported indictments against 18 persons in connection with the sale of notes of the Hampden Railroad, the connection between the Boston & Maine and the New York, New Haven & Hartford, which was built in 1913, but which has never been put in operation. The persons indicted are Frederick S. Moseley, banker; Charles S. Mellen, who was president of the New York, New Haven & Hartford; Ralph D. Gillett, who was president of the Hampden Railroad Corporation, but who is now dead, and members of the committees of two savings banks who bought the notes of the railroad corporation. It is charged that the indorsement by the Hampden Investment Company, on the notes of the railroad corporation, was not a substantial security.

The Hampden Railroad, about 15 miles long, cost over $4,000,000. The Massachusetts Public Service Commission has refused to approve more than $3,300,000 in securities and has refused to authorize the lease of the Hampden to the Boston & Maine; and because of the resulting delay in the opening of the road, and for other reasons, the financial burdens of the company and its bankers are becoming pressing. The Massachusetts legislature has discussed a bill designed for the relief of the company and to facilitate the plans of the Boston & Maine for opening the line to business, but has thus far done nothing. The objectors to the bill—declaring that there have been gross frauds and that the applicants do not come into court with clean hands—have succeeded in preventing all action. Ten counts in the indictment charge Mellen, Moseley and Gillett with stealing.

Summary of Revenues and Expenses of Steam Roads in April

The Bureau of Railway Economics summary of revenues and expenses and comments thereon for April, 1914, are as follows:

Railways operating 225,821 miles of line are covered by this summary, or about 90 per cent. of all steam railway mileage in the United States. Their operating revenues for the month of April, 1914, amounted to $230,534,172. This amount includes revenues from freight and passenger traffic, from carrying mail and express, and from miscellaneous sources connected with rail operation. Compared with April, 1913, total operating revenues show a decrease of $7,970,644. Total operating revenues per mile averaged $1,021 in April, 1914, and $1,065 in April, 1913, a decrease of $44, or 4.1 per cent. There was a decrease of 5.2 per cent. in freight revenue per mile, and a decrease in passenger revenue per mile of 0.2 per cent.

Operating expenses, which include all the costs of maintaining track and equipment, operating trains, securing traffic, and of administration, amounted to $172,231,630. This was $7,556,970 less than for April, 1913. These operating expenses per mile of line averaged $763 in April, 1914, and $803 in April, 1913, a decrease of $40 per mile, or 5.0 per cent.

Net operating revenue, that is, total operating revenues less operating expenses, amounted to $58,302,542, which was $413,674 less than for April, 1913. Net operating revenue per mile of line averaged $258 in April, 1914, and $262 in April, 1913, a decrease of $4 per mile, or 1.5 per cent.

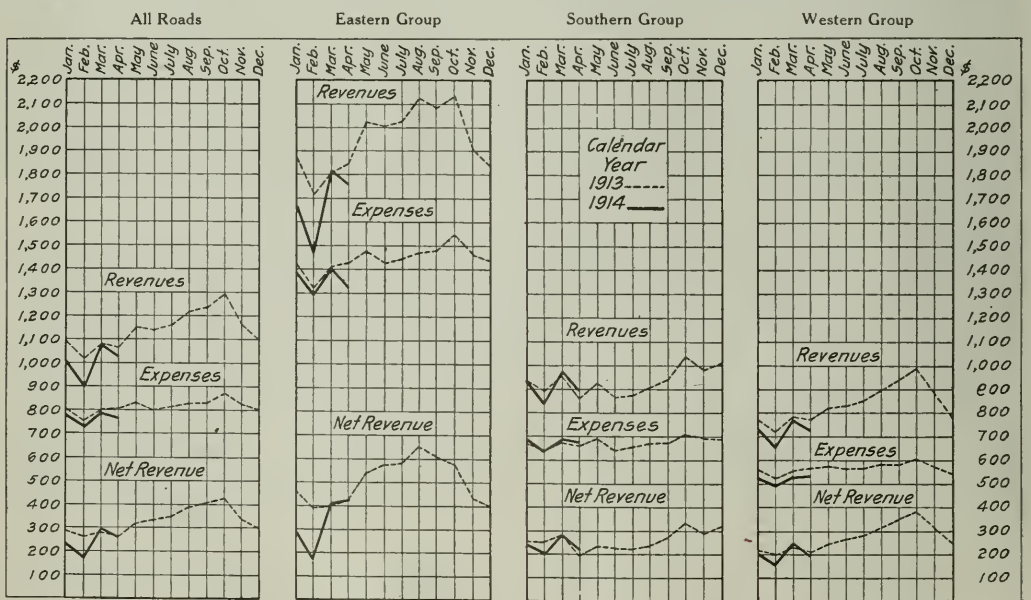
Taxes for the month of April amounted to $11,465,060, or $51 per mile, an increase of 9.3 per cent. over April, 1913.

Operating income, which is net revenue from rail and auxiliary operations, less taxes, averaged $206 per mile of line, and in April, 1913, $214, thus decreasing $8, or 3.5 per cent. Operating income for each mile of line for each day in April averaged $6.88, and for April, 1913, $7.14. Operating income is that proportion of their operating receipts which remains available to the railways for rentals, interest on bonds, appropriations for betterments, improvements, new construction, and for dividends.

The operating ratio for April, that is, the per cent. of total operating revenues absorbed in operating expenses, was 74.7 per cent., which is comparable with 75.4 per cent. in April, 1913, and 73.6 per cent. in April, 1912.

The railways of the Eastern district show a decrease in total operating revenues per mile of line as compared with April, 1913, of 5.1 per cent.; the railways of the Southern district an increase of 4.6 per cent., and the railways of the Western district a decrease of 5.9 per cent. Operating expenses per mile decreased 6.8 per cent. in the East, increased 1.9 per cent. in the South, and decreased 5.0 per cent. in the West. Net operating revenue per mile increased 0.9 per cent. in the East, increased 13.6 per cent. in the South, and decreased 8.3 per cent. in the West. Taxes per mile show an increase of 3.7 per cent. in the East, an increase of 16.1 per cent. in the South, and an increase of 13.3 per cent. in the West. Operating income per mile increased 0.9 per cent. in the East, increased 12.8 per cent. in the South, and decreased 12.7 per cent. in the West.

Comparison of returns for ten months of the current fiscal year with those of the corresponding months of the previous fiscal



Monthly Revenues and Expenses per Mile of Line in 1914

year reveals a decrease in total operating revenues per mile of 2.5 per cent., an increase in operating expenses per mile of 1.6 per cent., and a decrease in net operating revenue per mile of 11.6 per cent. This net operating revenue per mile decreased 18.8 per cent. in the East as compared with the corresponding period of the previous year, increased 0.3 per cent. in the South, and decreased 8.5 per cent. in the West.

When the returns for the four months of the calendar year 1914 are compared with those of the corresponding months of 1913, they show a decrease in total operating revenues per mile of 5.7 per cent., a decrease in operating expenses per mile of 3.4 per cent., and a decrease in net operating revenue per mile of 12.4 per cent. This net operating revenue per mile decreased 22.8 per cent. in the East as compared with the corresponding period of the previous year, decreased 2.9 per cent. in the South and decreased 6.4 per cent. in the West.

The diagram shows the variations in operating revenues, operating expenses, and net operating revenue per mile for the separate months of the calendar year 1913 and of the calendar year 1914 to date. The following table shows the per cent. of operating revenues consumed by each class of expenses:

SELECTED PERCENTAGES AND AVERAGES

(Roads having annual operating revenues above $1,000,000)

	April		Fiscal year ending June 30		Ten months ending April 30	
Account	1914	1913	1913	1912	1914	1913
Per cent. of total operating revenues:			Account			
Freight revenue	69.5	70.3	69.8	68.7	69.1	70.0
Passenger revenue	22.1	21.3	22.2	23.2	22.8	22.1
Other transportation	7.3	7.3	6.9	7.1	7.0	6.9
Non-transportation	1.1	1.1	1.1	1.0	1.1	1.0
Maintenance of way and structures	14.1	15.5	13.3	12.7	13.2	13.0
Maintenance of equipment	18.2	17.8	16.4	15.9	17.5	16.3
Traffic expenses	2.1	2.1	2.0	2.1	2.1	2.0
Transportation expenses	37.4	37.4	35.2	35.9	36.4	35.2
General expenses	2.9	2.6	2.4	2.5	2.6	2.4
Total operating expenses (excluding outside operations and taxes)	74.7	75.4	69.3	69.1	71.8	68.9
Averages per mile per day:						
Operating revenues per mile per day	$34.03	$35.48	$37.76	$34.78	$36.74	$37.67
Operating expenses per mile per day	25.42	26.75	26.17	24.05	26.37	25.95
Net operating revenue per mile per day	8.61	8.73	11.59	10.73	10.37	11.72
Operating income per mile per day	6.88	7.14	10.08	9.28	8.70	10.24

Association of American Railway Accounting Officers

The annual convention of the Association of American Railway Accounting Offices was held at the Hotel Radisson, Minneapolis, Minn., on June 24, 25 and 26, with an attendance of about 150 members. Because the report of the Standing Committee on Corporate, Fiscal and General Accounts was acted upon at a special meeting in New York in March there was little but routine business to come before the meeting. Reports were received from the Executive Committee, the Standing Committee on Freight Accounts and the Standing Committee on Passenger Accounts, and were discussed, and all of the committees of the association presented memorials to the memory of the late C. G. Phillips, who had been secretary of the association since its organization. J. A. Taylor, comptroller of the Central of New Jersey, presented an informal address on the subject of "Loyalty."

Officers were elected as follows: President, C. B. Seger, vice-president and comptroller Union Pacific System, New York; first vice-president, R. A. White, general auditor New York Central & Hudson River, New York; second vice-president, L. A. Robinson, comptroller Chicago & North Western, Chicago. New members of the Executive Committee, Mr. Robinson, B. A. Dousman, general auditor, Chicago, Milwaukee & St. Paul, Chicago; H. H. Laughton, auditor Southern Railway, Washington, D. C. H. G. Foster, assistant general auditor, Chicago, Burlington & Quincy, Chicago, and W. G. Johnson, assistant comptroller, Northern Pacific, St. Paul. E. R. Woodson, of Washington, D. C., was appointed permanent secretary.

Through the courtesy of Mr. Dousman, the Chicago, Milwaukee & St. Paul furnished a special all-steel train of 13 cars for the accommodation of members and their families, leaving Chicago on Tuesday evening and arriving in Minneapolis the following morning. The entertainment program included a ball, a trolley excursion to Lake Minnetonka, and a steamboat ride on the lake.

American Railway Tool Foremen's Association

The sixth annual convention will be held in Chicago, July 20-22, at the Hotel Sherman. The following is the program: July 20, 9:30 a. m.—Opening address; Standardization of Reamers for Locomotive Repairs; Machine Tool Repairs.

July 21.—Special Tools for Drilling, Reaming and Milling; Tool Room Grinding; address: Safety First in Grinding.

July 22.—Distribution of Tools for Shop Use; Dies for Cold Work, Press and Special Punching.

MEETINGS AND CONVENTIONS

The following list gives names of secretaries, dates of next or regular meetings, and places of meeting.

AIR BRAKE ASSOCIATION.—F. M. Nellis, 53 State St., Boston, Mass. Next convention, May 5-8, 1915, Hotel Sherman, Chicago.

AMERICAN ASSOCIATION OF DEMURRAGE OFFICERS.—A. G. Thomason, Boston, Mass.

AMERICAN ASSOCIATION OF DINING CAR SUPERINTENDENTS.—H. C. Boardman, D. L. & W., Hoboken, N. J. Next convention, October, Washington.

AMERICAN ASSOCIATION OF GENERAL PASSENGER AND TICKET AGENTS.—W. C. Hope, 143 Liberty St., New York.

AMERICAN ASSOCIATION OF FREIGHT AGENTS.—R. O. Wells, I. C. R. R., East St. Louis, Ill.

AMERICAN ASSOCIATION OF RAILROAD SUPERINTENDENTS.—E. H. Harman, Room 101, Union Station, St. Louis, Mo. Next convention, August 20 and 21, New York.

AMERICAN ELECTRIC RAILWAY ASSOCIATION.—E. B. Burritt, 29 W. 39th St., New York. Annual convention, October 12-16, Atlantic City, N. J.

AMERICAN ELECTRIC RAILWAY MANUFACTURERS' ASSOC.—H. G. McConnaughy, 165 Broadway, New York. Meetings with Am. Elec. Ry. Assoc.

AMERICAN RAILWAY ASSOCIATION.—W. F. Allen, 75 Church St., New York.

AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—C. A. Lichty, C. & N. W., Chicago. Next convention, October 20-22, 1914, Los Angeles, Cal.

AMERICAN RAILWAY ENGINEERING ASSOCIATION.—E. H. Fritch, 900 S. Michigan Ave., Chicago. Next convention, March 16-18, 1915.

AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION.—J. W. Taylor, Karpen Building, Chicago.

AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—A. R. Davis, Central of Georgia, Macon, Ga. Next convention, July 20-22, Hotel Sherman, Chicago.

AMERICAN SOCIETY FOR TESTING MATERIALS.—Prof. E. Marburg, University of Pennsylvania, Philadelphia, Pa. Next annual meeting, June 30 to July 4, Hotel Traymore, Atlantic City, N. J.

AMERICAN SOCIETY OF CIVIL ENGINEERS.—Chas. W. Hunt, 220 West 57th St., New York; 1st and 3d Wed., except June, July and August, New York.

AMERICAN SOCIETY OF ENGINEERING CONTRACTORS.—J. R. Wemlinger, 11 Broadway, New York; 2d Thursday of each month, at 2 P. M., 11 Broadway, New York.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 39th St., New York.

AMERICAN WOOD PRESERVERS' ASSOCIATION.—F. J. Angier, B. & O., Baltimore, Md. Next convention, January 19-21, 1915, Chicago.

ASSOCIATION OF AMERICAN RAILWAY ACCOUNTING OFFICERS.—E. R. Woodson, 1300 Pennsylvania Ave., Washington, D. C.

ASSOCIATION OF RAILWAY CLAIM AGENTS.—C. W. Egan, B. & O., Baltimore, Md.

ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.—Jos. A. Andreucetti, C. & N. W. Ry., Chicago. Annual convention, October 19-23, Chicago.

ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—P. W. Drew, 112 West Adams St., Chicago.

ASSOCIATION OF TRANSPORTATION AND CAR ACCOUNTING OFFICERS.—G. P. Conard, 75 Church St., New York.

ASSOCIATION OF WATER LINE ACCOUNTING OFFICERS.—W. R. Evans, Chamber of Commerce, Buffalo, N. Y.

BRIDGE AND BUILDING SUPPLY MEN'S ASSOCIATION.—L. D. Mitchell, Detroit Graphite Co., Chicago, Ill. Meeting with American Railway Bridge and Building Association.

CANADIAN RAILWAY CLUB.—James Powell, Grand Trunk Ry., Montreal, Que.; 2d Tuesday in month, except June, July and August, Windsor Hotel, Montreal.

CANADIAN SOCIETY OF CIVIL ENGINEERS.—Clement H. McLeod, 176 Mansfield St., Montreal, Que.; 1st Thursday, October, November, December, February, March and April, Montreal.

CAR FOREMEN'S ASSOCIATION OF CHICAGO.—Aaron Kline, 841 Lawler Ave., Chicago; 2d Monday in month, except July and August, Lytton Bldg., Chicago.

CENTRAL RAILWAY CLUB.—H. D. Vought, 95 Liberty St., New York; 2d Fri. in Jan., May, Sept. and Nov. and 2d Thurs. in March, Hotel Statler, Buffalo, N. Y.

CIVIL ENGINEERS' SOCIETY OF ST. PAUL.—Edw. J. Dugan, P. O. Box 654, St. Paul, Minn.; 2d Monday, except June, July, August and September, Old State Capitol Bldg., St. Paul.

ENGINEERS' SOCIETY OF PENNSYLVANIA.—Edw. R. Dasher, Box 75, Harrisburg, Pa.; 1st Friday after 10th of each month, except July and August, 31 So. Front St., Harrisburg, Pa.

Engineers' Society of Western Pennsylvania.—Elmer K. Hiles, Oliver Bldg., Pittsburgh; 1st and 3d Tuesday, Pittsburgh, Pa.

Freight Claim Association.—Warren P. Taylor, Richmond, Va.

General Superintendents' Association of Chicago.—A. M. Hunter, 605 Grand Central Station, Chicago; Wed. preceding 3d Thurs., Transportation Bldg., Chicago.

International Railway Congress.—Executive Committee, 11, rue de Louvain, Brussels, Belgium. Convention, 1915, Berlin.

International Railway Fuel Association.—C. G. Hall, 922 McCormick Bldg., Chicago.

International Railway General Foremen's Association.—Wm. Hall, 829 West Broadway, Winona, Minn. Next convention, July 14-17, Hotel Sherman, Chicago.

International Railroad Master Blacksmiths' Association.—A. L. Woodworth, Lima, Ohio. Next convention, third Tuesday in August.

Maintenance of Way and Master Painters' Association of the United States and Canada.—T. I. Goodwin, C. R. I. & P., Eldon, Mo. Next convention, November 17-19, 1914, Detroit, Mich.

Master Boiler Makers' Association.—Harry D. Vought, 95 Liberty St., New York.

Master Car Builders' Association.—J. W. Taylor, Karpen Building, Chicago.

Master Car & Locomotive Painters' Assoc. of U. S. and Canada.—A. P. Dane, B. & M., Reading, Mass. Next convention, September 8-11, Nashville, Tenn.

National Railway Appliances Association.—Bruce V. Crandall, 537 So. Dearborn St., Chicago. Next convention, March 15 to 19, 1915, Chicago.

New England Railroad Club.—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass.; 2d Tuesday in month, except June, July, Aug. and Sept., Boston.

New York Railroad Club.—H. D. Vought, 95 Liberty St., New York; 3d Friday in month, except June, July and August, New York.

Niagara Frontier Car Men's Association.—E. Frankenberger, 623 Brisbane Bldg., Buffalo, N. Y. Meetings monthly.

Peoria Association of Railroad Officers.—M. W. Rotchford, Union Station, Peoria, Ill.; 2d Thursday in month, Jefferson Hotel, Peoria.

Railroad Club of Kansas City.—C. Manlove, 1008 Walnut St., Kansas City, Mo.; 3d Friday in month, Kansas City.

Railroad Master Tinners, Coppersmiths & Pipefitters' Association.—U. G. Thompson, C. & E. I., Danville, Ill.

Railway Business Association.—Frank W. Noxon, 30 Church St., New York.

Railway Club of Pittsburgh.—J. B. Anderson, Penna. R. R., Pittsburgh, Pa.; 4th Friday in month, except June, July and August, Pittsburgh.

Railway Development Association.—W. Nicholson, Kansas City Southern, Kansas City, Mo.

Railway Electrical Supply Manufacturers' Assoc.—J. Scribner, 1021 Monadnock Block, Chicago. Meetings with Asso. Ry. Elec. Engrs.

Railway Fire Protection Association.—C. B. Edwards, Mobile & Ohio, Mobile, Ala. Annual meeting, October 6, Washington, D. C.

Railway Gardening Association.—J. S. Butterfield, Lee's Summit, Mo.;

Railway Signal Association.—C. C. Rosenberg, Bethlehem, Pa. Annual meeting, Bluff Point, N. Y., September 22-24.

Railway Storekeepers' Association.—J. P. Murphy, Box C, Collinwood, Ohio.

Railway Supply Manufacturers' Association.—J. D. Conway, 2136 Oliver Bldg., Pittsburgh, Pa. Meetings with M. C. B. and M. M. Associations.

Railway Telegraph & Telephone Appliance Association.—G. A. Nelson, 50 Church St., New York. Meetings with Assoc. of Ry. Teleg. Supts

Richmond Railroad Club.—F. O. Robinson, C. & O., Richmond, Va.; 2d Monday in month, except June, July and August.

Roadmasters' and Maintenance of Way Association.—L. C. Ryan, C. & N. W., Sterling, Ill. Next convention, September 8-10, 1914, Chicago.

St. Louis Railway Club.—B. W. Frauenthal, Union Station, St. Louis, Mo.; 2d Friday in month, except June, July and Aug., St. Louis.

Salt Lake City Transportation Club.—R. E. Rowland, Hotel Utah Bldg., Salt Lake City, Utah; 1st Saturday of each month, Salt Lake City.

Signal Appliance Association.—F. W. Edmunds, 3868 Park Ave., New York. Meeting with annual convention Railway Signal Association.

Society of Railway Financial Officers.—Carl Nyquist, La Salle St. Station, Chicago.

Southern Association of Car Service Officers.—E. W. Sandwich, A. & W. P. Ry., Atlanta, Ga. Next meeting, July 16, Chattanooga, Tenn.

Southern & Southwestern Railway Club.—A. J. Merrill, Grant Bldg., Atlanta, Ga.; 3d Thurs., Jan., March, May, July, Sept., Nov., 10 A. M., Candler Bldg., Atlanta.

Toledo Transportation Club.—J. S. Marks, Agent, Interstate Despatch, Toledo, Ohio; 1st Saturday in month, Boody House, Toledo.

Track Supply Association.—W. C. Kidd, Ramapo Iron Works, Hillsburn, N. Y. Meetings with Roadmasters' and Maintenance of Way Association.

Traffic Club of Chicago.—W. H. Wharton, La Salle Hotel, Chicago.

Traffic Club of New York.—C. A. Swope, 291 Broadway, New York; last Tuesday in month, except June, July and August, Waldorf-Astoria, New York.

Traffic Club of Pittsburgh.—D. L. Wells, Erie R. R., Pittsburgh, Pa.; meetings bimonthly, Pittsburgh. Annual meeting, 2d Monday in June.

Traffic Club of St. Louis.—A. F. Versen, Mercantile Library Building, St. Louis, Mo. Annual meeting in November. Noonday meetings October to May.

Train Despatchers' Association of America.—J. F. Mackie, 7122 Stewart Ave., Chicago.

Transportation Club of Buffalo.—J. M. Sells, Buffalo; first Saturday after first Wednesday.

Transportation Club of Detroit.—W. R. Hurley, Supt.'s office, L. S. & M. S., Detroit, Mich.; meetings monthly, Normandie Hotel, Detroit.

Traveling Engineers' Association.—W. O. Thompson, N. Y. C. & H. R., East Buffalo, N. Y. Next meeting, September 15-18, Hotel Sherman, Chicago.

Utah Society of Engineers.—Frank W. Moore, Newhouse Bldg., Salt Lake City, Utah; 3d Friday of each month, except July and August, Consolidated Music Hall, Salt Lake City.

Western Canada Railway Club.—W. H. Rosevear, P. O. Box 1707, Winnipeg, Man.; 2d Monday, except June, July and August, Winnipeg.

Western Railway Club.—J. W. Taylor, 1112 Karpen Building, Chicago; 3d Tuesday of each month, except June, July and August, Karpen Building, Chicago.

Western Society of Engineers.—J. H. Warder, 1735 Monadnock Block, Chicago; regular meeting 1st Monday in month, except January, July and, August, Chicago. Extra meetings, except in July and August, generally on other Monday evenings.

Traffic News

The Western Classification Committee held a meeting at San Francisco, Cal., on June 30, for the hearing of petitioners on a large docket of subjects.

The California terminal lines have announced that during the expositions to be held in California next year special cars or special trains will not be parked at Los Angeles, San Diego, or San Francisco, or anywhere within 50 miles of those points.

President O. L. Dickeson, of the White Pass & Yukon, announced in Seattle June 24 that the new tariffs equalizing the St. Michael gateway rates from Seattle and Puget Sound ports to Fairbanks and all points on the Tanana river, and to Hot Springs via Skagway, would become effective July 1.

The United States Express Company went out of business on the night of June 30. Of the 32,860 miles of lines operated by this company about 14,000 miles will now be operated by the American Express and about 12,000 by Wells Fargo & Company The Adams Express will operate the remainder.

Since August 7 last, the Minnesota railroads have refunded $1,500,000 to passengers and shippers of freight, in the form of reparation, as a result of the decision of the Supreme Court in the state rate cases. Claims are still arriving at the office of the state railroad commission at the rate of nearly a hundred a day.

Governor Spry of Utah has advised the Salt Lake City Commercial Club Traffic Bureau that he has found that no law has been violated by the declaration of the Union Pacific special dividend, and that the state will, therefore, take no action in the matter. The Governor's answer quotes a long opinion from the attorney general of the state, who holds that on the statement of facts the company has not violated any of its charter provisions. The bureau petitioned the governor on June 2 to investigate the matter with a view to preventing the distribution of the dividend, on the ground that it was illegal and would mean increased freight rates.

A committee of the Denver Chamber of Commerce has invited representatives of the Denver & Rio Grande and the Pullman Company to appear at meetings of the committee to explain the reasons for alleged discrimination against Denver in their rates. The Denver Convention Association has complained that fares from points in the southwest are higher to Denver than to Colorado Springs and Pueblo, that lower round-trip rates are made from Denver to Colorado Springs and other cities than from those cities to Denver, and that the combination of Pullman fares from Chicago to Denver, $6, and from Denver to San Francisco, $9, is higher than the combination on Salt Lake City, $8.50 plus $5.

The Department of Agriculture has issued revised regulations governing the interstate movement of live stock, embracing changes designed to facilitate the movement of stock from quarantined areas. Cattle that have been dipped once under state or federal supervision may be shipped from an area quarantined for ticks to a market center where there are proper dipping facilities and the Department of Agriculture maintains an inspector. After a second dipping the cattle may be sold for any purpose. Under certain strict conditions, the transportation of hogs from public stock yards is now permitted, this because of the discovery by government scientists of a serum which renders swine immune to hog cholera. Hogs which have been treated with the serum and which show no symptoms of suffering from any form of disease may now be shipped. As a result of this it is expected that thousands of lightweight hogs will be sent from the stock yards to the country for feeding and fattening and that the country's total production of pork will be greatly increased.

Representatives of the Texas railways affected by the Shreveport decision appeared at a hearing before the Texas Railroad Commission on June 19, and asked the approval of the commission for a tariff of rates applying from Dallas and Houston to East Texas points, equalized with the interstate rates from

Shreveport, La., westward to the same points, as ordered by the Interstate Commerce Commission in the decision which has been upheld by the Supreme Court. The new tariff, which it is proposed to make effective on August 1, advances the Texas rates which were fixed by the Texas Railroad Commission. The railroad representatives asked the Texas commission to agree to the new rates and place them in a position where they could act without offense to either the Texas commission or the Interstate Commission. The Texas commission declined to state that it would not prosecute the railroads for violating state tariffs in making the new adjustment, and Commissioner Williams said he did not think the rates should be raised from Texas points towards Shreveport, but that the situation should be compromised by a partial advance in the Texas rates and a partial reduction in the Shreveport rates. The roads announced that they would file the new tariff at once.

The refusal of the St. Louis Southwestern Railway to deliver beer at Lufkin, Tex., is to be made the basis of a court proceeding to test the Allison liquor law. Smith & Jones some time since ordered a cask of beer from Kansas City, Mo. Upon the arrival of the beer at Lufkin, the agent refused to deliver and intended to return it to Kansas City; but Messrs. Smith and Jones sued out a writ of injunction. The railroad company has consistently refused to deliver intoxicating liquors.

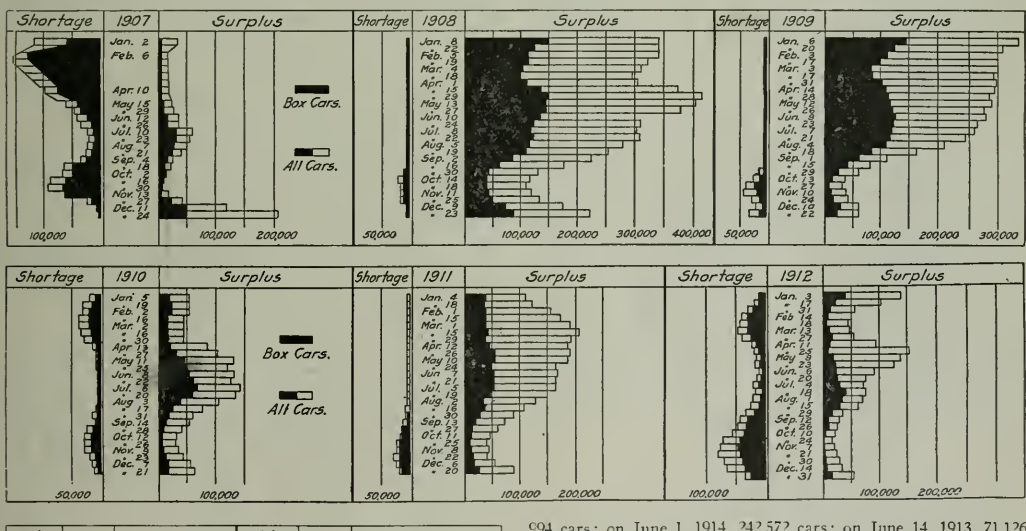
Car Surpluses and Shortages

Arthur Hale, chairman of the committee on relations between railroads of the American Railway Association, in presenting statistical bulletin No. 169-A, giving a summary of car surpluses and shortages by groups from February 15, 1913, to June 15, 1914, says: The total surplus on June 15, 1914, was 232,994 cars; on June 1, 1914, 242,572 cars; on June 14, 1913, 71,126 cars; on June 20, 1912, 73,464 cars; on June 21, 1911, 165,934 cars, and on June 22, 1910, 125,644 cars.

CAR SURPLUSES AND SHORTAGES

Date	No. of roads.	Surpluses Box.	Flat.	Coal, gondola and hopper.	Other kinds.	Total.	Shortages Box.	Flat.	Coal, gondola and hopper.	Other kinds.	Total.
Group *1.—June 15, 1914	8	674	246	1,531	305	2,756	0	134	0	0	134
" 2.— " 15, 1914	34	5,608	174	20,854	10,319	36,955	0	0	0	0	0
" 3.— " 15, 1914	28	6,855	1,173	41,448	3,798	53,274	40	200	0	6	246
" 4.— " 15, 1914	11	6,055	974	5,962	1,395	14,386	0	0	19	25	44
" 5.— " 15, 1914	21	3,671	712	10,120	2,201	16,704	4	2	0	0	6
" 6.— " 15, 1914	28	15,945	645	8,347	6,219	31,156	129	30	9	13	181
" 7.— " 15, 1914	4	2,831	56	954	1,684	5,525	0	0	0	0	0
" 8.— " 15, 1914	15	11,786	409	1,589	4,708	18,492	0	0	0	0	0
" 9.— " 15, 1914	14	1,233	109	222	1,339	2,903	6	0	20	0	26
" 10.— " 15, 1914	22	16,170	1,645	2,493	9,331	29,639	0	0	1	22	23
" 11.— " 15, 1914	3	17,622	968	0	2,614	21,204	0	0	0	0	0
Total	188	88,450	7,111	93,520	43,913	232,994	179	366	49	66	660

*Group 1 is composed of New England lines; Group 2—New York, New Jersey, Delaware, Maryland and Eastern Pennsylvania lines; Group 3—Ohio, Indiana, Michigan and Western Pennsylvania lines; Group 4—West Virginia, Virginia, North and South Carolina lines; Group 5—Kentucky, Tennessee, Mississippi, Alabama, Georgia and Florida lines; Group 6—Iowa, Illinois, Wisconsin and Minnesota lines; Group 7—Montana, Wyoming, Nebraska, North Dakota and South Dakota lines; Group 8—Kansas, Colorado, Missouri, Arkansas and Oklahoma lines; Group 9—Texas, Louisiana and New Mexico lines; Group 10—Washington, Oregon, Idaho, California, Nevada and Arizona lines; Group 11—Canadian lines.



Car Surpluses and Shortages, 1907 to 1914

The principal reduction of surplus is in central freight association territory (group 3), with smaller reductions in the central part of the southeastern district (group 5), and in the Nebraska, Wyoming, etc. (group 7), while the surplus continues to increase in trunk line territory (group 2).

The total shortage on June 15, 1914, was 660 cars; on June 1, 1914, 770 cars; on June 14, 1913, 7,199 cars; on June 20, 1912, 5,746 cars; on June 21, 1911, 2,764 cars, and on June 22, 1910, 2,729 cars.

The total shortage of 660 cars remains negligible.

The table on the preceding page gives car surplus and shortage figures by groups for the last period covered in the report and the diagram shows total bi-weekly surpluses and shortages from 1907 to 1914.

Cleveland Traffic Club

At a meeting of the Traffic Club of Cleveland, held on June 22, the following officers were elected: President, D. F. Hurd, traffic commissioner, Cleveland Chamber of Commerce; first vice-president, John W. Clark; second vice-president, J. G. Masterton; secretary, Martin F. Doyle; treasurer, C. M. Andruss.

Car Location

The accompanying table, which was taken from bulletin No. 19 of the American Railway Association, gives a summary of freight car location by groups on June 1, 1914.

CAR LOCATION ON JUNE 1, 1914

	New England.	N.Y., N.J., Del., Md., Eastern Pa.	Ohio, Ind., Mich., Western Pa.	Va., W. Va., No. & So. Carolina.	Ky., Tenn., Miss., Ala., Ga., Fla.	Iowa, Ill., Wis., Minn.	Mont., Wyo., Neb., Dakotas.	Kans., Colo., Okla., Mo., Ark.	Texas, La., New Mexico.	Oregon, Idaho, Nev., Cal., Ariz.	Canadian Lines.	Grand Total.
Total Cars Owned	88,141	689,020	261,742	207,872	175,860	496,064	20,707	155,374	33,598	139,618	154,334	2,422,330
Home Cars on Home Roads	54,890	489,029	122,857	140,664	116,980	369,621	11,677	106,545	21,554	88,025	111,755	1,633,597
Home Cars on Foreign Roads	33,251	199,991	138,885	67,208	58,880	126,433	9,040	48,829	12,044	51,593	42,579	788,733
Foreign Cars on Home Roads	39,269	219,810	168,136	64,067	49,963	114,956	10,168	43,754	20,021	46,109	26,196	802,449
Total Cars on Line	94,159	708,839	290,993	204,731	166,943	484,587	21,835	150,299	41,575	134,134	137,951	2,436,046
Excess or Deficiency	6,018	19,819	29,251	*3,141	*8,917	*11,477	1,128	*5,075	7,977	*5,484	*16,383	13,716
Surplus	3,890	58,831	36,122	12,694	18,049	31,943	10,908	14,755	3,648	30,601	21,131	242,572
Shortage	7	5	241	53	100	86	...	...	8	1	269	770
Shop Cars—												
Home Cars in Home Shops	7,563	58,896	20,850	18,868	15,464	36,881	904	16,034	3,768	7,916	6,495	193,639
Foreign Cars in Home Shops	975	7,266	7,666	1,794	1,562	3,659	474	1,429	951	2,545	202	28,523
Total Cars in Shops	8,538	66,162	28,516	20,662	17,026	40,540	1,378	17,463	4,719	10,461	6,697	222,162
Per Cent. to Total Cars Owned—												
Home Cars on Home Roads	62.28	70.97	46.94	67.67	66.52	74.51	56.34	68.57	64.15	63.05	72.41	67.44
Total Cars on Line	104.39	102.88	111.06	98.49	94.93	97.69	105.45	95.73	123.74	96.07	89.38	100.57
Home Cars in Home Shops	8.58	8.55	7.96	9.08	8.79	7.48	4.36	10.32	11.22	5.67	4.21	7.99
Foreign Cars in Home Shops	.71	1.05	2.93	.86	.89	.74	2.29	.85	2.83	1.82	.13	1.18
Total Cars in Shops	9.29	9.60	10.89	9.94	9.68	8.22	6.65	11.17	14.05	7.49	4.34	9.17

* Denotes deficiency.

New Mississippi River Barge

A steel barge which has just been built at New Orleans by J. H. Bernard for use on the Mississippi is expected by its sponsors to reduce the cost of transportation on the river. Under the auspices of the Inland Navigation Bureau, the barge will leave New Orleans, July 6. The barge is one of several producer gas propelled flat bottom craft with large freight-carrying capacity. The cost of moving freight by them, even under existing unfavorable conditions, is expected to be more than half a mill per ton mile, while the cost under ideal conditions may be cut down to one-fourth or one-eight of a mill per ton mile. These barges, unlike the old are plain iron and steel from stem to stern. They are so shaped as to hold every possible ton of freight. The crew needed to navigate a loaded 1,000-ton barge consists of seven men all told.

On the trip to St. Paul, 1,000 tons of Louisiana lumber will be taken up, and 1,000 tons of export flour and other commodities will be brought back to New Orleans.

GERMAN LOCOMOTIVES FOR GREAT BRITAIN.—On May 19 the South-Eastern & Chatham received five engines in section on its order recently placed with a German locomotive firm.

AUSTRALIAN RAILWAY TIES.—The West Australian government, which undertook the contract for the supply of ties for the transcontinental railway is finding some difficulty in complying with the terms of delivery, as delays have taken place in the construction of saw mills and in shipping logs out of the forest. The engineer in chief in charge of the railway construction says, in regard to the relative merits of the Karri and Jarrah ties which are being used, that while Jarrah ties are known to have an average life of about 14 years, it is anticipated that treated Karri ties will last nearly 30 years. The Jarrah tie has the unfortunate peculiarity of sinking away from the spikes so that in time the latter become loose. The Karri, on the other hand, closes around the spike and holds it tight.

Commission and Court News

INTERSTATE COMMERCE COMMISSION

Examiner Henderson held a hearing at Duluth, Minn., on June 20 on an application for a reduction in the rates on apples from Missouri to Duluth and Ashland.

Examiner Gibson held a hearing at Duluth, Minn., on June 23 on an application of shippers for a reduction in the freight rate on pulp wood from points in Minnesota.

Examiner Berry held a hearing at Chicago on June 22 on reshipping rates on grain and grain products from Omaha, Neb., and other points to Chicago & Alton stations in Illinois and Missouri.

The commission has further suspended from July 1 to October 29 tariffs filed by the eastern carriers imposing charges for switching cars to and from points on private sidings and industrial tracks.

The Interstate Commerce Commission has scheduled a hearing to be held on July 14 at Peoria, Ill., on the application of the Chicago, Ottawa & Peoria Traction Company for an order compelling steam railways to join it in making through rates.

Examiner Pugh held a hearing at San Francisco last week on the application of the cities of Santa Rosa, Santa Clara, San Jose and Marysville and others for terminal rates. The commission some time ago issued an order that Santa Rosa should be given terminal rates if they were accorded the other three cities, whereupon the railways withdrew them from the other three. These cities then protested that they were entitled to the rates if a large number of other cities were given them. The railways then announced that terminal rates would be restricted to San Francisco, Oakland, Los Angeles and San Diego.

Rates on Fresh Meats and Packing-house Products from Mason City, Ia.

Jacob E. Decker & Sons v. Chicago, Milwaukee & St. Paul. Opinion by Commissioner Daniels:

The commission finds that the rates of 18 and 16 cents per 100 lb. respectively on fresh meats and packing-house products from Mason City, Ia., to Chicago are not unreasonable *per se* nor discriminatory as compared with the rates from competing points. It is also held that the fact that Mason City pays different rates on fresh meats and packing-house products, whereas no difference in charge on the two is made from competing points, is not in itself evidence of discrimination as against Mason City and that identity of ratio between commodity rates

and the corresponding class rates is not indispensable to disprove absence of discrimination, especially where the divergence is moderate in amount. (30 I. C. C., 547.)

Malt Rates to New Orleans

Opinion by Commissioner Daniels:

The commission finds that the carriers have justified a proposed increase from 25 to 30½ cents per 100 lb. in the rate on malt in carloads from Minneapolis, Minn., and other points to New Orleans, La. Complaint is chiefly made that the proposed rate will give malsters of Chicago an advantage over competitors in Milwaukee, but the commission holds that there is nothing in the record which clearly shows that the total cost to the former of getting the grain to this plant, malting it in transit and forwarding it to New Orleans is less than the cost to the Milwaukee malster. (30 I. C. C., 587).

Transit Privileges on Hay at St. Albans, Vt.

American Hay Company v. Central Vermont et al. Opinion by Commissioner Daniels:

The complainant, owning a hay shed at St. Albans, Vt., had the privilege of reshipping hay to various destinations on old billing. To obtain this privilege it should have written "own billing" on the bill of lading, but complainant's agent wrote "new billing" and, therefore, in accordance with the custom the carrier charged the local rate from St. Albans. It is claimed that this was incorrect and reparation is asked for the difference between the through rate and the rate paid. The commission holds, however, that where the option of a transit privilege exists, the duty rests primarily on the shipper who elects to make use of it to make clear affirmatively to the carrier his right and intention to do so, failing which the carrier, especially when following written instructions, may fairly assume that the shipment is intended to be made without the benefit of the transit privilege. The complaint is therefore dismissed. (30 I. C. C. 562.)

Coal Car Distribution Rules

McCaa Coal Company et al v. Coal & Coke Railway. Opinion by Commissioner McChord:

The complainants, six coal mining companies operating on the line of the defendant contend that in the distribution of coal cars they are discriminated against in favor of the Davis Colliery Company, a company owned and controlled by substantially the same interests as the defendant. Cars are distributed to the mines involved on the basis of their physical and commercial capacity. The former is added to the latter as figured for the preceding 12 months, and the result divided by two, and if the resultant figure obtained is greater than the tipple or haulage capacity the lesser of these is taken as the basis of the mine rate.

It is the practice of the defendant to require the mines on its road to furnish quarterly, on blanks supplied by it, detailed information concerning the physical and operating conditions of the mine, such as the coal loaded during each of the months for the 12 months' period prior; average thickness of coal seam; number of working places available; number of miners working; number of miners that could be worked to advantage; average capacity of each miner; whether or not machines are used in mining; number of miners' houses occupied; haulage capacity; and tipple capacity. With this information before it, however, the defendant disregards all of it except the reported number of working places; in each working place it imagines two miners working with a capacity per miner as reported, and with this calculation the physical capacity is determined, no regard being given to the fact that the places may never have been worked, tracks may never have been laid into them, or that the working places may have been exhausted. Nor is consideration taken of the use of machines, the thickness of the seam nor of the men that could be housed.

The commission believes that the best that can be said for these calculations as to physical capacity is that they are arbitrary inflations, which furnish nothing real or tangible. From the results obtained under the system of car distribution employed it seems that it must have been devised and prosecuted with a view to furnishing the mines which are owned by the same interests as the defendant railroad all the cars required during periods of car shortage and high prices. The discrimination permitted by this system, as indicated, is of the most insidious character, calling for drastic action by the commission.

It is therefore held that the distribution of coal cars based on the element of physical capacity is wholly unsatisfactory and unjust. It is suggested that the proper basis should be the total shipments of each mine, taken for the two-year period prior to January 1, 1913, divided by the number of 10-hour days the mine actually operated during such period. This will furnish the average daily output over a two year period during car shortage as well as during free car supply and will reflect the operations and possibilities of each mine as truly as they can be ascertained.

Cars must be supplied to all operators as of 7 a. m. of the day charged. Where the mine's percentage is not high enough to entitle it to one car in the distribution for the day its order shall go over to the next day and such mine shall be supplied before any other on the next day's distribution. In the case of a new mine or a mine that did not operate during period above described, an arbitrary allotment shall be made upon request, which shall bear due relation to other operating mines of similar proportions. It is recommended that the defendant continue to require the mines to report quarterly, as now, concerning their operations, and the mine operators are cautioned that these reports hereafter must not be padded. By reason of the relation existing between the defendant company and the Davis Colliery Company, in complying with the views expressed herein the strictest impartiality will be required. The defendant is given until August 1, 1914, to follow the foregoing suggestions. (30 I. C. C., 531.)

STATE COMMISSIONS

Philip D. Laird has resigned as chairman of the Maryland Public Service Commission to take effect August 1.

The Nebraska Railway Commission has announced that it is considering a reduction in freight rates throughout the state which will amount to approximately 20 per cent. on the average.

The Pennsylvania Water Supply Commission has granted the applications of the Pennsylvania and the Erie railroads to make fills along the Allegheny river. The Pennsylvania has applied for permission to build a bridge at Pottsville.

The Missouri Public Service Commission held a hearing at Kansas City on June 22, on the application of the Kansas City Connecting Railroad for authority to build terminals in connection with the Kansas City stock yards. The application was opposed by the principal railways.

The Arizona Corporation Commission has issued an order reducing lumber and timber rates from Northern Arizona to Southern Arizona points, effective July 5. Most of the reductions are between 20 and 50 per cent. The carload minimum on lumber is reduced from 40,000 to 30,000 lb.

The Ohio Public Utilities Commission has ordered 44 railroads operating in Ohio to establish joint rates and through routes between points on their lines in Ohio and points on the lines of the Newburg & South Shore and the Lake Terminal railways. These short roads, since the Interstate Commerce Commission's recent order, have been classed as "plant facilities."

COURT NEWS

The application of the Terminal Railroad Association of St. Louis for a modification of a decree of the district court ordering it to refrain from switching from one industry to another on its tracks, was denied on June 20, by Judges Hook, Sanborn and Smith of the United States district court at St. Paul. Permission was granted to appeal to the Supreme Court.

Tariffs of the Egyptian State Railways.—Although Egypt has been occupied by Great Britain for more than 30 years and the administration of the railway system is entirely in British hands, the Egyptian State Railways are said to have no good tariff in the English language, the tariffs being given only in French and Arabic. It is said also that practically the same freight tariff, without alteration, has been in use for 20 years.

Railway Officers

Executive, Financial, Legal and Accounting

George W. Wiley has been appointed assistant treasurer of the Lehigh Valley, with office at Philadelphia, Pa.

Benjamin F. La Rue, claims attorney of the Lehigh Valley, has been appointed assistant general solicitor, with headquarters at New York.

James E. Kelby has been appointed general attorney of the San Pedro, Los Angeles & Salt Lake, with office at Los Angeles, Cal., succeeding P. Cherrington, deceased.

Benjamin A. Brown has been appointed auditor and assistant secretary of the Colorado, Kansas & Oklahoma, with headquarters at Scott City, Kan. The office of traffic manager is abolished.

J. P. O'Malley, assistant auditor of merchandise receipts of the Baltimore & Ohio, has been appointed auditor of merchandise receipts, with office at Baltimore, Md., succeeding William McGowan, assigned to other duties.

John W. Everman, who on July 1 became first vice-president and general manager of the St. Louis Southwestern, with headquarters at Tyler, Tex., as has been announced in these columns, was born February 1, 1861. He graduated from the public schools at Philadelphia, Pa., in 1876, and during 1877 and 1878 was engaged in mining pursuits in Venezuela, South America. He began railway work in 1879 in the ticket department of the Pennsylvania Railroad. From January 28, 1880, to May 10, 1892, he filled various clerical positions with the Texas & Pacific, including that of chief clerk and a private secretary to a superintendent. He was then made assistant general superintendent of that road, and two years later became assistant general manager, with headquarters at Dallas, holding the latter position until May, 1911, when he was appointed general superintendent at Dallas. He now resigns from the Texas & Pacific to go to the St. Louis Southwestern as first vice-president and general manager, as above noted.

J. W. Everman

Operating

Mark H. Reasoner has been appointed assistant supervisor of stations of the Minneapolis, St. Paul & Sault Ste. Marie, with headquarters at Minneapolis, Minn.

W. B. Causey has resigned as superintendent of the Northern division of the Chicago Great Western at St. Paul, Minn., to engage in coal business at Des Moines, Iowa.

R. S. Marshall has been appointed superintendent of the Virginia division of the Seaboard Air Line, with headquarters at Richmond, Va., succeeding J. H. Witt, resigned.

A. B. Copley, superintendent of the Arkansas division of the Rock Island Lines at Little Rock, Ark., has been appointed assistant general manager of the Third district, with headquarters at El Reno, Okla.

J. N. Haines, assistant superintendent of the Buffalo division of the Lehigh Valley at Sayre, Pa., has been appointed superintendent of the new Seneca division, with headquarters at Sayre. The new division was formerly the part of the old Buffalo division between Manchester, N. Y., and Athens, Pa.

W. A. Whitney, superintendent of the Sacramento division of the Southern Pacific, has been appointed general superintendent of the Oregon Short Line, with headquarters at Pocatello, Idaho, succeeding E. C. Manson, who has been appointed superintendent of transportation, with office at Salt Lake City. The position of car service agent, now held by W. S. Anderson, and that of B. F. Frobes, superintendent of telegraph, have been abolished, and the duties of those offices will be performed by the superintendent of transportation.

C. W. Miller, formerly superintendent of the Southern division of the Chicago & Alton, and whose position was abolished June 1, has been appointed superintendent of terminals at Chicago, a newly created position. W. R. McCullom, terminal trainmaster at Chicago, has been appointed assistant superintendent of terminals at Chicago. C. W. Bearden, assistant superintendent at Bloomington, Ill., has been appointed chief despatcher, in place of E. E. Sutton, and the former position is abolished. Mr. Sutton has been appointed assistant chief despatcher.

James R. Kearney, superintendent of transportation of the Baltimore & Ohio, the Baltimore & Ohio Southwestern and the Cincinnati, Hamilton & Dayton, with headquarters at Baltimore, Md., has been appointed general superintendent of transportation of those lines, also of the Staten Island and the Sandy Valley & Elkhorn lines of the Baltimore & Ohio. Mr. Kearney was born on March 29, 1859, and was educated in the common schools at Altoona, Pa. He began railway work in 1876, as a clerk in the car record office of the Pennsylvania Railroad at Altoona. From March, 1880, to May of the following year, he was in the car record office of the Illinois Central, and then to the following November was car accountant of the Illinois Midland, now a part of the Vandalia Railroad. He then returned to the car record office of the Illinois Central, remaining in that position until May, 1882, and subsequently to May, 1899, was successively clerk and chief clerk of the car record office of the St. Paul, Minneapolis & Manitoba and its successor, the Great Northern, at St. Paul, Minn. In May, 1899, he entered the service of the Baltimore & Ohio as superintendent of car service. In September, 1910, he was appointed superintendent of transportation of the same road and of the Baltimore & Ohio Southwestern and later also of the Cincinnati, Hamilton & Dayton, which position he held at the time of his recent appointment as above noted.

J. R. Kearney

Traffic

J. H. Ginet, Jr., has been appointed western immigration agent of the Chicago, Milwaukee & St. Paul, with headquarters at Seattle, Wash.

B. W. Robbins has been appointed assistant general freight agent of the Denver & Rio Grande and the Rio Grande Southern, with office at Denver, Colo., effective July 1.

F. N. Hait, commercial agent of the Lehigh Valley at Cleveland, Ohio, has been appointed commercial agent, with office at Pittsburgh, Pa., succeeding T. L. Painter, deceased; and E. R. Bardgett, succeeds Mr. Hait.

W. O. Sydnor, division freight agent of the Chesapeake & Ohio, at Charleston, W. Va., has been appointed assistant general freight agent with headquarters at Charleston, and his former position has been abolished.

E. B. Boyd, hitherto manager of the transportation department of the Chicago Board of Trade, and formerly assistant to the vice-president of the Gould Lines, has been elected chairman of the Western Trunk Line Committee, with office at Chicago.

S. G. Langston, general immigration agent of the Missouri, Kansas & Texas, has been appointed division passenger agent at St. Louis, Mo. The former office is abolished and the duties of that department will be assumed by R. W. Hockaday, industrial commissioner, St. Louis.

Charles K. Duncan, soliciting freight agent of the Tennessee Central, has been appointed traveling freight agent, with office at Chicago, succeeding W. D. Jones, resigned to accept service with another company, and Walter J. Dill has been appointed soliciting freight agent, succeeding Mr. Duncan.

Engineering and Rolling Stock

John Horan, road foreman of the Northern Pacific at Minneapolis, Minn., has been appointed acting master mechanic at the same place, succeeding J. B. Neish, who has been granted leave of absence. R. E. Hammond has been appointed acting road foreman in place of Mr. Horan. F. B. Costello has been appointed acting supervisor at Spokane, Wash.

Purchasing

E. L. Fries has been appointed general storekeeper of the Union Pacific, with headquarters at Omaha, Neb., vice J. H. Stafford, retired under the pension rules of the company; effective July 1.

Henry Orville Hukill, purchasing agent of the Pennsylvania Lines West of Pittsburgh, with headquarters at Pittsburgh, Pa., was retired on June 1, under the pension rules of the company.

H. O. Hukill

He was born on May 25, 1844, at Steubenville, Ohio, and was educated in the public schools of his native town. At the age of 16 he entered the service of the Steubenville & Indiana, now a part of the Pittsburgh, Cincinnati, Chicago & St. Louis as a messenger in the superintendent's office. In 1863, he was appointed an assistant operator, and in April of the following year entered the service of the Pittsburgh, Fort Wayne & Chicago and the Cleveland & Pittsburgh, now part of the Pennsylvania Lines West of Pittsburgh, as telegraph operator and clerk in the office of the purchasing agent at Pittsburgh. He was promoted on January 1, 1877, to chief clerk to the purchasing agent, and ten years later was appointed assistant to purchasing agent. He remained in this position until January 1, 1894, when he was appointed purchasing agent of the Pennsylvania Lines West, from which position he now retires after a service of over 54 years on the Pennsylvania Lines. At the time of the retirement of Mr. Hukill, the directors of the Pennsylvania Company adopted the following minute: Mr. Hukill's long service in the purchasing department was noted for the sound judgment and business principles which governed him in all his official relations. The contracts made by him for materials and supplies aggregated enormous sums of money, but his constant study of market conditions and his knowledge of values enabled him to make these purchases under terms that were advantageous to the company, and at the same time fair to the manufacturers. The integrity of his character and the genial and winning nature of his personality won the esteem and friendship of his associates, and the board of directors takes great pleasure in expressing its appreciation of his able and faithful service and wishes for him many years of happiness and health.

OBITUARY

E. C. Coffey, assistant general freight agent of the Chicago & Alton at Peoria, Ill., died in that city on June 26.

Franklin Harvey Head, formerly a director of the Toledo, Peoria & Western, died recently at Maplewood, N. H., at the age of 79.

Marvin S. Chase, formerly from 1885 to May, 1901, assistant general freight agent of the Lake Shore & Michigan Southern, died at his home in Chicago on June 27, aged 70 years.

Russell Pardee Orcutt, from 1909 to 1911 division engineer of the Rochester division of the Erie, and a son of George N. Orcutt, assistant to president of that road, died on June 28, at Hot Springs, Ark., at the age of 29.

William Harder, for 20 years general agent of the freight department of the Great Northern at Portland, Ore., died suddenly at his home in the latter city on June 18, aged 70 years. He had been associated with the Hill lines continuously for 23 years, previous to which time he was assistant traffic manager of the Canadian Pacific at Winnipeg.

Alexander Stewart, general superintendent of motive power and equipment of the Southern Railway, with office at Washington, D. C., died suddenly at the Hotel Continental in Paris, France, on June 28. Mr. Stewart had been in bad health for several months and, on June 16 accompanied by Mrs. Stewart and their only daughter, sailed on the *Mauretania* for Bad Nauheim, Germany, where it was hoped he would fully regain his health. Mr. Stewart was 46 years old and widely known in the railroad world as one of the most capable and experienced men of his profession. He was born at Fort Wayne, Ind., and began at an early age to prepare for the railroad business. He entered the service of the Union Pacific as machinist's apprentice, and after serving his apprenticeship, worked consecutively as machinist, chief foreman, general foreman, general division foreman and then as master mechanic at Cheyenne, Wyo. In 1903 he left the service of the Union Pacific to go to the Southern Railway as division master mechanic at Knoxville, Tenn. A little later he was promoted to general master mechanic of the Western district, and on April 1, 1904, he was appointed mechanical superintendent of the same road. Two years later he was promoted to general superintendent of motive power and equipment, with headquarters at Washington, D. C., and also chairman of the Committee on Mechanical Standards of the Southern Railway and the following affiliated lines: Alabama Great Southern; Cincinnati, New Orleans & Texas Pacific; Mobile & Ohio and Georgia Southern & Florida railroads, which positions he held at the time of his death. In 1910 he attended the International Railway Congress at Berne, Switzerland, as a delegate, and in 1911 was elected president of the Master Car Builders' Association; he was also a member of the Master Mechanics' Association. There was no man who was held in higher esteem than Mr. Stewart by his associates, as well as those who served under him, and he was widely known in fraternal and club circles.

A. Stewart

SIGNALMAN'S ARREST IN NEW ZEALAND.—The Court of Inquiry into the collision between an express from Wellington and a freight train 40 miles from Auckland has found that the cause of the disaster was the defective working of a signal due to an unauthorized alteration by a signal maintainer named Donaldson, who has been arrested on the charge of manslaughter.

Equipment and Supplies

LOCOMOTIVE BUILDING

The Chicago, Milwaukee & St. Paul has ordered 5 mikado type locomotives from the American Locomotive Company.

The Calcasieu Long Leaf Lumber Company, Lake Charles, La., has ordered one prairie type locomotive from the Baldwin Locomotive Works.

CAR BUILDING

The Wabash has requested bids on 1,500 40-ton steel underframe box cars.

The Pittsburg & Shawmut is in the market for 25 30-ton steel underframe box cars.

The Chicago Elevated Railways have ordered 122 all steel cars from the Cincinnati Car Company.

The Delaware, Lackawanna & Western is in the market for 500 steel underframe box cars in addition to 200 automobile cars previously reported.

IRON AND STEEL

The St. Louis & San Francisco has ordered 32,000 tons of rails from the Tennessee Coal, Iron & Railroad Company.

The Great Northern has ordered 1,150 tons of material for a mail and express building at Minneapolis, Minn., from the Milwaukee Bridge Company, Milwaukee, Wis.

SIGNALING

Electro-Pneumatic Signaling at Jersey City

The Union Switch & Signal Company has just completed the second of the three electro-pneumatic interlocking plants installed by it at the enlarged terminal of the Central Railroad of New Jersey at Jersey City, N. J., and is now at work on the third, tower A, which is the largest one and which is nearest the train shed. The three towers together will have capacity for 297 levers as follows: Tower A, a 179-lever frame; tower B, 47-lever frame and tower C, 71-lever frame. Tower A will have 145 working levers, which will operate 340 units, including nine check lock circuits between towers. From the terminus to the outer limits of the interlocking of tower C, there are 18 automatic block signals.

The entire system is equipped with three-position upper quadrant signals arranged for speed signaling. In the terminal, where speed is restricted the signals are two-arm. The upper arm in each case governs all routes fully equipped with track circuits, and is semi-automatic for all routes. The lower arm governs all routes not fully equipped with track circuits, but is semi-automatic for the portion of its route equipped with track circuits. The lower arm may also be used as a calling-on arm to govern low-speed movements into any occupied section of track by the manipulation of a push button after the signal lever has been reversed. At Tower "C," which has no speed restrictions for the main line, the signals are arranged for high speed, intermediate speed and low speed indications.

All track circuits have alternating current, using the vane type relay. The track circuits for the automatic block signals are "polarized" and have Model "12," three-position polyphase track relays. There will be a total of 250 track circuits. Alternating current will be delivered by the railroad company's own power house, but there will be an emergency connection with the Public Service Corporation of New Jersey.

The Union Switch & Signal Company is also installing at Jersey City a train starting system, using indicator lights for communication between the ferry master's office, the gatemen, conductors and tower directors.

Supply Trade News

C. M. Means, electrical engineer, of Pittsburgh, Pa., has been appointed consulting electrical engineer with the United States Bureau of Mines.

John F. Wallace, consulting engineer, has moved his Chicago office from the New York Life building to 859 Insurance Exchange building.

The American Hoist & Derrick Company, St. Paul, Minn., has moved its Seattle office from 613 Western avenue to 1512 L. C. Smith building.

Dudley O. Johnson has been appointed branch manager of the Chicago office of the Joseph Dixon Crucible Company, succeeding the late Sam Mayer.

W. G. Willcoxson has been appointed representative in the railway department of the Garratt-Callahan Company, with office at 27 South Clinton street, Chicago, Ill.

The Ogle Construction Company, Chicago, has recently been awarded a contract by the Illinois Central for the construction of a 500-ton wood coal chute at Jackson, Miss.

L. H. Shoemaker has been appointed division engineer of the Pittsburgh division of the American Bridge Company, succeeding Richard Khuen, Jr., transferred to the erecting department.

H. W. Green, for the past ten years district sales agent for the American Steel Foundries in Pittsburgh, has been elected vice-president of the Lawrence Steel Casting Company, Pittsburgh, Pa.

The Taylor-Wharton Iron & Steel Company, High Bridge, N. J.; Wm. Wharton, Jr., & Company, Inc., Philadelphia, Pa., and the Tioga Steel & Iron Company, Philadelphia, Pa., have removed their Seattle office to 1604 L. C. Smith building.

The Niles-Bement-Pond Company was recently awarded a first prize of $20,000 in the contest announced last year by the Chilean government for the best designs for a general railroad shop. The awards were made the first week in June, the second prize of $10,000 going to a combination Belgium and English concern. It is expected that the shops will cost $3,000,000.

The Titanium Alloy Manufacturing Company, Niagara Falls, N. Y., has organized a bronze department for the manufacture of titanium-bronze specialties under its various patents. Wm. M. Corse, formerly works manager of the Lumen Bearing Company, Buffalo, and lately general manager of the Empire Smelting Company, Depew, N. Y., will be made manager of the new department.

Mason safety tread, manufactured by the American Mason Safety Tread Company, Lowell, Mass., has been selected by the Boston Transit Commission for use in the stations of the new Boylston street subway, and the company has already received an initial order for about 2,000 sq. ft. of tread for the Massachusetts and Copley Square stations. The same company has also furnished since January 1, 1914, over 10,000 sq. ft. of safety tread to the Interborough Rapid Transit Company, New York, for the stairs and platforms of its subway and elevated stations.

The American Car & Foundry Company

The net earnings of the American Car & Foundry Company in the fiscal year ended April 30, 1914, were $5,810,889, $271,060 greater than for the year before, but slightly less than the $6,240,324 of 1911. There was sent for renewals, replacements, repairs, etc., $2,052,918, so that the balance available for dividends was $3,757,918. Dividends of $2,100,000, or 7 per cent., were paid on the preferred stock as usual, leaving a balance of $1,657,971, equal to 5.52 per cent. of the common stock as compared to an amount equal to 4.09 per cent. earned on the same stock in 1913. Two per cent. dividends were paid on the common stock, or $600,000, which included with $704,000 charged for maintenance and improvements left a surplus for the year

of $357,971, so that the total surplus has now reached the large total of $25,613,140.

The company's balance sheet shows it to be in a strong financial position. The value of the properties is given at $66,782,532. Stocks and bonds of other companies are held to a value of $682,219. On April 30 there was material on hand worth $7,551,777 and there were accounts and bills receivable of $12,099,353. The cash balance was $4,251,577. There were also $2,000,000 worth of bank certificates on deposit. The company's capital stock amounts to $60,000,000, of which one-half is common and one-half preferred. The other liabilities are as follows: audited vouchers and payrolls, $3,899,999; insurance reserve, $1,000,000; reserve for improvement, maintenance, etc., $905,011; reserve for steel car plant $674,310, and reserved for common and preferred dividends, $1,275,000. The surplus, as noted above, is now $25,613,140, nearly $2,000,000 greater than in 1911.

President F. H. Eaton in presenting the report says in part: "The gratifying result of the operations of your company during the fiscal year ended April 30, 1914, is not to be ascribed altogether to any improvement in general business conditions occurring during the year just ended. It is due in large measure to the fact that at the close of the fiscal year 1912-13 your company had on its books contracts for cars in number sufficient to assure the continuous operation of your plants for a number of months.

"The number of cars under contract at the close of the fiscal year was appreciably less than it was at the close of preceding period. Since then, however, there has been some improvement in this regard, and buying has been somewhat more free and inquiries more numerous.

"It is a matter of general belief that the facilities of the railroads for the prompt and proper handling and moving of such a crop as is now indicated are more or less inadequate; if this be so, it is entirely likely that the above noted improvement in the demand for your products, both for the construction of new and the repair of old equipment, will continue and become more accentuated if the favorable crop conditions indicated by the government forecasts are realized by the actualities.

"It goes without saying that any condition which makes for the prosperity of the railroads will redound to the benefit of your company; and it is, therefore, earnestly to be hoped that the current year will see such a further clarifying and settling of the great problems affecting transportation as will result in the resumption of buying activity on the scale and with the regularity so much to be desired by those industries which are in any degree dependent for their own prosperity upon the welfare of the railroads."

TRADE PUBLICATIONS

HEADLIGHTS.—The Esterline Company, Indianapolis, Ind., has issued a catalog descriptive of its "Golden Glow" headlights for street railway service.

LUMBER CRAYONS.—The Walter A. Zelnicker Supply Company, St. Louis, Mo., has issued a leaflet giving the story of Zelnicker lumber crayons.

WELDING AND CUTTING OUTFITS.—The Macleod Company, Cincinnati, Ohio, has issued a catalog illustrative of the Buckeye oxy-acetylene welding and cutting outfits. The booklet contains views of the apparatus and statements of its advantages for various kinds of work. Views are also given showing the process of welding in different kinds of operations.

ELECTRIC LIGHTING FIXTURES FOR RAILWAY CARS.—The Safety Car Heating & Lighting Company, New York, has recently issued a remarkably good catalog entitled "Electric Fixtures," with the object of showing a comprehensive selection of electric lighting fixtures adapted for railway cars. The catalog contains slightly less than 100 pages. It is 9 by 12 in. in size and is printed on a fine grade of paper. Almost all of it is occupied by simple but tasty half tone engravings, very well reproduced, showing a great variety of designs selected from the company's wide experience as best suited to the tastes of the majority and most serviceable in all classes of railway car lighting requirements. The exceeding simplicity of the catalog and its very pleasing arrangement make it rank with the best that have been issued in the railway supply field for some time.

Railway Construction

CENTRAL OF GEORGIA.—An officer writes that a new yard is being constructed at West Macon, Ga., and will occupy about 65 acres. It is approximately 2.5 miles in length, and contains 25 miles of track, with the following capacity: Westbound departure yard, 6 tracks, 315 cars; classification yard, 18 tracks, 554 cars; repair yard, 7 tracks, 146 cars; receiving yard, 5 tracks, 345 cars; caboose and hold yard, 7 tracks, 218 cars, and eastbound departure yard, 7 tracks, 441 cars. The excavation work involving the handling of about 225,000 cu. yd. has been completed. The west end of the classification yard will be operated by an electro-pneumatic plant, and the west end of the receiving yard by a mechanical plant. Two public roads, formerly crossing the tracks, one at grade and the other by short span over a single track are replaced by one 150 ft. steel span over the receiving yard, and the other grade crossing across a wider section of the yards is replaced by a 365 ft. bridge consisting of four spans. The girders are supported on steel bents, which are encased in concrete for a height of 9 ft., and one reinforced concrete span over main tracks 2 ft. 3 in. deep and flared to meet the approaches on the east end of the bridge. These approaches are built at right angles to the bridge and are of reinforced concrete; there being 24 spans of 30 ft. each supported by reinforced concrete columns.

GLEASONTON & PADDY'S RUN.—A contract has been given to Peter Cillo, Williamsport, Pa., for the grading and track laying and to the American Bridge Company for the bridges on a narrow gage mountain line from Gleasonton, Pa., via North Bend. Grading work has been finished on two miles. The maximum grade will be about 6 per cent., and there will be one steel bridge and two trestles on the line. I. W. Gleason, president, Gleasonton, Clinton county, Pa.; H. S. Sleicher, treasurer, and E. C. Wakefield, chief engineer.

LAKE ERIE & EASTERN.—See Pittsburgh & Lake Erie.

LEHIGH VALLEY.—The new Cayuga cut-off from Cayuga, N. Y., west to Seneca Falls, 8 miles, has been completed and put in operation. By the new cut-off the Lehigh Valley has a direct route from Cayuga to Buffalo. (May 15, p. 1118.)

MONTREAL & SOUTHERN COUNTIES (Electric).—An officer writes that a contract has been given to Grant Campbell & Company, Montreal, Que., for building a 15-mile extension to Granby, Que. (October 24, p. 805.)

NEW YORK SUBWAYS.—The New York Public Service Commission, First district, will open bids on July 24, for the construction of Section No. 5 of Routes Nos. 4 and 36, the crostsown portion of the Broadway-Seventh avenue and Fifty-ninth street subway, in Fifty-ninth and Sixtieth streets between Seventh and Second avenues, in the borough of Manhattan. Bids for the making of borings along the lines of proposed rapid transit railroads in the boroughs of Manhattan, Brooklyn, Queens and the Bronx will be opened on July 10 by the commission. This contract will include both land and river borings. The commission has given the contract for the construction of Section No. 1 of Route No. 12, the Eastern Parkway subway, in Flatbush avenue between the terminus of the existing subway and St. Marks avenue, borough of Brooklyn, to the Cranford Company, the lowest bidder, for $2,195,296. (June 26, p. 1606.)

PITTSBURGH & LAKE ERIE.—Announcement is made that the Lake Erie & Eastern, a subsidiary of the P. & L. E., and the Lake Shore & Michigan Southern, which is being built through Youngstown, O., will be put in operation next fall. The present plans call for a line from Struthers, Ohio, northwest to a point west of the Brier Hill Steel Company's plant in Youngstown, thence to Niles Junction. It is planned to ultimately extend the line west to Brady's Lake near Ravenna.

PITTSBURG, SHAWMUT & NORTHERN.—An officer of the Pittsburg & Shawmut writes that construction work is now under way from Kittanning, Pa., to Freeport, along the west bank of the Allegheny river, on about 15 miles. The J. H. Corbett Co., Kittanning, Pa., has the contract to build the line, and the Amer-

ican Bridge Company, Pittsburgh, Pa., is carrying out the bridge work. The work on cuts involves handling about 20,000 cu. yd. to the mile. There will be three bridges of 24 ft., 35 ft. and 55 ft. long respectively. E. E. Tait is president, Bradford, Pa., Dwight C. Morgan, vice-president and general manager, and W. W. Henshey, chief engineer, Kittanning, of the Pittsburg & Shawmut. (December 5, p. 1099.)

Pittsburg & Shawmut.—See Pittsburg, Shawmut & Northern.

Quebec Central.—An officer writes that a contract has been let to P. J. Wolfe, Sherbrooke, Que., for building the first section of ten miles on the extension from St. Sabine, Bellechasse county, Que., northeast to Lac La Frontier, Montmagny county, 25 miles. Five miles of the extension have already been finished. The company expects to have five miles additional completed by September, 1914, and the entire line completed by December, 1915. On the first ten miles now under contract, there will be one steel bridge; the maximum grade will be 1 per cent., and the maximum curvature 5 deg. The company expects to develop a traffic in lumber, pulpwood and other forest products. (May 15, p. 1118.)

Seattle, Port Angeles & Lake Crescent.—This company has completed work on 25 miles of the line, on which work was started last year. The plans call for building from a point near Oak Bay, Wash., west via Irondale, Chimacum valley, Sequim, Dungeness valley and Port Angeles to the Lyre river, thence west past Lake Crescent into the Olympic timber district. C. J. Erickson, president, Seattle, and C. C. Donovan, division engineer, Port Angeles. (September 19, p. 542.)

Southwestern Pacific.—This company has applied for incorporation in Utah with $2,200,000 capital. The plans call for building from Denver, Colo., west to San Diego, 2,200 miles. D. C. Collier, president, San Diego, Cal.; H. A. Parkyn, first vice-president; A. H. Bunge, second vice-president; S. Sherman, secretary and treasurer; C. C. Carnahan, general counsel, all of Chicago; J. E. Carnahan, Canton, Ohio; H. B. Rettie, Chicago; E. Fletcher, San Diego, Cal., and T. Morinaux, Salt Lake City, Utah, are directors. (May 29, p. 1216.)

Southern Railway.—This company plans to carry out double tracking work during the next five years, on 139 miles between Washington, D. C., and Charlotte, N. C., and on 218 miles between Charlotte and Atlanta, Ga.

Williston & Northern (Electric).—An officer writes that the prospects of building are good and that contracts will be let in about 30 days for a line from Williston, N. Dak., on the Great Northern north to Crosby, about 60 miles. A. H. Brown, president, J. C. Field, chief engineer, Williston.

RAILWAY STRUCTURES

Charleston, S. C.—The Carolina, Clinchfield & Ohio has entered into an agreement with the city council of Charleston, S. C., for the construction of terminals on Cooper river in Charleston. Land has been secured and the Holston Corporation has been organized to carry out the work on the terminals and coal handling facilities. It is understood that contracts are to be let at once, and that the work will be started before September 1.

Dallas, Tex.—A contract for a union station and terminals, re-arrangement of terminal tracks and a bridge over Trinity river at Dallas, has been let to John W. Thompson, St. Louis, Mo. The estimated cost of the work is $3,000,000.

Griffin, Ga.—An officer of the Central of Georgia writes that bids will be asked for at once, to build a one-story brick and stone station at Griffin. The new building is to be 38 ft. x 125 ft., with concrete platform and shelter shed 16 ft. x 250 ft. The estimated cost of the improvements is $25,000. (June 5, p. 1257.)

Macon, Ga.—See Central of Georgia under Railway Construction.

Montreal, Que.—According to press reports the Canadian Northern will put up a new building on Lagauchetiere street, Montreal, at a cost of $250,000, to be used temporarily as a station. It is understood that as soon as the permanent station on Dorchester street is finished, the Lagauchetiere station will be used for express and other offices.

Railway Financial News

Atchison, Topeka & Santa Fe.—Final arrangements have been made, in compliance with the special law passed by the last Texas legislature, for merging with the Gulf, Colorado & Santa Fe the following subsidiary roads: the Concho, San Saba & Llano Valley, the Texas & Gulf, the Gulf & Interstate and the division of the Pecos & Northern Texas south of Sweetwater. The several different separate general offices are abolished. The Gulf & Interstate is 75 miles long, connecting Galveston and Beaumont; Texas & Gulf 126 miles, Longview to Center, and a branch connecting Gary and Grigsby; Concho, San Saba & Llano Valley 56 miles, Paint Rock to Miles; and San Angelo to Sterling City; Pecos & Northern Texas, Sweetwater to Coleman, being a part of the "Coleman cutoff."

Cincinnati, Hamilton & Dayton.—See editorial comments in regard to default in interest.

Colorado, Wyoming & Eastern.—This company has taken over, as of June 1, the railroad and property of the Laramie, Hahns Peak & Pacific.

Laramie, Hahns Peak & Pacific.—See Colorado, Wyoming & Eastern.

National Railways of Mexico.—It is said that the requirements for interest maturing July 1 for this company and for its subsidiary companies are the subjects of negotiations with the Mexican government. The negotiations look toward an arrangement similar to that made for interest requirements earlier this year.

New York, New Haven & Hartford.—In addition to the passing of the New York, Ontario & Western's dividends mentioned elsewhere, the Rhode Island Company and the Housatonia Power Company have also passed their dividends. Approximately the loss to the New Haven annually will be $1,000,000. The New England Navigation Company declared a dividend of 2¾ per cent. as compared with 3½ per cent. in the previous year.

The syndicate which underwrote the New York, New Haven & Hartford, Harlem River & Port Chester and New England Navigation Company note sale has been dissolved. All of the $20,000,000 New Haven notes were sold; from 75 per cent. to 80 per cent. of the Harlem River & Port Chester notes were sold, and about half of the New England Navigation notes were sold.

Northern Central.—See Pennsylvania Railroad.

Northern Pacific.—The directors have approved the creation of a refunding and improvement mortgage to be dated July 1, 1914, securing bonds maturing July 1, 2047. The directors have authorized the executive committee to sell $20,000,000 bonds under this mortgage. Of these bonds, which it is thought will be 4½ per cent. bonds, $10,000,000 will pay notes maturing July 9, and the remainder will be used to reimburse the company for advances for additions and betterments.

Pennsylvania Railroad.—The directors have approved the lease of the Northern Central, which lease has been approved by the great majority of Northern Central stockholders. Under the terms of this lease the stock of the Northern Central is to be increased by 40 per cent., the additional stock to be paid out as a stock dividend. The Pennsylvania is to continue to guarantee 8 per cent. dividends on the stock and the lease is to run for 999 years.

Union Pacific.—The executive committee has extended the date of payment of the extra dividend, consisting of Baltimore & Ohio stock and $3 in cash, to common stockholders from July 1 to July 20. The court of appeals, which heard the so-called Equitable case to restrain the payment of the dividend, meets on July 14.

Williamsville, Greenville & St. Louis.—On July 7 this road is to be sold under foreclosure by Charles Morsey, special master at St. Louis, Mo.

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*Illustrated.

The *Railway Age Gazette Mechanical Edition* recently held a competition on draft gear, a prize of $100 being awarded for the best article showing which type of draft gear should be used. The prize was awarded to E. W. Newell, of Pittsburgh, and Mr. Newell's article, together with two of the three other articles which were used in the July Mechanical Edition, are reproduced elsewhere in this issue. Of the twelve papers which were recommended by the judges for publication, ten favor the friction draft gear. There can be no question as to the necessity of more care on the part of the mechanical department in providing the best type of draft gear and of seeing that it is maintained in good condition.

The Draft Gear Problem

On the other hand, and Mr. Wells brings this out clearly and forcefully, the cars are now seriously abused in switching service and it is squarely up to the operating department officers to see that the careless and rough handling of cars at terminals is stopped. Mr. Umshler, general yardmaster of the Illinois Central at Centralia, Ill., in the first prize article on "The Operation of Large Classification Yards" in the *Railway Age Gazette* of July 3, directed attention to this as "one of the paramount questions of successful yard operation." The damage done to the cars by this rough handling is serious enough, but when the cost of delays to traffic, shortage of equipment, damage to freight and the effect on the organization are considered it is imperative that the roads study carefully the draft gear problem with the idea of using only the best, because that will be the cheapest in the end, and that more care be used in handling the cars by the operating department.

In the establishment of the parcel post the Government has entered into competition with the railroads and the express companies in the business of transporting merchandise—freight. Mr. Peters puts emphasis on this point in his latest appeal to Congress, which is printed in another column. It is important to remember this when considering the prices that the postoffice department ought to pay the railroads. The original purpose or theory of the national postal service was that of disseminating information, and weight was not a chief factor. For letters weighing fractions of an ounce the payment by the Government of an arbitrary rate was not intolerable. The irrational plan of fixing the price in the halls of Congress, without consultation with the carrier, could be peacefully submitted to. But when to ounces of letters are added wagon-loads—tons—of merchandise, the unreasonableness of the arrangement becomes apparent to everybody—except to the blind statisticians of the postoffice department. Mr. Peters says that the railroads object to being paid wholly by space. The question of space versus weight, however, is not so important as that of getting some method of paying according to actual service, instead of by four-year periods on a one-month average. Space-rates might possibly be made tolerable, though inequitable, for the same reason that per diem rates for freight cars, though not always equitable, are tolerable; their simplicity and the facility with which they can be accounted for outweigh any small injustice involved. Competition, the rules for which are formulated by one only of the competitors, is hardly fair. Not the least of the problems before the Congressmen, therefore, is the preliminary problem suggested by Chairman Bourne—whether the postal laws are to be formulated by Congress or by a bureau of the executive department.

Mail Pay Rates Still Unsettled

On two divisions of the St. Louis & San Francisco the wife of every employee has received a pass, good for six months, over the whole division; this by way of recognizing the excellence of the division from the standpoint of "Safety-First." The arrangement is described on another page of this paper. The influence of wives and mothers over their husbands and sons in the matter of these men's habits, as related to personal safety, has been recognized from the first, and ladies have been invited to safety-first meetings everywhere; but what is a picture-show lecture, even with band concerts and ice cream thrown in, compared with a piece of cardboard which can be valued in dollars, perhaps scores of dollars? For the time being the shopman's or the section master's wife is on a level with the directors' wives. Mr. Nixon has been exceedingly liberal with his passes; but, evidently, he wished to make his advertisement loud enough to be heard by all; and a little excess can do no great harm. He can hereafter vary the terms of the grant as circumstances may indicate that they ought to be varied. As we suggested in commenting on the motion pictures, variety and novelty are impor-

Season Passes for the Wives of Employees

tant elements in the safety-first movement. Making all calculations on the basis of statistics of results, which is only a crude measure of men's carefulness, the keeper of the accident records cannot expect to determine very accurately who deserves a prize; but, nevertheless, if he can arouse general interest he may do a great deal of good.

A New Experience

The Texas Railroad Commission is taking with very bad grace the recent decision of the Supreme Court in the Shreveport rate case, in which the railways were authorized to advance rates in Texas to correct a discrimination against Shreveport, La., shippers who had to pay higher interstate rates into Texas. It was perhaps not to be expected that they should be overjoyed at the prospect of having their rates subjected to somewhat the same kind of regulation that the railways have had. The Texas commission has heretofore been inclined to consider itself as rather above the laws. Therefore, it was a new experience when the railways submitted to it a new tariff of advanced rates from Dallas and Houston to East Texas points, backed by the authority both of the interstate commission and the highest court of the law, with a request that the Texas commission approve it, as a matter of form and in the interest of harmony. This the commissioners declined to do at the hearing and at present writing they have not yet signified any intention of graceful acquiescence, although the tariffs have been filed. Commissioner Williams even argued for a compromise based on a slight advance in the Texas rates and a slight reduction in the interstate rates, although the latter had been pronounced reasonable by the interstate commission. Apparently an interesting situation has been created, for if the rates from Dallas and Houston are advanced, those cities will be at a disadvantage unless the rates from other points in the state to East Texas are also advanced. Chairman Mayfield is quoted as complaining that every time the Interstate Commerce Commission touches Texas rates it is to raise them. Of course, Chairman Mayfield could not be expected to discuss the reason for this, but to many others the statement is rather significant that there has been something the matter with Texas rates. The Texas commission undoubtedly has the power to make things rather disagreeable for the railways in retaliation but the present time affords an unusual opportunity for observation of the handwriting on the wall.

THE AUTOMATIC TRAIN STOP—I

IN the report of the committee on automatic train stops, laid before the American Railway Association at its last meeting and printed in the *Railway Age Gazette*, May 29, page 1192, there is presented for the first time a clear cut official declaration *against* the use of automatic stops; and setting over against this the demand of the Interstate Commerce Commission that a safeguard of this kind shall be introduced on our principal railroads, we may say that we have a more definite issue than has existed at any time in the past; the problem is measurably simplified. It will be worth while to look for a moment at the grounds on which is based this conservative opinion of the committee. With these grounds clearly defined we can the more intelligently compare the opposing views.

The committee says that our present system of visual signals, if properly installed and maintained, is so nearly perfect that both the railroads and the public authorities should direct their efforts towards the enforcement of obedience to signals rather than the installation of additional devices. Reading a little between the lines, one concludes that the members of the committee regard the whole automatic stop proposition as so difficult and costly that it ought to be put aside as unworthy of attention. The committee wisely omits the old argument that an automatic stop impairs discipline; that with it the enginemen will be less vigilant. It has been demonstrated that stops stimulate vigilance rather than the opposite.

The committee must, of course, take for its main groundwork the very high percentage of safety to be found in the present records of the best roads. When a road carrying twenty million passengers yearly goes ten years without a fatal passenger train collision, that good record must be due to something more than good luck. Whatever may be said of individual disasters, the fact remains that under the best conditions, the *percentage* of failures is so small that we are justified in saying that those failures really are accidents, not constitutional faults of the system of operation. To produce such a very high percentage of perfect operations the *system* must have merit. Railroading is a dangerous business, and, in its development, innumerable risks have been met and overcome. The records for safety of train movements which are made year after year on our busiest lines, such, for example, as those between New York and Philadelphia, constitute a really great achievement. A similar history of long continued, well-directed efforts and high standards of operation is to be found on numerous suburban lines and at the great passenger terminals. These records testify to the high efficiency of American locomotive runners (it is to be borne in mind that the automatic train stop is designed to do only one thing; to provide against the failure of enginemen to see and obey signals).

The committee is justified in basing its opinion on what can be done, not under average, but under the best conditions. If each road had put forth proportionately the effort, the knowledge and the money which have made the best American safety records, the train-accident record would have been smaller than it is by a very large percentage. Moreover, by any rational theory, it is a duty to improve existing practices, methods and standards, regardless of what may be done about new safeguards. The report is inadequate at this point, for it seems to be designed simply to head off those governmental busybodies who ignorantly think that a complicated machine can accomplish impossible wonders, when logically, the committee, to carry out the spirit of its declaration, ought to sound a "clarion appeal" to the members of the association to take vigorous action to perfect their practice with the ordinary visual signals. But, whatever the shortcomings of the report, there is no gainsaying that if every railroad officer were to do his very best, and if all were guided by a strong and energetic national committee, the safety of trains could be much more securely insured than it is at present, *without* resorting to the automatic stop.

Secondly, the committee could point to much progress in this direction already accomplished. For a road to carry all passengers safely for ten years may not be conclusive evidence that all its appliances and methods are the best, but the records of surprise checking, of improved attention to the bodily and mental health of enginemen, and other improvements that have been made during the past five years by numerous prominent roads, afford tangible evidence that correct practice is being constantly studied. Moreover, those who believe in improving present methods, in preference to making a change which introduces new difficulties and greatly increases cost, can point to the fact that a large proportion of the notable collisions which would have been prevented by automatic stops have been due to faults of enginemen which may be very easily cured. For example, Corning: total abstention from intoxicants. Stamford: adequate instruction of new runners. At Western Springs and North Haven the responsibility of the company was greater; but most students of the subject believe that with suitable distant signals these collisions would not have occurred; a very simple remedy compared with automatic stops. There are plenty of other examples.

But the third and strongest claim of the committee is that the difficulties connected with the use of automatic stops would be almost insuperable; not quite insuperable (though, that,

no doubt, is the view of the most pronounced conservatives), but presenting such all-pervasive and constant difficulties that the perfection so confidently promised by the theorists would never be achieved. These difficulties were the subject of an article by Mr. Rudd, signal engineer of the Pennsylvania, printed in the *Railway Age Gazette*, June 6, 1913, page 1211. For fast trains there must be an overlap of 4,000 ft. to give stopping space; a costly sacrifice of capacity. For slow trains this necessitates unnecessary stops, which bring in new dangers. The "stop-and-proceed" rule, in automatic territory, is troublesome enough already, and it would be made more troublesome; for if trains were kept further apart they would the more frequently approach occupied blocks. With long freights this consumes valuable time. This waste of 4,000 ft. must be borne at every crossover and every diverging track—every place where the automatic apparatus is to be used. An engineman with a light train (and often with a heavy one) having been stopped, could then proceed, increase speed and run into the train ahead. In other words, the stops cannot in practice be located close enough together to provide against all careless running. If the special apparatus gets out of order on the road, the train may have to run a hundred miles with it out of service, which introduces a difficulty in discipline. With two or more engines on a train all but the leading one must be cut out—another chance for neglect on the part of trainmen to cause trouble.

Certain desirable characteristics of a workable stop have not yet been developed to any satisfactory degree. With everything in good order, the apparatus should be self-detecting—revealing its own failures—but to maintain this condition without causing frequent undesired stops, is a detail yet to be learned. To guard against the tricks and the laziness of the occasional engineman who lacks conscience, and against anything that will discourage instead of encourage a vigilant habit, a device to record every operation of the stopping apparatus is desirable; so much so that most inventors include this as one of the elements supporting their claim to infallibility; but such a device introduces a new train of annoyances which as yet no one has thoroughly studied. It may be said that the railroad profession ought before now to have solved some of these problems, but it cannot be said that they continue to exist because no one has tackled them. The trouble is that they are very hard to deal with. No experiments to explore the difficulties with snow and ice have yet been satisfactorily completed. None of the experimenters, so far as we know, have gone thoroughly into the question of automatic application of brakes on very long freight trains. In short, the whole problem is so complicated and makes demands in so many directions, and every solution leaves so many things unsettled, that the wisest heads are nonplussed.

It will be said that all difficulties could be solved if sufficient money were forthcoming. Accepting this dictum as correct, theoretically, there are limits to its application. The Pennsylvania might easily spend $5,000 a mile for automatic stops; but it is a grave question whether it could rightfully use its money in that way. Everyone admits that the automatic stop is an adjunct only. The system of visual signals should be perfected in advance of the adoption of refinements. The Pennsylvania, says Mr. Rudd, needs to spend $3,000,000 a year to improve its present signal system. To go beyond that and spend additional millions for stops would be using money which very likely would do the public more good if used in other directions—removing grade crossings, making safer cars, giving employees better training, etc. Moreover, the problem in some situations is so troublesome, as Mr. Rudd shows, that the use of stops would so reduce the capacity of the road that additional tracks would at once become necessary, and additional tracks cost many millions of dollars for very short distances.

The other side of this problem, the accomplishments and the hopes of those who advocate stops, and the points on which they dispute the conservatives, must be left for discussion in a future issue.

AMERICAN SOCIETY FOR TESTING MATERIALS

THE meeting of the American Society for Testing Materials, which was held in Atlantic City last week, was the largest in the history of the society and held the interest of the members well sustained to the end. In commenting on the proceedings of this society at the close of the convention a year ago, attention was called to the fact that the adoption of standards to the extent that prevails did not carry the weight and respect that it ought, owing to the manner in which these specifications were voted upon. This was frankly recognized in an unofficial paper this year by the secretary, in which he called attention to the fact that many standards for specifications were adopted on a vote of less than one hundred out of a total membership of the society of more than sixteen hundred. A number of suggestions were made as to the best means of getting an intelligent vote on questions submitted, but it is acknowledged that the problem is a very difficult one. The trouble lies in the wide diversity of interests and specialities that are represented. All classes of materials come under review with the result that there are a comparatively few members that are competent to sit in judgment on the value of any one set of specifications. Evidently it has been realized that the society has been going too fast in some particulars and has jumped to the adoption of standards and specifications without due consideration, for the whole tenor of the meeting this year was to go slow, though the tendency was violated in some particulars.

The handicap of the widely diversified interests that are involved made itself apparent this year, as it has before, in the meagerness of the discussions. It is safe to say that there was not a paper or report, of the 59 presented, that received the discussion which it deserved. When discussion was progressing freely it was frequently found necessary to curtail and cut it off because of the limited time available for the work. With 64 items on the program to be presented and discussed in nine sessions, averaging about two hours and a half each, the actual time allowable for each item would not be more than about 20 minutes, and it often happened that quite as much time as that was required for the presentation alone.

While, as a whole, the society may be getting more conservative in the adoption of standards and specifications, it still shows spasmodic tendencies in the other direction. There are some of the specifications that have been referred to letter ballot at this meeting that appear to be useless. If an article is of general use and must be made for a large number of consumers by a large number of manufacturers, the specification may be necessary, but when the work is limited to a few makers or to makers who are themselves the consumers, it is difficult to see where the usefulness of the standard comes in. Take, for example, the specification for the cast iron to be used in locomotive cylinders. It is doubtful if the few large locomotive builders of the country would allow their methods of foundry practice to be modified by the specifications of the society, nor is it conceivable that any railroad making its own cylinders would consider itself bound to use these specifications for its own work simply because it has been adopted as a standard by this society. It would have seemed better, then, to have simply put this out as a committee report that makers of locomotive cylinders could use or not as suited their own ideas and foundry practices. In fact, when it comes to the last analysis, all of the work of the society resolves itself down to committee reports that the society has adopted without the majority of the members being able to judge as to whether the reports are solidly founded or not.

Of course, the society could not have obtained the prestige that it has unless its committees had been composed of men who are expert in the lines of investigation and report assigned to them. But, while there may be every confidence in the ability

of these men, great care should be taken that there is no suspicion of the domination of any particular interest in their decisions. Piazza talk sometimes is a far better indication of what men are really thinking than the discussion on the floor, and at Atlantic City last week there was more than one hint thrown out that the committee reports are getting to be dominated by the manufacturing interests. This may or may not be true, and one can only be convinced one way or the other by a careful consideration of the reports in the fullest detail. But the point is that there should be no suspicion of such a thing.

Then, there is the attitude of the society towards other organizations that more truly represent the manufacturers or consumers along special lines. It should always be borne in mind that it comes as a suppliant, as it were, to the manufacturers and users, and must present its specifications with hat in hand. It cannot enforce their use, and they must appeal to these outsiders before they can be made worth the paper that they are printed upon. This was promptly recognized on two occasions during the recent meeting. When the subject of steel springs was up for consideration, the original specifications included the springs for automobiles. These were unsatisfactory to the automobile builders, and so all reference to that branch of the art was canceled from the report as it will be submitted to letter ballot, and the matter was referred back to the committee for further consideration. Again, it was stated on the floor in connection with a matter in which the Master Car Builders' Association was interested, that that association was recognized in Washington and that it would be necessary to conform strictly to its ideas of what was wanted before the specifications could be presented.

It was rather difficult to understand, then, the reversal of this attitude in the matter of heat-treated axles as applied to the motor axles of electrically driven cars. The Electric Railway Association sent a representative to the meeting to protest against the adoption of the specifications as presented for motor axles and simply asked that these axles be excepted from the specifications. The request was refused in a manner so emphatic as to be quite dumbfounding. If the Electric Railway Association is equally emphatic in its decision as to what it wants, and at the fall meeting votes to discard the specifications of the Society for Testing Materials as unsatisfactory, it will be difficult to see what may be the value of those specifications. As to which of the two associations are correct in this particular case, there is no place for discussion here. But it does seem that the promulgation of the specification as a standard had better have been delayed until an agreement with the users was reached.

But back of any differences of opinion that may exist as to the value of the specifications for use and their desirability in the abstract, there is one thing that stands out pre-eminent, and that is the great amount of work and interest that has been done and displayed by the several committees. There is hardly a report submitted that cannot be called a masterpiece. It is to be regretted, however, that there are not more papers giving the results of the personal research work of the members. Many of them are engaged in work of this character all of the time and it is regrettable that more of it does not come to the light of day at these meetings. Diversity of interest is, of course, partly responsible for this, as men do not like to present the results of work in which they are vitally interested to a meeting, in which their own presentation must be limited to a few minutes and the discussion thereon to seconds.

There will be universal disappointment at the outcome of the paint experiments on the Havre de Grace bridge of the Pennsylvania Railroad. According to the committee, no conclusions or statements can be made as to what was accomplished because of the lack of data concerning the materials used. Engineers all over the country have been waiting patiently for years to learn what might be a good practice as based on these results, and now to be told that "the king of France marched up the hill only to march down again," with nothing but his exertions to show for it, is discouraging and the action of the society in referring the matter back to the committee with the plea that it make a final attempt to tell what it all means, if it means anything, was certainly a move that will meet with universal approval; and it is to be hoped that the manufacturers who supplied the paints will also now furnish the information needed to compile a report of value. In like manner the much-talked-of and widely-heralded Atlantic City panel tests are concluded, but here it is expected that a full report will be submitted next year and the results of these years of trial will be made public in a manner that will be of value to all who have to do with the making and using of paints.

THE DELAWARE & HUDSON

With the sale recently to Kuhn, Loeb & Company of $4,500,000 first and refunding mortgage 4 per cent. bonds the Delaware & Hudson rounded out the operations which belong to the calendar year 1913. In March of that year the New York Public Service Commission approved the issue of these bonds to be sold at 95 or better; but contrary to the expectations of both the road's management and its bankers the company was unable to dispose of them at that price during 1913. The company had begun 1913 with a floating debt of $3,500,000, and this had been increased during the year by $1,000,000 through expenditures for additions and betterments covered by the first and refunding mortgage and for advances to subsidiary companies for which the parent company is to be, or has been since the last of the year, reimbursed. The present sale, therefore, presumably permanently finances these expenditures that had been previously temporarily financed through loans and bills payable.

The Delaware & Hudson Company's income is principally from two sources, from the mining and sale of coal and from the operation of its railroad. In 1913 the company had larger gross income and larger net income than in 1912, both from its coal mining department and from its railroad department, and while it is true that during 1912 there was a strike in the coal fields which adversely affected both revenue from coal operations and revenue from railroad operations, 1913 was not entirely free from labor troubles. There were ten strikes in all during 1913, despite an agreement entered into the previous year by which a method of adjustment of differences without strike and without a lockout had been agreed upon by the men and by the company. In 1913 the gross revenue from the coal mining department was $16,045,000, and net after the payment of expenses and taxes $1,188,000. This compares with $13,398,000 gross and $1,024,000 net in 1912.

In the railroad department the company was able to hold down its transportation ratio to almost the same figure as in 1912, despite large increases in rates of pay due to the apparently inevitable compromise by arbitrators under which organized railroad employees get something more than they had previously been getting and something less than they had the audacity to ask for. The ratio of railroad expenses to railroad revenue was 62.97 in 1913 and 62.57 in 1912. The company was able to maintain this operating ratio, despite the wage increases, first, because of economies which would naturally result from a larger gross business; second, through an apparently actual more efficient use of the plant itself, and third, through a reduction in maintenance of way expenses which in part offset increases in maintenance of equipment expenses.

Railroad operating revenues in 1913 amounted to $24,153,000 as against $22,480,000 in 1912, representing the revenues received for carrying 20,470,000 tons and 9,029,000 passengers in 1913 and 19,319,000 tons and 7,950,000 passengers in 1912. The average haul per ton of freight in 1913 was 148 miles, and in 1912 was 146 miles, and the average passenger journey 17.39 miles in 1913 and 18.82 miles in 1912. The average ton-mile rate was exactly the same in the two years, namely, 6.6 mills, and the rate per passenger per mile was 2.02 cents in 1912 and 2.05 cents in 1913. It will be seen, therefore, that the percentage of increase in operating revenue just about represents the increase in the percentage of business handled, the slight difference due to the shorter aver-

age passenger journey and slightly larger revenue per passenger per mile being negligible.

Transportation expenses, which include only the wages, of trainmen, station employees, etc., and the cost of fuel and other materials incident to the actual movement of traffic, amounted to $8,585,000 in 1913, an increase of $606,000 over 1912, which is about 7½ per cent., or almost exactly the same percentage of increase as is shown by the business handled and the revenues earned. Since the rate of wages was higher and the cost of fuel per ton also higher in 1913 than in 1912 this means a movement of traffic per man-hour and per ton of coal considerably greater in 1913 than in 1912.

The revenue train load in 1913 was 543 tons, and the total train load, including company freight, which is the better measure of operating efficiency, was 585 tons, an increase of 52 tons, or more than 9 per cent. over 1912. The average number of all cars, excluding cabooses, per train was 31 in 1913, an increase of over two cars; the average number of loaded cars per train was 20.76, an increase of 1.23. The average number of passengers per train mile was 54.88 in 1913, an increase of 2.78 over 1912.

Maintenance of way, which includes the wages and cost of material used in maintaining the railroad plant exclusive of the rolling stock, was $1,788,000 in 1913, as against $1,940,000 in 1912. Maintenance of way, of course, under ordinary circumstances would not increase anywhere near in proportion to an increase of 7 or 8 per cent. in traffic handled, and the actual decrease in expenditures on this account in 1913, is explained in the annual report as being due to heavy charges in 1912 on account of maintenance charges incidental to the strengthening of bridges and other additions and betterment work then under way. This addition and betterment program was carried on in 1913, as well as in 1912, and $1,041,000 was expended on this account in 1913.

The Delaware & Hudson is a short road, 904 miles, having a heavy freight density, with coal forming a large percentage of its total tonnage. Of the total 904 miles of road, 341 have second track and about 20 third and fourth track, with a total of 634 miles of yard tracks and sidings. The freight density—ton miles per mile of road—was 3,616,000 in 1913 and the passenger mileage per mile of road, 186,000. Of the total 22,269,000 tons carried in 1913, 1,800,000 tons were company freight. Of the remainder 63.93 per cent. was products of mines, 13.97 per cent. manufactures, 7.99 per cent. miscellaneous car load freight, 5.08 per cent. products of agriculture, 4.86 per cent. lumber, 3.13 per cent. merchandise (L. C. L.) and 1.04 per cent. meats and products of animals. The tonnage of all classes of commodities, with the exception of grain, bituminous coal, lumber and bar and sheet metal, and certain other negligible exceptions, increased, the most notable increases being in coal, cement and merchandise.

The Delaware & Hudson is a rather lightly capitalized property; the total outstanding securities, including the $4,500,000 of floating debt which has just been permanently financed, amounted at the end of 1913 to $104,923,000. Subtracting from this the book value of unmined coal owned and advances on unmined coal and the book value of stocks and bonds, we find outstanding about $65,000 of securities per mile of road operated. This is probably very much smaller than the actual investment per mile in the property. Since the credit of the Delaware & Hudson is so high as to permit of the sale of 4 per cent. bonds at a reasonable figure, and since the volume of the securities issued against its investments is so conservative, and further, since nearly two-thirds of its securities are represented by funded debt, the final return on the stock representing the ownership of the company is high. In 1913 the company earned 14.53 per cent., and paid 9 per cent. in dividends on its stock, and in 1912 it earned 12.95 per cent. and paid 9 per cent. It must be remembered, of course, that these figures represent the earnings from all sources, including the profits on coal mined and the dividends on stocks and the interest on bonds of electric railway companies and other companies in which the Delaware & Hudson has a considerable investment. The net railroad income amounting to $4,927,000 is at the rate of a little over 8 per cent. on our estimated capitalization against the railroad property—$65,000 per mile.

Letters to the Editor

STEEL CAR INSULATION

NEW YORK, July 3, 1914.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

In order to correct impressions or conclusions that might be reached after reading the article appearing in your issue of June 26, "Heat Transmission Tests on Steel Mail Car Section," we desire to submit the following:

As stated in the article, these tests were limited. They do not cover or give results that would aid in determining the correct steel car insulation. In the first place, before making laboratory tests it is customary to secure only material first class in every respect; it will be noted in Fig. 2 that almost all the four panels show the insulation torn, damaged or pieced together, and on one side of the box the insulating material is cut into two sections. This would allow an open joint, which would not be the case with insulation as applied in a car, as it would be cut in one sheet, eliminating radiation through open joints.

It would also seem that the best results would be obtained if all sides of the test box were of exactly the same construction, instead of having one side of steel and the others of wood. The study of steel car insulation problems is one that has been given considerable thought ever since the inception of the all-steel design, and there are certain conditions which must be considered but which appear to have been overlooked entirely in the tests conducted by Prof. Willard. Steel car insulation should have the following properties:

1. Highest insulation efficiency.
2. Correct sound absorbing properties.
3. Flexibility, ease of application and adaptability to irregular surfaces.
4. Light weight.
5. Moisture repelling or absorbing qualities.
6. Combustion resistance.

The test in question has eliminated almost all of the above with the exception of insulation efficiency. A great many insulation tests have been made by almost all the large laboratories as well as testing laboratories of different universities, but one report that has been given considerable prominence is that prepared by Prof. J. A. Moyer, in charge of the thermal testing plant of the Pennsylvania State College, read before the Third International Congress of Refrigeration, Chicago, 1913. One of the largest and most elaborate thermal testing plants in the country is installed at this college. The efficiency of granulated cork shown in Mr. Willard's paper does not agree with Prof. Moyer's, as the latter shows 1 inch granulated cork to have a B. t. u. transmission per square foot per hour per degree Fahrenheit difference in temperature of air as .479 and of 1 inch hair insulation as .31.

Prof. Moyer's test also brought out a 5 per cent. increase in B. t. u. transmission per 100 feet per minute velocity over 200 feet per minute; at 20 miles per hour this means an increased transmission due to increased air velocity amounting to 75 per cent. This clearly shows the difference existing between a test made in still air and one made under actual operating conditions on a railroad. Insulation efficiency depends upon dead air spaces, and under Item 3, "Object of Tests," in Mr. Willard's article, there is a statement that the space between the inside and outside plates would be filled with a granular or fibrous material which would render that space dead. Those familiar with steel car construction will readily agree that it would be almost impossible to make a dead air space, owing to the openings between riveted joints, around windows, etc. The only possible way to obtain dead or entrapped air spaces is by the use of a material that will actually give this.

The article in question does not clearly describe the kind of

granulated cork used, but from the extremely light weight, six pounds per cubic foot, we assume it is made of large granules of baked cork and its insulation efficiency would be greatly questioned, as this particular material is the sawdust from pure cork sheets, trimmings, broken sheets ground up, etc., after the cork has been baked; and unless the interstices existing between the granules of the cork were filled with a fine re-granulated material the insulation value would not be very high in actual practice. Granulated and re-granulated cork is sometimes used in cold storage work, but it has been found that the material tends to pack and in building work a space is usually left so that additional material may be added upon settlement of the original quantity. It would be almost impossible to take care of this condition in steel cars; and unless the insulation was continuous it would allow uninsulated portions of the steel plates to exist, which would be liable to cause condensation, thus further reducing the efficiency of the insulation. Nor would very fine re-granulated cork answer the purpose in attempting to obtain the required insulation efficiency in all-steel cars, as it would filter down into the interior of the car body over window curtains, etc.

In regard to cork insulation showing a 28 per cent. saving in weight: This amount is so small it is hardly worth notice, for when it is considered that a steel postal car weighs approximately 100,000 lb., figuring on the basis of 3,000 sq. ft. of insulation per car at an average weight of eleven ounces per square foot, it would mean a saving of only about 580 lb. per car, approximately one-half of one per cent. of the total weight of the entire car, which is really not of enough importance to warrant serious consideration.

It would seem from the tests that the insulation was of the well known Salamander brand. Such is not the case, however, as it was a special material known as "Nycinsul." Three-quarter-inch three-ply Salamander steel car insulation weighs only eleven ounces per square foot, whereas ¼-inch and ½-inch Nycinsul weigh eleven and sixteen ounces, respectively, making a weight of twenty-seven ounces per square foot of material for both courses. Figuring on using two courses of ¾-inch three-ply Salamander, we would have a weight of twenty-two ounces per square foot for both, or a saving that would offset the use of granulated cork in the entire air space.

There is nothing new in the suggestion to fill the wall spaces of the car solid with an insulating material. This has been tried on one or two occasions by large railroads, and it has been found to increase the insulation efficiency by 20 per cent.; but by the correct use of double insulation and combinations thereof, almost exactly the same results can be obtained.

The question of sound-deadening is one of prime importance in steel car design; and it has been ascertained that with the Salamander form of hair insulation, cars are much less noisy than is the case with those insulated with a harder and more dense material. This type of material is used in remedying the acoustics in offices, auditoriums, schoolhouses, court houses, etc., the treatment being worked out along purely scientific lines, hair being found to reduce the reverberations of sound to a minimum.

In regard to the test showing that by eliminating the use of the Agasote fibrous blocks between the steel posts and the inside and outside steel plates: This does not seem to be reconciled by other results or good engineering practice, as it has been long recognized that it is better to break the continuity of the steel plates by the use of ¼-inch asbestos felt, cork board or Agasote. This also tends to reduce radiation through steel post sections. If this is not done the steel sheets have a tendency to sweat, the same as cold water pipes running through a hot room.

A number of the largest railroads in the country have made operating insulation tests that have proved clearly the correct insulation material to be used; and we know the development of this part of the all-steel car has kept pace with other parts of the design and is really one of the things that have done much to facilitate the adoption of the steel passenger equipment car.

H. W. Johns-Manville Company.

New York, July 7, 1914.

To the Editor of the Railway Age Gazette:

Referring to the article appearing in your issue of June 26, under the heading, "Heat Transmission Tests on Steel Mail Car Section." Comparing tests 2-A and 2-B with 3-A, 3-B and 3-C, the former with the fibre insulation between the posts and inside sheets, and the latter with the fibre insulation separations omitted, the fibre insulation combination is shown to have an insulating efficiency of 40 per cent., while, by omitting the fibre insulation, the efficiency is increased to 47 per cent. This is diametrically opposed to any heretofore known facts of heat transmission. It may develop that in tests 3-A, 3-B and 3-C the plates were not firmly in contact, as a casual reader might be led to infer that heat transmission through ⅜-in. rivets does not seem sufficient explanation for the difference.

It seems to me quite unusual that agasote should be subjected to such a comparison, when it has long been known to possess insulation values practically equal to wood, as demonstrated in actual service and through exhaustive laboratory tests conducted by Prof. Pryor, of Stevens Institute, and others. For the comparative test between agasote and wood Prof. Pryor selected three-ply poplar veneer, 5/16 in. in thickness, and thoroughly seasoned, as he believed thoroughly dried poplar to have the highest thermo-insulation properties. This material, being a veneer, had higher insulation properties than a single thickness, where the grain runs in only one direction throughout the board, as, in a veneer, the grain runs in various directions, thus breaking the direct transfer of heat units. The results of his test are as follows:

Three boxes, cubes of equal size, were made of different materials, one of No. 20 gage steel, one of Agasote, and one of 5/16 inch 3-ply veneer poplar. Each of these boxes was made with a removable cover.

The tests consisted of determining the amount of heat that had to be supplied to the air inside of the box in order to keep the internal temperature about forty degrees higher than the temperature of the room. That is, heat was supplied to offset the heat lost through the walls of the box when there was a difference of temperature of forty degrees between the outside and inside temperature.

The boxes were set up in the still air of a room having a temperature of about 85 F. A number of incandescent lamps and a slow moving circulating fan were placed inside of the box to maintain a uniform temperature, approximately forty degrees higher than the room temperature. The amount of heat furnished by the lamps was regulated by an adjustable resistance placed outside. Calibrated instruments were used to find the electrical energy that was supplied to the boxes, and this quantity was transformed mathematically to heat units. The temperature inside the box was noted and maintained by observing thermometers that were inserted through the side walls. The outside temperature was also obtained by thermometers hung about the boxes. The boxes were sealed as tight as possible in order to keep down the air filtration.

It was found in the tests that the transmission value of the materials used, based on steel being 100, as follows:

Steel	100.0
Agasote	62.5½
Wood, three-ply poplar	51.2 5/16

The detailed figures of the tests, showing the actual temperatures and heat transmissions, are given in the following table:

Boxes in Still Air

Designation of material	Steel	Agasote	Wood
Radiating box surface, sq. ft.	38.5	39.4	39.2
Heat supplied per hour, watts	553.9	366.2	295.2
Heat supplied per hour, B. t. u.	1896.7	1249.5	1007.2
Average inside air temperature, deg. F.	126.5	121.8	126.3
Average temperature of external air, deg. F.	87.2	81.3	86.3
Difference in temperature between inside air and external air, deg. F.	39.3	40.5	40.0
Radiation per hour in B. t. u.'s per deg. F. difference between inside air and external air, B. t. u.	48.3	30.8	25.2
Radiation per hour in B. t. u.'s per deg. F. difference between inside air and external air, per sq. ft. (based on box surface), B. t. u.	1.253	0.783	0.642
Ratio of performance (based on box surface)	100.0	62.5	51.2

The Pantasote Company.

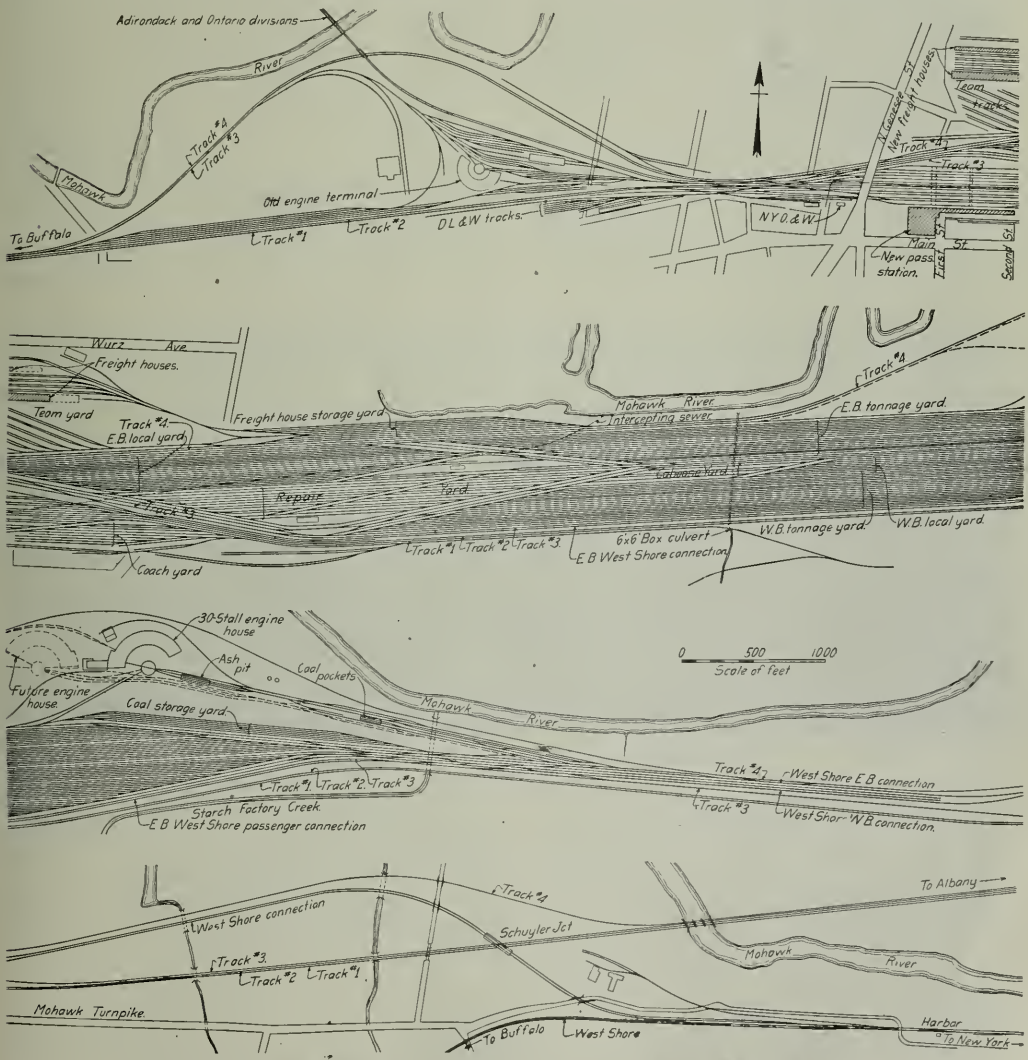
Railway Construction in Russia.—The Vladikavkaz Railway of Russia is at present considering the construction of a new line for the purpose of connecting up the Ekaterininsky system with the Vladikavkaz Railway. The project will involve a capital expenditure of about $1,000,000. The company is also proposing certain improvements and extensions at Novorossisk to cost about $750,000.

The New York Central's Improvements at Utica, N. Y.

Construction of New Passenger Station, Freight Houses, Classification Yards and Engine Terminal

The New York Central & Hudson River's new passenger station at Utica, N. Y., opened on May 24, is one of the important features of the extensive improvement work that this company has been carrying out in Utica for several years and which, when completed, will represent an estimated investment of $6,000,000. Utica is an important point, both for freight and passenger traffic, on account of its location on the main line between Albany and Buffalo at the junction with the West Shore, the Ontario and the Adirondack divisions. About 30 passenger trains are operated in each direction daily from Utica on the main line and about 12 on the other lines. The total daily car movement into and out of the Utica freight yard was shown by a check made last summer to exceed 1,100 cars. The distribution of this freight business is shown in the accompanying traffic diagram.

As the West Shore is electrified and operated by a separate company west of Utica, all freight except for points in electrified territory is handled over the main line west of that point. East of Utica either the main line or the West Shore may be used for freight traffic, connections at Utica, Hoff-

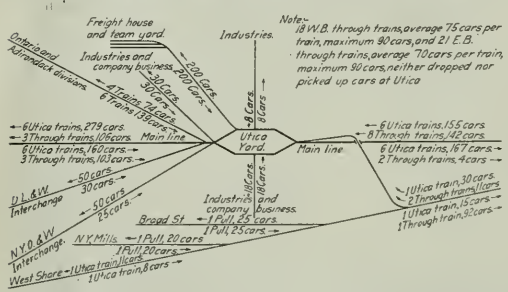


General Layout of the Ultimate Yard Development at Utica, Only a Portion of Which Has Been Built

mans, and Carmen making the operation quite flexible. A large amount of business between New York and Montreal also passes through Utica. Practically no classification of through freight is made at Utica, but all local business and all transfer freight from the West Shore, the Watertown line, the Adirondack division and foreign roads must be classified there.

NATURE OF THE IMPROVEMENTS

As substantially all of the city lies to the south of the main line, the company negotiated with the city for the straightening of the channel of the Mohawk river immediately adjacent to the old layout on the north, to remove that obstruction to development of the terminal facilities. An agreement was finally reached under which the city constructed a new river channel about 2,000 ft. north of the main line and the New York Central purchased the excavated material at a fixed unit price to be used in refilling the old channel. A large outfall or intercepting sewer was necessary in order to carry out this agreement, running under the passenger and freight yards to the river about one mile east of the station.



Diagrammatic Daily Car Movement Into and Out of Utica Yards

The next step was the elimination of grade crossings in the vicinity of the station. This involved the closing of Park avenue east of the station, the construction of a new street along the north side of the proposed new layout to connect Genesee street with the extension of Park avenue, and the elevation of Genesee street on a viaduct crossing the main tracks. This viaduct consists of one 40 ft. girder span and five truss spans, varying in length from 70 ft. to 87 ft. Three lines of girders and pony trusses are used in these spans, carrying a roadway 45 ft. 6 in. wide in which are laid two street railway tracks. Two 8 ft. sidewalks are supported outside of the outer trusses. Three-column steel bents on concrete footings, with reinforced concrete collision piers connecting the lower ends of the columns, carry the trusses. The plate girder floor beams and I-beam stringers support reinforced concrete slabs on which the pavement is laid. All steel work with the exception of the girders above the curb is encased in concrete. Concrete facia girders are provided along the outer edges of the sidewalks.

The new local freight facilities are grouped north of the passenger terminal east of and easily accessible from Genesee street. Separate inbound and outbound freight houses of brick construction are provided, the former being 50 ft. wide and 760 ft. long and the latter 30 ft. wide and 500 ft. long. Room for additions of 200 ft. to the length of both houses is provided at the east end of the layout. Eight tracks serve the houses. The team yard contains 14 tracks with a total capacity of 171 cars. These tracks are arranged in pairs with 30 ft. paved driveways between the pairs. There are two additional team tracks of 20 cars capacity each outside of the north station driveway, supplied with a platform and ramps for handling automobiles.

As the new passenger station covers the site occupied by the old station, it was necessary to provide a temporary building for use during the erection of the new station before the old building was torn down. This was located along the north side of the proposed station platform layout with a temporary framed trestle ramp connecting with the Genesee street viaduct. The three northerly platforms serving six station tracks and the north half of the passenger subway were also built before the old station was abandoned.

During the construction of the new passenger facilities, work was being pushed on the construction of a "jump-over" connection between the West Shore and the main line about 3½ miles east of the passenger station, and on the new classification yard and engine terminal located between that jump-over connection and the passenger terminal. This work involved the construction of a number of minor structures and the handling of large quantities of excavation. The following table indicates the magnitude of the operations that were undertaken:

A Portion of the Team Track Yard and East-Bound Local Yard

Items	Old terminal	Present construction	Ultimate development
Right of way	310 acres	728 acres	.....
Grading excavation	700,000 yd.	6,400,000 yd.	7,500,000 yd.
Masonry culverts	2,400 yd.	13,200 yd.	.....
Cast iron pipe	75 tons	365 tons	370 tons
Main track	18 miles	18.5 miles	22.8 miles
Yard tracks	11.3 miles	27.1 miles	57.8 miles
Total trackage	29.3 miles	45.6 miles	80.6 miles

JUMP-OVER CONNECTION AND YARDS

The old single track connection between the West Shore and the main line at Harbor, where the two lines are only about 600 ft. apart, required freight trains to pass over a heavy grade and to drag through crossovers on the two-passenger tracks which are on the south side of the four-track main line. To improve this condition, a double track jump-over connection has been built leaving the West Shore just west of Harbor, crossing the main line overhead and swinging around parallel with the main line east of the main freight yard. The maximum grade on this new connection is 0.25 per cent. compensated. Track 4 is diverted to the north a short distance east of the jump-over connection and is carried north of the entire yard development and engine terminal. Track 3 has been relocated to separate it somewhat from tracks 1 and 2 and place it on a grade which will allow easy connections with the yard. Tracks 1 and 2 are diverted to the south of the yard layout and are carried on a separate embankment for the greater part of their changed length.

The ultimate yard development as planned at present, includes nine yards of the following capacities:

	Tracks	Capacity
Eastbound tonnage yard	20	2,200 cars
Westbound tonnage yard	20	2,200 cars
Eastbound local freight yard	19	1,000 cars
Westbound local freight yard	8	640 cars
Repair yards		380 cars
Freight house and team track storage yard		300 cars
Coal storage yard		300 cars
Coach yard		78 coaches
Caboose yard		90 cabooses
Total capacity		7,188 cars

This capacity is in excess of the present demands and it is expected that sections of the yard will be built as required and if conditions change the plans will doubtless be altered before the completion of the development. Ample room has been left for extensions and changes wherever the possibility of such changes could be foreseen. The yards are served by an ample number of both thoroughfare and engine running tracks.

A large portion of the filling material for the yard and jump-over connection was obtained by hydraulic dredging. Two field towers, one 95 ft. high and one 65 ft. high, operating drag line buckets were used to throw up a dike behind which the hydraulic fill was made. A 20 in. suction dredge with a 40 ft. by 138 ft. hull, equipped with a 750 h. p. engine, a 1,000 h. p. boiler and a 50 ft. ladder, was used on this work. This dredge pumped through pipe lines 800 ft. to 4,600 ft. in length against a maximum head of 35 ft. The material handled contained from 18 to 22 per cent. of solids. This dredge was able to handle 19,400 cu. yd. in 24 hours. A size "B" Lidgerwood dipper dredge was also used for portions of the work, its maximum record being 18,000 yd. in three 8-hour shifts. This dredge was equipped with a 2½ yd. bucket and an 80 ft. boom. A 65-ton Bucyrus steam shovel and team outfits were used for making the high fill under the jump-over connection and other miscellaneous grading work.

Starch Factory creek which crossed the yard site, has been diverted to the east in order to shorten the length of the required culvert. This creek is carried under the yard in a 24 ft. concrete arch culvert. A 6 ft. by 6 ft. concrete arch has also been built near the middle of the yard. A three-story frame yardmaster's office and four interlocking towers are also provided. An electric transmission line which crossed the site of the yard had to be relocated to keep it north of the new development and a new crossing has been constructed on steel towers with a maximum height of 98 ft.

The tracks in the main yard are laid on 12 ft. centers with a 16 ft. space in the middle of each of the tonnage yards and between adjacent yards, for piling material, rubbish, etc. An 18 ft. to 20 ft. spacing is standard along ladder tracks, leads and thoroughfares. The tracks in the repair yards are spaced alternately 16 and 20 ft., with two adjacent ladders through the center of the yard, dividing it completely. No. 8 frogs on No. 7 ladders are used for all of the principal yards and No. 10 frogs are the sharpest used on running tracks and main line connections. Main line tracks are laid with 105 lb. rail and yard tracks with 80 lb. relaying rail. Creosoted ties and gravel or cinder ballast are used.

At present the only main line trains that change engines at Utica are tonnage freights and local passengers. For these trains and for the Ontario and the Adirondack trains about 54 engines per day are turned at Utica.

The engine house consists of 30 stalls built on a 70-stall circle with provision for the addition of the same capacity in a separate house adjacent to the present one. The depth of 25 of the stalls is 100 ft., and of five, 125 ft. Three drop pits are provided in the long stalls, making it possible to remove any wheel from any engine using the house. A 7-ton electric hoist handles the wheels from these drop pits. The house is a brick structure on concrete footings, similar in type to the generally adopted New York Central standard. The engine terminal also includes a machine shop power house, fan house, two double track ash pits 200 ft. long, two inspection pits 80 ft. long, a gravity coal trestle, sand house, two 50,000 gal. wooden storage tanks and four penstocks.

The power house is a brick building 75 ft. by 89 ft. in size. The machine shop is located in an annex building connecting with the long stalls over the drop pits. The coaling trestle is arranged to coal engines on two tracks directly from the pockets and by means of a bridge reaching over to track No. 4 engines can also receive coal on that main track. Clearfield coal is used for freight engines and Pittsburgh coal for passenger engines, provision being made in the pockets to keep these grades separate. The pockets are 160 ft. long and are reached by a trestle on a .5 per cent. grade.

General View of the 30-stall Roundhouse

The Recently Completed Passenger Station

NEW PASSENGER STATION

The new passenger station is a three-story building 192 ft. by 204 ft. in plan, facing on Main street and on First street, one block east of Genesee street. First street ends at the tracks and provides an entrance to the trucking space alongside the baggage and express building, which extends from the passenger station east to Second street. The front of the station is set back from the street line 18 ft. There are two main entrances on the front covered by heavy marquises. Auxiliary entrances are also provided on both sides of the

The Main Waiting Room in the New Station, Showing Vaulted Ceiling Over Passageway and Beam and Skylight Ceiling Over Seating Lobbies

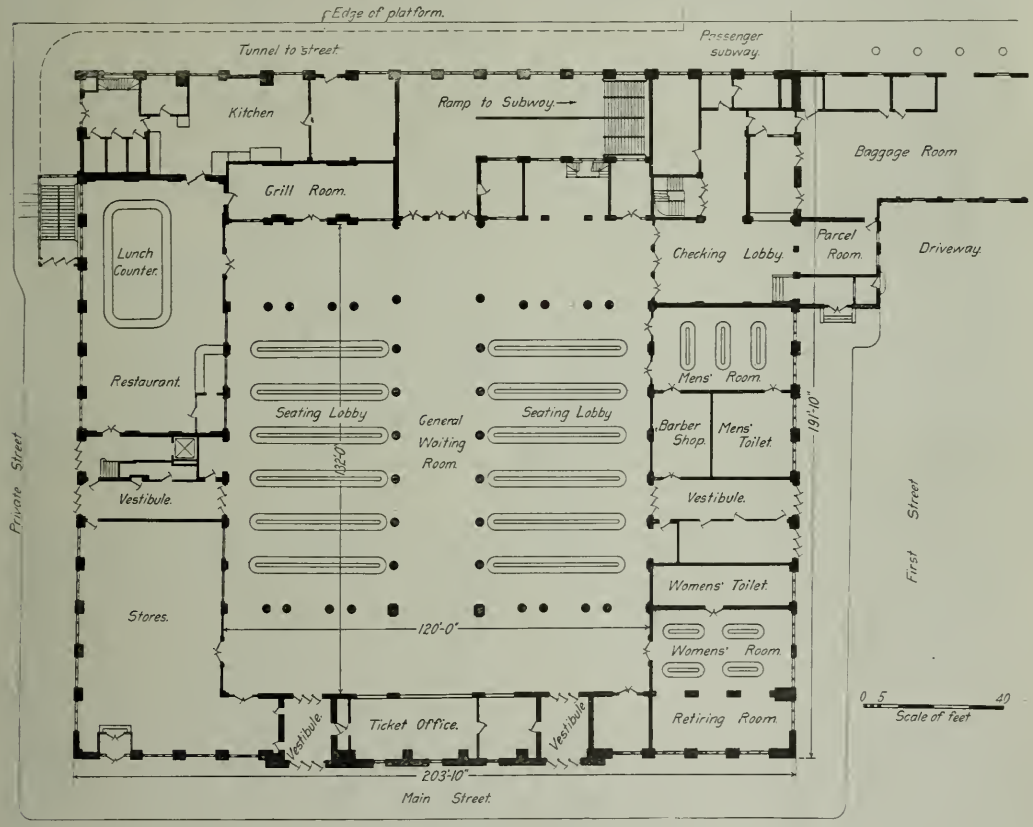
building. Structurally the station has a steel frame with Bedford stone facing up to the first office floor and grayish rough textured brick for the remaining height. Limestone trim is used throughout. Architecturally the building is of the Tuscan order with only enough ornamentation to relieve the severity of the lines. The first story supports a colonnade of Tuscan columns, between which are placed the window openings for the second and third stories. The colonnade is surmounted on the Main street side by a clock 6 ft. 6 in. in diameter supported on either side by cut stone eagles.

The building was designed to rest on spread footings without piles, but as a water-bearing sand was encountered in the excavation, it was decided to use piles under all foundations. A Thew steam shovel was used in excavating for the building and subways, and by rigging a set of leads on this machine it was also used for driving piles. As the street in front of the station and the new track level are at approximately the same grade, the main floor of the station on which all public facilities are grouped is kept at approximately the same elevation, and access to the train platforms is provided by a subway under all the tracks connecting by a ramp and a short flight of stairs, with the main waiting room in the station and to the street at the west side of the building, allowing incoming passengers to reach the street without passing through the station, if desired.

The two main entrances on the south front of the building open through enclosed vestibules directly into the main waiting room, which is 120 ft. by 132 ft., divided by rows of marble columns into a central and two end passageways and two seating lobbies. The central passageway continues to the north wall of the building where a connection is made with the passenger subway. Each seating lobby contains six double seats. The total capacity is about 400 people. All facilities for handling passenger business are grouped around this main waiting room, including the ticket office, information booth, the women's rooms, barber shop, men's rooms, parcel room and baggage check room, news stand, grill room, restaurant and lunch room. A large rental space, which will be occupied by a store, is located in the southwest corner. The floors in the main waiting room, men's rooms and restaurant are of terrazzo, in the vestibules and ramp leading to the subway of paving tile, in the women's rooms of cork tile, and in the grill room of quarry tile.

The effect of ornamentation has been secured in the interior of the building chiefly by the skilful treatment of permanent materials. Vermont marble of soft gray and green veining has been used throughout for wall facing and columns. The vaulted ceiling over the main isles and the paneled ceiling over the seating lobbies are tinted with a grayish green shade to harmonize with the marble, the relief ornamentation being picked out in dull Roman gold. The woodwork is of oak throughout. The building is heated by steam furnished by three 150 h. p. boilers, located under the baggage house.

The building contains two main office floors, and provision has been made for two elevators, one of which has been in-



Ground Floor Plan of New Passenger Station at Utica, N. Y.

stalled. The floors in the office portion of the main building are of steel and concrete construction, the corridor floors being finished with a cement surface and the offices with wood. The partitions are of gypsum blocks and the structure is made fireproof throughout.

The baggage house is a brick building with limestone trim. It is 604 ft. long and 36 ft. wide. It includes a baggage room, mail room and offices and storeroom for the National and American Express Companies.

The track layout at the passenger station includes 12 station tracks served by six platforms, 20 ft. wide and with a maximum length of 1,200 ft. Two through tracks for fast freight and passenger trains which do not stop at Utica are carried through the middle of the layout and are not adjacent to any platforms. The platforms are covered with canopies, 600 ft. long, with provision for extension over the full length of the platforms. Each platform is reached by two stairways from the passenger subway below and by an elevator from the baggage subway.

The passenger subway is 30 ft. 5 in. wide and 8 ft. high with a center row of columns supporting the roof. The walls are of concrete founded on piles and faced with hard burned face brick. The roof consists of concrete slabs under the platforms and I-beams supporting transverse concrete slabs under the tracks. The ceilings under the solid slabs are of sheet steel painted white. The subway is provided with seats along both walls where passengers can wait until trains are called, and if desirable, two rows can be added between the center columns. Heat is supplied by direct radiation under these seats. The electric lights are suspended from wall brackets.

This entire improvement work was carried out under the direction of the engineering department of the New York Central & Hudson River, G. W. Kittredge chief engineer; C. J. Parker principal assistant engineer; J. W. Pfau, engineer of construction, exterior zone; E. B. Menuez, district engineer; B. C. Martin and G. F. Chism, resident engineers, and R. T. Horton, assistant district engineer, had resident charge of the work at various times. James H. Dawes (New York State Dredging Corporation), Philadelphia, had the contract for all grading work on the general improvement. The high fill under the jump-over connection was let to the Walsh-Kahl Construction Company, Davenport, Iowa. Henry R. Beebe, Utica, had the contract for the construction of subways, platforms, canopies, temporary passenger stations and numerous details. The passenger station was designed by Stem & Fellheimer, New York, and was built under contract by J. Henry Miller, Inc., Baltimore, Md. The freight houses were built by Mosier & Summers, Buffalo, N. Y., and the engine house by James Stewart & Company, New York. All tracks were laid with company forces.

Fast Trains on a German Rack Railway.—On the Höllentalbahn (Hellvale Railway), between Freiburg, in Baden, and Donaueschingen, international through cars are now run at relatively high speed for the service between Mülhausen, in Alsace, and Ulm and Munich. Freiburg is situated in the low plains of the middle Rhine, not far from Basle, where the Rhine makes a bend, just at the foot of the Schwarzwald; the Höllental rack railway leads into the highest part of the Black Forest mountains, which there rise to 5,500 ft. The length of the Höllental section of the railway is 22 miles, and the rack line itself has a length of 4.3 miles, and passes over gradients of 55 in 1,000, and curves of 240 ft. radius. Since 1908, through trains of 62 tons maximum weight have been run over this section. Since the summer of 1912, trains of 121 tons weight have been run on the rack at a speed of 19 miles an hour, while the speed over other parts of the Höllental line is 32 miles. The trains are hauled by tender engines of 63.5 tons weight, fully equipped, and special rack locomotives act as helper engines on the rack section.

SOUTHERN RAILWAY PROGRESS

The trustees of the voting trust certificates of the common and preferred stock have sent a letter to stockholders in which they comment on the growth of the property during the life of the voting trust. The following figures are taken from this letter:

	1913	1895	Increase	Per cent.
Mileage	7,037	4,392	2,645	60
Gross revenue	$69,676,720	$17,114,792	$52,561,928	307
Gross revenue per mile	9,903	4,135	5,768	139
Gross income	21,221,685	5,141,615	16,080,070	319
Gross income per mile	3,016	1,242	1,774	142
Ded. from inc. (exc. divs.)	14,191,721	4,245,870	9,945,851	234
Ded. per mile	2,017	1,025	992	96
Net income	7,029,965	895,745	6,134,220	684
Net income per mile	999	216	783	361
Ton m., revenue fr	4,577,486,801	1,098,932,884	3,478,553,917	316
Ton ms. per ms	650,617	265,479	385,138	145
Fr. revenue per mile	6,388	2,613	3,775	144
Pass. miles	844,801,198	178,015,925	666,785,273	374
Pass. ms. per ms	120,075	43,005	77,070	179
Pass. tr. revenue per m.	3,118	1,349	1,769	131
Double track in	385	.....	.....	...
Locomotives	1,632	623	1,009	161
Pass. train cars	1,157	487	670	137
Freight train cars	49,512	18,924	30,588	161

Expenditures have been made for additions to the company's property from 1894 to 1913 to the extent of over $124,000,000 as follows:

New equipment	$35,539,829
Double track, terminals, yards, heavier rails, etc	44,263,176
Real estate—right of way	3,869,041
New lines and extensions	10,731,421
Betterments through inc., approximately	30,000,000
Total	$124,403,465

Growth of the investment and of the financial resources of the company is indicated by the following figures:

Property investment:	1913	1895
Road	$307,962,970	$228,639,979
Equipment	65,502,224	6,010,803
Securities	68,151,367	7,609,801
Materials and supplies	5,744,876	919,430
Advances to proprietary cos	408,235	.....
Total	$447,769,673	$243,180,013
Per mile of road owned	$103,481	$85,565
Per mile road owned, controlled and leased	67,331	55,992

During the period the company has paid aggregate dividends on its preferred stock amounting to $30,758,904, equal to an average of 2.76 per cent. per annum.

Records of the company's land and industrial department show that from 1900 to 1913, inclusive, 8,337 new manufacturing plants of various kinds, representing an investment aggregating $500,000,000, were located on the lines of the Southern Railway. During the same period additions were made to 2,486 existing factories amounting to $100,000,000.

The states principally served by the Southern Railway are nine in all—Virginia, North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Kentucky and Tennessee. In 1910 the population of the South as so defined was 17,554,840, an increase in twenty years of 4,471,933 or 34.18 per cent.

The last available census figures of the value of property in the South compare 1904 with 1890, and show an increase in wealth in those fourteen years in these southern states of $2,373,242,026 or 38.12 per cent. Farm property in the same states increased in value, comparing 1910 with 1890, in the amount of $2,505,340,373 or 128.08 per cent., while the capital invested in manufactures in the same states in 1909 shows an increase over the year 1889 of $1,075,325,534 or 278.71 per cent.

Value of farm crops in the South in 1909 was $1,199,424,319, an increase of $605,580,746 or 102 per cent. over 1899. Value of products of manufactures in 1909 was $1,455,927,000, an increase in the same period of $939,113,553 or 181.71 per cent. Comptroller of the Currency reports bank deposits in the South in 1910 as $677,483,913, an increase of $435,316,983 or 179.76 per cent. over 1900.

"The share which Southern Railway Company has had in this prosperity is notable," says the trustees' letter.

The Draft Gear Problem from Various Viewpoints

First Prize Article and Two Others Presented in the Railway Age Gazette Mechanical Edition Competition

FIRST PRIZE—THE DRAFT GEAR PROBLEM

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Draft gear—the real meaning of which is "an apparatus used for drawing a load"—when applied to railway equipment becomes not merely a pulling mechanism, but a shock absorber as well, and owing to the limited space allotted for its installation and the short movement through which it performs its work, the design, principle of operation and installation make it one of the most important, if not the greatest problem, confronting the engineer and designer of railway equipment.

The demands of modern railroading require the stopping of a heavy, high speed train in about one-quarter of one minute, but the draft gear is expected to protect from injury the coupler, the car and its lading, in one-sixth of one second at the very low speed of one mile per hour and in proportionally less time at higher speeds.

It is not our purpose to go into elaborate statistics regarding the number of cars continually out of service on account of defective draft gears and attachments, or to give figures showing the high stresses to which the draft gear is subjected, but to describe the different methods which have been used to meet these conditions and to give results of laboratory and road tests, together with car repair records in order to show which principle, in the designing of draft gears, has proved to be the most efficient.

Various means, including the compression of liquids and air, have been employed to dissipate the shocks on railway vehicles, but the only devices which have been found practical are compression springs and a combination of springs and metallic frictional members, known as friction draft gear; the comments which follow will be confined to the merits of the spring and friction draft gears.

SPRING DRAFT GEAR

Since the discovery of metals, springs of different forms have been used as a cushioning medium and it was natural that they should have been selected for draft gear purposes in the early days of railroads. So long as railway equipment was of light construction, the trains short, and the speeds moderate, spring draft gears were satisfactory, but as these conditions changed, the light springs were found inadequate and those of higher capacity were substituted.

The increased capacities and weights of railway equipment, together with the general use of air brakes on freight trains, permitting higher speeds and longer trains, necessitated a still further increase in the capacity of the springs, and to such an extent that disastrous results occurred from recoil. If it were not for the reactive effect, the use of springs as a shock absorber would be an ideal arrangement on railway trains, because the power required to compress a spring is in direct proportion to its movement, and this is about the rate shock stresses should be dissipated to give the best results.

The damages resulting from the recoil of draft springs is most severe on cars in transit, not only to the lading, but to couplers and attachments and other parts of the car. The danger of parting long trains equipped with spring draft gears and running at slow speeds is so great if the throttle is opened immediately after placing the handle of the brake valve in release position, before all brakes are fully released, that locomotive engineers rarely attempt it and some roads issue instructions forbidding it.

The capacity of draft springs is limited to their safe recoil effect, which is also the capacity of the springs to resist buffing stresses; it has been found to be only about one-third the capacity of a friction gear which does not have the damaging recoil results of the springs.

SERVICE RESULTS

The limited capacity of draft springs gives but a comparatively slight protection to heavy equipment in buffing; this fact was very forcibly brought to the writer's attention a few years ago, when inspecting a lot of cars at the request of a railroad official. Three years previously the road had purchased five hundred cars, alike in every respect except that one-half were equipped with spring draft gears and the other half with friction gears. After having been in the same service for the above length of time, all the cars were reported to be in excellent condition. The railroad was about to purchase additional cars and contemplated using spring draft gears, as the cars equipped with this device were apparently in just as good condition as those fitted with the more expensive friction device. The cars referred to were steel hoppers and their use was confined to ore service. The steel end sills were strengthened on the outside by a very heavy steel casting extending the full width of the car, the casting being so arranged as to take the final blow of the coupler horn. An inspection of many of the cars with both types of draft gears showed them to be in excellent condition, but a visit, the following day, to the repair tracks (the best place to obtain practical draft gear information) revealed a condition which proved conclusively the superiority of the friction gears over the spring gears.

From the repairmen the writer learned that the 250 cars equipped with friction gears were still using the couplers which were applied when the cars were built. On the 250 cars equipped with spring gears all the original couplers had been broken, as well as a complete renewal of another make and at the time of the investigation all of the spring draft gear cars which came in for coupler failures were being equipped with still another make, in the hope that the last type of coupler would be better than the other two. They failed to realize that the trouble was due to the end sills being so strong and the capacity of the spring draft gears so low that the coupler head was continually being driven against the end sill until it broke.

If railroads would keep accurate and systematic records of expenditures and replacements of repairs to freight cars, separating the cost of draft gear maintenance from general repairs, there would be many revelations similar to this.

From experience in car design and inspection of failures of different parts of railway equipment, together with the information obtained from reading railway literature and papers before our railway clubs, there is no question (and it seems to be corroborated by all published reports) that the enormous expense of car maintenance, damage to lading, delays from break-in-twos, etc., would be materially reduced if friction draft gears, properly applied and maintained, were standard on all railways. To be more emphatic, the universal use of friction gears would show as great improvement in conditions as the change from link and pin connection to the present M. C. B. coupler.

LABORATORY TESTS OF DRAFT GEARS

Much time and space could be taken by presenting figures and charts of tests of draft springs on static testing machines and under falling weights, from the early tests under the M. C. B. drop of 1,640 lb. to the present schedule of drop and rivet shearing tests under a 9,000 lb. weight, but these results have been published so generally and are so well known that a rehearsal of this data is unnecessary. Drop test efficiencies of spring and friction gears may be briefly summed up by the following statements, which are results of demonstrations made at various

times, under the auspices of railroad officers, and which are matters of common knowledge among railroad mechanical men:

(a) A 9,000 lb. weight falling 5½ in. closes the most powerful draft gear spring solid.

(b) A 9,000 lb. weight is required to drop from 15 to 20 in. to close solid a friction draft gear of ordinary capacity.

(c) The above draft gear springs placed upon a follower, supported by two standard draft lugs, attached to channels by nine 9/16 in. rivets in each draft lug, required 15 blows of a 9,000 lb. weight falling 6 in., and one blow from a height of 9 in., to shear the rivets.

(d) A friction draft gear, under the same conditions, before shearing the same number of rivets, required:

15 blows of a 9,000 lb. weight falling 6 in.
15 blows of a 9,000 lb. weight falling 9 in.
15 blows of a 9,000 lb. weight falling 12 in.
15 blows of a 9,000 lb. weight falling 15 in.
12 blows of a 9,000 lb. weight falling 18 in.

ROAD TESTS OF DRAFT GEARS

There are many who do not consider laboratory tests of much importance, because of the conditions being so different from service. For this reason there have been made, in different parts of the country, several draft gear demonstrations, with fifty car trains equipped with spring and different forms of friction gears. The two most important tests of this kind were the Santa Fe tests at Ft. Madison, Ia., in 1906, and those on the Los Angeles division of the Southern Pacific in 1908. In order to illustrate the comparative service operation of spring and friction draft gears, a few results of the demonstrations on the Southern Pacific (see report published in serial form in the *Railway Age Gazette*, and the *Railway and Engineering Review*, December, 1908) are given below.

Jerk Test

Set 10 rear brakes by air, take slack with full throttle and throw reverse lever ahead; engine worked on sand. (Train: 50 cars, dynamometer car the 41st.)

Spring Gear	Friction Gear
260,000 lb. jerk	120,000 lb. jerk

Buff Test

Emergency application of the brake at a speed of 9½ miles an hour, steam shut off just previous to use of brake valve. (Dynamometer car 41st.)

Spring Gear	Friction Gear
550,000 lb. buff	155,000 lb. buff
(One broken coupler)	(No damage)

Release Test

Accelerate train to 20 miles an hour, then apply brakes in service application and when speed has been reduced to 13 miles per hour open throttle of engine. (Dynamometer car 26th in train.)

Spring Gear	Friction Gear
285,000 lb. jerk	156,000 lb. jerk
(Train parted)	(No damage; train kept moving)

BUMPING POST TESTS

In 1905-1906 a series of very interesting tests were made by a large railroad; the method employed showed in the best possible manner the inefficiency of spring draft gears. At the foot of a grade a substantial bumping post was erected, against which was anchored a dynamometer car. To the yoke of the coupler on the opposite end of the dynamometer car from the bumping post was attached a slide, containing the record paper, the buffing stresses from the striking cars being registered upon the paper, through the dynamometer, in the usual manner, the movement of the paper being coincident with the travel of the coupler. The diagrams showed the actual operations of the gears in the same manner that an indicator card illustrates what takes place inside of a steam engine cylinder.

During these bumping post demonstrations, tests were made with loaded cars to about 3 m. p. h. and with an empty car to 7 m. p. h. and the records showed the low cushioning effect of spring gears more accurately and clearly than any laboratory or road tests could do.

FRICTION DRAFT GEAR

The preceding comments relating to the inefficiency of spring draft gears disclose, in comparison, the superiority of the friction gear, which is admitted by all who have thoroughly and conscientiously investigated the draft gear question to be founded upon the best principle yet devised for dissipating the stresses to which railway equipment is subjected. The design of friction gears and the methods of operation have taken several forms, but unless some better principle than friction is discovered, friction draft gears, with possibly some modifications in design, will be used for many years to come.

Railroad mechanical men are often skeptically inclined towards the claims made by the makers of railway appliances, but it would seem that the friction draft gear manufacturers have done their part well in furnishing a device of such high efficiency, when it is considered that the spaces allowed for the apparatus are very limited and the travel (length of time for performing the work) is much less than it should be for dissipating shocks of such magnitude; and also to make it of sufficient strength, and at the same time as light as possible, so as not to increase the dead weight of the car.

The draft gear question today is one of close co-operation between the manufacturers of friction draft gear and the railroads, with especial care given to the proper installation upon cars, periodical inspections and renewal of repair parts when necessary. These suggestions, if put into practice, will undoubtedly result in more efficient service from draft gears and better protection to railway equipment and will assist greatly in answering that vital question which is worrying railroad officials so much today as to "how to reduce the cost of car repairs."

A REMEDY FOR DRAFT GEAR TROUBLES

By George Thomson
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What is draft gear and what is it used for? This may seem a very useless question, yet if the truth is to be acknowledged we must admit that the draft gear is one of the least understood and most abused appliances on railroad equipment. The draft gear is, to state it plainly, the cushion between the back end of the coupler and the car, and is put there to protect the car from hard knocks; therefore, the better the cushion we use the more protection we give the car, which means a reduction in freight car trouble and the cost of maintenance. At present draft gear is distinctly divided into two kinds—friction draft gear and spring draft gear—there being different designs of each kind.

Until, probably, twelve to fifteen years ago the draft gear commonly in use consisted of one or two springs having a capacity of 19,000 lb. each. These springs were attached to the coupler and car in different ways. With the old type of link and pin coupler this type of gear proved fairly satisfactory, but with the advent of the automatic coupler came the rougher and more severe handling of cars in switching service, so that it was found that a more powerful gear or cushion was needed; then springs having a capacity of 30,000 lb. were brought into use. The attachments for applying the draft gear to the cars were also improved and made stronger. While these springs gave more protection to the car, it was also found that they had a very destructive recoil, which caused a great amount of coupler trouble, such as broken knuckles, knuckle pins and coupler locks; in addition, this rougher handling of cars also entailed a vast amount of trouble in the draft gear attachments themselves, such as broken yokes, yoke rivets, center sills, draft sills, end sills, buffer blocks and broken draft timber bolts. On box cars came an increase in bulged or broken ends, leaking and damaged roofs and side doors damaged and missing—all this increase of damage due to the more severe handling of equipment. A large amount of these troubles could have been prevented by the use of a draft gear giving more adequate protection.

Then came the steel underframe and all-steel car. On an all-wooden car the cars had some "give" to them when hit hard enough, and, while this may have helped out the draft gear, it was pretty hard on the car. With a properly designed steel underframe, or steel car, these conditions changed and the draft gear had to take the humps, as there is no "give" to the steel car. The capacity of the cars and the number of cars per train

were also increased. Heavier and more powerful locomotives came into use, so that in addition to the damage to cars and lading in switching yards came an increase in difficulties in handling long trains, such as break-in-twos, which is a very serious matter. A break-in-two means that not only the train itself is delayed while the damaged car is being switched to a side track, but it may also delay other trains, and very often cause wrecks. Men studying this question came to the conclusion that a more powerful draft gear was needed; but, while they wanted more draft gear capacity, it was preferable to obtain this without any increase in recoil; in fact, it was found highly desirable to reduce the recoil of draft gears. Therefore, this additional capacity could not be obtained by the use of springs alone for the very reason that every pound of energy used to close a spring is returned in the form of a "kick-back" or recoil.

After a great deal of experimenting, the friction draft gear was devised. In this type of gear the springs are not called upon to do all the work, as the frictional resistance is brought into use. This causes a large part of the energy delivered to the coupler by cars striking together to be used in overcoming the frictional resistance of the draft gear friction parts. Thorough tests show that, while it would take a large amount of energy to close a friction draft gear, it also has very little recoil. Friction draft gears have been tested in different ways and have proved their superiority over any and all forms of spring draft gear, this not only in laboratory tests but also in road and service tests.

Several railroads have at times fitted out test trains, equipping them with different types of draft gear, both spring and friction, and conducting a series of tests. These experiments proved beyond a doubt that the trains equipped with a good friction draft gear could be handled with greater despatch and with far less liability of break-in-twos than trains equipped with any form of spring draft gear. The shocks to which these trains are subjected due to train handling were accurately recorded by means of a dynamometer car.

The tractive effort of the locomotive has increased from the 50,000 or 60,000 lb. of several years ago to as high as 160,000 lb. on a large Mallet engine just built. A locomotive having a tractive effort of only 60,000 lb. is sufficient to close a spring draft gear solid, which leaves no cushion in the gear to take care of emergencies. All these facts tend to prove the need for a draft gear giving more protection.

The original friction draft gears had a travel of 2½ in., whereas the spring draft gears have only 1¾ in. This increase in travel alone was of great benefit, and, added to the other desirable qualities of a friction draft gear, helped to solve a large number of the draft gear troubles. Since then various designs of draft gear have been placed on the market, some of them being widely used today, while others had only a short life.

Manufacturers are constantly endeavoring to improve their devices until now there is at least one make of draft gear having a travel of 3¼ in., an increase of 1½ in. over the travel of the spring draft gear. This manufacturer realized that a long travel was not only desirable but very effective in destroying hard blows to which the cars are subjected.

The friction draft gear has solved many troubles and it remains to be decided which make is most desirable. The friction draft gear should have some means to compensate for slack which may occur due to wear of the parts of the device. This provision to compensate for slack should preferably be some form of adjustment which will accomplish this without reducing the length of travel, as reduction in travel means reduction of efficiency. The design of draft gear should be such that it will exclude small parts which may be easily broken or damaged. The design should not be complicated, thus making it easy for the average repair man to handle it when necessary.

The draft gear is fully as important to a car as the air brake and it would be to the railroads' advantage if they would maintain as systematic an inspection of draft gear as they do of air brakes. If air brakes were applied to the car and never looked after, how long do you suppose they would give good, efficient service? Other parts of the car are regularly inspected, so why not the draft gear, and thereby keep it working at maximum efficiency? A preferable design of draft gear would be one that is easy to inspect and maintain. Some designs of friction draft gear are so constructed that if anything is damaged or broken the gear is a complete loss, while in others the broken or damaged parts can be replaced and the draft gear put in working condition.

Railroads which have made a fair and impartial investigation of various draft gears have never failed to find the friction draft gear far more efficient than any form of spring draft gear ever made. Statistics of the cost of car maintenance show that cars equipped with good friction draft gears cost far less to maintain than cars equipped with spring draft gears. Some roads, in keeping the cost of maintenance covering repairs due to draft gear performance, do not go far enough, as the cost of repairs to the draft gear does not cover everything. The cost of replacing broken couplers, broken sills, yokes, yoke rivets and attachments should also be included; in fact, it is hard to tell just where to stop, as a good friction draft gear protects the whole car, while a poor draft gear causes more or less damage to the entire car, particularly in case of a box car, where it is not only destructive to the car but also to the lading. It also puts a car out of service while necessary repairs are being made, thus reducing the earning capacity of the car.

A number of roads which have had wooden cars equipped with spring draft gear that were a constant source of trouble, are at present stopping this trouble by removing the old obsolete draft gear and applying either steel underframes or cast metal draft arms to the cars and equipping them with good friction gear. The roads doing this have made a study of draft gear conditions and find that, while a spring gear is probably cheaper than the friction as to initial cost, it costs far more money in the long run in paying for repairs necessary because of poor protection.

While some of the roads have looked into the draft gear question, there are a number of them which have paid very little or no attention to it. They cannot realize what inadequate draft gear is costing them until they get right down and analyze the cost of repairs due to inferior draft gear and take into consideration the total cost necessary to put a car back into service after it has been hammered to pieces by not having the necessary protection. A number of roads have kept records of these costs and after doing it there has always been one result: they have quit using inadequate draft gear and have put on the best draft gear they could buy, with the result that instead of having cars on the repair track all the time and having congested tracks, they are keeping their cars in service, where they are earning revenue instead of helping to swell the expense account.

Another question. Why do not all railroads, when buying draft gear, make an investigation as to the merits of the different draft gears and have certain requirements covering draft gear? They will inspect various articles going into the manufacture of the car, but when it comes to the question of draft gear they generally do not pay very much attention to it. There are draft gear testing laboratories in this country where the railroads are at liberty to conduct any laboratory test they care to. These laboratories have been put up at great expense by the draft gear manufacturers, and there are at least two companies which are willing to offer their laboratories to any railroad at any time in order that they may conduct draft gear investigations. It seems, however, that some of the railroads do not realize the importance of a draft gear and what it means to them in dollars and cents. When the selection of a draft gear is left to the purchasing agent, as it sometimes is, he will generally buy the cheapest sort of draft gear, regardless of the fact that this same cheap draft gear is going to cost a whole lot of money for repairs later on. Again, the selection of draft gear is often made by some superior officer who is not acquainted with the different

devices, and who will often go against the recommendations of his mechanical men who have made a study of the subject.

The M. C. B. Association has made many and thorough investigations of various articles used in car building, but for some reason or other has done very little along the lines of draft gear investigation. I will grant that it has made some investigations and has gathered some valuable data, but it has merely scratched the surface and has not gone deep enough. Within the past two years it has conducted a long investigation into the manufacture and design of couplers with the idea of making a stronger coupler and thus reducing the enormous number of broken couplers occurring every day. At the M. C. B. convention held in Atlantic City in 1913, various types of couplers were on exhibition, illustrating ideas of strengthening them and eliminating some of the present troubles. The weight of the coupler was increased from 300 lb. to 500 lb. to overcome coupler troubles. Again we ask the question, why do not they also investigate the draft gear and see if something cannot be done there and thus help the coupler troubles by using an efficient cushion back of the coupler?

Railroads which have followed it up know that fewer couplers are broken when used in connection with friction draft gear than when used with spring draft gear. These facts are also more forcibly brought out when the records include steel cars, for, as above stated, a steel car has no "give" to it, to help out the poor draft gear, as is the case with a wooden car. The steel car is here to stay, so why not use all the draft gear protection possible and reduce draft gear and coupler troubles to a minimum?

THE SO-CALLED DRAFT GEAR PROBLEM

By Myron E. Wells
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From an economic standpoint the draft gear problem is certainly most important. W. E. Symons, before the Western Railway Club, made a very reasonable estimate of the annual cost of repairs to freight cars that occur through the draft gear alone, and placed the figure at approximately ninety million dollars. This does not take into account the loss and damage claims, the cost of switching bad order cars to and from the repair track, the delays to traffic and the consequent overtime. It is also a most important factor in keeping the average daily mileage of freight cars down to the very low figure of twenty-five miles a day. This, to my mind, is a great source of lost efficiency, and one not usually taken into account.

The combined effect of all these handicaps results in greatly reducing the efficiency of the railroads. When all these matters are carefully considered and taken into account, the recent estimate quoted by the *Railway Age Gazette* of two hundred and fifty million dollars' damage per annum caused by draft gear troubles is not far wrong. At any rate, any efforts to solve the problem are certainly worth while, and I am very glad to add my mite, because I have for a good many years held some very positive ideas on the subject.

It is already well known that the modern type of friction draft gear is the best and most efficient so far produced. Understand, I am speaking of the type in general, and not any particular make. And with this improvement in friction draft gears we have advanced some, but the problem of reducing the expense of car repairs is still unsolved.

I want to ask, in this connection, why is there this distrust as to the work of our mechanical men along the lines of improved draft gears? No one is offering prizes for data to show that the locomotives and cars of the present day are an improvement over what we had ten and twenty years ago, because that fact is beyond question; so, also, is the fact of the present improved friction draft gears. Our railroad mechanical men are a valiant lot. They are usually equal to any emergency. They have made wonderful strides in improving locomotives and cars generally, but their work on improved draft gears is questioned and in grave doubt, so much so that it is now asked, What have they done? *Is* there any real improvement, and what is now the most efficient type of draft gear?

On the improvement of any particular mechanical problem the effort put forth, and the improvement made, is usually in proportion to the necessity for improvement; and of all the important necessities in modern railroading none has called louder, or been more persistent than the one that has asked for an improved draft gear. My private opinion is that this has been well met by our mechanical men, and, considering the limitations under which they have been compelled to work, they have done nobly in producing the present friction draft gears, and their efforts are to be commended rather than questioned and criticized. If there is anyone who doubts the efficiency of the present friction draft gears I would ask him to not only read, but study carefully, first, the tests of a committee of the Master Car Builders' Association reported in 1908. Second, the actual road tests on the Southern Pacific Railroad, published in the *Railway Age Gazette* of January 8, 1909. Third, the facts and figures presented by J. C. Fritts on this subject at the September, 1913, meeting of the Central Railway Club.

If they will take the trouble to go over this evidence carefully, I do not understand how they can still continue to doubt. As for myself, I am thoroughly convinced, not only from the facts cited, but from personal experience, that modern friction draft gears *do* absorb shock; and the Master Car Builders' tests show that draft gears after from one to five years' actual service were equally efficient with the new in absorbing the shock.

Perhaps a large share of the distrust in friction draft gears comes from the fact that the method of absorbing the shock by friction is sort of paradoxical and hard to understand. It is also most clearly shown that these modern friction draft gears do away with practically all of the shocks from recoil, and if they did only this one thing they would still be enough better than the old spring gears to warrant their substitution. That, in a general way, they are stronger and more efficient is shown most clearly and emphatically by Mr. Fritts' figures. It must be remembered that our mechanical men, in dealing with the draft gear problem, have had to stay within the limitation of 2½ in. or 3 in. travel, and have had to build the drawbars inside of the limitation of one square foot. With these limitations they have done as well as could reasonably be expected. If you could give them a 5 in. or 6 in. movement instead of 2½ in. or 3 in., they could make the friction plates take up much more shock. Also if they had five or six square feet instead of one square foot, they could build a stronger drawbar. But this first is out of the question because you could not then keep the air hose coupled, and in the second case you would complain of the increased expense.

Is there then a solution of this problem? Surely there is. But it is not to be found, in my opinion, along the lines of your suggested competition, nor in finding the most efficient type of draft gears. The solution of the problem is not mechanical. The remedy lies with the operating official in stopping the outrageous and unwarranted destruction of cars in our switching yards.

BETTER OPERATION NEEDED—NOT BETTER DRAFT GEARS

Mr. Fritts, of the Lackawanna, in classifying the damage done to draft rigging, places it in the following order: First, damage on the road because of the introduction of heavier power and larger trains; second, the switching of light and heavy cars together; third, and he says the most important, is the starting of trains and taking slack. Under this head he mentions as a suggestion that cars are sometimes damaged in switching yards. I do not like this classification, and I am going to put the switching of cars in yards as the one great cause of most of our drawbar trouble. Cars are damaged in yards 20 to 1 for those damaged on the road, and my proof for this is the difference in the trouble in maintaining the draft gears on yard and road locomotives.

In road work practically all of the work is done on the tender

drawbar. Any roundhouse foreman can tell how long an average tender draft gear will last in the average switching yard. The fact of the matter is that they do not last at all; and for this reason you will find all yard locomotives doing the work with the front end. Not only this, but you will find that the front ends of yard locomotives have been wonderfully strengthened beyond anything possible on an average tender or car. The extension frames have been shortened and made much heavier; in some cases a large cast steel filling piece is placed between the frames to add strength. Then it has been found that the ordinary front-end timber is entirely inadequate, and this has been replaced by a cast steel member, and even then the roundhouse foreman's troubles are not over in maintaining it.

The necessity for switching from the front end of yard locomotives is so great that in some cases the reverse lever has been changed to the left side of the locomotive in order that the engineer may be on the inside of the curve in some yards where a large amount of switching is done. And while there is all this trouble with yard switching engines the roadmen are going along day after day doing all the work with the drawbar on the tender, with very little drawbar trouble.

During a six months' period recently I rode thousands of miles on freight trains on a trunk line railroad; and in that time no train I was on pulled out a drawbar, and I received but one severe shock, and this did not damage the drawbars to make a delay. In a large majority of cases where drawbars are pulled out on the road the initial damage was done in some switching yard. In this connection I want to speak of the work done by the Air Brake Association and the Traveling Engineers' Association in reducing the shocks in road work. They are entitled to a great deal of credit for the work that has been done; and yet practically nothing has been done to decrease the shocks in switching yards. In fact I sometimes think that the stronger and more efficient the draft gears become, the harder the switchman persists in throwing the cars together.

Mr. Fritts in his report says that from 70 to 80 per cent. of the drawbar damage was due to shock, and he further adds: "If this monster shock is responsible for so great an expense to the railroads in general, *and we all know that it is,* what should be done to relieve the equipment of the ravages of this demon?" Do we all know that this "monster shock" is responsible? For myself I have known it for years, and I believe with Mr. Fritts that every railroad man in this country knows it also, and if this is true, and we have the courage of our convictions, why can not the problem be solved?

Operating officials have side-stepped it long enough by making themselves believe it was a mechanical problem. So far as I am concerned, the whole object of this paper is to answer Mr. Fritts' one question, and the answer is very simple. The solution of this so-called draft gear problem does not depend upon any particular type of draft gear. It is a matter of stopping the present methods of switching in our yards. A solution of a very large percentage of the trouble will be accomplished when operating officials cut the speed of switching operations in yards. I know on practically all the railroads in this country that the switchmen are supreme in the matter, but the officials must take a stand and stop the destruction.

To back this argument I want to cite that the Pennsylvania Railroad some five or six years ago issued an order limiting the speed of switch engines to two miles an hour, and it is well known that the Pennsylvania road is leading in this matter, and that it has some very rigid rules, and that it is actually stopping in a great measure rough switching in yards. In most yards five miles an hour is considered slow switching, and four cars cut off at one time is a reasonable average. These four cars, loaded, weighing approximately 600,000 lb., striking other cars at five miles an hour, develop over a million foot pounds of energy, and this shock is more than any draft gear can possibly be made to stand, friction or otherwise.

Locomotive boilers are built on a factor of safety of four. What would you think of the sanity of a man who would allow 800 lb. of steam put on a boiler that was made to carry 200 lb.? This seems a very silly question, yet you are allowing your draft gears on cars to be mistreated as badly as this every hour of the day and night. If there is a general manager who doubts my statement he can convince himself by spending a few days and nights in some switching tower watching the actual work. To get his full money's worth he must make sure his presence in the tower is not known to the switchmen.

I believe you will all agree with me that any time now gained in *hurry-up* switching is more than lost in the extra switching of the bad order cars produced by the *hurry-up* methods. But whether this is true or not makes little difference, because cars cannot be made to withstand the shocks they get, and I know of no solution but to cut out the shock.

All of this expense and destruction to the freight cars does not take into account the millions of damage claims paid annually on account of rough switching. The Santa Fe has a special committee working to reduce the damage claims, and it is spending much time on methods of loading and schemes of fastening freight in cars so that it cannot move, etc. This is all very good in a way, but if it really wants to accomplish much in a short time, I would suggest that it join forces with the mechanical officials, and go in a body to the operating officers and persuade them to issue some kind of an order that will stop the rough switching in yards. It will save them millions annually in both freight car repairs and in freight claims, even after they have put on a few more switch engines and crews.

Most railroads handle their passenger equipment in a reasonable manner, and I have maintained for a good many years that no general manager would go wrong if he ordered all freight cars switched in the same way that passenger cars are usually handled. If we are really convinced that this problem is no longer mechanical, and that the large amount of money spent annually for car repairs and freight claims can be reduced by stopping the outrageous switching methods in our yards, then will the so-called draft gear problem be solved.

A COMMISSION ON RAILROAD ETHICS

Frederic A. Delano, president of the Chicago, Indianapolis & Louisville, has issued a circular entitled "Some Suggestions for the Owners of Railway Securities and Railway Officials." The circular contains a reprint of an editorial on the railroad situation published in the Chicago *Tribune* of May 31, a letter to the editor of the *Tribune* commenting on it, which was published in the *Railway Age Gazette* of June 19, page 1516, and the following appeal to investors and officials:

"I have been inspired by the foregoing editorial in the Chicago *Tribune* to address you, first, to call your attention to the editorial and then to some comments upon it addressed to the editor of the *Tribune*, and, lastly, to ask your consideration and perhaps your co-operation in an effort to bring about a better condition of affairs.

"As pointed out in my letter to the *Tribune*, railway undertakings are on a totally different economic basis from other undertakings. A railway project, however ill conceived it may have been or however bad the judgment of the original promoters, must continue to be operated, and this obligation makes many a railway or branch line a liability to its owners rather than a valuable asset.

"There is a theory prevalent—unfortunately among men who ought to know better—that the so-called book value put upon a railway property by its owners in capitalizing it is the basis upon which rates for transportation have been established. As a student of the subject for 29 years, I consider that the valuation of railways has about as little to do with the rates as the value of property at State and Washington streets in Chicago has to do with the price of handkerchiefs. In my judgment, there has been great confusion in the public mind between the meaning of the words 'cost' and 'value.' Because a railroad or

any piece of property costs a given sum does not prove that it is worth it, and it must never be forgotten that the government does not guarantee a return upon the *cost* of a railway. Whether the estimates of the government experts and engineers shall prove the value of the railroads to be more or less than the book values now claimed by the corporations will in no way pledge the federal authorities to giving the railroads any certain return on that valuation; and, in fact, if we are honest with ourselves, we must admit that the only advantage which can possibly accrue to the public from an expenditure of some ten to fifteen millions of dollars in the preparation of the figures, will be that, presumably at least, it will settle for all time the mooted but somewhat academic question as to whether the railroads are over-capitalized or not. My own judgment on the matter is that some railroads are over-capitalized regardless of whether the capital is more or less than the actual cost, while other railroads are under-capitalized equally regardless of that fact. In other words, it is clear to my mind that the value of a piece of property is determined by the use to which it is put; and in the case of property permanently dedicated to a public use, it is determined solely and wholly by that use, so that unless there is some possibility or serious intent of allowing a railroad's real estate to revert to its original condition of lots and blocks, or farms, it is silly to talk of the value of it as bearing any relation to the value of adjacent property. *It necessarily follows that the value of railroad property today lies wholly in the hands of the legislative authority of the state and federal governments or in the hands of those commissions to whom the legislatures have delegated authority and administrative powers. The value of railroad property can be increased by increasing earning capacity, and can be diminished even to extinction by decreasing it*

"From the foregoing it is evident that private investment in railroad construction is and has been a hazardous one, and inasmuch as the government gives no guarantee to the investor in the unfortunate enterprises, it should not deprive the investor in the wisely located and well conducted enterprises of not only a fair return, but something more than an average return on the investment. The public can properly demand that railroads as a whole shall not be allowed to earn an exorbitant return on the cost of their original construction plus the improvements and betterments since made; but this being based upon averages, it necessarily means that some properties will earn only a small return on their cost, while others are entitled to earn a very considerable return.

"It is manifestly to the interest of investors in railway securities and of every honest railroad man—and surely a very large proportion of them are honest—that the public shall understand the true situation. On the one hand, the railroad investor has been entirely unorganized and unrepresented, while on the other, the railway official has been entirely misrepresented by a few notorious examples of men who have gone wrong. There is need of organization among the investors and there is also need of organization among railway officials. Small investors must organize so that at every stockholders' meeting they will be intelligently represented just as they are in an English stockholders meeting. The railroad officials must organize so that they may establish on some firm foundation such a system of practices, business ethics and methods as will prevent their being discredited by ignorant, reckless or unprincipled men who are bringing to discredit an honorable profession.

"In short, then, my statement is that, however it has come about, the investor in railway securities and the railway official are today being done a cruel injustice by the public; that this is because these two interests either have not been represented at all or been grossly misrepresented. What is the remedy? Is it not evident that the time has come for effective, constructive work? Far-seeing men, be they bankers, railway officials, publicists or whoever they be, must aid in the solution of this great problem. We must form a commission of our own which, by correcting evils justly complained of, will put railway management in a proper light before the public. We want a commission which not only will not countenance the methods which have recently come to light in the New Haven investigation, but which will set such a standard of business morals and ethics as to make such methods impossible. Such a body should be more than simply critical; it should point out effective remedies for uneconomical methods, wasteful practices and the like. Government supervision is necessary, but after 26 years of experience with it, it is evident that the railway problem needs something more; it needs effective co-operation among men of sufficient experience and knowledge to set things right."

AMERICAN SOCIETY FOR TESTING MATERIALS

The American Society for Testing Materials held its seventeenth annual convention at Atlantic City, N. J., June 30 to July 3, with a registered membership in attendance of 473. In the four days devoted to the convention, nine technical sessions were held at which fifty-nine papers and reports were presented.

President Arthur N. Talbot of the University of Illinois delivered the annual address, taking for his subject the "Relation Between Research and the Activities of the Society." He reviewed the growth in research work that has taken place during the life of the society and outlined the various activities of the several agencies at work along those lines and urged that the society should co-operate with them in the undertakings that came before it. He was especially solicitous that it should work in harmony with the other technical societies so that the results should be properly co-ordinated. He asked that the members encourage the making of larger appropriations for national, state and semi-public laboratories and said that they might properly ask manufacturers and consumers to support liberally research work in all lines on engineering materials.

TEST FOR METALLIC PROTECTIVE COATINGS

In the proposed test metallic protective coatings are exposed to an atmosphere saturated with salt water. The articles to be tested are placed in any convenient chamber into which there is projected an atomized spray of water saturated with common salt in solution, care being taken to avoid placing the test specimens directly in the path of the jet. The spray is produced by a jet of compressed air lifting the water to the nozzle, whence it is projected as a cloud. This apparatus is the common atomizer used in the household. For testing bare metals it is better to use a plain saturated atmosphere, as the salt solution is apt to be too severe. Failure is indicated by the development of red rust.

RELATION OF BRINNELL AND SCLEROSCOPE HARDNESS TESTS

A paper was presented to show the relationship of the Brinnell and the scleroscope readings for hardness and the factor connecting the two was placed at 6.67. That is to say, the readings of the scleroscope multiplied by 6.67 will give the Brinnell readings.

PROCEDURE GOVERNING THE ADOPTION OF STANDARDS

A paper by Prof. Marburg, entitled "A Review of the Procedure Governing the Adoption of Standards," cited the regulations applicable to the constitution of technical committees and the by-laws and regulations pertaining to the procedure governing the adoption of standards. The author expressed the opinion that it would be difficult to suggest wherein the former might be materially improved, but in connection with the latter he presented critical arguments as to:

1. The amendment of a committee report by vote at the annual meeting; and

2. The requirement of a letter ballot of the society for final approval of proposed standards.

Concerning (1) he discussed the present policy by which amendments may be made by a majority vote of those voting, and an alternative policy under which the meeting would not be empowered to amend a committee report, but would have

the power only to refer the report to letter ballot of the society or back to the committee. He concluded that neither of these alternative courses is free from potential evils, and suggested for consideration a compromise policy by which the meeting would be empowered to amend a committee report only by a vote of substantial unanimity—say a nine-tenths vote of those voting—whereas a two-thirds vote would suffice to determine whether recommended standards shall be referred without change to letter ballot of the society, or back to the committee for further consideration.

As to the prescribed letter ballot of the society at large for the final adoption of standards, the author asked whether an experience of 14 years had not shown such a ballot to be almost meaningless, and whether it is not time that it should be abolished.

Discussion.—The discussion of this paper was extended. Attention was called in the first place to the low estimate in which many of the specifications of the society were held by the users of materials, on the ground that they were voted upon by men who had no knowledge or experience to guide them in their decisions and it was suggested that members should be requested not to vote upon subjects for which they had no qualifications. It was generally acknowledged that the ballot system as used did not give convincing results. Various suggestions were made to overcome the difficulty, one being the division of the society into groups and of confining the voting for any particular specification to the members of the group to which it was assigned. It was insisted that the specifications were always drawn by men of experience and that they deserved endorsement on that ground, but that there must be some means by which matters could be referred back to committees where the members were dissatisfied with the reports as presented.

STANDARD SPECIFICATIONS FOR STEEL

These specifications were passed and referred to letter ballot without discussion in every instance except one. In that case the American Electric Railway Association sent a representative to protest against the adoption of the specification for quenched-and-tempered carbon-steel axles, shafts and other forgings for locomotives and cars. Objection was made to the specification for elongation and reduction of area as applied to axles that are used for the driving axles of electric motor cars on the ground that this reduction in the requirements would not insure the care in the heat treatment of the material that was desired. The association asked that the title of the specification be made to read "Quenched-and-Tempered Carbon-Steel Axles, Shafts and Other Forgings for Locomotives and Trailer Axles for Cars." This would have left the driving axles for electric cars out of the specification. There was considerable discussion on the subject, in which the representative of the Electric Railway Association maintained his position and the advocates of the specifications attempted to show that they would give a better axle than that obtained under the present specifications with which the Electric Railway Association was content. When the matter was referred to vote, the answer was very positive to retain the specifications unchanged and to include the driving axles of electric cars in them.

STANDARD SPECIFICATIONS FOR WROUGHT IRON

This was a short report and related almost entirely to a slight change in the specifications for stay-bolt iron. This change simply allows, in the case of retests, a reduction of 2 per cent. in elongation and 3 per cent. in reduction of area from that previously specified. During the past year the committee has conducted experiments with a view to establishing a standard vibratory requirement for stay-bolt iron. Comparative series of tests made on the several types of machines in use finally demonstrated that it would be impossible, on account of their widely different construction, to formulate a standard method of testing that could be strictly adhered to on any two types of machines. As a result of this condition the committee is of the opinion that until such a time as it can see sufficient merit in any particular machine to warrant the adoption of a vibratory requirement based on that or a similar type of machine, the reinsertion of a vibratory requirement in the "Standard Specifications for Stay-bolt Iron" will have to be held in abeyance.

OTHER BUSINESS

The report on "Methods of Sampling and Analysis of Coals" treated in an extensive and thorough manner the methods of sampling and the chemical processes to be followed in the determinations of the various elements in the coal.

At the annual election the following officers were elected for the ensuing year: President, A. W. Gibbs; vice-president, A. A. Stevenson; secretary-treasurer, Edgar Marburg; members of the executive committee, Robert Job, F. W. Kelley, A. Marston, S. S. Vorhees.

EUROPEAN FREIGHT CONGESTION AND AMERICAN TRAIN DESPATCHING

BY ARTHUR HALE
General Agent, American Railway Association

"Lingering Congestion." Is not that an eloquent term? Does it not remind you of that time in the winter of 1903 when the congestion which began on the Jinntown division lingered on into the lap (only the first lap) of spring? But J. Hansen, state councillor and member of board of works at Frankfort-on-the-Main, who invented the term and "proposes it" in the International Railway Congress Bulletin, does not apply the term to congestions that linger toward a conclusion, but to congestions that are lingering in their beginning.

When there is a landslide or derailment in Germany it seems, naturally enough, that the "main traffic office" of the railway is notified promptly and "special measures . . . are necessary to restore order." When, however, some slight delay to one freight train involves another, and perhaps still others, it seems that a German railway may "linger" into a congestion without anyone knowing it except the "assistant station master" and presumably the train crews and the shipping public.

Mr. Hansen takes more than three pages of the bulletin with the help of "sidings *A, B, C,*" etc., and "goods trains 1, 2, 3, etc.," to prove without a possible shadow of doubt that "for some exceptional reason, for instance . . . because an unusual amount of time is required for the operations on the loading sidings . . ." freight trains can, may and do delay each other. Small delays, he says, are unimportant, but there is a "danger point," and that danger point comes at "the moment in which the second goods train begins to wait" after schedule time "in order to be overtaken." "It is important to understand clearly," he says, "that this condition of beginning congestion, harmless though it may appear, is exceedingly dangerous to the regular operation of the science, as it forms a starting point for further development." And he goes ahead for several more pages in an exceedingly logical discussion of proper methods of avoiding this "danger point," for, as he truly states, "congestions of this kind cannot occur if the 'danger points' are eliminated."

Perhaps some young American may here inquire, "Why doesn't the train despatcher make a new passing point?" To him I reply, "My dear young friend, don't you know that in Germany, and in other countries for that matter, there are no train despatchers? How can the train despatcher make a new passing point if there is no train despatcher?" And further I could explain that there are no train sheets, no train reports, no train wire—nothing but a block-wire. And I could conclude that I have been informed that on foreign roads no such expensive system is necessary, their move-

ments being so regular, that all trains can be run as per schedule.

Even when there is a landslide or derailment and the "main traffic office" is notified it seems that the "special measures" taken are apt to be "changes in the time-table." Great—isn't it?

American railway men are curious as to how their European friends, operating as they do without train despatchers, manage to get on with their traffic in case of accident. Mr. Hansen's article dealing with this subject would seem to indicate that according to our standards, in time of accident, the European railways' freight service at least does not get on at all.

American railway men are also curious as to the European arrangement under which they are told the transportation department is made a part of the traffic department, and not allied with the two engineering departments. If we may judge by Mr. Hansen's article this is simply arranged by absolutely eliminating any form of organization such as we could term a transportation department.

But to return to "lingering congestions." They do not occur on single track lines. As Mr. Hansen states, "congestion produced by the blockade of the section is . . . a trouble to which single track railways are very much exposed." In other words, congestions on single track are apt to result in complete blockade.

It seems that no special instructions exist to deal with "lingering congestions." The whole matter is in the hands of the "assistant station masters," who appear to have absolute power over the movements of the train crews in adjoining blocks. The assistant station master is at liberty to allow a delayed freight train to come ahead, but if he has one already at his station he must run the risk of putting the second train on an unusual siding or on the opposite running track. In practice "he does not do this because it would give him a lot of trouble, besides he would run the risk of having to delay a passenger train." He will, as a rule, refuse to allow trains to enter his block unless he is absolutely sure he has sidings where he can readily place them in any event.

The result of this decentralization of authority is that as many as three or four goods trains may be "put in wrong places and all the assistant station masters concerned . . . in a 'state of great uncertainty.'" It is difficult for the assistant station masters involved "to come to a mutual understanding as . . . there are no special rules specifying which train is to have precedence. It gradually becomes more and more difficult to get trains through. . . Locomotives and crews perhaps arrive at their destination so late that the time at which their return trains start has already expired and consequently the return trains are also late. The result is an ever growing confusion . . . the crew of individual trains which are standing still must leave their train or else the hours of work become too long . . . the final result is such a state of chaos that one is quite powerless to cope with the circumstances particularly as it is impossible to obtain a general survey of the state of affairs."

Mr. Hansen admits that "in most cases . . . there are . . . intervals in which individual trains can be pushed forward . . . this . . . depends . . . on the zeal and ability of the different assistant station masters."

Apparently, as above, a lingering congestion of this kind may go on for some time without anyone in authority knowing about it. Mr. Hansen states "a lingering congestion is particularly dangerous . . . because its pressure and its dangers are not recognized in good time. It is true that one notices that trains are late . . . but the ordinary assumption is that this is due to increased traffic for which existing installations no longer suffice. Either no attention is paid to the matter or auxiliary trains are run in order to deal more quickly with the traffic." In other words, when there are too many trains on the road the ordinary method to deal with the situation is to start more trains running.

He goes on, "It is quite possible for a number of goods trains to be standing still and for several stations to be overcrowded before the authorities become aware of the fact. It is only when it becomes nearly impossible for goods trains to be sent on that it is recognized that it is a case of congestion. . ."

When a congestion is recognized, it appears that the traffic manager does take a hand, and Mr. Hansen evidently has had experience in clearing blockades. For instance, he offers this undeniable fact, ". . . it seems advisable to begin with clearing those passing-places where, according to the time-table, trains have to overtake each other." But it is only when there is a very bad congestion that anything like train despatching is resorted to, and then under extreme difficulties. Mr. Hansen says, "If a congestion has already assumed larger dimensions before the traffic manager is informed . . . it becomes exceedingly difficult to cure it and sometimes takes much time, as it is impossible to ascertain with certainty the probable results of any measures proposed." In this case it seems advisable that the traffic manager should in the first place obtain a general survey of the train movements and ascertain which trains are held up at the different stations. For this purpose it is advisable to issue orders that within the whole of the district affected certain definite stations should report by telegraph to the traffic manager the actual time of arrival and time of departure of each goods train.

In other words, a train despatcher system has to be improvized to clear the blockade. To use Mr. Hansen's words, "With the help of this information the traffic manager would enter (record) the real movements of the trains . . . and could proceed to work out the prospective future movements just as one can work out the movements of the figures on a chessboard. With the help of the information acquired in this way, it would then be possible to give the stations any orders necessary." Mr. Hansen admits that "in exceptional cases this procedure could be adopted beforehand," but in general he appears to distrust the train despatcher system, because "the adoption of this system would involve an entire revolution of all our traffic arrangements, and as there is the fear that great difficulties would arise, seeing the density of our traffic, the author thinks that this would be inadvisable."

It can hardly be thought our foreign friends are fully advised as to the adaptation of the train despatcher system to our double track and four track roads of heavy traffic density, or Mr. Hansen would hardly propose the half-way plan which follows as a cure to the "lingering congestion" which he so clearly analyzes and of which he so bitterly complains. After showing that no "lingering congestion" could occur if all "danger points" were avoided and after showing that many danger points could be avoided if assistant station masters were given more discretion, especially in the way of delaying passenger trains somewhat and of taking certain liberties with freight trains, he comes to the conclusion that as assistant station masters will err, the traffic department should be *in position* to supervise them, both day and night.

As he puts it, "It is necessary for the traffic management to exercise a continual supervision over the assistant station masters." With this object in view, the following rules are proposed:

"1. The traffic management must always—day and night—be ready for work.

"2. Any lateness of goods trains, greater than a certain amount (yet to be fixed), is at once to be reported by wire. . .

"3. Any special incidents affecting the traffic, such as accumulations of wagons, . . . are at once to be reported by wire."

The management will take no action on these reports unless

it considers that a "danger point" is imminent. In such a case the traffic management will take the matter up with the assistant station master, "will ask him what he intends to do, will authorize him to do what is advisable or will give him instructions." It is confessed that "a certain time will always elapse after the disturbance of the service has begun before the traffic manager will be in position to intervene." But the author does not consider this a serious objection, "as a lingering congestion only develops slowly."

One material concession is made: ". . . In principle it might seem better if the traffic manager were able to intervene at once." This, however, involves a wholesale adoption of the train despatcher system, and as above stated, "there is the fear that great difficulties would arise, seeing the density of our traffic." Is it possible that the author has compared the density of his traffic with that, say, of the main line of the Pennsylvania Railroad?

Mr. Hansen's article is answered in the same issue of the bulletin by a gentleman who signs "H. T.," who thinks the proposition too radical and that it is very doubtful whether it would succeed. "H. T." continues: "If the traffic management is to control the movement of the trains not from the spot, but from a distant office, on the receipt of telegraphic news, it must not be left out of consideration that the state of affairs may in the meantime have become so much changed by other circumstances which have arisen (e. g., shortness of engines, etc.) that the orders of the traffic management can no longer be carried out." It seems quite clear that "H. T." knows much less about train despatching than Mr. Hansen. H. T.'s idea seems to be in favor of giving the assistant train masters more discretion, although he agrees that "if the traffic congestion extends over a large district . . . then it is, of course, necessary for the head office to intervene," and ends with the hope "that this work will be carried out successfully by the recently established train management offices."

Mr. Hansen does not refer to these recently established offices. Possibly they are the beginning of a train despatching system which will doubtless have to work its way gradually before it is adopted. Indeed, it seems probable that the American system never will and never should be adopted in all its detail on the other side.

Our train despatcher system was worked out before our signal system, while the signals have come first on the other side, and it would not be surprising if they found that the train despatcher's orders should not be sent direct to "conductor and engineer," but to the tower man, or some functionary at the station like the German "assistant station master" who could transmit them to the engine driver and crew, probably by signal.

There is much that is instructive in Mr. Hansen's article in regard to car supply and its relation to congestion, and there is another point which should not be lost sight of.

If it is true that congestion on continental railways is ordinarily attributed to lack of facilities without investigation as to whether the transportation management is good or not, it is impossible to escape from the conclusion that many facilities have been provided which would not be necessary with improved transportation methods. Possibly this throws some light upon the enormous capitalization of the European railroads.

EQUIPMENT ORDERS OF THE SOUTH AFRICAN RAILWAYS.—The South African Railways in 1913 placed orders in England and other countries for passenger cars having a total value of $1,400,345; for freight cars having a value of $4,940,000 and for locomotives having a total value of $6,660,000. Very often large orders are placed abroad simply because of the quick deliveries which can be obtained. The English and other shops can deliver the equipment in from 9 to 12 months, whereas the local shops require from 18 to 20 months.

THE FEDERAL EMPLOYERS' LIABILITY ACT*

BY J. B. SHEEAN

General Solicitor, Chicago, St. Paul, Minneapolis & Omaha Railway.

The federal employers' liability act has effected a revolution in the law as it existed prior to 1908, and is for you the supreme law of the land. It is as remarkable for the laws it abolishes as for the law it prescribes. It is of vital concern to you and must be considered whenever an employee's claim is presented. It is developing from day to day as its various provisions are construed by the courts, and you will find its study as full of interest to yourselves as of benefit to the interests that you represent.

Expressed generally, this act regulates those relations of common carriers by railroad and their employees which have a substantial and direct connection with interstate commerce and while both carrier and employee are engaged in such commerce. It creates a new cause of action and establishes a uniform rule of liability. It introduces a new public policy applicable to railroads and their employees and radically changes the existing law. It supersedes the laws of the several states, in so far as the latter cover the same field, and is supreme within its sphere of action. It must be construed by itself and cannot be pieced out by state legislation. If no liability arises under the act, none can arise from state legislation on the same subject. It probably conflicts with one or more laws of every state and supersedes all such laws. It establishes a liability for the acts of all servants, whether they be engaged in work involving special railroad hazards or in state or interstate commerce. It abolishes the defense of contributory negligence. When a federal law enacted for the safety of employees is involved, contributory negligence can be considered for no purpose. Where no such law is involved, contributory negligence may be considered for the purpose of apportioning the damages. When such a law is involved, the act also abolishes the defense of assumption of risk. In all other cases this defense may exist and must be ascertained and applied in accordance with the decisions of the federal courts. The act also removes the death limit, prescribes to whom the proceeds shall go in case of death, requires a jury to assess the pecuniary loss of each beneficiary, limits the commencement of actions to two years, and requires no preliminary notice to the carrier before suit is commenced. Under this act no one can bring suit except the legal representative of the deceased, and only one action can be maintained. Damages are limited to the pecuniary loss sustained by the beneficiary; that is, the pecuniary assistance which the beneficiary had reasonable expectation of receiving from the continued life of the deceased. Except in the case of a minor child, no damages are recoverable for loss of society or companionship; none are recoverable for the grief or wounded feelings of the beneficiaries, and probably none for the expenses incurred or suffering endured by the deceased before death.

The act removes all of the foregoing questions from the control of the states and is exclusive and supreme within its sphere of action.

The question presented for consideration today is, "What is this sphere of action or when are railroad employees engaged in interstate commerce?"

The act provides that every common carrier by railroad, while engaged in commerce between any of the states, shall be liable in damages to any person suffering injury while he is engaged by such carrier in such commerce, if such injury be caused by the negligence of any of its officers, agents or employees, or by reason of any defect, due to its negligence, in its cars, engines, appliances, machinery, track, roadbed, works, boats, wharves or other equipment. The injury, therefore, must occur while the carrier is engaged and the employee is employed by the carrier in interstate commerce, and the test always is whether the work

*Address presented at the annual convention of the Association of Railway Claim Agents, at St. Paul, Minn., on May 21, 1914.

in question was a part of the interstate commerce in which the carrier was in fact engaged.

Commerce between the states begins when a shipment is delivered to a carrier for transportation to another state and ends with its delivery at destination. It embraces all acts necessarily incident to the receipt and delivery of such a shipment. Cars containing one or more shipments or containing mail, express matter or passengers moving into or out of one state or across or in and out of the same state are engaged in interstate commerce. Trains or cars containing shipments, mail, express or passengers so moving are likewise so engaged, although they only move between points within a state. Empty cars moving across state lines are also engaged in such commerce. Inasmuch as commerce is done by the labor of men and with the help of things, these men and these things are the agents and instruments of such commerce. The act, therefore, applies to every agent and instrumentality by which interstate commerce is carried on and extends to all moving matters having a real or substantial relation to such commerce. An employee engaged in repairing instrumentalities used in interstate commerce, or in moving such commerce, is engaged therein, and if an employee acting within the scope of his employment is engaged in such commerce, it follows that the carrier for whom he works is so engaged.

Whether an employee is so engaged must depend in each case upon the special facts of that case. Courts have had no difficulty in agreeing upon the definitions and general principles involved. They have differed widely, however, in applying these definitions and principles to the cases presented. Since the last meeting of this association, the Supreme Court of the United States has rendered a number of decisions directly bearing on the question under consideration. It is now possible to name with assurance many of the employees to whom the act applies.

In the light of these decisions, it may be stated that the following employees are within the act:

(1) All employees working on or about or assisting in the movement of trains which cross state lines or contain cars loaded, in whole or in part, with mail, freight, express or passengers moving into or out of one state or across or in and out of the same state are admittedly within the act.

(2) All employees engaged in making up, breaking up or performing any necessary work in connection with such trains, or cars at terminals, are within the act. In the Seale case the court held that a yard clerk killed while on his way through the yards to take the numbers, check the seals and tag certain interstate cars was performing work directly connected with interstate commerce and that the interstate transportation was not ended merely because the train had arrived at a terminal and the cars therein were not going to another station. Irrespective of their final destination, it was necessary that the cars be switched for the making up of outgoing trains or for the unloading of freight, and this was as much a part of interstate commerce as was their movement across the state line. You will note that this man was not actually at work when injured, but was on his way through the yards to his place of work and was within the act. From the rule so announced it follows that enginemen, trainmen, yardmen, repairmen and inspectors engaged in making up, breaking up or performing any necessary work in connection with interstate cars are within the act.

(3) All employees while at work in preparing engines or cars for use in interstate commerce are within the act. In the Zachary case the court held that the acts of a fireman in oiling, firing, inspecting and preparing his engine soon to start on a trip within the state, done before two interstate cars ordered to be attached to his train had been so attached, and before his engine had been coupled on to his train, were acts performed as a part of interstate commerce. When killed, the fireman was on his way, within the yards, to his boarding house for a brief visit and was held to be within the terms of the act. Applying the rule thus announced, it follows that all enginemen, engine wipers, hostlers and inspectors engaged in preparing engines and trainmen, yardmen and inspectors engaged in preparing cars for immediate service in interstate commerce are within the act.

(4) All employees engaged in the work of maintaining and repairing instrumentalities in proper condition after they have become and during their use in interstate commerce are engaged in that commerce, although such instrumentalities are used indiscriminately in both state and interstate commerce.

In the Pederson case the Supreme Court held that it would not undertake to separate such service into its elements, and that an ironworker injured while carrying bolts from a tool car to a bridge, to be used in the repair thereof, which bridge was being used indiscriminately in both state and interstate commerce, was within the act; that it was necessary to the repair of the bridge that the materials be at hand and the act of taking them there was a part of that work. Excepting for the phrase "during their use in interstate commerce," the principle announced in this decision would clearly apply to the repair and maintenance of all instrumentalities used indiscriminately in state and interstate commerce. Text-book writers and other courts, however, construe this decision as applying generally to all instrumentalities so used, whether actually in use or temporarily withdrawn from use for the purpose of repair.

It has accordingly been held that all employees engaged in repairing or maintaining tracks, switches, bridges or roadbeds used in both kinds of commerce are within the act, and it follows that all employees engaged in repairing or maintaining cars, engines, appliances, machinery, works, boats, wharves or other equipment used in interstate commerce, or used indiscriminately in state and interstate commerce, are within the act. It should be noted that employees engaged in the original construction of such instrumentalities are not within the principle announced and probably not within the terms of the act. Such, at least, is the reasonable construction to be placed upon the language of the court.

Applying the principles announced by the Supreme Court in the foregoing cases, the district courts have held the following employees to be within the act:

A truckman injured by a truck while loading interstate freight into a car.

A trainman injured while weighing an empty car last used in interstate commerce for the purpose of ascertaining the net weight.

A brakeman injured while making a flying switch to set out a car loaded with state traffic, although taken from a train carrying both state and interstate traffic.

It has also been held that an employee injured while at work in the construction of a new tunnel intended for use in state and interstate commerce was not within the act and that non-resident alien beneficiaries are not entitled to the benefits of the act.

It will thus be noted that the greater part of the work performed by railroad employees is connected with the instrumentalities or movements of interstate commerce. This is due to the fact that the liability act embraces the repair of all instrumentalities used indiscriminately in both kinds of commerce and all movements connected wholly or in part with interstate commerce. If any shipment or passenger in a car or train is moving interstate, the entire car or train is engaged in that commerce, even though the car or train may only move between points within a state. The general opinion has prevailed that this act would be construed to apply to every employee over whom the power of Congress could be exercised. Within the past 30 days, however, the Supreme Court has decided to the contrary and, in the case of I. C. Ry. v. Behrens, has made it clear that Congress intended to limit the act to injuries occurring when the particular service in which the employee was engaged was a part of interstate commerce.

In that case, a switching crew was engaged in yard work, moving state and interstate cars indiscriminately, frequently both at once, and at times turning directly from one to the other. At the time of the injury the crew was moving several cars loaded

only with intrastate freight and after completing that movement intended to switch certain interstate cars. It was held that the particular service in which the crew was engaged at the time of accident was no part of interstate commerce and that the fireman was not within protection of the act. The principle therein announced is an important one and the case should receive your careful consideration. It puts at rest the contention that the act applies to all employees and substantially increases the number of employees not within the act; it emphasizes the necessity of analyzing every car or train movement, and gives assurance that the act will not be unduly extended beyond its terms.

From the foregoing considerations it follows that the act does not embrace instrumentalities used exclusively in state commerce and does not apply to employees engaged in moving trains or cars which are disconnected from interstate commerce. The act does not apply to employees exclusively engaged in moving state cars, although the employees may be engaged in the indiscriminate movement of both state and interstate cars. The act, however, does apply to employees injured when repairing or maintaining instrumentalities used indiscriminately in state and interstate commerce. It does not apply to employees while at work in the original construction of such instrumentalities and should not apply to general office employees whose work is not directly or substantially connected with interstate commerce or its instrumentalities.

Within the limits of this presentation I have given you the controlling definitions and tests for determining what employees are within the act and have named the employees certainly included within and those certainly excluded from its operations. Between these limits are employees whose status is uncertain and in such cases the question may be one of fact to which no answer can be given until after the verdict. The act, no doubt, will continue to be liberally construed and in case of doubt or disputed facts you will be wise in assuming that the act applies.

MAIL-PAY RATES

Congress appears at present to be doing nothing at all to correct the continuing injustice of the present arrangements for paying the railroads for carrying the mails; but as the Bourne committee has not presented its report and as the Moon bill is the only important proposition on the calendar, nothing better than inaction could, perhaps, be hoped for. In the meantime Mr. Peters, speaking for the railroads' committee, has written to Mr. Moon a letter, again calling attention to the inconsistencies of the present arrangement.

In this letter he says:

"The Committee on Railway Mail Pay appeals for fair treatment in fixing any basis of compensation for the handling of the mails.

"A personal effort was made by members of this committee to secure from you a hearing on the bill recently introduced in Congress by your committee, but without success; therefore we submit this open letter.

"We desire to protest against the method of paying the railroads for the valuable service rendered the Government as contemplated in House Bill No. 17042. This question is now pending before a Joint Congressional Committee, which has had the whole subject under most careful consideration, continuously, for more than two years, and has announced that it is about ready to make its report.

"The introduction of bill No. 17042, in effect, forestalls the report of this Joint Committee, and commits Congress before the results of that investigation are made known.

"The Joint Committee of Congress is a bi-partisan body, and the Post Office Department has had the fullest opportunity of presenting the views of its officials before it, many of them having appeared as witnesses. The railroad companies have been called upon at great expense to furnish complete detailed information. . . . The passage of House Bill No. 17042 would practically ignore the action of your own Joint Committee.

"This is the fourth bill which the Post Office Department has framed and recommended on this subject within the past two years, each differing materially from the others. . . .

"The railroad companies do not favor the adoption of any space basis for ascertaining what is proper compensation for carrying the mails. The mails are freight and they are becoming more and more so as the weight of the parcel post increases and the Government enters more and more into competition with the railroads of the country in the business of carrying commercial freight.

"Space in cars under complete control of officials of the Post Office Department as a basis of payment for this service is an anomaly; it will not fit your mail service; and, in our opinion, it will tend to the reduction of facilities and general inefficiency. In this service the Government is a shipper, and no other shipper demands the right to fix his own rates. It uses the facilities of the companies in competing with their own service, and in view of the published intimations of greatly added revenue from the carriage of parcel post, common fairness would seem to demand that the railroad companies should be permitted to share in the increased revenues that the Government collects from the people for the use of these facilities.

"The wiser policy, it seems to us, will consist in modifications and improvements of the existing system, based, as that system is, upon the method of compensating railroads for carrying freight that is universally recognized as sound; such modifications to be an annual weighing of the mails, payment for the use and haulage of apartment post office cars, relief from the messenger service, and other reforms. . . . Congress should at least hear the complete testimony, giving the reasons for the position taken by the railroads, as well as the conclusions of your Joint Committee. . . ."

Mr. Peters has issued a circular containing editorials from thirty newspapers, published in many States, and most of them prominent papers, condemning the unfair attitude of the Post Office Department.

The presidents of the prominent roads west of Chicago on June 30 sent to Mr. Moon a protest similar in tone to that of the Mail-Pay Committee, and requesting that no action be taken by Congress or by its committees until the Bourne report shall have been received.

Ex-Senator Bourne is speaking his mind quite freely concerning the postal service. "In its persistent efforts to secure dictatorial power, the Post Office Department," says Mr. Bourne, "has broken all records. The department bill, H. R. 17042, provides that 'not exceeding' certain rates shall be paid to steam railroads for transportation of the mail. The same bill also contains a clause compelling the railroads to carry mail.

"It is claimed that 'not exceeding' is but a continuance of existing law; but heretofore the railroads have not been compelled by law to carry mail. They are supposed to have accepted the rates as a voluntary act, which in itself was assumed to be sufficient guarantee that rates would not be too low; and it was thought necessary only for Congress to fix maximum rates. But this assumption was not sound, as a railroad would hardly dare to refuse to carry mail; such action would considerably irritate the community along the road.

"The Interstate Commerce Commission is now authorized to fix maximum freight rates, it being left to the railroads to fix the minimum. It would be considered preposterous for the commission to fix the maximum rates at which railroads must carry freight and leave the shippers to fix the minimum. Yet this is the very thing that the Post Office Department in the Departmental bill, proposes for mail pay. Congress is to fix the maximum rates and the shipper—the Post Office Department—is to fix the minimum rates, and the railroads are to be compelled to carry the mail. This is a proposition without parallel in the history of rate regulation. It is bureaucracy run mad."

The General Office Clerk—A Neglected Factor

Bureaus Suggested to Specialize in Appliances and Methods and in Selection of Men for this Department

By George A. Clark

The army of general office clerks represents to a greater or less degree in every railroad organization, certain neglected opportunities for direct economy of expenditure and opportunities for more efficient service to the entire organization. The relative and absolute importance of the work of this group of railroad employees has increased tremendously during recent years. The latest figures covering expenditures for this purpose are those published in the statistical report of the Interstate Commerce Commission for 1911. In that year the railroads of the United States reporting to the commission paid out in the form of compensation to "General Office Clerks" a total of $61,971,046. This amount represents an increase of 149 per cent. over the amount similarly expended ten years before. As contrasted with this, the amount expended as compensation for "general officers" and "other officers" increased during the same period but 48 per cent. It appears that in 1901 the pay of clerks exceeded that of officers but 11.9 per cent., while in 1911 the difference amounted to 88 per cent.

In so far as these comparisons indicate tendencies in railroad development, two striking factors appear—the contention of the editors of the *Railway Age Gazette* that one of the crying needs of present day railroad organizations is more men to act as supervisors, the other that in the total of the amount paid to clerks when considered with the increase during the past decade, a condition exists which should challenge the attention of railroad officials alert to every opportunity to make each factor in their department and organization fully productive. The amount expended as compensation for clerks represents an important and rapidly growing expenditure which under the most favorable conditions can only be made productive in part. It is one of the many factors which have brought the railroads of the country to their present position.

Although the general office clerks have become an increasing burden in railroad organizations, few of the men so employed are in a position much better than that of ten years ago. Most of this work is of such a character that effective organization for purposes of bettering conditions of work and pay is not practical. In many instances men in this kind of work are contending with difficulties from which other classes of employees escaped twenty years ago. The increase of 149 per cent. in the compensation of "general office clerks" is largely one of bulk —additional clerks taken on to perform additional clerical labor.

For the purpose of this discussion the work of this class of employees may be grouped into two principal classes, the first that of preparing and keeping the records necessary properly to carry on the work of the company, the second, the rendering of personal service for the purpose of facilitating the work of individual officers. The first item is of principal importance, although it is essential that some attention be given to the second factor, as it is a time and expense consumer in every railroad organization.

A railroad organization must maintain records for one or more of three purposes: These are (1) to preserve the essential information having to do with the corporate and fiscal affairs of the company; (2) to meet the requirements of federal and state laws and regulating bodies; (3) to facilitate the work of administrative and executive officers in better performing their duties with respect to the operation of the property.

Without doubt there has been in the past ten years a very marked development with respect to the detail in which each class of the above kinds of records are kept. The requirements of each have in many instances interworked in making it necessary to keep more elaborate and detailed accounts of every phase of railroad operations.

Complexity in intercorporate relationships is one of the most striking features in the organization of an American railway system. A property that presents a rather simple operating organization may be maintained as to its legal and financial existence through records of from fifty to one hundred corporations. During the past ten years there has been a growing respect for the value of accurate legal and fiscal records. It is a development that is on the whole highly desirable, as it insures to both the stockholder and the public, data which may be essential in determining the relative rights of each.

The largest single factor, however, which has contributed to the increase in the expense of the railroads through compensation of general office clerks arises from the constantly growing demands of various public bodies for reports of one kind and another bearing upon the operations of the railroad property. A railroad system operating through a number of states, many of which require different kinds of records and reports, places upon every railroad organization the burden of a heavy, and at times oppressive, amount of clerical labor. It is possible that there will be more sense and less insatiate desire for volume in future demands along this line. In the past too many reports required by governmental bodies have had for their principal purpose the employment of additional clerical labor, the vexation of railroad auditors and the increased frequency of pay day for public printers.

Although it is reasonable to expect that there will not be so much required by public bodies in the future, it is probable that the development and use of statistical records by administrative and executive officers is as yet in its infancy. In certain organizations, and with certain types of executives, this represents already an important item in the work of general office clerks. It is quite probable, however, that the volume of the right kind of data could be very materially increased for the right executive. It is also probable that an increased appreciation and demand for this type of records will be one of the interesting developments in railroad organizations during the next few years. This is the one kind of general office work which, if material be properly compiled and intelligently used, can be considerad almost as productive as the moving of a car of coal over the property.

This situation obtains generally; a very considerable volume of records is essential in maintaining the fiscal, legal and operating efficiency of American railroad organizations. Whatever development there will be in the future will be in the direction of a greater volume than now exists. Records will be kept and considered of value for reasons to which we give little attention at this time. The problem involving any consideration of the relation of the expenditure for this class of labor to other railroad expenses is to get back into the processes by which the records are compiled.

Before taking up this point, however, it is important to consider one additional service which consumes the time of a considerable number of employees classed as general officer clerks. I refer to the various types of personal service which secretaries, confidential clerks, etc., are called upon to render, types of service which are generally considered as proper in that they serve to materially increase the efficiency and effectiveness of the work of their superiors.

In this type of service there is a very considerable amount of waste—time which is taken by the interested officers for needs semi-personal and semi-official. There is no means by which this expenditure can be regulated other than the conscience and common sense of the officer interested. With advancement and opportunities many men have an unconscious tendency to

shift their point of view with reference to fine distinctions as to "mine and thine" in matters of company time. If the wife of the boss wants a box of peaches for dinner it is not an uncommon thing for the office boy to be despatched both to purchase the peaches and deliver them. If, on the other hand, the private bank account is at an inconvenient location it is not uncommon for the secretary to make regular trips for cash. Such items in themselves are of small consequence and considered without reference to the rest of an organization not worthy of notice, but when magnified by the imagination of a none too ambitious office force, they become consciously and unconsciously the justification for a variety of petty delinquencies on the part of the rank and file. The idea that "the king can do no wrong" is more diligently fostered in a railroad organization than in many lines of business and commercial life. There are, of course, requirements in discipline that demand the implicit obedience of employees, but in general office work, at least, there are many situations where one of the best experiences that could happen to the head of an office would be to take a certified copy of the honest opinion of those nearest to him among his subordinates.

Wastes of the character just described, although worthy of mention in this connection, are not of first consequence, however. Of far greater importance is a consideration of the various factors which enter actively into the great part of the time for which the railroad companies of the country expend more than $60,000,000 per annum. In an analysis of the wastes that appear most conspicuously it is most convenient to group them about two principal propositions, the first, that a great deal of office work is poorly organized and more inadequately supervised, the second, that the railroads of the country have done little or nothing toward selecting the best qualified men for this class of work, and having once taken them into the organization have considered each employee as a potential executive.

A peculiar situation exists with reference to the physical conditions which surround much of the general office work of the railroads of the country. In many instances methods have been reduced to a thoroughly scientific basis and from the point of view of appliances, efficiency, organization and adequate supervision, the organization is all that could be desired. More frequently, however, it will be noted that the improvement in physical appliances has come about primarily at the behest of commercial organizations interested in pushing particular machines. Frequently a situation will be found in a department where a certain section of the organization works smoothly and efficiently and where adequate supervision can be found. Speaking generally, there are these three phases of the work constituting the elements of weakness of general office work.

The difficulty in adequately utilizing resources which are available in mechanical appliances arises from a lack of knowledge as to methods employed elsewhere, and from inertia. It frequently happens that machines are purchased after a desultory examination by officials who in many cases have not used and never expect to use, the machine themselves. Often to add to the difficulty, there has been no general test. Each department head, frequently each stenographer, is a law unto himself as to standards.

To overcome this difficulty it would seem that it would be profitable for every large railroad organization to create a bureau which specializes in standards and methods. Such a bureau would insure that every change or improvement which was considered, with reference to a given appliance, would be adequately tested. In short, such a bureau could insure that the proposed improvement would realize the results which should be expected. Of even greater importance, however, than the proper selection of the appliances used in general office work is the effectiveness of the plan of organization. A great deal of general office work involves the handling of a vast volume of routine material. In many offices there is a tremendous amount of waste due to improper routing and arrangement.

Here again it would appear that in the reorganization of a department, the experience of other individuals in a similar kind of work would be of the utmost value. In order to secure this, a corporation should maintain a library and a staff competent to pass intelligently upon questions of this kind.

One of the most conspicuous services which the *Railway Age Gazette* has rendered to the American railway service, has been by placing emphasis upon the necessity of more adequate supervision of the work of the rank and file of the organization. This is just as applicable to the work of a $35 clerk in the office of the auditor of freight receipts as to the work of a section hand. In the neglect of this factor of supervision arises probably the largest single item of waste which may be found in the $60,000,000 expended annually for salaries for general office work. Improvement in supervision is a problem; first, as to methods, and second, as to personnel. Better methods could be acquired through a more extensive and intimate study of the accumulated experience of others engaged in the same kind of work. Improvement in the personnel is largely a problem of finding an individual suitable for the work to be done. This, without question, is the foremost problem before those responsible for the management of the railroads at the present time.

Roughly, the history of railway development in the United States might be divided into four periods. Thees are, first, period of construction; second, period of consolidation and system building; third, period of perfecting the physical plant; fourth, period of complete utilization of the talents of the individuals comprising the organization.

The railways are just entering into the fourth of these periods of development. In the last analysis all of the acute problems of organized railway labor and the incidental evils which have arisen are due to lack of appreciation of this factor of railway organization.

Certain classes of labor have overcome, at least from their individual points of view, certain of the difficulties inherent in their position. Certain other classes, notably general office clerks, have been unable to assert themselves in this manner. The result has been that one of the best places for the acquisition of a certain type of experience is regarded as a grave yard for ambitious railroad men. This is a most regrettable situation, for with the increased complexity and difficulty of the problem which confronts the present day railroad executive the ability to understand and interpret representative data is imperative.

As already indicated, general office clerks as a class are not organized; the conditions surrounding their work covering compensation and advancement have not materially changed during a long period of years, and quite generally promising talent is uniformly neglected, as has been the case in the past.

There are two classes of individuals which must make up every organization—first, the large group including those whose possibilities of growth and development in the organization have rather fixed limitations; second, a very considerable group of individuals who give every promise of large usefulness if properly developed.

The methods of handling work which prevail in most organizations, are such as to preclude all but individuals possessing the most extraordinary initiative and ability from asserting themselves and attracting favorable attention to their possibilities.

Scores of industrial organizations have found it tremendously profitable to specialize in the human element in the business. This involves more particularly an acquired estimation of the possibility of the individual who is taken into the organization and a consistent appraisal of the development which that individual makes as a member of the organization. Until recently there were but two of the large railways of the United States which maintained bureaus which specialized in employment conditions.

There is a very exceptional opportunity for those in charge of general office clerks in this direction. Employees of this class should be selected with reference to their fitness for the particular positions for which they apply, and second, with reference to the promise which they indicate for future development. It is impossible under present conditions to expect that every individual chief clerk can be a specialist along these lines. It

is essential that he receive the co-operation and assistance of a bureau, which is able to devote its specialized attention to this particular problem.

In summary, we have noted that the railways of the country are spending a tremendous sum of money for work of this character, that the amount expended has increased with rapidity during the past decade, that a very considerable portion of this is represented in uneconomic appliances, improper methods of organization and inadequate supervision, and that more particularly there is imperative need for more intelligent attention to the problem and possibilities latent in the personnel of the organization. Such a result can best be accomplished by creating two bureaus; one to specialize in appliances and methods, the other to specialize in men. Such a development would pay its way in any organization.

THEODORE VAIL ON GOVERNMENT OWNERSHIP

The following are a series of extracts from the American Telephone & Telegraph Company's annual report for 1913, which although the report itself relates specifically to public ownership of telephones are of general character and apply also to the question of government ownership of railroads:

Should government operation be self-sustaining in its full significance, entirely maintained and operated out of its own revenue, or should such properties be operated at a charge on general revenue at the cost of the whole public for the benefit of a part? Should they be regulated as to *efficiency* and *sufficiency* as private utilities are regulated, or should each department or utility regulate itself? If utilities are to be subsidized, that is, maintained entirely or in part out of public revenue for the benefit of the users, then the tendency toward government ownership is strong. There may be some things which should be made free and convenient for the whole public even at the expense of the public revenues, but the telegraph and telephone are not of them.

The power or right of the government to own and operate utilities need not be discussed. If such power is to be exercised it becomes of the greatest importance that a right decision, based on an exhaustive study and a thorough understanding of facts, conditions and possible results, should be reached.

The greatest embarrassment in dealing with many public or quasi-public questions is the difficulty of establishing a clear understanding unaffected by prejudice or partisanship; of offsetting erroneous impressions, created by mistaken or misleading statements and disputable and controvertible statistics, particularly when such statements are made by those who have the public ear.

Dickens said, when a parliamentary reporter: "Night after night I record predictions that never come true, professions that are never fulfilled, explanations that are only meant to mystify." It was so then, is now and probably ever will be the same.

The functions of government and the causes of its being are *"Control"* and *"Regulation"*—control of the individual and regulation of the community so far as is necessary to secure the enjoyment of life, liberty and happiness by all, and "control" or "regulation" of anything that might in any way become a menace to the social organization or to its individual members.

To the extent that anything *is a necessity* in its absolute sense to the enjoyment of life and health—the absence of which would endanger the community as a whole—it is a proper function of the government either to provide it or to see that it is so provided as to bring it within the reach of every individual member of society: even to provide it for all at the cost of the general revenue.

To the extent that anything of a utilitarian nature is adopted by or assimilated into the habits of the public and contributes to their comfort, convenience, or even generally to their profit, it should become an object of *sufficient government regulation to prevent the public convenience being made the cause of private exaction;* the distinction between what should be furnished in whole or in part by the government and what should be regulated by the government being whether *the necessity is absolute* and the thing indispensable to the life, health and well-being of the individual and consequently of the community, or whether it be something contributing to or even important, but not indispensable, to the comfort, convenience and profit of the community or of the individual.

A sufficient supply of potable water available to all is a necessity. The street car, the electric light, the telephone or telegraph are conveniences of the highest importance but are not necessities in the foregoing sense.

The control, and later the operation, of the mails and posts, for the interchange and dissemination of intelligence—letters, books, periodicals—have by general acceptance become a proper governmental function. The conveyance of packages and parcels has by custom been included with the mails.

The step from government control and regulation to government ownership and operation is radical and fundamental; one which absolutely changes the character of government organization and functions. In this country there is no organization or function of the government that in any sense approaches ownership or operation in the real, large way.

There are no sound reasons given or real advantages promised for government ownership and operation which do not apply to or cannot be secured by government regulation. Most of the "advantages" promised and arguments used are purely hypothetical, theoretical and uncertain, they are not vindicated by the experience either of this or of any other country.

Governments have in the past taken over or constructed and operated all kinds of utilities where political, national or strategic exigency made it necessary. Such operations, other than those to meet national crises, have properly been confined, wholly or in part, to such as were of a national character and where the risks and uncertainties or magnitude placed such operations beyond private initiative, enterprise and capital.

There is, however, no reason for government ownership and operation where private initiative and enterprise are not only competent to develop, but have actually developed, these utilities to the fullest extent. The government never has taken the initiative in the introduction of any new and untried utilities, nor any interest in them except so far as it has encouraged their development in private hands through the provisions of the "patent," "copyright" and "trade mark" laws; and there is no reason why it should unless such utilities have become of such general use that their regulation is necessary.

The general stock arguments put forth for government ownership and operation are:

Extension of benefits to a larger public;

Abolition of selfish exploitation;

Control of monopoly;

Pecuniary advantages to the public through lower cost and consequently lower charges;

Greater efficiency;

Saving to general public rewards of private initiative.

Private enterprise is rightly said to be based on personal interest. There is no doubt as to this, but incentive to achievement along individual lines could not be suppressed without great detriment to the community at large. What would be the result if government restrictions reduced the reward or profit on initiative and enterprise to that of certain and secure business ventures? Where would be the incentive to assume risk and uncertainty, or the larger profit necessary to recoup the individual and the community for the unsuccessful ventures?

The pecuniary reward to those who take the initiative and the risks of new enterprises must correspond to the labor and to the risk, but this reward cannot exceed the advantage to the public using the service, for the user must get in service, in some way at least, the equivalent of its cost to him. Private initiative, invention, enterprise, risk, spurred on by the incentive of reward,

have changed the face of the world, and the resulting unearned increment largely constitutes the wealth of nations; without it many of the great scientific industrial developments would have remained scientific curiosities, even if they had been evolved at all.

The general tendency in this country is to the "one system" idea of public utilities under regulation. Every one knows the evil of duplication, no one wants two gas, water or electric lighting systems, and there is a general acquiescence in the "single system" in each community. In no one of the utilities except the telephone, and the street cars to a slight degree but for a very different cause, does the fact whether A, B or C residing in the same community is on the same or different "systems" make the slightest difference as to service, nor does it matter whether systems in different communities are connected or not.

With the telephone exchange the question of those connected is vital; your service depends upon one system connecting all telephone subscribers in the same community and upon all communities being connected with each other.

A telegraph system reaching all telegraphic points avoids physical transfers from one system to another, with the incidental delays and obstructions to good service.

Telephone and telegraph systems operated under common control can avoid duplication by making use of the same wires.

For practicability of management, economy of operation or efficiency of service there should be one combined telephone and telegraph system. This has been the Bell contention and this is the conclusion reached by the post office committee and by Congressional advocates of government ownership, who say in substance that the *telephone and telegraph should constitute one system and that a monopoly.*

Government regulation can effectually curb "monopoly" and "selfish exploitation" and make them useful without destroying them, by subordinating them to the public for the public advantage. Government ownership and operation would destroy individual initiative; they would create monopoly and increase and strengthen its evils by placing it in the control of officials and servants, responsible only to themselves as a political party, and parts of the organization which made or unmade the chief executives.

Operation, economical and efficient, requires high organization continuously maintained, superior methods and efficient service. There must be supervision by able executives assisted by experts, all of long experience as executives as well as in the particular industry. They must have large discretionary powers, assume responsibility, and have undisputed directive authority over subordinates. It is purely administrative and executive in its nature.

There is a very narrow margin between efficient economical operation and waste. It is possible to have efficiency accompanied by waste, but never possible to have efficiency without responsible organization and the individual initiative, watchfulness and continuing interest which only accompany permanency and expectation of reward.

Regulation is in the nature of a review, consideration, determination. It is judicial and advisory, not administrative or executive; a commission of regulation is analogous to a board of direction representing the public as well as the corporation, having no other object than the conservation and protection of the interests of all.

Operation is a methodical action upon lines of a determined policy, requiring expert knowledge, experience, training, and individual interest.

Regulation is common sense, intelligent review and decision, based on presentation and examination of facts and conditions.

Theoretically there may be no reason why government operation should not be as economical and efficient as private operation, but actual constructive performance runs up against actual conditions and tangible difficulties which only experience shows how, and responsibility develops the ability, to deal with.

Departmental officers taken from walks of life affording neither experience nor knowledge of the duties and responsibilities they are to assume, are expected to perform the various duties of their departments and also to incidentally look after their political obligations. As a rule their training better fits them for advocates than for executives, for judicial positions or as commissioners of regulation than directors of operation.

Every new head of a department is of necessity a reformer; his average incumbency is less than four years; there is seldom any continuity of departmental policy, and never any continuity of departmental staff. The important assistants come and go with the head. A review of the operations of his department shows much that could be changed to advantage; to eliminate all that is unsatisfactory and bring about effective results under the conditions and in the time available is impossible for the ablest. He starts in finding an incomplete attempt at accomplishment along a certain line of policy, and goes out leaving an uncompleted attempt along a different line of policy. The inevitable tendency is towards promise, not performance.

The departments are run by the minor officials and the clerical force who under ordinary conditions are permanent. The officials have no responsibility in the selection of and little directive control over their subordinates. There is a premium on that *finished mediocrity* which leaves much to be desired and furnishes nothing upon which to base effective reprimand, enforce discipline, or cause for removal. Lack of responsibility is a handicap in the development of men; lack of accountability is a handicap on thorough efficiency; lack of opportunity is a handicap on initiative and enterprise.

A full average of the minor heads and clerks would normally have capacity, initiative, enterprise and ambition. If any one of them develops extraordinary efficiency, initiative or enterprise, he is either elbowed out of the way as disturbing the quiet, complacent habitude of the organization, or, if sufficiently masterful, develops to a point where he can go no farther, and is soon taken up by outside organizations. The higher positions, honorable as they may be, are not sufficiently compensated and do not afford the permanent and remunerative positions to be had in private enterprises for similar occupations and ability.

In European countries, where even the minor office holders and government employes have a certain official distinction which also attaches to their families, there is something higher than the mere remuneration, something that does not attach to private occupation, and is not attached to government subordinate positions in this country.

Government administration is more or less a game of politics, and while with government operation it may sometimes be possible to have efficiency, it will always be impossible to have economy.

RAILWAY EXTENSION IN AUSTRALIA.—The New South Wales and Australian governments have arrived at an agreement respecting the construction of proposed railways from Moama to Moulamein; from Euston inland about 50 miles and from Wentworth inland, about another 50 miles. These lines, when constructed, will be operated by the Victorian Railway department, on the Victorian gage under an interstate agreement.

ELECTRIC RAILWAYS IN AUSTRIA.—Statistics issued for 1913 show that in Austria, Bosnia and Herzegovina there is a total of 73 direct-current railway systems, of which 25 operate at 750 volts or more; and six single-phase systems. Twenty-four of the railways are operated on standard gage and 55 on narrow gage. The length of the direct-current lines is about 723 miles, and of the alternating current lines about 150 miles, or 873 miles in all. During the year the increase in the number of direct-current lines was 12 and single-phase lines three. The increase in the length of direct-current lines was 92 miles, and single-phase lines 106 miles.

General News Department

The Grand Trunk roundhouse at West Forty-ninth street and South Kedzie avenue, Chicago, was destroyed by fire on July 5, and 18 locomotives were damaged.

The New York, New Haven & Hartford has just pensioned 13 employees, making 51, altogther, retired within three months. One of those who have just been pensioned is George C. Crocker of Hyannis, Mass., a crossing man, 82 years old, who has been in the service 59 years.

The Pennsylvania Railroad, since January 1 last, has sold 100 pieces of real estate for approximately $1,000,000. The directors have voted to sell, as fast as purchasers can be found, all of the real estate owned by the company which is not needed for its uses, of which there are 647 separate parcels. Station agents of the company will give all desired information.

Engineers and firemen of the railroads west of and including the main line of the Illinois Central who have been taking a strike vote in connection with their demand for increased wages and important changes in working conditions, which were denied by the railways some weeks ago, are reported to have voted overwhelmingly to empower the leaders to declare a strike. Conferences between the representatives of the men and the general managers' committee are to be resumed in Chicago on July 14.

According to press reports from Portland, Ore., about a dozen passenger conductors on the Oregon-Washington Railroad & Navigation Company have been dismissed in the last few weeks as the result of the discovery of numerous irregularities in collecting cash fares. A rigid investigation is said to have disclosed evidence against 38 conductors. The Order of Railway Conductors and the Brotherhood of Railway Trainmen are said to have issued a circular on the subject warning the men against such practices.

The *Railway World*, studying the last annual report of the Interstate Commerce Commission, finds that in June, 1913, the number of persons employed was 852. The list includes 10 chiefs of divisions, 32 attorneys, 75 examiners and 501 clerks. This statement evidently was made before many persons were engaged in the valuation division, as only the five engineers are mentioned under that head. The appropriations made by Congress for the work of the commission for the last fiscal year amounted to $1,853,629. In 1888 the number of persons employed by the commission was 33 and the expenditures in that year were $113,008.

The New York State Workmen's Compensation Commission reports that the railroads are no longer opposing the application of the workmen's compensation law. They are insuring their risks, some having taken out policies in the state fund while others have given their business to the stock insurance companies. Still others insure their own risks. The distinction between intrastate and interstate employees in applying the law to the railroads is still an unsettled question, and decision in the matter probably will be held in abeyance until the first claims are filed. Four hundred claims for compensation had been filed up to July 8. It was found that only four of these were death claims.

Officers of the shop craft unions which struck on the Illinois Central and Harriman lines in 1911 are gathering a large amount of evidence, in connection with the strike, with a view to presenting it to the United States commission on industrial relations. The committee says it is the intention to show that this was not a strike but a "lockout," resulting from the refusal of the roads to recognize their federation. An effort is being made to locate all of the men who struck, and question blanks are being sent out to ascertain how many have lost homes on account of inability to make payments, whether children have been obliged to go to work, whether any of the strikers or members of their families have committed suicide, etc.

The Indian Railway Board has recently placed orders for two shipments of railway ties to be shipped from the Pacific coast. One is of creosoted Oregon pine at a cost of $1.44 per tie delivered Calcutta, and the other of uncreosoted Californian redwood at $1.20 per tie. The dimensions are 9 ft. by 10 in. by 5 in., and are for the state broad-gage railways. The reasons given for going to the United States for ties are that the cost of Australian jarrah has gone up to $2.80 per tie, and that these orders have been given after satisfactory experiments with Pacific coast timbers to see that they resist the ravages of white ants and do not show undue deterioration from the tropical climate. It is also stated that the Indian government requires between 500,000 and 1,200,000 ties a year for the state railways of the country.

Cash Investment of the Railways During Six Years

During the six fiscal years 1908 to 1913, inclusive, the steam railways of the United States of Class I invested in their road and equipment cash to the amount of $4,010,385,303. Railways of Class 1, so designated by the Interstate Commerce Commission, are those with annual operating revenues of over $1,000,000. They include about 90 per cent. of the mileage, receive more than 96 per cent. of the revenues, and handle more than 98 per cent. of the traffic.

This cash investment of the operating railways of Class I of the eastern district during the six years was greater than the amount of capital securities issued by them during this period, and was 19.9 per cent. of the aggregate of their capital securities outstanding June 30, 1913; of the railways of the same class of the southern district it was 21.1 per cent., and of the railways of the same class of the western district it was 23.2 per cent. of the aggregate of their capital securities outstanding June 30, 1913. That is, the cash actually expended by these railways during the last six years upon their properties used in transportation amounts to more than one-fifth of their total capitalization at the close of the last fiscal year. This is at the rate of $668,397,551 per year.

These figures are obtained through a compilation made by the Bureau of Railway Economics from the reports of the railways to the Interstate Commerce Commission, and have not heretofore been collated.

Extensive Under-Studying on the Baltimore & Ohio

To broaden the knowledge of its division officers and give them the benefit of a thorough training with respect to the methods of administering the affairs of the company in the general offices at Baltimore, the Baltimore & Ohio is putting its division officers through a course of employment which will better equip them for promotion to positions of greater responsibility. Assistant superintendents, trainmasters and, in some instances, their subordinates, are transferred to Baltimore and set at work where they can study the problems of operation from the viewpoint of the general officers. While the staff officials are thus engaged their subordinates discharge the regular duties of the office. The plan, therefore, has the added advantage of equipping the men lower in rank to qualify when vacancies occur.

The men who take the course in the general offices are employed for a period in the transportation department; then in maintenance of way work, in the motive power office, the accounting and statistical departments, and in the tonnage, discipline, employment, station service, rates of pay and other bureaus, so that when they return to their respective divisions it will be with a general knowledge of the relation of their work to the operation of the property as a whole. Several of these men are in the Baltimore offices constantly, and when they go back to their regular duties others are brought in.

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF MAY, 1914

Name of road.	Average mileage operated during period.	Operating revenues: Freight.	Passenger.	Total, inc. misc.	Operating expenses: Maintenance: Way and structures.	Maintenance: Of equipment.	Traffic.	Transportation.	General.	Total.	Net operating revenue (or deficit).	Outside operations, net.	Taxes.	Operating income (or loss).	Increase (or decr.) comp. with last year.
Alabama & Vicksburg	143	$82,116	$42,752	$133,979	$21,944	$39,525	$4,365	$52,330	$5,801	$123,965	$10,014	—$259	$7,250	$2,505	—$23,425
Alabama Great Southern	309	274,330	103,142	410,163	55,552	140,888	13,225	146,545	14,944	371,154	39,009	—1,277	15,943	22,239	—68,990
Ann Arbor	292	114,190	40,439	167,381	24,408	12,593	5,768	62,366	8,362	113,497	53,884	—69	13,770	40,045	—2,659
Arizona & New Mexico	109	71,045	9,204	82,994	9,824	7,924	855	13,410	2,643	34,656	48,338	.....	3,000	45,338	6,391
Arizona Eastern	367	202,335	36,520	251,029	30,378	24,009	2,047	64,781	11,146	132,361	118,668	336	12,260	106,744	27,830
Atchison, Topeka & Santa Fe	8,340	4,861,004	2,043,236	7,556,173	988,344	1,259,152	165,437	2,225,101	144,151	4,782,185	2,773,988	.....	388,530	2,385,458	—222,201
Atlanta & West Point	93	44,863	40,676	95,828	12,682	21,679	5,897	34,608	4,780	79,646	16,182	—657	7,125	8,400	—3,904
Atlanta, Birmingham & Atlantic	646	154,181	52,109	230,949	41,999	32,168	13,436	99,880	12,549	201,032	29,917	.....	14,337	15,580	—431
Atlantic & St. Lawrence	167	76,107	21,602	107,407	6,254	19,603	3,821	56,101	3,867	89,646	17,761	.....	10,157	7,604	61,525
Atlantic Coast Line	4,682	2,108,874	709,981	3,055,882	435,239	546,117	53,561	1,179,091	100,781	2,314,789	741,093	1,553	112,000	627,540	17,049
Baltimore & Ohio—System	4,456	5,752,513	1,316,431	7,586,213	847,571	1,506,434	163,940	2,965,665	184,922	5,668,532	1,917,681	—71,559	318,554	1,527,568	—874,404
Baltimore & Ohio Chicago Terminal	77	.....	652	113,494	6,494	23,273	671	52,661	7,071	90,170	23,324	1,039	19,021	5,342	—25,315
Bangor & Aroostook	631	247,133	44,190	305,068	54,268	38,294	2,242	79,705	10,271	184,780	120,288	335	8,789	111,834	730
Belt Railway of Chicago	21	.....	.....	258,921	20,324	23,146	616	92,289	7,886	144,261	114,660	.....	11,063	103,597	11,588
Bessemer & Lake Erie	204	711,377	29,022	750,265	78,402	207,236	8,965	169,822	11,536	475,961	274,304	.....	18,000	256,304	—226,435
Bingham & Garfield	27	154,913	4,991	160,543	15,710	23,505	896	25,313	2,124	67,548	92,995	.....	2,978	90,017	—6,863
Birmingham Southern	44	47,379	1,433	87,079	12,570	14,058	439	30,248	3,372	60,687	26,392	.....	1,614	24,778	—7,501
Boston & Maine	2,252	2,286,708	1,222,965	3,820,868	404,782	721,801	34,895	1,719,134	134,970	3,015,582	805,286	14,656	171,970	647,972	6,039
Buffalo & Susquehanna R. R. Corporation	253	62,439	7,075	73,054	24,186	33,023	1,063	27,336	6,462	92,070	—19,016	.....	2,600	—21,616	.....
Buffalo & Susquehanna Ry	91	13,247	6,208	21,847	4,468	7,486	484	12,963	3,370	28,771	—6,924	—122	1,600	—8,646	10,828
Buffalo, Rochester & Pittsburgh	586	641,033	91,593	770,113	172,653	176,431	11,731	283,877	23,017	667,709	102,404	—566	24,000	77,838	—224,862
Butte, Anaconda & Pacific	90	103,937	10,908	124,560	17,750	24,559	586	37,925	4,133	84,953	39,607	.....	2,500	37,107	—2,174
Canadian Pacific Line in Maine	233	52,847	25,439	86,147	30,477	14,004	7,399	36,980	4,846	93,706	—7,559	.....	15,000	—22,559	14,959
Carolina, Clinchfield & Ohio	248	176,340	16,479	197,077	16,938	27,020	7,080	41,445	9,969	102,452	94,625	.....	14,250	80,375	—44,606
Carolina, Clinch. & Ohio Ry. Co. of S. C.	18	8,490	1,563	10,275	1,371	82	1,946	2,190	611	6,200	4,075	.....	750	3,325	—845
Central of Georgia	1,924	554,934	304,395	953,620	178,225	208,668	40,270	389,138	42,569	858,870	94,750	6,897	52,360	49,287	40,529
Central New England	304	257,993	37,458	310,002	90,916	42,438	715	95,959	3,744	233,772	76,230	86	11,500	64,816	—61,138
Central Vermont	411	244,934	70,017	336,216	40,320	55,257	7,883	157,236	7,496	268,192	68,024	5,559	16,980	56,603	—30,614
Charleston & Western Carolina	341	108,488	30,192	146,574	34,412	30,525	4,502	60,760	7,387	137,586	8,988	.....	5,000	3,988	11,988
Chicago & Alton	1,026	660,039	306,725	1,064,378	121,761	250,250	41,394	424,286	35,200	872,891	191,487	4,683	55,200	131,604	23,972
Chicago & Eastern Illinois	1,282	736,060	230,187	1,066,400	120,920	282,413	23,285	435,794	41,059	903,471	162,929	1,522	56,900	104,507	598,747
Chicago & Erie	270	298,945	60,251	402,377	63,916	93,818	22,718	213,216	13,473	407,141	—2,764	4,097	9,004	—17,865	—42,324
Chicago & North Western	8,095	3,958,206	1,700,953	6,465,427	1,399,206	1,028,201	108,257	2,535,350	143,920	5,214,934	1,250,493	1,572	385,000	867,065	—535,417
Chicago, Burlington & Quincy	9,129	4,331,505	1,587,999	6,520,269	1,461,133	1,241,987	121,060	2,288,102	203,678	5,315,960	1,204,309	4,231	304,327	904,213	219,563
Chicago Great Western	1,496	760,319	236,949	1,090,017	171,499	214,101	45,944	425,583	39,036	896,163	193,854	—720	46,107	147,027	—47,303
Chicago, Indiana & Southern	359	300,746	22,693	333,589	38,121	86,493	10,110	123,886	11,556	270,166	63,423	658	18,600	45,481	—27,865
Chicago, Indianapolis & Louisville	617	364,242	160,432	575,382	91,744	87,508	19,245	233,517	17,664	439,678	135,704	.....	32,665	103,039	—58,733
Chicago Junction	12	.....	.....	161,259	9,118	17,989	957	84,591	4,101	116,756	44,503	9,810	1,229	53,084	—8,787
Chicago, Milwaukee & St. Paul	9,690	41,929,689	1,436,871	6,970,871	935,195	960,326	139,717	2,641,286	154,495	4,831,019	2,139,852	28,421	338,054	1,830,219	25,320
Chicago, Peoria & St. Louis	255	105,852	22,858	136,607	25,283	32,439	6,005	63,997	5,118	132,842	3,765	.....	8,700	—4,935	—8,870
Chicago, Rock Island & Gulf	477	132,547	43,353	194,461	38,207	29,144	10,007	96,408	7,464	181,230	13,231	—519	8,815	3,897	—72,842
Chicago, Rock Island & Pacific	7,845	3,052,058	1,338,591	4,744,367	789,695	824,450	143,837	2,140,537	152,751	4,051,270	693,097	—12,559	226,489	454,049	—530,989
Chicago, St. Paul, Minneapolis & Omaha	1,753	785,653	426,897	1,303,725	374,390	212,140	30,719	545,944	38,560	1,201,753	101,972	1,500	84,038	19,434	—252,218
Chicago, Terre Haute & Southeastern	375	128,849	16,484	149,668	29,202	48,657	3,434	49,257	9,655	140,205	9,463	—358	11,500	—2,395	6,118
Cincinnati, Hamilton & Dayton	1,015	669,077	122,551	882,852	180,406	150,682	18,903	431,914	21,853	803,758	79,094	.....	49,765	29,329	—30,200
Cincinnati, New Orleans & Texas Pacific	337	726,850	154,130	929,112	100,550	233,704	25,929	283,007	28,792	671,982	257,130	—1,632	31,000	224,498	61,939
Cincinnati Northern	246	79,074	15,001	100,109	16,662	23,403	2,582	47,917	3,442	94,006	6,103	.....	6,000	103	—12,026
Cleveland, Cincinnati, Chic. & St. Louis	2,361	1,739,835	715,393	2,713,309	444,412	628,205	64,410	1,201,494	65,928	2,401,449	308,860	1,365	124,500	185,725	—7,326
Colorado Midland	338	104,098	18,556	135,402	33,495	34,366	7,932	64,985	5,919	146,697	11,295	—7,876	10,000	—29,171	—1,436
Colorado & Southern	1,127	397,286	100,509	544,520	95,863	85,457	8,946	216,717	21,083	428,066	116,454	71	35,625	80,900	—108,442
Cumberland Valley	162	193,010	54,015	259,993	38,407	30,891	4,352	84,842	8,041	165,533	93,460	—131	5,910	87,419	—10,820
Delaware & Hudson Co.—R. R. Dept	881	1,604,503	214,660	1,897,438	133,580	266,840	26,008	721,464	70,254	1,208,146	689,292	—2,277	56,250	630,765	—9,132
Delaware, Lackawanna & Western	960	2,471,357	705,634	3,414,174	595,968	501,915	67,512	1,024,189	73,376	2,262,960	1,151,214	43,025	185,000	1,009,239	—156,963
Denver & Rio Grande	2,585	1,311,663	360,366	1,751,378	276,051	294,744	37,096	519,317	48,907	1,176,115	575,263	—4,979	70,000	500,284	96,092
Denver & Salt Lake	255	86,336	18,982	109,562	18,847	20,456	1,686	39,520	4,710	85,219	24,343	.....	4,500	19,843	5,795
Detroit & Mackinac	411	67,658	24,248	97,453	15,854	16,494	2,051	34,622	3,070	72,091	25,362	—1,008	9,135	15,219	—15,822
Detroit & Toledo Shore Line	79	99,773	.....	100,913	12,347	8,285	1,863	35,545	2,596	60,636	40,277	.....	5,600	34,677	—27,200
Detroit, Grand Haven & Milwaukee	191	133,000	48,700	202,064	45,541	35,846	6,535	119,440	6,603	213,965	—11,901	175	3,600	—15,326	4,421
Detroit, Toledo & Ironton	441	93,094	9,227	112,777	136,085	64,416	2,748	66,151	5,990	275,390	—162,613	.....	5,700	168,313	—123,460
Duluth & Iron Range	292	502,344	19,892	529,495	95,532	52,482	1,044	116,308	10,109	275,475	254,020	—2,440	26,771	224,809	—328,890
Duluth, Missabe & Northern	363	604,714	31,652	643,033	145,044	85,770	2,884	117,370	12,050	363,118	279,915	2,878	32,639	250,154	—562,777
Duluth, South Shore & Atlantic	627	171,777	87,787	274,857	95,021	39,976	11,093	99,458	12,154	257,702	17,155	—2,294	19,600	—4,739	—31,364
Duluth, Winnipeg & Pacific	181	84,374	18,434	105,676	21,666	28,805	1,230	40,624	5,613	97,938	7,738	.....	5,284	2,454	—58,222
El Paso & Southwestern	1,030	614,352	111,710	756,997	93,494	101,482	20,080	222,520	24,483	462,059	294,938	—15,170	38,210	241,558	27,928
Elgin, Joliet & Eastern	776	739,957	3	798,367	128,530	164,202	7,542	229,857	22,476	552,607	245,760	.....	45,595	200,165	—278,930
Erie	1,988	3,063,273	793,115	4,211,318	306,082	694,894	109,149	1,458,467	112,038	2,680,630	1,530,688	—48,971	116,413	1,365,304	—244,326
Florence & Cripple Creek	87	89,449	12,568	103,255	9,336	10,476	2,265	31,223	4,196	57,486	45,769	.....	9,198	36,571	—7,595
Florida East Coast	685	318,557	159,204	543,178	74,435	53,124	7,238	140,315	11,037	286,139	257,039	6	20,000	237,045	144,118

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF MAY, 1914 CONTINUED

Name of road.	Average mileage operated during period.	Operating revenues: Freight.	Operating revenues: Passenger.	Operating revenues: Total, inc. misc.	Operating expenses: Maintenance: Way and structures.	Operating expenses: Maintenance: Of equipment.	Operating expenses: Traffic.	Operating expenses: Transportation.	Operating expenses: General.	Operating expenses: Total.	Net operating revenue (or deficit).	Outside operations, net.	Taxes.	Operating income (or loss).	Increase (or decr.) comp. with last year.
Galveston, Harrisburg & San Antonio	1,338	$569,541	$263,096	$900,295	$170,603	$178,420	$33,119	$429,304	$36,565	$848,011	$52,284	—$2,760	$45,651	$3,873	—$143,314
Georgia, Southern & Florida	395	105,456	70,244	201,305	27,459	39,832	9,736	79,075	10,318	166,420	34,885	—238	11,174	23,473	15,136
Grand Rapids & Indiana	575	273,167	120,470	431,294	58,848	76,542	10,542	174,831	16,454	337,217	94,077	—1,282	24,221	68,574	26,779
Grand Trunk Western	347	380,000	163,000	574,777	109,514	103,979	20,936	274,290	18,476	527,195	47,582	1,564	31,500	14,518	—92,261
Great Northern	7,804	4,352,813	1,097,985	5,867,557	1,678,042	776,565	127,277	1,645,565	132,812	4,360,281	1,507,276	7,115	626,206	888,185	1,044,456
Gulf & Ship Island	308	107,409	29,869	146,484	20,731	35,918	[illegible]	46,753	9,509	115,753	30,731	69	7,289	23,511	—35,878
Gulf, Colorado & Santa Fe	1,596	618,400	227,714	920,946	159,779	174,096	25,939	417,819	31,706	809,339	111,607	....	41,316	70,291	—58,517
Hocking Valley	352	330,317	67,136	442,016	40,153	70,435	8,375	163,327	13,854	296,144	145,872	....	38,400	107,472	—141,191
Houston, East & West Texas	191	75,878	30,278	112,006	25,379	2,571	1,745	36,185	4,035	79,915	32,091	....	4,916	27,175	27,455
Houston & Texas Central	789	271,316	124,299	428,607	106,035	68,396	11,822	238,369	19,496	444,118	—15,511	—226	27,612	—43,349	—67,903
Illinois Central	4,763	3,475,848	1,053,059	5,182,356	738,956	1,172,857	107,575	1,951,771	120,272	4,091,431	1,090,925	—719	257,000	833,206	—237,668
Indiana Harbor Belt	105	....	....	273,420	34,958	29,270	3,017	120,887	8,107	196,239	77,181	3,959	6,000	75,140	3,784
International Great Northern	1,159	477,531	159,158	684,770	134,909	87,795	27,974	363,418	31,737	645,833	38,937	—689	25,000	13,248	—94,294
Kanawha & Michigan	177	205,034	30,543	243,293	38,640	48,836	2,836	79,049	6,929	176,290	67,003	79	11,400	55,524	—45,815
Kansas City Southern	827	676,828	130,638	886,186	110,910	104,711	27,245	304,238	43,010	590,114	296,072	....	67,125	228,947	—68,466
Lake Erie & Western	906	350,230	66,651	446,214	69,553	86,337	15,348	193,054	11,394	375,686	70,528	....	24,000	46,528	—28,758
Lake Shore & Michigan Southern	1,854	2,538,599	967,688	4,011,523	481,595	931,029	85,052	1,459,050	102,417	3,059,143	952,380	51,144	196,500	807,024	—612,654
Lehigh & Hudson River	97	150,366	3,934	161,206	13,371	20,199	1,429	55,515	5,808	96,322	64,884	....	4,000	60,884	11,151
Lehigh & New England	293	250,295	1,071	260,850	36,872	43,561	2,063	58,351	5,165	146,012	114,838	....	5,670	109,168	15,570
Lehigh Valley	1,444	2,984,876	397,444	3,516,422	405,265	548,480	92,455	1,136,105	71,107	2,253,412	1,263,010	54,960	137,000	1,180,970	126,881
Long Island	398	319,774	718,960	1,153,804	132,968	113,815	11,529	472,344	24,928	755,584	398,220	12,790	64,080	346,930	21,816
Louisiana & Arkansas	279	125,291	20,338	149,240	29,875	23,592	2,502	38,008	4,866	98,843	50,397	....	7,091	43,306	9,499
Louisiana Ry. & Navigation Co.	351	126,804	23,963	160,852	27,147	20,262	6,095	65,755	5,673	124,932	35,920	....	7,500	28,420	9,858
Louisiana Western	208	120,301	57,760	187,297	28,248	35,978	7,576	61,311	6,881	139,994	47,303	—515	9,535	37,253	25,467
Louisville & Nashville	4,941	3,188,019	1,026,232	4,514,075	814,409	989,790	112,977	1,688,111	93,214	3,698,501	815,574	4,115	225,251	594,438	137,431
Louisville, Henderson & St. Louis	200	65,399	36,385	108,907	20,945	14,738	5,211	36,640	3,120	80,654	28,253	—404	3,600	24,249	3,749
Maine Central	1,207	594,783	272,248	927,874	129,478	160,786	8,448	329,793	33,161	661,666	266,208	—6,550	52,129	207,529	73,362
Michigan Central	1,800	1,657,912	695,129	2,606,439	313,269	456,923	67,108	1,116,863	57,411	2,011,574	594,865	—1,854	134,000	459,011	—304,540
Midland Valley	373	71,248	38,272	116,226	31,004	24,718	2,332	34,582	6,317	98,953	17,273	—162	6,543	10,568	4,654
Minneapolis & St. Louis	1,586	516,615	139,122	701,455	107,700	127,687	[illegible]	282,458	21,995	559,424	142,031	46	33,649	108,336	—40,755
Minneapolis, St. Paul & Sault Ste. Marie	4,065	1,454,496	449,778	2,041,674	334,355	329,000	52,733	[illegible]	50,150	1,498,471	543,203	1,077	90,479	453,801	—166,634
Missouri & North Arkansas	365	57,260	32,342	96,553	27,179	20,597	3,834	42,033	5,885	99,528	—2,975	....	5,500	—8,475	—7,153
Missouri, Kansas & Texas System	3,865	1,380,268	652,683	2,194,849	318,511	196,163	[illegible]	[illegible]	110,710	[illegible]	642,589	874	120,283	523,180	64,213
Missouri, Oklahoma & Gulf	332	52,606	19,279	75,109	27,129	14,417	5,365	44,071	6,441	97,423	—22,314	231	6,461	—28,544	5,817
Missouri, Okla. & Gulf Ry. Co. of Texas	19	7,403	348	8,039	1,679	185	253	5,592	585	8,294	—255	....	196	—451	4,290
Missouri Pacific	3,920	1,438,370	379,497	1,999,202	346,526	398,125	53,068	813,020	108,059	1,718,798	280,404	—4,296	100,383	175,725	400,514
Monongahela	67	96,726	2,889	100,905	16,711	5,303	533	22,374	2,270	47,191	53,714	....	2,100	51,614	—30,180
Monongahela Connecting	6	....	....	69,788	10,802	11,185	300	41,571	3,872	67,730	2,058	....	2,181	—123	—14,897
Morgan's La. & Texas R. R. & S. S. Co.	405	237,110	101,335	362,695	57,447	51,643	12,541	161,508	12,310	395,449	67,246	—2,047	23,612	41,587	8,291
Nashville, Chattanooga & St. Louis	1,231	688,445	249,156	1,014,190	144,226	189,427	43,372	405,679	32,070	814,774	199,416	—1,443	29,400	168,573	—55,321
Nevada Northern	165	130,449	12,686	146,498	24,450	20,618	494	31,912	6,485	83,959	62,959	....	7,200	55,339	—15,170
New Orleans & North Eastern	204	242,902	50,303	316,044	37,442	64,621	10,948	113,885	11,655	238,551	77,493	198	14,200	63,491	—20,184
New Orleans Great Northern	283	103,535	31,151	148,541	19,001	25,137	2,094	42,300	6,744	95,276	53,265	—53	3,330	49,882	—23,670
New Orleans, Mobile & Chicago	403	136,399	28,298	174,770	32,588	31,613	4,045	55,905	8,090	132,241	42,529	....	6,183	36,346	—13,053
New Orleans, Texas & Mexico	286	98,009	18,314	125,836	48,054	20,504	4,961	57,761	10,937	142,217	—16,381	....	1,000	—17,381	7,276
New York Central & Hudson River	3,756	5,116,410	2,767,341	8,917,463	1,276,599	1,692,487	170,126	3,260,359	217,568	6,617,139	2,300,324	—59,461	559,626	1,681,237	—537,250
New York, Chicago & St. Louis	567	701,806	142,280	878,715	135,264	120,985	47,134	446,118	21,841	771,342	107,373	—1,984	45,000	60,389	—81,900
New York, New Haven & Hartford	2,007	2,785,007	2,259,250	5,580,765	833,810	794,440	40,182	2,188,235	172,480	4,029,147	1,551,618	8,440	300,000	[illegible]	307,979
New York, Ontario & Western	566	601,060	121,080	760,980	88,999	133,362	11,207	292,485	16,158	542,211	218,769	8	23,500	195,277	—28,442
New York, Philadelphia & Norfolk	112	276,281	36,466	337,520	31,623	64,760	3,874	150,480	15,029	265,766	71,754	....	8,700	[illegible]	—18,509
New York, Susquehanna & Western	141	208,939	46,816	281,330	13,312	26,273	2,289	101,149	1,415	141,608	[illegible]	1,869	5,298	[illegible]	46,137
Norfolk & Western	2,037	3,259,946	393,055	3,760,982	412,435	756,640	73,484	1,133,586	79,160	2,455,305	1,305,677	—1,306	140,000	[illegible]	7,499
Norfolk Southern	860	220,016	79,460	320,482	61,346	47,271	5,825	125,465	20,087	259,994	60,488	3,561	10,577	[illegible]	—36,651
Northern Central	472	788,210	202,668	1,064,305	147,548	222,915	14,720	495,084	26,188	906,455	157,850	1,216	37,044	[illegible]	5,558
Northern Pacific	6,314	3,561,250	1,162,336	5,076,147	783,584	570,647	101,066	1,685,006	67,957	3,208,260	1,867,887	770	484,656	1,384,001	84,963
Northwestern Pacific	401	113,792	195,857	329,185	48,739	45,070	4,905	118,736	13,524	230,974	98,211	....	15,498	82,713	—1,257
Oregon Short Line	2,120	1,119,668	382,789	1,617,526	216,180	193,195	36,429	405,639	51,804	903,247	714,279	—3,236	113,303	597,740	60,786
Oregon-Washington R. R. & Nav. Co.	1,915	789,310	377,716	1,255,799	177,600	159,896	41,345	429,346	58,523	866,710	389,089	—6,981	111,300	270,808	—38,715
Pecos & Northern Texas	570	143,364	36,021	190,708	21,259	39,364	2,264	68,631	6,416	137,934	52,774	....	7,236	45,538	—4,856
Pennsylvania *Company*	1,750	3,350,435	706,974	4,623,208	668,244	802,190	83,480	1,681,791	178,227	3,413,932	1,209,276	—2,088	283,953	923,235	423,411
Pennsylvania *Railroad*	4,044	9,746,396	3,070,363	13,900,292	1,822,613	2,703,999	173,918	5,038,614	350,743	10,089,887	3,810,405	—102,966	597,327	3,110,112	—384,197
Philadelphia, Baltimore & Washington	717	863,432	712,261	1,772,602	262,618	315,173	28,066	735,616	40,634	1,382,107	390,495	....	56,107	334,388	118,939
Pittsburgh & Lake Erie	224	1,124,536	146,863	1,324,046	145,480	363,133	13,602	344,314	29,182	895,711	428,335	—102	53,500	374,733	—564,077
Pittsburgh, Cincinnati, Chic. & St. Louis	1,472	2,064,136	692,793	3,142,403	460,592	620,657	69,843	1,188,168	110,603	2,449,863	692,540	—1,119	163,668	527,753	—727
Pittsburgh, Shawmut & Northern	282	118,637	11,128	133,486	15,628	36,449	1,456	45,952	4,459	103,944	29,542	....	1,822	27,720	2,627
Richmond, Fredericksburg & Potomac	88	189,973	79,753	301,571	33,284	30,020	3,458	103,508	7,536	177,806	123,765	—132	7,500	116,133	—5,558
Rutland	468	184,745	84,676	310,013	37,632	52,390	9,654	135,036	8,294	243,006	67,007	—64	17,487	49,456	—8,897
St. Joseph & Grand Island	319	85,802	25,822	122,393	38,822	23,814	4,803	53,473	5,346	126,258	—3,865	....	7,048	—10,913	2,993

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF MAY, 1914—CONTINUED

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses						Net operating revenue (or deficit).	Outside operations, net.	Taxes.	Operating income (or loss).	Increase (or decr.) comp. with last year.
		Freight.	Passenger.	Total. inc. misc.	Maintenance: Way and structures.	Maintenance: Of equipment.	Traffic.	Transportation.	General.	Total.					
St. Louis, Brownsville & Mexico	518	$120,524	$80,110	$215,801	$58,273	$20,220	$5,041	$85,858	$11,239	$180,631	$35,170	.....	$7,000	$28,170	—$17,756
St. Louis, Iron Mountain & Southern	3,365	1,964,596	486,710	2,624,978	387,509	484,140	56,149	778,217	77,167	1,783,182	841,796	$1,214	127,985	712,597	197,798
St. Louis Merchants' Bridge Terminal	9	.....	236	134,970	23,527	8,581	714	76,585	6,082	115,489	19,481	.....	6,250	13,231	—5,305
St. Louis, San Francisco & Texas	244	60,797	25,279	93,128	38,052	21,367	3,594	51,654	5,341	120,008	—26,880	.....	1,476	—28,356	—16,489
St. Louis Southwestern	943	443,755	108,507	584,784	81,175	123,677	28,372	187,417	29,017	449,658	135,126	—1,164	34,332	99,630	—153,493
St. Louis Southwestern of Texas	810	178,169	83,143	287,115	91,345	74,290	12,264	152,330	20,913	351,142	64,027	—254	15,500	—79,781	—7,857
San Pedro, Los Angeles & Salt Lake	1,133	688,150	240,580	983,819	126,315	133,404	31,159	302,711	20,533	614,122	369,697	3,676	50,946	315,075	97,462
Seaboard	3,093	1,387,808	434,832	2,040,671	237,899	267,664	71,375	761,279	65,553	1,403,770	636,901	—3,328	87,000	546,573	—90,527
Southern	7,010	3,444,446	1,615,858	5,505,277	770,892	1,022,375	193,261	2,130,077	198,839	4,314,444	1,190,833	3,096	238,032	955,897	—146,220
Southern Kansas of Texas	179	114,472	14,907	137,240	7,464	25,349	1,277	42,032	3,856	79,978	57,262	.....	3,581	53,681	2,829
Southern Pacific Co.	6,487	4,591,792	2,344,298	7,475,050	878,586	1,103,774	157,868	2,176,725	207,257	4,524,210	2,950,840	—1,379	577,725	2,371,736	—815,890
Spokane International	163	60,645	16,786	81,700	13,292	5,516	1,885	22,880	3,667	47,340	34,460	.....	3,192	31,268	3,962
Spokane, Portland & Seattle	556	222,290	127,249	378,574	101,942	34,755	7,535	92,292	12,929	249,453	129,121	736	53,400	74,985	—88,681
Tennessee Central	294	94,966	38,299	141,071	26,198	17,361	6,397	48,919	7,316	106,191	34,880	.....	4,245	30,635	—9,788
Terminal R. R. Ass'n of St. Louis	34	.....	201	211,288	41,011	22,021	938	80,473	4,474	148,917	62,371	8,390	27,109	43,652	—29,488
Texas & New Orleans	458	202,667	98,207	315,643	72,866	71,854	8,323	159,743	13,338	326,124	—10,481	—326	18,206	—29,013	—32,571
Toledo & Ohio Central	446	190,412	46,279	266,841	74,647	72,295	7,605	136,066	10,640	301,253	—34,412	—731	23,347	—58,490	—192,805
Toledo, Peoria & Western	248	51,312	36,390	93,509	20,804	21,384	3,531	42,563	3,682	90,964	2,545	.....	6,800	—4,255	—4,980
Trinity & Brazos Valley	463	74,359	32,222	114,775	43,515	30,184	10,157	72,221	11,476	167,553	52,778	.....	4,900	—57,678	—8,979
Union Pacific	3,616	2,640,942	822,463	3,840,920	626,571	596,951	107,692	1,006,151	117,985	2,455,350	1,385,570	—10,797	189,274	1,185,499	—243,849
Union R. R. of Baltimore	9	109,488	24,712	136,321	16,343	.....	.....	4,614	2,253	23,210	113,111	.....	6,180	106,931	—32,150
Union R. R. of Pennsylvania	31	.....	.....	281,728	111,854	102,442	166	142,144	3,850	360,456	78,728	6,238	6,000	78,490	—225,924
Vandalia	910	503,940	200,788	784,748	103,394	176,477	24,161	340,361	24,461	668,854	115,894	.....	32,291	83,603	—44,879
Vicksburg, Shreveport & Pacific	171	69,899	44,189	126,692	23,190	30,698	3,869	46,922	5,047	109,726	16,966	—374	7,200	9,392	—11,164
Virginia & Southwestern	240	133,576	13,488	152,240	24,320	44,321	3,395	44,001	4,076	119,113	33,127	.....	6,823	26,304	18,178
Virginian	503	497,259	32,963	543,079	93,941	65,104	5,824	117,532	16,380	288,781	254,298	7,434	21,550	240,182	55,154
Washington Southern	36	52,211	40,108	122,258	16,659	13,995	1,234	49,880	3,230	84,998	37,260	—434	3,500	33,326	—2,647
West Jersey & Seashore	356	153,039	354,372	538,318	77,446	71,865	12,069	205,977	12,475	379,832	158,486	471	26,959	131,056	78,733
Western Ry. of Alabama	133	52,194	44,162	104,417	20,533	22,053	6,925	35,062	5,492	90,065	14,352	—654	5,008	8,690	9,573
Wheeling & Lake Erie	459	379,963	47,443	464,265	50,421	70,463	9,464	184,866	19,911	335,125	129,140	—45	28,190	100,905	—19,162
Yazoo & Mississippi Valley	1,372	594,539	209,945	862,198	144,259	136,955	17,337	353,389	28,215	680,155	182,043	—312	46,500	135,231	4,377

ELEVEN MONTHS OF FISCAL YEAR ENDING JUNE 30, 1914

Alabama & Vicksburg	143	$1,104,628	$460,514	$1,687,947	$261,564	$383,025	$43,669	$614,801	$65,403	$1,368,462	$319,485	—$4,280	$90,593	$224,612	—$140,002
Alabama Great Southern	309	3,375,607	1,190,824	4,957,620	613,816	1,281,482	148,670	1,690,032	124,310	3,858,310	1,099,310	—6,311	173,667	919,332	238,423
Ann Arbor	292	1,298,189	492,620	1,930,575	222,432	254,955	56,610	726,569	78,469	1,339,035	591,540	—131	150,280	441,129	14,821
Arizona & New Mexico	109	753,122	99,867	889,502	118,127	105,997	8,711	168,708	33,264	434,807	454,695	.....	30,383	424,312	—71,045
Arizona Eastern	367	2,029,173	412,859	2,565,792	342,535	314,728	22,333	700,507	118,524	1,498,616	1,067,176	920	148,398	919,698	—171,700
Atchison, Topeka & Santa Fe	8,339	$5,979,531	22,494,532	85,644,152	11,452,197	14,886,743	1,954,332	24,819,092	1,969,453	55,081,817	30,562,335	.....	4,320,173	26,242,162	1,738,231
Atlanta & West Point	93	595,022	452,679	1,172,769	164,697	245,886	57,484	373,372	50,609	892,048	280,721	1,206	75,786	206,141	—32,439
Atlanta, Birmingham & Atlantic	646	2,263,030	628,417	3,159,445	517,872	508,084	156,705	1,260,241	127,455	2,570,357	589,088	.....	157,705	431,383	30,904
Atlantic & St. Lawrence	167	1,071,441	330,700	1,527,106	226,631	237,547	47,488	731,754	46,988	1,290,408	236,698	.....	111,727	124,971	110,374
Atlantic Coast Line	4,643	22,908,253	8,546,576	33,981,826	4,670,066	5,519,503	596,031	12,057,091	1,123,339	23,966,030	10,015,796	—7,377	1,432,000	8,576,419	—931,550
Baltimore & Ohio—System	4,456	69,841,158	14,541,361	89,610,138	10,746,403	15,229,584	1,986,391	35,698,250	2,114,658	65,775,286	23,834,852	—834,087	3,090,944	19,909,821	2,058,235
Baltimore & Ohio Chicago Terminal	77	.....	7,720	1,461,357	170,708	256,027	8,064	688,311	57,723	1,180,833	280,524	9,047	201,944	87,627	—78,709
Bangor & Aroostook	631	2,718,298	610,503	3,487,446	476,406	461,946	28,105	1,153,639	110,373	2,230,469	1,256,977	—759	107,167	1,151,051	373,662
Belt Railway of Chicago	21	.....	.....	2,807,401	264,126	286,726	6,615	1,112,336	71,863	1,741,666	1,065,735	.....	109,421	956,314	—16,299
Bessemer & Lake Erie	204	6,928,975	376,695	7,427,464	790,536	2,220,588	111,444	2,002,833	150,014	5,275,415	2,152,049	.....	318,000	1,834,049	—1,309,540
Bingham & Garfield	27	1,566,729	49,429	1,624,610	110,855	212,545	9,523	247,471	26,222	606,616	1,017,994	.....	32,544	985,450	391,210
Birmingham Southern	44	632,775	11,918	1,077,161	177,572	160,062	5,476	376,256	48,432	767,798	309,363	.....	23,025	286,338	118,854
Boston & Maine	2,252	25,437,233	14,501,088	43,290,901	5,866,294	7,071,037	416,213	20,424,574	1,249,997	35,028,115	8,262,786	173,188	1,906,425	6,529,549	924,271
†Buffalo & Susquehanna R. R. Corp	253	519,073	33,796	571,722	111,789	173,932	6,212	219,368	33,155	544,456	27,266	.....	13,000	14,266	.....
Buffalo & Susquehanna Ry.	91	348,961	91,386	469,627	99,833	208,014	5,889	210,115	31,475	555,326	—85,699	—147	17,600	—103,446	49,742
Buffalo, Rochester & Pittsburgh	581	8,477,618	1,091,158	9,900,417	1,328,601	2,078,730	139,461	3,630,052	223,813	7,400,657	2,499,760	—2,562	210,000	2,287,198	465,729
Butte, Anaconda & Pacific	90	1,121,452	136,059	1,371,317	163,384	235,063	6,993	475,589	42,101	926,130	445,187	.....	28,255	416,932	224,942
Canadian Pacific Line in Maine	233	887,685	326,640	1,319,316	332,847	211,255	75,189	608,548	56,223	1,284,062	35,254	.....	125,000	—89,746	139,090
Carolina, Clinchfield & Ohio	248	2,109,955	186,228	2,343,371	162,341	294,919	75,213	437,795	100,770	1,071,038	1,272,333	.....	126,750	1,145,583	—83,920
Carolina, Clinch. & Ohio Ry. Co. of S. C.	18	127,286	20,038	150,368	10,481	960	17,499	27,407	6,456	62,803	87,565	.....	8,250	79,315	—1,564
Central of Georgia	1,924	8,613,463	3,510,399	13,258,770	1,872,230	2,615,240	388,554	4,568,481	448,899	9,893,404	3,365,366	68,390	579,236	2,854,520	—59,291
Central New England	298	2,875,417	430,145	3,461,490	516,231	421,666	13,803	1,207,619	49,462	2,208,781	1,252,709	—4,127	120,500	1,128,082	—378,220
Central Vermont	411	2,489,668	927,648	3,679,247	556,454	709,263	97,190	1,906,587	93,196	3,362,690	316,557	8,379	174,940	149,996	—360,989
Charleston & Western Carolina	341	1,505,399	362,874	1,956,817	355,933	318,426	38,685	743,267	55,876	1,512,187	444,630	.....	55,000	389,630	60,774
Chicago & Alton	1,026	8,249,548	3,783,054	13,088,673	1,654,565	3,315,104	487,198	5,227,307	410,640	11,094,814	1,993,859	—36,921	518,300	1,438,638	—403,636
Chicago & Eastern Illinois	1,283	10,535,185	2,724,604	14,417,664	2,106,155	3,787,954	262,617	5,492,486	427,650	12,076,862	2,340,802	—25,721	573,600	1,741,481	—616,278

†Figures stated here are for period January 1-May 31.

REVENUES AND EXPENSES OF RAILWAYS

Eleven Months of Fiscal Year Ending June 30, 1914—Continued

Name of road.	Average mileage operated during period.	Operating revenues: Freight.	Passenger.	Total. inc. misc.	Operating expenses: Maintenance: Way and structures.	Of equipment.	Traffic.	Transportation.	General.	Total.	Net operating revenue (or deficit).	Outside operations, net.	Taxes.	Operating income (or loss).	Increase (or decr.) comp. with last year.
Chicago & Erie	270	$3,928,266	$639,157	$5,035,626	$940,658	$1,260,386	$237,638	$2,686,458	$145,000	$5,270,140	—$234,514	—$37,182	$156,019	—$427,715	—$351,552
Chicago & North Western	8,068	49,544,518	19,597,399	76,399,257	10,574,046	11,236,599	1,256,453	29,448,412	1,599,199	54,114,709	22,284,548	9,198	3,847,000	22,293,746	—880,781
Chicago, Burlington & Quincy	9,129	57,819,542	19,866,210	85,239,094	10,665,025	14,539,799	1,471,811	27,934,445	2,187,485	56,798,565	28,440,529	—146,720	3,353,688	24,940,121	—1,643,396
Chicago Great Western	1,496	9,146,562	2,940,779	13,102,399	1,851,152	2,160,714	524,064	5,017,835	399,048	9,952,813	3,149,586	—7,268	447,859	2,694,459	310,906
Chicago, Indiana & Southern	359	3,584,738	285,715	3,995,898	566,170	1,241,132	99,355	1,459,107	114,939	3,480,703	515,195	3,467	187,467	331,195	422,600
Chicago, Indianapolis & Louisville	617	4,237,171	1,574,606	6,372,391	948,861	1,005,211	213,045	2,429,953	183,490	4,780,560	1,591,831	.....	300,326	1,291,505	—202,634
Chicago Junction	12	.....	.....	1,874,139	178,793	189,265	12,314	1,001,951	49,577	1,431,900	442,239	98,296	27,083	513,452	—44,733
Chicago, Milwaukee & St. Paul	9,690	59,999,798	17,194,458	84,111,284	9,579,809	12,169,068	1,647,886	31,222,564	1,593,017	56,212,344	27,898,940	205,985	3,752,333	24,352,592	1,136,471
Chicago, Peoria & St. Louis	255	1,162,238	292,527	1,545,557	301,825	371,529	71,582	762,406	57,630	1,564,962	—19,385	.....	63,400	—82,785	—126,460
Chicago, Rock Island & Gulf	477	1,802,759	589,179	2,594,220	329,899	338,908	106,168	1,074,105	86,863	1,935,943	658,277	—8,900	106,240	543,137	511,580
Chicago, Rock Island & Pacific	7,711	38,909,587	16,647,807	59,456,780	7,697,381	8,608,476	1,658,911	25,105,046	1,728,446	44,798,260	14,658,520	155,591	2,949,640	11,553,289	1,226,403
Chicago, St. Paul, Minneapolis & Omaha	1,748	10,581,982	4,912,417	16,542,614	2,323,852	2,139,135	322,749	6,431,873	404,760	11,622,369	4,920,245	11,427	891,001	4,040,671	143,640
Chicago, Terre Haute & Southeastern	373	1,754,041	187,166	1,988,344	295,572	575,098	40,178	647,204	99,747	1,658,509	329,935	—3,031	126,500	200,404	—84,950
Cincinnati, Hamilton & Dayton	1,015	6,776,092	1,472,732	9,219,574	1,666,401	1,668,181	232,629	4,560,427	227,282	8,354,920	864,654	.....	412,626	452,028	—998,425
Cincinnati, New Orleans & Texas Pacific	337	7,642,192	1,882,941	10,005,428	984,204	2,525,654	279,505	2,998,971	239,725	7,028,059	2,977,369	—10,254	337,000	2,630,115	251,980
Cincinnati Northern	245	1,073,572	207,458	1,340,908	299,316	367,855	30,237	605,882	39,841	1,343,131	2,223	.....	64,059	—66,282	183,593
Cleveland, Cincinnati, Chic. & St. Louis	2,363	21,963,508	8,207,347	33,104,777	4,975,025	8,306,986	842,482	14,686,080	757,370	29,567,943	3,536,834	15,334	1,347,168	2,174,332	4,060,392
Colorado Midland	338	1,236,530	248,992	1,625,307	306,288	394,948	86,164	735,571	63,658	1,586,629	38,678	12,783	98,000	—72,105	—154,539
Colorado & Southern	1,127	5,188,823	1,352,866	7,014,342	981,413	1,309,292	116,656	2,549,669	239,517	5,196,547	1,817,795	8,515	369,696	1,439,584	—692,397
Cumberland Valley	162	2,380,009	639,800	3,160,247	602,118	377,026	55,526	1,098,955	93,553	2,227,178	933,069	944	66,886	867,127	134,249
Delaware & Hudson Co.—R. R. Dept	881	17,485,744	2,857,265	21,124,897	1,616,924	3,336,970	297,835	8,078,619	741,380	14,071,728	7,053,169	10,061	604,357	6,438,751	1,526,166
Delaware, Lackawanna & Western	960	26,139,497	7,772,857	36,355,709	4,643,674	5,655,784	791,363	11,523,555	775,555	23,389,931	12,965,778	396,653	1,915,000	11,447,431	1,580,450
Denver & Rio Grande	2,583	15,758,426	4,675,255	21,376,419	3,093,568	3,925,654	454,064	6,729,298	579,351	14,781,935	6,594,484	—14,437	948,600	5,631,447	477,567
Denver & Salt Lake	237	719,715	303,144	1,077,896	203,388	183,663	20,570	371,105	49,248	827,974	249,922	.....	45,500	204,422	2,746
Detroit & Mackinac	417	732,324	310,279	1,114,274	130,088	177,681	26,212	409,792	29,995	773,768	340,506	987	96,756	242,763	28,306
Detroit & Toledo Shore Line	79	1,436,990	.....	1,450,709	140,474	116,762	19,119	416,809	29,310	722,474	728,235	.....	61,030	667,205	83,733
Detroit, Grand Haven & Milwaukee	191	1,406,967	593,053	2,321,901	294,147	336,753	74,809	1,287,818	61,382	2,074,909	246,992	983	39,600	208,375	162,859
Detroit, Toledo & Ironton	441	1,135,175	124,214	1,385,104	604,112	530,092	28,514	884,374	64,450	2,111,542	—726,438	.....	62,700	789,138	642,152
Duluth & Iron Range	281	5,387,662	267,064	5,760,896	806,659	702,513	12,303	1,432,985	156,337	3,110,797	2,650,099	19,717	307,550	2,322,832	545,270
Duluth, Missabe & Northern	360	6,157,353	354,089	6,589,375	1,110,998	966,951	25,903	1,432,482	160,733	3,697,067	2,892,308	16,816	369,487	2,539,637	—996,625
Duluth, South Shore & Atlantic	627	1,929,596	1,013,766	3,142,625	699,061	393,664	96,973	1,193,259	122,949	2,505,906	636,719	3,988	218,035	422,672	14,118
Duluth, Winnipeg & Pacific	181	1,328,096	258,979	1,616,594	256,687	305,191	23,590	609,207	63,142	1,257,817	358,777	.....	80,854	277,923	—93,214
El Paso & Southwestern	998	6,717,516	1,142,592	8,221,491	1,168,381	1,136,280	185,548	2,350,416	284,239	5,124,864	3,096,627	38,074	449,013	2,609,540	271,438
Elgin, Joliet & Eastern	796	9,800,099	45	10,490,472	1,543,325	2,245,122	65,798	3,122,952	232,542	7,211,739	3,278,733	.....	403,484	2,875,249	2,093,924
Erie	1,988	35,136,279	8,743,180	47,770,791	5,339,834	9,189,309	1,158,801	17,217,713	1,209,611	34,115,268	13,655,523	342,709	1,656,766	11,656,048	—3,095,091
Florence & Cripple Creek	87	922,109	185,261	1,127,372	130,844	107,523	22,858	340,214	48,182	649,621	477,751	.....	66,046	411,705	—72,505
Florida East Coast	685	2,417,238	1,956,253	5,000,160	788,472	685,191	91,464	1,625,848	125,454	3,316,429	1,683,731	12,953	220,000	1,450,778	203,865
Galveston, Harrisburg & San Antonio	1,338	7,317,629	2,959,366	10,895,331	1,458,096	2,040,907	375,883	4,632,202	384,748	8,891,836	2,003,495	28,890	565,653	1,408,952	662,901
Georgia, Southern & Florida	395	1,338,300	770,533	2,394,060	296,312	475,973	93,475	981,845	113,203	1,960,808	433,252	1,348	125,028	306,876	—51,311
Grand Rapids & Indiana	575	3,020,635	1,703,326	5,102,230	696,832	827,163	135,075	2,245,901	175,266	4,080,237	1,021,983	—5,490	265,489	751,004	—76,708
Grand Trunk Western	347	4,171,102	1,994,782	6,555,785	780,447	1,213,709	243,864	3,107,155	200,562	5,545,737	1,010,048	—20,406	346,500	643,142	682,169
Great Northern	7,779	50,631,214	13,930,960	69,329,993	11,065,828	9,112,284	1,246,098	19,547,366	1,310,737	42,282,313	27,047,680	120,715	4,350,625	22,817,770	—3,865,471
Gulf & Ship Island	308	1,368,306	361,639	1,848,634	248,642	320,143	32,301	520,992	94,977	1,267,055	581,579	198	82,503	499,274	114,331
Gulf, Colorado & Santa Fe	1,596	8,387,602	2,750,687	11,879,473	1,901,234	1,907,817	287,131	4,715,325	364,311	9,175,818	2,703,655	.....	548,564	2,155,091	728,834
Hocking Valley	352	5,243,763	840,071	6,544,209	627,215	1,370,983	99,270	2,223,466	161,180	4,482,114	2,062,095	.....	438,000	1,624,095	464,531
Houston, East & West Texas	191	886,783	368,729	1,328,826	215,728	142,183	20,734	552,629	45,456	976,730	352,096	.....	56,096	296,000	20,033
Houston & Texas Central	789	3,992,142	1,661,485	6,079,000	1,011,956	885,086	157,038	2,848,322	202,761	5,105,163	973,837	—1,877	321,290	650,670	454,284
Illinois Central	4,763	40,427,991	12,613,496	60,632,156	8,460,257	13,291,383	1,189,107	22,305,740	1,485,052	46,731,539	13,900,617	13,924	3,010,000	10,876,693	853,150
Indiana Harbor Belt	105	.....	.....	2,992,660	401,832	369,567	31,970	1,431,060	86,130	2,320,559	672,101	24,959	69,541	627,519	—188,769
International Great Northern	1,159	6,594,562	2,070,073	9,286,670	1,494,559	1,125,781	295,941	4,155,174	366,262	7,437,717	1,848,953	17,594	314,842	1,516,517	777,117
Kanawha & Michigan	177	2,526,426	347,039	2,944,523	405,414	671,051	31,923	909,707	76,897	2,094,992	849,531	165	116,850	732,516	—201,568
Kansas City Southern	827	7,483,331	1,542,991	10,012,986	1,036,469	1,220,142	295,208	4,375,204	406,864	6,333,887	3,679,099	.....	501,210	3,177,889	88,223
Lake Erie & Western	906	4,165,166	784,188	5,260,475	829,622	1,077,012	157,370	2,185,737	132,476	4,382,217	878,258	.....	243,640	634,618	457,290
Lake Shore & Michigan Southern	1,857	31,428,889	11,737,005	48,960,702	6,282,577	11,570,570	944,336	17,814,424	1,079,254	37,691,161	11,269,541	83,724	2,212,712	9,140,553	7,675,943
Lehigh & Hudson River	97	1,504,624	45,834	1,633,297	247,422	255,551	15,516	641,311	50,484	1,210,284	423,013	.....	44,000	379,013	—134,399
Lehigh & New England	293	1,893,220	12,914	1,981,389	260,586	278,139	22,000	532,219	44,666	1,137,610	843,779	.....	37,456	806,323	37,730
Lehigh Valley	1,440	30,447,367	4,374,304	36,161,936	4,206,638	6,500,003	917,331	12,967,367	859,874	25,451,213	10,710,723	240,313	1,423,000	9,047,410	—2,224,032
Long Island	398	3,095,315	6,995,235	11,268,107	1,431,766	1,310,675	159,443	5,034,127	303,539	8,239,550	3,028,557	—4,866	711,250	2,312,441	—319,258
Louisiana & Arkansas	274	1,279,198	248,578	1,577,439	296,564	244,918	27,705	406,398	57,222	1,032,807	544,632	.....	62,165	482,467	—57,841
Louisiana Ry. & Navigation Co	351	1,425,713	266,313	1,806,323	338,667	217,118	67,583	744,854	73,679	1,441,901	364,422	.....	73,000	291,422	92,462
Louisiana Western	208	1,355,459	674,464	2,133,030	233,304	452,329	81,676	684,354	73,209	1,524,872	608,158	—9,071	112,951	486,136	124,649
Louisville & Nashville	4,934	39,669,406	12,050,219	55,167,021	8,617,684	11,275,372	1,209,261	19,026,321	1,151,404	41,280,042	13,886,979	27,332	1,801,359	12,112,952	—228,399
Louisville, Henderson & St. Louis	200	796,373	374,597	1,247,840	248,960	163,093	53,135	433,382	35,037	933,607	314,233	1,803	39,600	276,436	129,174
Maine Central	1,207	6,814,364	3,179,255	10,654,081	1,505,785	1,665,397	125,197	4,162,364	315,927	7,774,670	2,879,411	—44,194	545,908	2,289,309	—116,331
Michigan Central	1,800	20,046,910	8,350,981	31,429,090	4,246,364	5,535,726	703,973	13,804,396	627,693	24,918,152	6,510,938	—26,649	1,360,814	5,123,475	—3,225,717
Midland Valley	373	969,874	446,156	1,497,721	341,834	286,808	26,920	531,845	69,346	1,256,753	240,968	1,014	72,148	169,834	—19,467
Minneapolis & St. Louis	1,586	6,570,970	1,755,881	8,833,985	1,191,100	1,276,767	196,348	3,434,284	221,648	6,320,147	2,513,838	—451	373,962	2,139,425	—291,903
Minneapolis, St. Paul & Sault Ste. Marie	3,994	18,875,255	6,117,487	26,582,541	3,231,865	4,085,543	588,376	8,863,299	585,957	17,355,040	9,227,501	106,650	1,083,665	8,250,486	2,855,141

REVENUES AND EXPENSES OF RAILWAYS

ELEVEN MONTHS OF FISCAL YEAR ENDING JUNE 30, 1914—CONTINUED

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses					Net operating revenue (or deficit).	Outside operations, net.	Taxes.	Operating income (or loss).	Increase (or decr.) comp. with last year.
		Freight.	Passenger.	Total. inc. misc.	Maintenance: Way and structures.	Maintenance: Of equipment.	Traffic.	Transportation.	General.	Total.				
Missouri & North Arkansas	365	$735,309	$385,689	$1,196,180	$305,720	$229,504	$40,692	$483,810	$62,587	$1,122,313	$73,867	.....	$60,500	$13,367	$29,634
Missouri, Kansas & Texas System	3,821	18,798,010	8,390,821	29,209,161	4,310,910	3,577,905	675,833	11,402,488	1,120,994	21,088,130	8,121,031	—$97,718	1,388,105	6,635,208	—1,236,228
Missouri, Oklahoma & Gulf	332	825,532	229,384	1,098,331	250,867	183,538	58,930	538,075	76,762	1,108,172	— 9,841	4,195	67,847	—73,493	—103,321
Missouri, Okla. & Gulf Ry. Co. of Texas	19	106,587	5,766	114,220	14,615	16,434	2,076	60,397	8,868	102,390	11,830	.....	2,195	9,635	14,113
Missouri Pacific	3,920	17,967,762	4,408,671	24,458,538	3,793,218	4,569,239	628,589	10,376,996	796,382	20,164,424	4,294,114	—38,981	1,071,206	3,183,927	—1,047,657
Monongahela	67	1,279,731	30,699	1,331,208	163,766	76,390	4,582	277,601	23,922	546,261	784,947	.....	25,100	759,847	—145,564
Monongahela Connecting	6	.....	.....	889,345	93,405	158,408	3,300	438,897	29,901	723,911	165,434	.....	29,250	136,184	—89,053
Morgan's La. & Texas R. R. & S. S. Co.	405	2,941,495	1,083,763	4,353,891	581,874	670,640	133,461	1,805,160	142,150	3,333,285	1,020,606	—15,661	265,650	739,295	244,770
Nashville, Chattanooga & St. Louis	1,231	8,132,576	2,821,933	11,805,680	1,824,515	2,242,706	468,491	4,501,524	354,363	9,391,599	2,414,081	—9,695	294,980	2,109,406	—334,813
Nevada Northern	165	1,445,694	135,855	1,619,334	194,137	216,477	4,945	377,546	54,837	847,942	771,392	.....	83,613	687,779	—18,713
New Orleans & North Eastern	204	2,801,065	590,889	3,656,098	383,076	793,543	112,740	1,379,579	142,609	2,811,547	844,551	—3,621	168,163	672,767	—14,092
New Orleans Great Northern	283	1,223,261	358,769	1,723,285	230,338	201,324	28,759	492,986	82,691	1,036,098	687,187	—852	30,253	656,082	30,217
New Orleans, Mobile & Chicago	403	1,582,387	339,583	2,037,471	300,488	247,394	42,689	653,365	87,938	1,331,874	705,597	—943	79,417	625,237	—8,194
New Orleans, Texas & Mexico	286	1,179,016	200,184	1,470,515	461,542	149,213	38,763	590,842	101,626	1,341,986	128,529	.....	13,546	114,983	—135,450
New York Central & Hudson River	3,753	60,053,802	31,763,373	103,239,170	14,720,348	20,830,595	1,978,923	39,047,255	2,706,369	79,283,490	23,955,680	267,935	5,646,733	18,041,012	4,923,349
New York, Chicago & St. Louis	566	9,019,083	1,470,105	10,859,501	1,385,696	1,728,124	536,635	5,093,785	213,725	8,957,965	1,901,536	—29,870	428,214	1,443,452	—1,189,763
New York, New Haven & Hartford	2,050	29,680,528	25,089,275	60,839,177	7,870,431	9,314,051	433,708	25,065,413	1,662,539	44,346,142	16,493,035	88,212	3,290,000	13,291,247	—3,220,282
New York, Ontario & Western	566	6,258,768	1,566,623	8,231,106	1,167,262	1,482,468	113,815	3,237,365	183,405	6,184,315	2,046,791	—25,923	212,800	1,808,068	621,768
New York, Philadelphia & Norfolk	112	2,739,067	470,124	3,450,676	304,956	737,357	53,495	1,576,344	155,246	2,827,398	623,278	.....	94,500	528,778	—207,152
New York, Susquehanna & Western	147	1,957,339	500,694	2,736,689	290,755	340,252	24,866	1,146,991	67,620	1,870,484	866,205	—20,610	144,109	701,486	14,617
Norfolk & Western	2,036	34,851,126	4,498,390	40,756,465	4,537,068	8,436,089	680,332	12,949,340	846,789	27,499,618	13,256,847	—16,753	1,480,000	11,760,094	—861,997
Norfolk Southern	842	2,495,395	877,330	3,650,796	559,326	521,732	64,382	1,339,284	194,168	2,678,892	971,904	3,138	115,232	859,810	—322,593
Northern Central	472	8,968,532	2,301,082	12,087,236	1,567,468	2,739,155	183,649	6,002,861	306,472	10,799,605	1,287,631	7,339	448,438	846,532	—539,443
Northern Pacific	6,313	44,511,504	14,325,195	62,887,165	8,315,183	7,683,649	1,134,032	20,538,119	971,627	38,542,610	24,344,555	281,432	4,588,421	20,037,566	2,332,455
Northwestern Pacific	401	1,310,032	1,821,058	3,382,264	535,107	471,232	44,858	1,239,320	133,906	2,424,413	957,851	.....	167,294	790,557	—60,789
Oregon Short Line	2,064	14,399,694	4,526,118	20,258,914	2,511,022	2,563,795	397,879	5,152,433	593,498	11,218,627	9,040,287	—32,413	1,401,583	7,606,291	—776,368
Oregon-Washington R. R. & Nav. Co	1,915	10,249,422	4,490,848	15,888,909	2,232,878	1,908,992	533,538	5,535,504	652,654	10,863,652	5,025,257	—55,633	1,224,123	3,745,501	—588,370
Pecos & Northern Texas	506	1,669,025	416,436	2,210,596	227,932	403,634	30,398	697,788	73,914	1,433,666	776,930	.....	82,821	694,109	26,944
Pennsylvania *Company*	1,750	41,007,353	9,278,033	55,726,472	7,837,477	10,641,899	959,027	21,429,969	1,402,482	42,270,854	13,455,618	—106,331	3,010,741	10,338,546	—2,584,768
Pennsylvania *Railroad*	4,044	118,215,937	34,633,759	164,702,264	21,792,521	34,065,480	2,269,473	61,760,050	4,165,628	124,053,152	40,649,112	—1,695,270	6,739,430	32,214,411	—3,281,700
Philadelphia, Baltimore & Washington	717	9,189,270	7,674,618	18,846,476	2,942,172	3,521,286	352,102	8,381,765	511,450	15,708,775	3,137,701	.....	600,092	2,537,609	528,496
Pittsburgh & Lake Erie	224	13,998,295	1,660,268	16,238,616	1,708,172	3,583,945	174,081	4,240,776	327,339	10,034,313	6,204,303	—3,754	636,386	5,564,163	—3,251,876
Pittsburgh, Cincinnati, Chic. & St. Louis	1,472	26,370,452	8,053,770	38,783,247	5,698,844	7,927,993	801,105	15,424,844	925,170	30,777,956	8,005,291	7,809	1,742,566	6,254,916	—1,206,715
Pittsburgh, Shawmut & Northern	282	1,796,272	120,903	1,946,238	351,375	526,002	18,504	705,541	55,214	1,656,636	289,602	.....	20,117	269,485	—184,708
Richmond, Fredericksburg & Potomac	88	1,409,266	955,928	2,692,907	280,758	310,861	35,269	1,014,437	81,022	1,722,347	970,560	—15,819	89,280	865,461	—187,695
Rutland	468	1,809,295	1,137,513	3,398,636	390,320	640,740	100,609	1,385,043	71,875	2,588,587	810,049	232	190,737	619,544	30,154
St. Joseph & Grand Island	319	1,041,053	320,654	1,483,634	302,081	229,952	55,296	645,769	66,885	1,299,983	183,651	—9	79,433	104,209	43,691
St. Louis, Brownsville & Mexico	518	1,468,165	803,984	2,475,301	544,164	263,510	54,003	950,838	121,530	1,934,045	541,256	.....	83,738	457,528	—72,494
St. Louis, Iron Mountain & Southern	3,365	22,686,134	5,815,868	30,648,231	4,092,299	4,777,675	596,177	9,317,070	820,473	19,603,694	11,044,537	—27,098	1,219,317	9,798,122	167,437
St. Louis Merchants' Bridge Terminal	9	.....	3,694	1,751,334	332,557	116,955	8,036	962,351	68,975	1,488,874	262,460	.....	66,901	195,559	—147,034
St. Louis, San Francisco & Texas	244	962,659	344,335	1,390,245	299,689	221,305	27,095	605,371	62,344	1,215,804	174,441	.....	16,892	157,549	—33,908
St. Louis Southwestern	923	5,882,139	1,343,880	7,638,799	756,414	1,404,928	321,413	1,975,268	319,122	4,777,145	2,861,653	—14,209	357,548	2,489,897	—686,138
St. Louis Southwestern of Texas	811	2,802,529	1,128,162	4,248,697	1,049,698	1,049,149	147,745	1,828,466	228,218	4,303,276	—54,579	—2,763	196,767	—254,104	—531,427
San Pedro, Los Angeles & Salt Lake	1,133	6,317,477	2,741,325	9,727,118	1,173,817	1,615,027	349,096	3,292,520	206,116	6,636,576	3,090,542	—34,580	479,583	2,576,399	—80,795
Seaboard	3,083	15,969,177	5,039,446	23,344,470	2,881,259	3,158,239	724,788	8,551,441	690,735	16,006,462	7,338,008	—16,773	912,000	6,409,235	168,615
Southern	7,035	41,851,737	17,492,503	64,367,103	8,424,155	10,937,182	2,046,134	23,018,956	1,996,195	46,422,622	17,944,481	47,838	2,454,533	15,537,786	—1,128,687
Southern Kansas of Texas	179	1,017,575	170,052	1,243,499	134,140	246,965	17,104	390,610	40,686	829,505	413,994	.....	42,042	371,952	—133,620
Southern Pacific Co.	6,453	50,220,934	27,560,231	84,064,225	9,792,092	12,025,557	1,740,628	24,267,767	2,521,010	50,347,054	33,717,171	968,704	4,802,034	29,883,841	—4,748,824
Spokane International	163	685,621	213,451	938,321	141,203	59,693	21,505	281,208	42,047	545,656	392,665	.....	38,618	354,047	—48,923
Spokane, Portland & Seattle	556	2,647,939	1,477,138	4,485,813	718,072	411,466	86,424	1,124,968	145,508	2,486,438	1,999,375	—2,941	587,400	1,409,034	—435,198
Tennessee Central	294	1,079,078	399,322	1,567,679	297,232	184,867	63,259	552,170	80,310	1,177,838	389,841	.....	46,717	343,124	—20,515
Terminal R. R. Ass'n of St. Louis	34	.....	2,261	2,600,295	433,247	208,651	10,206	1,030,397	62,564	1,745,065	855,230	87,592	308,708	634,114	—194,829
Texas & New Orleans	458	2,449,473	1,146,263	3,834,808	701,471	875,540	94,241	1,638,510	145,943	3,455,705	379,103	7,609	210,872	175,890	—156,987
Toledo & Ohio Central	444	4,232,124	597,426	5,111,243	927,527	1,078,235	88,918	2,072,734	117,630	4,285,044	826,199	—5,957	232,979	587,263	—544,947
Toledo, Peoria & Western	248	666,145	451,519	1,189,549	234,814	300,944	27,602	539,273	40,438	1,143,071	46,478	.....	67,600	—21,122	—185,543
Trinity & Brazos Valley	463	1,575,738	487,769	2,162,608	580,802	332,367	110,156	1,082,145	134,040	2,239,510	—76,902	.....	61,267	138,169	—376,981
Union Pacific	3,614	32,955,126	9,683,365	47,026,445	5,143,257	6,673,525	1,142,327	12,788,229	1,372,688	27,120,026	19,906,419	—117,866	2,073,991	17,714,562	—1,560,830
Union R. R. of Baltimore	9	1,223,803	251,572	1,497,343	160,850	.....	7,622	54,456	28,237	251,165	1,246,178	.....	65,981	1,180,197	—203,314
Union R. R. of Pennsylvania	31	.....	.....	3,694,412	585,504	1,101,187	1,179	1,719,701	46,773	3,454,344	240,068	49,440	93,500	196,008	—907,732
Vandalia	910	6,985,989	2,293,824	10,361,375	1,324,137	2,086,929	288,931	4,200,237	236,787	8,137,021	2,224,354	.....	349,573	1,874,781	—151,751
Vicksburg, Shreveport & Pacific	171	985,484	536,389	1,665,783	271,855	328,992	39,386	575,862	58,729	1,274,824	390,959	—2,498	76,662	311,799	2,727
Virginia & Southwestern	240	1,562,711	167,498	1,780,066	248,967	437,678	24,142	510,330	43,723	1,264,840	515,226	.....	70,578	444,648	1,690
Virginian	503	5,348,673	352,210	5,851,857	775,676	941,230	60,375	1,372,094	120,082	3,269,457	2,582,400	76,889	235,645	2,423,644	289,511
Washington Southern	36	415,788	472,502	1,180,586	158,678	158,699	14,792	485,634	34,652	852,455	328,131	4,725	38,464	284,942	73,190
West Jersey & Seashore	356	1,654,845	3,795,092	5,812,800	927,750	939,833	171,805	2,511,758	148,606	4,699,842	1,112,958	—37,383	289,891	785,684	152,172
Western Ry. of Alabama	133	766,432	506,319	1,377,278	245,098	269,586	69,376	396,123	62,890	1,043,073	334,205	—146	54,666	279,393	—21,175
Wheeling & Lake Erie	459	6,104,589	573,886	7,100,937	933,337	1,199,661	102,489	2,481,491	202,705	4,919,673	2,181,264	933	336,679	1,843,652	327,779
Yazoo & Mississippi Valley	1,372	8,239,197	2,688,956	11,687,664	1,652,509	1,639,419	172,324	4,294,891	304,138	8,063,281	3,624,383	—1,702	501,000	3,121,681	1,325,773

Season Passes for Employees' Wives

As a result of the safety records made by the Western and the Ozark divisions of the St. Louis & San Francisco, for the year ending May 31, one woman in every employee's family on these divisions will receive a pass good for six months over the division on which she is located. These pass prizes are also awarded to one woman in every employee's family at the St. Louis and the Memphis terminals, the winners being allowed, in this instance, to designate over which division they wish to have their passes extend. The idea of awarding passes for prizes originated with Mr. Nixon, the chief operating officer, and the incentive thus provided has resulted in a remarkable decrease in the number of casualties.

The pass prizes are awarded on two different plans: One, for the division making the greatest number of train miles per casualty; the other, for the division showing the best gain in this respect for the year ending May 31, as compared with the year ending May 31, 1913. The western division made a reduction of 46 per cent. from its record for the previous year, showing 9,146 train miles for each casualty, as compared with 5,588. The Ozark division—which has been a consistent prize winner—shows 10,112 train miles per casualty, which is the best record of all the Frisco divisions; but, because of its being a prize winner the previous year, it does not show the large gain made by the western division.

The Memphis terminal—which has won the prize three times in succession—reports 790 switching hours per casualty, the best of all the terminals; but the St. Louis terminal shows the best gain this year over last—523 switching hours per casualty, as compared with 345. The basis of computation for the terminals on the road is the greatest number of switching hours made per casualty.

The receiver and chief operating officer awards a semi-annual pass to all female employees and to the female head of the family of all employees on the division and at the terminal making the best record on the basis indicated.

Chicago Commission to Study European Terminals

The Chicago Railway Terminal Commission, which was recently appointed by the city council committee on railway terminals, as provided for in the ordinance for the new Union station, to make a comprehensive study of the terminal problem in Chicago, and to make a special preliminary report on January 1, 1915, left Chicago on Wednesday of this week for a trip of several weeks to study the principal railway terminals of European cities, as well as several in this country. E. C. Carter, who recently resigned as chief engineer of the Chicago & North Western, has been retained by the presidents of the Chicago railways to accompany the commission, at its request that the railways be represented. The commission includes John F. Wallace, consulting engineer retained by the committee; Bion J. Arnold, engineer representing the Citizens' Terminal Committee; Walter L. Fisher, also representing the Citizens' Terminal Committee; E. H. Bennett, architect of the Chicago Plan Commission; and Alderman Geiger, chairman of the council committee on terminals. A number of aldermen will also accompany the committee. The commission will visit Toronto, Montreal, Boston and New York, sailing on the *Lusitania* on July 14. While abroad they will visit Liverpool, Manchester, London, Paris, Vienna, Buda Pesth, Berlin, Frankfort, Kiel, Copenhagen and Stockholm. They expect to return to Chicago in September.

International Railroad Master Blacksmiths' Association

The twenty-second annual convention of the International Railroad Master Blacksmiths' Association will be held on August 18, 19 and 20 at the Hotel Wisconsin, Milwaukee, Wis. The subjects to be considered at the meeting are: Flue Welding; Making and Repairing Frogs and Crossings; Carbon and High Speed Steel; Tools and Formers; Electric Welding; Drop Forging; Spring Making and Repairing; Piece Work and Other Methods; Locomotive Frame Making and Repairing; Oxy-Acetylene Process for Cutting and Welding; Case Hardening; What New Subjects Can Be Brought Up to Benefit the Association; Heat Treatment of Metals; and Shop Kinks.

Society of Railway Financial Officers

The annual meeting of the Society of Railway Financial Officers for the year 1914 will be held at the Hotel Aspinwall, Lenox, Mass., from September 15 to 17, inclusive. Announcement of the business of the meeting will be made later.

MEETINGS AND CONVENTIONS

The following list gives names of secretaries, dates of next or regular meetings, and places of meeting.

Air Brake Association.—F. M. Nellis, 53 State St., Boston, Mass. Next convention, May 5-8, 1915, Hotel Sherman, Chicago.

American Association of Demurrage Officers.—A. G. Thomason, Boston, Mass.

American Association of Dining Car Superintendents.—H. C. Boardman, D. L. & W., Hoboken, N. J. Next convention, October, Washington.

American Association of General Passenger and Ticket Agents.—W. C. Hope, 143 Liberty St., New York.

American Association of Freight Agents.—R. O. Wells, 1. C. R. R., East St. Louis, Ill.

American Association of Railroad Superintendents.—E. H. Harman, Room 101, Union Station, St. Louis, Mo. Next convention, August 20 and 21, New York.

American Electric Railway Association.—E. B. Burritt, 29 W. 39th St., New York. Annual convention, October 12-16, Atlantic City, N. J.

American Electric Railway Manufacturers' Assoc.—H. G. McConnaughy, 165 Broadway, New York. Meetings with Am. Elec. Ry. Assoc.

American Railway Association.—W. F. Allen, 75 Church St., New York.

American Railway Bridge and Building Association.—C. A. Lichty, C. & N. W., Chicago. Next convention, October 20-22, 1914, Los Angeles, Cal.

American Railway Engineering Association.—E. H. Fritch, 900 S. Michigan Ave., Chicago. Next convention, March 16-18, 1915.

American Railway Master Mechanics' Association.—J. W. Taylor, Karpen Building, Chicago.

American Railway Tool Foremen's Association.—A. R. Davis, Central of Georgia, Macon, Ga. Next convention, July 20-22, Hotel Sherman, Chicago.

American Society for Testing Materials.—Prof. E. Marburg, University of Pennsylvania, Philadelphia, Pa. Next annual meeting, June 30 to July 4, Hotel Traymore, Atlantic City, N. J.

American Society of Civil Engineers.—Chas. W. Hunt, 220 West 57th St., New York; 1st and 3d Wed., except June, July and August, New York.

American Society of Engineering Contractors.—J. R. Wemlinger, 11 Broadway, New York; 2d Thursday of each month, at 2 P. M., 11 Broadway, New York.

American Society of Mechanical Engineers.—Calvin W. Rice, 29 W. 39th St., New York.

American Wood Preservers' Association.—F. J. Angier, B. & O., Baltimore, Md. Next convention, January 19-21, 1915, Chicago.

Association of American Railway Accounting Officers.—E. R. Woodson, 1300 Pennsylvania Ave., Washington, D. C. Annual convention, April 28, 1915, Atlanta, Ga.

Association of Railway Claim Agents.—C. W. Egan, B. & O., Baltimore, Md.

Association of Railway Electrical Engineers.—Jos. A. Andreucetti, C. & N. W. Ry., Chicago. Annual convention, October 19-23, Chicago.

Association of Railway Telegraph Superintendents.—P. W. Drew, 112 West Adams St., Chicago.

Association of Transportation and Car Accounting Officers.—G. P. Conard, 75 Church St., New York.

Association of Water Line Accounting Officers.—W. R. Evans, Chamber of Commerce, Buffalo, N. Y.

Bridge and Building Supply Men's Association.—L. D. Mitchell, Detroit Graphite Co., Chicago, Ill. Meeting with American Railway Bridge and Building Association.

Canadian Railway Club.—James Powell, Grand Trunk Ry., Montreal, Que.; 2d Tuesday in month, except June, July and August, Windsor Hotel, Montreal.

Canadian Society of Civil Engineers.—Clement H. McLeod, 176 Mansfield St., Montreal, Que.; 1st Thursday, October, November, December, February, March and April, Montreal.

Car Foremen's Association of Chicago.—Aaron Kline, 841 Lawler Ave., Chicago; 2d Monday in month, except July and August, Lytton Bldg., Chicago.

Central Railway Club.—H. D. Vought, 95 Liberty St., New York; 2d Fri. in Jan., May, Sept. and Nov. and 2d Thurs. in March, Hotel Statler, Buffalo, N. Y.

Civil Engineers' Society of St. Paul.—Edw. J. Dugan, P. O. Box 654, St. Paul, Minn.; 2d Monday, except June, July, August and September, Old State Capitol Bldg., St. Paul.

Engineers' Society of Pennsylvania.—Edw. R. Dasher, Box 75, Harrisburg, Pa.; 1st Friday after 10th of each month, except July and August, 31 So. Front St., Harrisburg, Pa.

Engineers' Society of Western Pennsylvania.—Elmer K. Hiles, Oliver Bldg., Pittsburgh; 1st and 3d Tuesday, Pittsburgh, Pa.

Freight Claim Association.—Warren P. Taylor, Richmond, Va.

General Superintendents' Association of Chicago.—A. M. Hunter, 605 Grand Central Station, Chicago; Wed. preceding 3d Thurs., Transportation Bldg., Chicago.

International Railway Congress.—Executive Committee, 11, rue de Louvain, Brussels, Belgium. Convention, 1915, Berlin.

International Railway Fuel Association.—C. G. Hall, 922 McCormick Bldg., Chicago.

INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—Wm. Hall, 829 West Broadway, Winona, Minn. Next convention, July 14-17, Hotel Sherman, Chicago.

INTERNATIONAL RAILROAD MASTER BLACKSMITHS' ASSOCIATION.—A. L. Woodworth, Lima, Ohio. Next convention, August 18-20, Hotel Wisconsin, Milwaukee, Wis.

MAINTENANCE OF WAY AND MASTER PAINTERS' ASSOCIATION OF THE UNITED STATES AND CANADA.—T. J. Goodwin, C. R. I. & P., Eldon, Mo. Next convention, November 17-19, 1914, Detroit, Mich.

MASTER BOILER MAKERS' ASSOCIATION.—Harry D. Vought, 95 Liberty St., New York.

MASTER CAR BUILDERS' ASSOCIATION.—J. W. Taylor, Karpen Building, Chicago.

MASTER CAR & LOCOMOTIVE PAINTERS' ASSOC. OF U. S. AND CANADA.—A. P. Dane, B. & M., Reading, Mass. Next convention, September 8-11, Nashville, Tenn.

NATIONAL RAILWAY APPLIANCES ASSOCIATION.—Bruce V. Crandall, 537 So. Dearborn St., Chicago. Next convention, March 15 to 19, 1915, Chicago.

NEW ENGLAND RAILROAD CLUB.—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass.; 2d Tuesday in month, except June, July, Aug. and Sept., Boston.

NEW YORK RAILROAD CLUB.—H. D. Vought, 95 Liberty St., New York; 3d Friday in month, except June, July and August, New York.

NIAGARA FRONTIER CAR MEN'S ASSOCIATION.—E. Frankenberger, 623 Brisbane Bldg., Buffalo, N. Y. Meetings monthly.

PEORIA ASSOCIATION OF RAILROAD OFFICERS.—M. W. Rotchford, Union Station, Peoria, Ill.; 2d Thursday in month, Jefferson Hotel, Peoria.

RAILROAD CLUB OF KANSAS CITY.—C. Manlove, 1008 Walnut St., Kansas City, Mo.; 3d Friday in month, Kansas City.

RAILROAD MASTER TINNERS, COPPERSMITHS & PIPEFITTERS' ASSOCIATION.—U. G. Thompson, C. & E. I., Danville, Ill.

RAILWAY BUSINESS ASSOCIATION.—Frank W. Noxon, 30 Church St., New York.

RAILWAY CLUB OF PITTSBURGH.—J. B. Anderson, Penna. R. R., Pittsburgh, Pa.; 4th Friday in month, except June, July and August, Pittsburgh.

RAILWAY DEVELOPMENT ASSOCIATION.—W. Nicholson, Kansas City Southern, Kansas City, Mo.

RAILWAY ELECTRICAL SUPPLY MANUFACTURERS' ASSOC.—J. Scribner, 1021 Monadnock Block, Chicago. Meetings with Asso. Ry. Elec. Engrs.

RAILWAY FIRE PROTECTION ASSOCIATION.—C. B. Edwards, Mobile & Ohio, Mobile, Ala. Annual meeting, October 6, Washington, D. C.

RAILWAY GARDENING ASSOCIATION.—J. S. Butterfield, Lee's Summit, Mo.;

RAILWAY SIGNAL ASSOCIATION.—C. C. Rosenberg, Bethlehem, Pa. Annual meeting, Bluff Point, N. Y., September 22-24.

RAILWAY STOREKEEPERS' ASSOCIATION.—J. P. Murphy, Box C, Collinwood, Ohio.

RAILWAY SUPPLY MANUFACTURERS' ASSOCIATION.—J. D. Conway, 2136 Oliver Bldg., Pittsburgh, Pa. Meetings with M. C. B. and M. M. Associations.

RAILWAY TELEGRAPH & TELEPHONE APPLIANCE ASSOCIATION.—G. A. Nelson, 50 Church St., New York. Meetings with Assoc. of Ry. Teleg. Supts.

RICHMOND RAILROAD CLUB.—F. O. Robinson, C. & O., Richmond, Va.; 2d Monday in month, except June, July and August.

ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.—L. C. Ryan, C. & N. W., Sterling, Ill. Next convention, September 8-10, 1914, Chicago.

ST. LOUIS RAILWAY CLUB.—B. W. Frauenthal, Union Station, St. Louis, Mo.; 2d Friday in month, except June, July and Aug., St. Louis.

SALT LAKE CITY TRANSPORTATION CLUB.—R. E. Rowland, Hotel Utah Bldg., Salt Lake City, Utah; 1st Saturday of each month, Salt Lake City.

SIGNAL APPLIANCE ASSOCIATION.—F. W. Edmunds, 3868 Park Ave., New York. Meeting with annual convention Railway Signal Association.

SOCIETY OF RAILWAY FINANCIAL OFFICERS.—Carl Nyquist, La Salle St. Station, Chicago. Annual meeting, September 15-17, Hotel Aspinwall, Lenox, Mass.

SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—E. W. Sandwich, A. & W. P. Ry., Atlanta, Ga. Next meeting, July 16, Chattanooga, Tenn.

SOUTHERN & SOUTHWESTERN RAILWAY CLUB.—A. J. Merrill, Grant Bldg., Atlanta, Ga.; 3d Thurs., Jan., March, May, July, Sept., Nov., 10 A. M., Candler Bldg., Atlanta.

TOLEDO TRANSPORTATION CLUB.—J. S. Marks, Agent, Interstate Despatch, Toledo, Ohio; 1st Saturday in month, Boody House, Toledo.

TRACK SUPPLY ASSOCIATION.—W. C. Kidd, Ramapo Iron Works, Hillsburn, N. Y. Meetings with Roadmasters' and Maintenance of Way Association.

TRAFFIC CLUB OF CHICAGO.—W. H. Wharton, La Salle Hotel, Chicago.

TRAFFIC CLUB OF NEW YORK.—C. A. Swope, 291 Broadway, New York; last Tuesday in month, except June, July and August, Waldorf-Astoria, New York.

TRAFFIC CLUB OF PITTSBURGH.—D. L. Wells, Erie R. R., Pittsburgh, Pa.; meetings bimonthly, Pittsburgh. Annual meeting, 2d Monday in June.

TRAFFIC CLUB OF ST. LOUIS.—A. F. Versen, Mercantile Library Building, St. Louis, Mo. Annual meeting in November. Noonday meetings October to May.

TRAIN DESPATCHERS' ASSOCIATION OF AMERICA.—J. F. Mackie, 7122 Stewart Ave., Chicago.

TRANSPORTATION CLUB OF BUFFALO.—J. M. Sells, Buffalo; first Saturday after first Wednesday.

TRANSPORTATION CLUB OF DETROIT.—W. R. Hurley, Supt.'s office, L. S. & M. S., Detroit, Mich.; meetings monthly, Normandie Hotel, Detroit.

TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, N. Y. C. & H. R., East Buffalo, N. Y. Next meeting, September 15-18, Hotel Sherman, Chicago.

UTAH SOCIETY OF ENGINEERS.—Frank W. Moore, Newhouse Bldg., Salt Lake City, Utah; 3d Friday of each month, except July and August, Consolidated Music Hall, Salt Lake City.

WESTERN CANADA RAILWAY CLUB.—W. H. Rosevear, B. O. Box 1707, Winnipeg, Man.; 2d Monday, except June, July and August, Winnipeg.

WESTERN RAILWAY CLUB.—J. W. Taylor, 1112 Karpen Building, Chicago; 3d Tuesday of each month, except June, July and August, Karpen Building, Chicago.

WESTERN SOCIETY OF ENGINEERS.—J. H. Warder, 1735 Monadnock Block, Chicago; regular meeting 1st Monday in month, except January, July and August, Chicago. Extra meetings, except in July and August, generally on other Monday evenings.

Traffic News

The Illinois Central has begun a suit in Kentucky to test the legality of the recent law of that state reducing passenger fares from three cents a mile to 2½ cents.

The Interstate Commerce Commission has tentatively approved the new code of weighing rules formulated by the American Railway Association and the National Industrial Traffic League.

The Southern Pacific, in accordance with a recent order of the Interstate Commerce Commission, has published both east and westbound freight rates through the Ogden gateway for traffic to points south of Portland, Ore. The westbound rates are already in effect and the eastbound rates become effective July 10.

Tariffs have been filed with the Interstate Commerce Commission, effective August 1, providing for storage charges at the railroad warehouses in Superior, Wis., and Duluth, Minn. The tariff provides a charge of 20 cents a ton between April 15 and December 1, the season of open navigation, and 50 cents a ton for the closed season, December 1 to April 15.

The General Managers' Association of Texas is urging the adoption of a new form of livestock contract, making the railroads responsible only for physical damage to livestock caused by derailments and collisions, and eliminating the market prices as factors in settlements between shippers and the railroads. Under this new form of contract the railroads would not be responsible for shrinkage en route.

The Denver & Salt Lake on June 29 put into effect new tariffs of local freight rates on its lines, making a considerable reduction in both class and commodity rates, in some cases amounting to as much as 50 per cent. For example, the first-class rate from Denver to Craig, the terminus of the line, was reduced from $1.70 to $1.09 per 100 lb. The rate on nails between the same points was reduced from 86 cents to 35 cents. It was announced that the reductions were made in order to develop the territory of the road. Nearly all commodities are affected by the reduction.

No more low price, one-way colonist tickets to the West and Northwest will be sold by the Southern Railway. This announcement is in accordance with the policy of President Fairfax Harrison to do everything possible to discourage the movement of people from the South. For a number of years the Southern has endeavored to discourage the offering of low colonist rates from the South and has only sold them at points where it was felt necessary to meet competition. From this time on, however, no such rates will be offered by the Southern Railway; this regardless of any action that may be taken by other lines. The Southern will continue to offer home-seekers' rates into the South.

Traffic officers of the Union Pacific, the Southern Pacific, the Atchison, Topeka & Santa Fe, the Chicago, Milwaukee & St. Paul, the Northern Pacific and the Great Northern, have been in Washington during the past week conferring with the Interstate Commerce Commission concerning the changes to be made in transcontinental freight tariffs as a result of the confirmation of the commission's decision, of 1911, by the recent opinion of the Supreme Court. The commission's order expired by statutory limitation in 1913 and the question now is whether the same order shall be reissued. There have been changes in conditions which may be used to support a claim on the part of the roads that different bases should now be applied.

A. M. Mortensen, traffic manager of the Panama-Pacific International Exposition estimates that the visitors to the exposition will number 2,132,500. This includes from points in the United States east of the Rocky mountains, 1,000,000; west of the Rocky mountains, exclusive of California, 250,000; from Europe and Africa, 50,000. Mr. Mortensen thinks that the attractions of California outside of the exposition will largely offset the disadvantage of being situated so far from the centers of population. The city of San Francisco has voted a bond issue of $3,500,000 for electric car lines to convey passengers between the center of the city and the exposition grounds, the existing lines being inadequate.

Commission and Court News

INTERSTATE COMMERCE COMMISSION

Examiner Brown held a hearing in Chicago on July 1 on the complaint of the National Association of Ice Cream Manufacturers against the express companies on account of the rates for express shipments of ice cream, which went into effect February 1, 1914, in connection with the general revision of express rates made by the Interstate Commerce Commission at that time. In the new rates ice cream was changed from first to second class at the request of the shippers, but the express companies provided a minimum of 49 cents for five gallons. The ice cream men want a 40-cent minimum, which prevails in some states. They also ask a reduction in the rates for returned empty cans from 15 cents to 10 cents for five-gallon sizes or under, and from 25 cents to 15 cents for sizes over five gallons.

Switching at Baltimore, Maryland

Opinion by Commissioner McChord:

The commission finds that the carriers have not justified proposed increases in the rates for the transportation of carload freight from the connection between the Northern Central Railway and the Western Maryland in Baltimore to and from certain points on the "block route" in that city. (30 I. C. C., 581.)

Rates on Flour and Grain Products Between Virginia Points

Page Milling Company et al v. Norfolk & Western. Opinion by the commission:

The commission finds that the rates on flour and grain products in carloads from milling points on the Shenandoah division of the Norfolk & Western in Virginia and West Virginia to points on the Pocahontas division and Clinch Valley extension in Virginia and West Virginia are not unreasonable or discriminatory (30 I. C. C., 605).

Tanbark Rates to North Carolina Points

Hans Rees' Sons v. Southern Railway. Opinion by Commissioner Clements:

The commission finds that a rate of six cents per 100 lb. on tanbark from Delrio, Tenn., to Asheville, N. C., is not discriminatory. It is also held that the carriers have justified a proposed cancellation of the application of the North Carolina intrastate mileage scale of rates on tanbark from stations on the line of the defendants in South Carolina to North Carolina tanning points, and the placing of that commodity on the same rate basis as lumber and other forest products. (30 I. C. C., 585.)

Rates on Iron Ore from Points in New York State

Ontario Iron Ore Company v. New York Central & Hudson River et al. Opinion by Commissioner Meyer:

The commission finds that the present rate of $1.10 per gross ton on iron ore in carloads from Fruitland and Ontario, N. Y., to Emporium, Pa., and the present rate of $1.60 per gross ton on the same traffic to Earlston, Saxton and Riddlesburg, Pa., are not unreasonable or unjustly prejudicial. The rate of $1.60 per gross ton to Curtin, Milesburg and Bellefonte, Pa., however, is found unreasonable to the extent that it exceeds $1.40. (30 I. C. C., 566.)

Passenger Fares on the Washington-Virginia Railway

Virginia Highlands Citizens' Association v. Washington-Virginia Railway. Opinion by Commissioner Harlan:

The commission finds that defendant's charge for 25-trip family tickets for use between its Washington terminal at Twelfth and D streets, northwest, and Addison and Virginia Highlands in Virginia is discriminatory as compared with the commutation fares to other points on the Mount Vernon division. It is also held that as defendant provides a 52-trip monthly commutation ticket between Washington and Alexandria, New Alexandria and other points on the Mount Vernon division it should also provide a similar ticket for Addison and Virginia Highlands and that the rate on this ticket should not exceed $3. The one way and round trip fares are not found unreasonable. (30 I. C. C., 593.)

Dunnage Allowances

Opinion by the commission:

The commission finds that the carriers in southwestern territory have justified a proposed cancellation of the allowance for actual weight of dunnage not in excess of 500 lb. used by shippers and furnished at their expense to protect freight in carloads shipped in box, stock or refrigerator cars. There can be no doubt that the primary and most important purpose of the dunnage used in varying forms by the shipping interests is to make the load safe for transportation and to obviate injury to the goods, the prevention of damage to the carriers' equipment being a minor consideration. Under these circumstances and in view of the fact that the substitution of dunnage for the more expensive boxes and crates and other packing material is of advantage to the shipper and reduces the gross weight upon which freight charges must be paid, it is held not inconsistent that the carriers should receive revenue for the total weight hauled. Following the findings in the case entitled *In the Matter of the Suspension of Western Classification No. 51*, the continuance of the allowance for shipments on open cars is upheld. (30 I. C. C., 538.)

Richmond Switching Charges

Richmond Chamber of Commerce v. Seaboard Air Line et al. Opinion by Commissioner McChord:

The Atlantic Coast Line, Seaboard Air Line and the Southern Railway, southern carriers serving Richmond, Va., have a rule whereby they have for some time absorbed connecting line switching charges on carload traffic at Richmond, Va., only when the carrier performing the transportation service was in competition for the traffic with the switching line. The Chesapeake & Ohio and the Richmond, Fredericksburg & Potomac which also serve the city, absorb connecting line switching on all carload traffic from and to other than local points on their respective lines. The result in general is that the arrangements affecting the absorption of switching charges at Richmond are quite different as far as the various receivers and shippers of freight at that point are concerned. The commission finds, therefore, that the refusal of the defendants to absorb switching charges on some carload shipments at Richmond, while absorbing such charges on other carload shipments to and from that point is discrimination against the shippers who are required to pay such charges. It is also found that the refusal of the defendants to absorb switching charges on some carload shipments at Richmond, while absorbing such charges on like shipments at Norfolk is discrimination against Richmond on traffic transported to and from that point. The defendants are therefore required to desist from such discrimination in the future. A complaint with respect to unreasonable and discriminatory charges on trap, peddler and station-order cars, however, is not sustained. (30 I. C. C., 552.)

Omaha Grain Rates

Omaha Grain Exchange v. Northern Pacific et al. Opinion by Commissioner Daniels:

On grounds similar to those in the case of *Omaha Grain Exchange v. C. B. & Q.*, it is held that the Northern Pacific and the Chicago, Burlington & Quincy should establish joint rates on grain in carload lots from points in Montana on the line of the Northern Pacific west of Billings to Omaha, South Omaha and Council Bluffs, which will not exceed the rates contemporaneously maintained from the same points of origin to Minneapolis via the Northern Pacific. The points west of Billings are substantially equi-distant from Minneapolis and Omaha and although the routes to the latter involve a two line haul, this is not an important consideration because the distances involved are so great. The commission finds that the essential disparity in the distance traversed over the Chicago, Milwaukee & St. Paul and between points of origin in Montana, North Dakota and South Dakota and Minneapolis on the one hand, and between these points of origin and Omaha on the other, warrants a difference in the

rates. It is held, however, that the present difference of five cents in favor of Minneapolis is discriminatory and that except where at present equal rates apply as in the Judith Basin territory between Roundup, Hilger and Twodot, the Chicago, Milwaukee & St. Paul should establish to Omaha, South Omaha and Council Bluffs, a rate not to exceed by more than two cents per 100 lb., the rate contemporaneously charged from the points of origin involved to Minneapolis. (30 I. C. C., 572.)

Pig Iron Rates from the South

Sloss-Sheffield Steel & Iron Company et al. v. Louisville & Nashville et al. Opinion by Commissioner McChord:

Operators of blast furnaces in Alabama and Tennessee complain that the existing rates on pig iron from the south to Ohio river crossings, to points north and east thereto all rail, and to New England, all rail and rail and water, are unreasonable and discriminatory. The rates from Chattanooga, Tenn., are made certain differentials under Birmingham and as these differentials have not been questioned, the entire southern situation can be dealt with by considering only Birmingham, which district is representative of the Alabama operations. Louisville is representative of Ohio river crossings, as Chicago and Boston are illustrative of central freight association territory and the east respectively.

The commission finds that the rates from Birmingham to Louisville, St. Louis, Chicago and to Boston via water and rail are unreasonable and should not exceed the following per gross ton: to Louisville, $2.65; to St. Louis, $3.40; to Chicago, $4.00, and to Boston, rail and water, $4.25.

The present differentials between the southern furnaces are to be maintained, as is also the relation of rates now obtaining to the Ohio river, to points in central freight association territory, and to the east. No change will be ordered in the proportional rates to the Ohio river at this time for the reason that this would throw the entire reduction upon the southern lines. The proportional rates to and from the Ohio river should be so revised as to make the through rate to Chicago, for example, not in excess of $4 per gross ton.

It is also held that the rates from the New England ports to interior New England points are unreasonable as applied to through traffic and it is prescribed that the rate from Birmingham to Springfield and Portland should not exceed $5.25; and to Lowell, $5, with like reductions in the rates to other interior New England points. No opinion is expressed as to the reasonableness of the present differentials between the all-rail and rail and water rates to New England, but this is not to be taken as justification for any increase in the differentials.

No reparation is awarded. (30 I. C. C., 597.)

STATE COMMISSIONS

The Illinois Public Utilities Commission has entered an order further suspending, until October 15, the proposed increase of one cent per 100 lb. in the rates on grain in Illinois.

The Texas railways on June 30 filed with the Texas Railroad Commission the new tariff increasing the rates from Dallas and Houston to points in East Texas to correspond with the interstate rates from Shreveport, La., to the same points, in accordance with the decision of the Interstate Commerce Commission which was recently sustained by the Supreme Court. The Texas commission has not yet indicated whether it would approve or make opposition to the new rates, although at a hearing the week before the commission suggested that the railroads make a compromise by raising the Texas rate somewhat and reducing the Shreveport rate somewhat.

PERSONNEL OF COMMISSIONS

E. L. Adams, hitherto assistant signal engineer of the Lake Shore & Michigan Southern, has been appointed senior signal engineer of the division of valuation of the Interstate Commerce Commission for the southern division (Chattanooga).

COURT NEWS

See mention of the New York, New Haven & Hartford dissolution suit in Financial News.

Railway Officers

Executive, Financial, Legal and Accounting

The office of F. A. Healy, secretary and treasurer of the Ohio Electric, has been removed from Cincinnati, Ohio, to Springfield.

B. Lancaster has been appointed auditor of disbursements of the Union Pacific, with headquarters at Omaha, Neb., in place of E. L. Fries, transferred.

W. Scott Hancock has been appointed assistant general attorney of the Missouri Pacific and the St. Louis, Iron Mountain & Southern, for lines in Missouri, with headquarters at St. Louis, succeeding James F. Green, promoted. Mr. Hancock has been assistant attorney in the vice-president's office.

Albert J. Stone, general manager of the Erie at New York, has been elected vice-president, in charge of the operating department, with headquarters at New York, effective July 15. A portrait of Mr. Stone and a sketch of his railway career were published in the *Railway Age Gazette* of December 26, 1913, page 1244.

James H. Hustis, president of the New York, New Haven & Hartford, with headquarters at New Haven, Conn., has been elected president of the Boston & Maine, effective August 15, succeeding Morris McDonald, who resigned last February. A portrait of Mr. Hustis and a sketch of his career were published in the *Railway Age Gazette* of August 1, 1913, page 179.

Operating

A. H. Ehlers, superintendent of the Copper Range at Houghton, Mich., has been appointed general superintendent.

H. E. Allen has resigned as superintendent of the Trinity & Brazos Valley at Teague, Tex., to go to the St. Louis Southwestern.

E. A. Gould has resigned as assistant to the general manager of the Cincinnati, Hamilton & Dayton at Cincinnati, Ohio, and the office is abolished.

R. A. Pierce, yardmaster of the Oregon Short Line at Ogden, Utah, has been appointed superintendent of the Ogden Union Railway & Depot Company.

C. P. Torrey, acting superintendent of transportation of the Hocking Valley, has been appointed superintendent of transportation, with headquarters at Columbus, Ohio.

C. R. Duncan, trainmaster of the Illinois Southern at Sparta, Ill., has been appointed superintendent, succeeding J. C. Collins, resigned to engage in other business, and L. V. Combs succeeds Mr. Duncan.

Warren D. Shull, trainmaster of the Waynesburg & Washington at Waynesboro, Pa., has been appointed superintendent, succeeding C. E. Bower, who has been retired under the pension rules of the company.

H. R. Hanlin has been appointed general manager of the Dayton & Union, with office at Cincinnati, Ohio, succeeding E. A. Gould, resigned, and W. F. Stark, superintendent at Dayton, Ohio, having resigned, his former position has been abolished.

J. P. Houston, assistant superintendent of the Minneapolis & St. Louis at Fort Dodge, Iowa, has been appointed superintendent of the Eastern division, with office at Oskaloosa, succeeding R. S. Marshall, resigned, to accept service with another company.

T. H. Sears, division superintendent of the Atchison, Topeka & Santa Fe at Marceline, Mo., has been appointed general superintendent at Amarillo, Tex. R. H. Allison, trainmaster at Emporia, Kan., succeeds Mr. Sears, and C. L. Mason takes the place of Mr. Allison.

J. W. Mulhern, superintendent of the Chicago-Petoskey division of the Pere Marquette at Grand Rapids, Mich., has been appointed superintendent of the Northern division of the Chicago Great Western, with headquarters at St. Paul, Minn., succeeding W. B. Causey, resigned.

The statement in our issue of July 3, that C. W. Bearden, assistant superintendent at Bloomington, Ill., of the Chicago & Alton, had been appointed chief despatcher and that E. E. Sutton, chief despatcher, had been appointed assistant chief despatcher was an error. Both will remain in their former positions.

Otto Holstein, until recently superintendent of transportation of the Guayaquil & Quito Railway in Ecuador, and previously operating manager of the Central Railway of Peru, has been appointed superintendent of transportation of the San Antonio, Fredericksburg & Northern, with headquarters at Fredericksburg, Tex.

J. E. Taussig, superintendent of transportation of the Texas & Pacific, has been appointed general superintendent, with headquarters at Dallas, Tex., succeeding J. W. Everman, resigned to accept service with another company, and the former office is abolished. J. B. Chandler, car accountant, has been appointed superintendent of car service, with headquarters at Dallas, and the former position is abolished.

J. H. Dyer, superintendent of the Tucson division of the Southern Pacific at Tucson, Ariz., has been appointed superintendent of the Sacramento division, with office at Sacramento, Cal., succeeding W. A. Whitney, resigned to accept service with another company. T. H. Williams, assistant superintendent of the Tucson division at Sacramento, succeeds Mr. Dyer, and J. T. Bell, trainmaster at Sacramento, succeeds Mr. Williams.

J. B. Heafer, assistant general manager of the International & Great Northern, has been appointed superintendent of transportation, with headquarters at Houston, Tex., and the office of second assistant general manager is abolished. J. L. Burd, formerly assistant superintendent of the Gulf division, has been appointed superintendent of that division, with headquarters at Palestine, Tex., to succeed J. P. Burns, who has been appointed superintendent of terminals at Houston, with jurisdiction over the Columbia branch.

A. F. Brewer, superintendent of the Utah division of the Oregon Short Line, will have jurisdiction also over the Montana division, with headquarters at Pocatello, Idaho. C. E. Brooks, who has been acting superintendent of the latter division, has been appointed assistant superintendent of the Idaho division, with headquarters at Nampa, Idaho. H. J. Plumhoff, trainmaster at Pocatello, has been appointed assistant division superintendent at Pocatello, and M. A. Pond, trainmaster at Salt Lake City, has been appointed assistant division superintendent at that place.

Jasper N. Haines, whose appointment as superintendent of the Seneca division of the Lehigh Valley, with headquarters at Sayre, Pa., has been announced in these columns, was born on February 20, 1876, at Pleasant Dale, W. Va. He began railway work in 1892 as water boy and laborer on construction work and was then consecutively station clerk, yard clerk trainmaster's clerk and general manager's clerk on the Pittsburgh & Lake Erie at Pittsburgh, Pa.; the Cleveland Terminal & Valley and the Cleveland, Lorain & Wheeling, now a part of the Baltimore & Ohio, at Cleveland, Ohio. On August 8, 1898, he went to the Lehigh Valley and has been in the continuous service of that road ever since, first as stenographer in the superintendent's office of the Mahanoy & Hazleton division and then as chief clerk. He was transferred in July, 1903, in the same capacity to the office of the superintendent of the Wyoming division. In October, 1904, he was appointed clerk in the general manager's office and the following May became chief clerk to the general manager. He was promoted to inspector of transportation on November 18, 1907, and in August, 1909, was appointed trainmaster of the Auburn division. On January 1, 1910, he was promoted to assistant superintendent of the Buffalo division, which position he held at the time of his recent appointment as superintendent of the Seneca division of the same road, as above noted.

Dixon Fay Kirkland, whose appointment as general manager of the Georgia & Florida, with headquarters at Augusta, Ga., has already been announced in these columns, was born on June 1, 1866, in Lowndes county, Ga., and was educated in the common schools. He began railway work in 1883, as a laborer with a bridge gang of the Plant Investment Company, building the South Florida Railway. He was then consecutively work train conductor, locomotive fireman, and from the latter part of 1885 to 1887 telegraph operator at various points on the Savannah, Florida & Western, now a part of the Atlantic Coast Line. From 1887 to January of the following year he was copying operator in the despatcher's office at Savanah, Ga., and then was appointed a despatcher on the same road. He was appointed despatcher on the Georgia Southern & Florida in September, 1889, remaining in that position until April, 1891, when he was appointed despatcher on the Plant system. From July, 1898, to September, 1900, he was trainmaster, and then to December, 1905, was division superintendent of the same system which is now operated by the Atlantic Coast Line. From July to December, 1906, he was superintendent of transportation of the Georgia, Florida & Alabama, and from May, 1907, to April, 1911, was chief clerk to the superintendent of transportation of the Central of Georgia, and then, until the following October, was acting superintendent at Savannah, Ga. He was then trainmaster on the same road at Cedarstown, Ga., until January, 1912, when he became superintendent of the Georgia & Florida, and from April 15, 1913, to June 1, 1914, he was superintendent of the Atlanta, Birmingham & Atlantic, at Manchester, Ga., which position he held at the time of his recent appointment as general manager of the Georgia & Florida, as above noted.

Traffic

J. H. Barr has been appointed traveling freight agent of the Central of Georgia, with headquarters at Kansas City, Mo.

George A. Clifford, city passenger agent of the Canadian Pacific and the Minneapolis, St. Paul & Sault Ste. Marie at Cleveland, Ohio, has been appointed general agent at the same place.

D. J. Bill, commercial agent of the Lake Erie & Western at Buffalo, N. Y., has been transferred to New York City as general agent. E. J. Lewis is appointed commercial agent at Minneapolis, Minn.

G. C. Henderson has been appointed westbound agent, with headquarters at Kansas City, Mo., of the Central-Savannah Line, which is operated jointly by the Ocean Steamship Company and the Central of Georgia.

R. W. Wirt has been appointed traveling freight agent of the Cincinnati, New Orleans & Texas Pacific and the Alabama Great Southern, with headquarters at Chattanooga, Tenn., succeeding E. L. Hunt, transferred.

E. J. Pope has been appointed commercial agent of the Missouri, Kansas & Texas and the Wichita Falls & Northwestern at Wichita Falls, Tex., to succeed O. C. Thomas, who has been transferred to Oklahoma City, Okla., in a similar capacity.

W. T. Stevenson, chief of the tariff bureau of the Cleveland, Cincinnati, Chicago & St. Louis, with headquarters at Cincinnati, Ohio, has been appointed assistant general freight agent, with office at Cincinnati. Walter Nichols, division freight agent at St. Louis, Mo., succeeds Mr. Stevenson, and S. A. Townsend, commercial agent at Pittsburgh, Pa., takes the place of Mr. Nichols. W. F. Greaves, general agent at Nashville, Tenn., has been appointed general southern freight agent, a newly-created position, with headquarters at Birmingham, Ala. Brent Arnold, Jr., general agent of the Western Maryland at Cleveland, Ohio, has been appointed general agent of the Big Four at Cincinnati, succeeding C. H. King, transferred to Louisville, Ky., as traveling freight agent. The following are appointed commercial agents: J. A. Moore, Nashville, Tenn.; C. W. Smith, Dallas, Tex.; J. M. Breen, Pittsburgh; A. F. Meyer, Kansas City, Mo.; M. T. Yeaton, Minneapolis, Minn.; M. R. Markle, Milwaukee, Wis., and J. J. Fahey, Memphis, Tenn.

Engineering and Rolling Stock

F. C. Baluss has been appointed engineer of bridges and buildings of the Duluth, Missabe & Northern at Duluth, Minn.

G. H. Wion, assistant supervisor of signals of the Pennsylvania Railroad at New York, has been appointed assistant signal engineer of the Victorian Government Railways, with headquarters at Melbourne, Australia.

J. Hainen, superintendent of motive power of the Southern Railway at Washington, D. C., has been promoted to general superintendent of motive power and equipment, with headquarters at Washington, succeeding A. Stewart, deceased, and E. C. Sasser, master mechanic at Spencer, N. C., has been promoted to superintendent of motive power of the Northern and Eastern districts, with headquarters at Washington, succeeding Mr. Hainen.

Purchasing

A. A. Dawley has been appointed purchasing agent of the Denver & Salt Lake, with headquarters at Denver, Colo.

Ray F. Transue has been appointed storekeeper of the Lehigh & New England, with office at Pen Argyle, Pa., succeeding F. B. Arndt, resigned.

G. E. Scott, acting purchasing agent of the Missouri, Kansas & Texas, has been appointed purchasing agent, with headquarters at St. Louis, Mo.

George L. Mayer has been appointed purchasing agent of the Ohio Electric, with headquarters at Springfield, Ohio, succeeding Claude Burckmyer.

G. W. Saul, assistant purchasing agent of the Oregon-Washington Railroad & Navigation Company, has been appointed purchasing agent, with headquarters at Portland, Ore., succeeding R. Koehler, retired.

The office of J. F. Hoyer, purchasing agent of the New Orleans Great Northern, was abolished on July 1, and the purchasing of supplies is now handled through the office of R. H. Howard, general manager, at Jackson, Miss.

Ernest Baxter, whose appointment as purchasing agent of the St. Louis Southwestern, with headquarters at St. Louis, Mo., has already been announced in these columns, was born October 11, 1882, at Delmer, Ont. He received a public and high school education, and began railway work in March, 1903, as messenger in the local freight office of the Michigan Central. From May to September he was with the Algoma Central & Hudson Bay as a clerk at Sault Ste. Marie, Ont., and from October, 1903, to March, 1905, he was secretary to the superintendent of the Grand Trunk at London, Ont. Mr. Baxter was then employed successively in the operating departments of the Cincinnati, Hamilton & Dayton at Indianapolis, Ind., and the Missouri Pacific at St. Louis, Mo., until February, 1906, when he became secretary to the general manager of the St. Louis Southwestern at St. Louis. In May, 1909, he was made chief clerk to the president of the latter road, from which position he was promoted to that of purchasing agent on June 22, as above noted.

E. Baxter

OBITUARY

Guy Phillips, assistant secretary of the Missouri Pacific, and secretary and treasurer of the Richmond & Chesapeake Bay Railway, committed suicide by shooting himself at his office in New York on July 2.

Milton B. Van Zandt, treasurer and assistant secretary of the Chicago & North Western at New York, died on July 6 at his home in that city from a stroke of paralysis at the age of 66. He became general transfer clerk of the Chicago & North Western in February, 1872. He was promoted to be assistant treasurer in April, 1906, and was appointed treasurer of the same road on February 11, 1911.

Martin L. Clardy, vice-president and general solicitor of the Missouri Pacific-Iron Mountain system, with headquarters at St. Louis, Mo., died suddenly on July 5 in that city at the age of 68. He was born in St. Genevieve, Mo., and became connected with the Missouri Pacific in its legal department as assistant and later was general attorney of that road for Missouri and Illinois. In 1909 he succeeded Alexander G. Cochrane as general solicitor.

Equipment and Supplies

LOCOMOTIVE BUILDING

THE ERIE has ordered 5 Pacific type locomotives from the Baldwin Locomotive Works.

THE INTERCOLONIAL RAILWAY OF CANADA has ordered 3 switching locomotives from the Montreal Locomotive Works.

THE PHILADELPHIA SLAG COMPANY, Bethlehem, Pa., has ordered one six-wheel switching locomotive from the Baldwin Locomotive Works.

CAR BUILDING

THE WABASH is in the market for 7 postal cars.

THE MISSOURI PACIFIC is in the market for 25 caboose cars.

THE CHICAGO GREAT WESTERN is in the market for 500 40-ton box cars.

THE DELAWARE, LACKAWANNA & WESTERN has ordered 400 box cars from the American Car & Foundry Company, and 250 box and 200 automobile cars from the Western Steel Car & Foundry Company. The Lackawanna is also in the market for 500 gondola cars in addition to those previously ordered.

IRON AND STEEL

THE ILLINOIS TRACTION SYSTEM has ordered 498 tons of material for its terminal building, at Peoria, Ill., from the Decatur Bridge Company.

CHINESE TRADITION VERSUS THE NEED OF PROGRESS.—The railways of China in 1913 carried over 20,000,000 passengers and 16,000,000 tons of freight. Another striking thing showing the new appreciation of western methods and a change which struck at the very root of all that the Chinese held in the deepest respect and reverence, was the yielding to the necessity for the occasional removal of graves in order that a railway might be properly constructed. The aversion to such removal in the early days of railway construction in China very often resulted in giving the lines some of the most extraordinary alinements.

PORTUGUESE RAILWAY DEVELOPMENT.—It is reported that during the past few years the personnel of the state and privately-owned railways in Portugal have been showing better results. Notwithstanding restricted funds, improvements have been introduced in the technical and administrative departments and the structures and rolling-stock have been maintained in better condition. Hitherto the resources of the country have not been developed to full advantage. This is particularly noticeable in view of the headway the colonies are making as compared with the motherland. The development scheme proposed some time ago for carrying out railway extension, purchasing rolling-stock, etc., is now to be realized by the passing of an act dated April 13, 1913, which authorizes the government to raise nearly $5,000,000. With this more rolling-stock is to be installed, and among other things the line from Vidago to connect with the Spanish frontier at Verin is to be commenced at once. Extensions on the Minho-Douro line are also to be carried out. Some idea of the slow progress of railway construction in the republic, which is about seven-tenths the size of England, may be gathered from the fact that in 1877 the total system stood at 596 miles, and 37 years after the total mileage reached only 1,793 miles. Since 1906 the increase has been only 13 miles. For many years the work of extension was at a standstill and the structures and rolling-stock allowed to deteriorate. Expansion of trade and traffic in Portugal, as in Spain, is seriously handicapped by the original layout of the lines, which do not provide the fruit and other agricultural industries with sufficiently cheap and rapid transit to the ports. The break of gage, which isolates the peninsula from France and the rest of Europe, is another disadvantage.

Supply Trade News

G. K. MacEdward, advertising manager of the Detroit Lubricator Company, has resigned to join the advertising department of the Chalmers Motor Company.

The American Mason Safety Tread Company, Lowell, Mass, has received an orde for over eighty tons of its "Karbolith" sanitary fireproof car flooring for the new steel cars of the Southern Railway which are being built by the Pressed Steel Car Company

Harry C. Holloway, who was for several years representative of the Rail Joint Company, New York, resigned on July 1 and opened an office in the Railway Exchange, Chicago. He will handle railway supply accounts, representing among other companies the Keystone Grinder & Manufacturing Company, of Pittsburgh.

On June 19, the United States patent office issued to William R. McKeen, president of the McKeen Motor Car Company, Omaha, Neb., patent No. 352,725, covering all-steel box cars, including underframe, superstructure, the steel box, the steel bracing and the diagonal bracing. This patent has been in litigation since 1906 in two interference cases which have been passed on by the examiners in chief, the commissioner of patents and the court of appeals of the District of Columbia, sustaining practically every claim made by Mr. McKeen. The Union Pacific steel box cars built in 1906 and 1907 were built under this patent.

TRADE PUBLICATIONS

Steel Taped Cable.—The Simplex Wire & Cable Company, Boston, Mass., has recently issued a catalog descriptive of Simplex steel taped cable for city lighting and other circuits.

Concrete Ties.—The Percival Concrete Tie & Socket Company, New Orleans, La., has issued a pamphlet describing and illustrating the use and qualities of its reinforced concrete ties.

Belt Railway of Chicago.—This company has issued an attractive folder describing its service in the Chicago switching district and the plan of operation of the new clearing yards now under construction.

Car Heating Valves.—The Gold Car Heating & Lighting Company, New York, has recently issued bulletins Nos. 938 and 940, illustrative of Gold's Packless twin and quick opening supply valves, respectively.

Interphones and Accessories.—The Western Electric Company has recently issued a catalog descriptive of its line of interphones and accessories. The booklet contains illustrations and descriptions of the apparatus, the information concerning it being given in clear and concise form.

Milling Machines.—The Newton Machine Tool Works, Philadelphia, Pa., has recently issued catalog No. 48, descriptive of its line of horizontal milling machines. The booklet contains views of the various machines, specifications and brief descriptions of them and their accessories.

Ditchers, Pile Drivers and Buckets.—The Browning Company, Cleveland, Ohio, has recently issued folders devoted to the description and illustrations of its newly designed Browning ditchers, pile drivers and buckets. The illustrations clearly show the various conditions under which these devices work satisfactorily.

Jacks.—The Duff Manufacturing Company, Pittsburgh, Pa., has recently issued a very complete catalog of its various types of jacks. The catalog contains views of the jacks, specifications and statements naming the kind of work for which each is best adapted. Among the jacks included are Barrett trip or track jacks, Barrett automatic lowering jacks, Barrett automobile jacks, Duff ball bearing screw jacks, and Duff-Bethlehem hydraulic jacks. There are also sections on Dunn trench braces, jacks for special purposes and repair parts.

Railway Construction

Alabama Great Southern.—This company will start work at once on improvements at Tuscaloosa, Ala., putting in a new passing track north of the station and extending the switching lead. At Akron the track serving the station will be extended 200 ft. north and 2,417 ft. south. The passing track will be extended 1,403 ft. north and two storage tracks of 1,700 ft. and 1,518 ft. will be constructed, also 600 ft. of cinder pit track and a depressed track 400 ft. long.

Balsam Lake & Eastern.—Incorporated in Wisconsin with $100,000 capital to build from Balsam Lake, Wis., west to Centuria, about 8 miles. The incorporators include W. R. Taylor, J. W. Park and H. W. Radcliffe.

Bay City, Lynn Haven & Northern.—Capitalists of New York and Philadelphia are planning to build a railway between Montgomery, Ala., and St. Andrews Bay, Fla., about 160 miles. It is proposed to secure control of the Birmingham, Columbus & St. Andrews Bay, operating a line from Chipley, Fla., south to Southport, 38 miles, which is to form part of the through route. The first work to be carried out will be on the section from Chipley, Fla., north to Hartford, Ala., about 28 miles, from which point the projected route is via Enterprise and Troy to Montgomery. The plans call for the construction of terminals at Southport, Fla., to include docks, wharves and warehouses. The Montgomery Chamber of Commerce may be addressed.

Berks & Lancaster (Electric).—Incorporated in Pennsylvania to build from Lititz, Pa., north to Womelsdorf, about 18 miles. The incorporators include F. J. Duckett, W. Grimshaw, T. H. Paist and H. B. Longbottom, Philadelphia, and V. J. McGlesney, Phoenixville.

Chicago, Burlington & Quincy.—An officer writes that a contract has been let to Petersen & Company, Omaha, Neb., to build a cut-off from Yutan, Neb., southeast to Chalco. There will be a 300-ft. trestle on the line over Elkhorn river and a 1,700-ft. trestle over the Platte river.

The grading for the extension of this line from Casper, Wyo., to Orin Junction has been completed and the track is now being laid. This company is also building a new line connecting Wendover, Wyo., and Guernsey. The grading work is now being done by Kilpatrick Bros. & Collins Construction Company, Beatrice, Neb.

Illinois Central.—This company has awarded a contract to the J. O. Heyworth Construction Company, Chicago, for two concrete subways at One Hundred and Fifteenth street and Kensington avenue, Chicago.

Intermountain Railway.—An officer writes that contracts have been given to the Wasatch Grading Company and the Oregon Bridge & Construction Company for building from Boise, Idaho, east to Moores creek and Boise basin. Most of the work on the line will be canyon rock work, and the maximum grades will be 1 per cent. There will be one steel bridge with four 80-ft. girder spans and three 70-ft. girder bridges. The company expects to develop a traffic in lumber, logs, live stock, minerals and merchandise. C. A. Barton, president; C. N. Jacquette, chief engineer, and E. M. Hoover, treasurer, Boise, Idaho.

Kewanee, Bradford & Henry Interurban.—Plans are being made, it is said, to build an electric line from Kewanee, Ill., southeast via Osceola and Bradford to Henry, about 35 miles. C. G. Lampton, Cedar Rapids, Iowa, is interested. (See Illinois Roads, May 22, p. 1171.)

Lewisburg & Northern.—See Louisville & Nashville.

Louisville & Nashville.—An officer writes that a section of the Lewisburg & Northern between Brentwood, Tenn., and Athens, Ala., will be opened for freight traffic on July 15. The company does not intend to operate passenger trains over the line for some months or until the track and roadbed are in first class condition.

OGDEN RAPID TRANSIT COMPANY.—A contract is reported let to the Utah Construction Company, Ogden, Utah, to build a branch line east to Huntsville.

PACIFIC GREAT EASTERN.—This company, which is building a line from Vancouver, B. C., north to Prince George on the main line of the Grand Trunk Pacific, 480 miles, is now operating about 5 miles between North Vancouver ferry landing and West Vancouver and expects soon to open for traffic an additional section of 8 miles to Horseshoe Bay. The line is also open for traffic between Squamish at the head of Howe Sound and Cheakamus, 11 miles. Track laying is now being extended north from the latter section and grading work between the end of track and Lillooet, where the line crosses the Fraser river, 100 miles north of Vancouver, is finished. The unfinished bridges on this section will delay the completion of the track laying into Lillooet until next fall. The remaining section between Lillooet and Prince George is all under contract. The company expects that a force of about 6,000 men will be put to work on this section, and that the grading work will be finished to Prince George by the end of this year. (May 8, p. 1055.)

PENNSYLVANIA RAILROAD.—An officer writes that the elimination of grade crossings and track elevation work is being carried out through Wilkinsburg, Pa., from a point near Edgewood station through the boroughs of Edgewood, Wilkinsburg and the city of Pittsburgh to a point near the junction with the Brilliant branch, a total of about 2.25 miles. The maximum elevation of tracks above the present grade will be about 16 ft. The streets in Wilkinsburg are to be depressed about 5½ ft. below the present grade, and the grade crossings eliminated at the intersection of Penn avenue and Pitt street, at South avenue and Hay street, and at Wood street and Rebecca avenue, where undergrade bridges are to be constructed. In addition a 10-ft. pedestrian tunnel will be constructed on the line of Franklin avenue and an 8-ft. pedestrian tunnel on the line of Whitney avenue. The work of eliminating two grade crossings in Pittsburgh at Homewood avenue and Brushton avenue has already been completed. The plans for the new elevated line provide for the eventual construction and operation of a seven-track railroad, although only five tracks will be laid at the present time; also for the construction of a new station in the vicinity of South avenue and Hay street, with island platforms between tracks, and a passenger and baggage tunnel under the tracks with elevators and stairways leading to the platforms. The improvements also include the construction of a modern freight station and delivery yard on the south side of the tracks on the north side of Penn avenue. The masonry work is being done by the Dravo Construction Company, Pittsburgh, Pa., and the track raising by the Pennsylvania Railroad forces. (See Pennsylvania Roads, May 29, p. 1215.)

ST. JOHN & QUEBEC.—An officer of this company, which is building a line from Grand Falls, N. B., southeast following the St. John river to St. John, about 210 miles, writes that track laying has been finished on 110 miles. Contracts have been let to Kennedy & McDonald, Woodstock; the Hibbard Company, Ltd., and the Corbett Company, Inc., both of Fredericton. The work includes building 14 steel bridges. On completion the line is to be operated by the Intercolonial Railway. A. R. Gould, president, Presque Isle, Me., and S. B. Wass, secretary, Fredericton, N. B. (September 26, p. 586.)

SOUTHERN RAILWAY.—An officer writes that contracts for the construction of 19 miles of double track on the Washington division between Amherst, Va., and Elma have been let. C. W. Lane & Company, Atlanta, Ga., has been given the contract for eight miles from Amherst to Tye river and H. J. Dunavant, Chattanooga, Tenn., has been given the contract for 11 miles between Tye river and Elma. (July 3, p. 40.)

TEXAS ROADS (Electric).—It is understood that plans are under consideration for the construction of an electric railway from Mexia, Tex., northwest to Fort Worth, about 95 miles. E. N. Farris, Hillsboro, Tex., may be addressed.

TRI-STATE RAILWAY COMPANY OF MICHIGAN.—A contract is reported let to A. C. Lingebach & Company, Chicago, to build the 18-mile section from Hillsdale, Mich., south to Pioneer, Ohio. This is part of the projected line from Adrian, Mich., to Elkhart, Ind. (June 19, p. 1565.)

VICKSBURG, ALEXANDRIA & SOUTHERN.—A contract is reported let to Frank T. Constant, Alexandria, La., to build a section of 8.5 miles from Tioga, La., to Alexandria. The company was recently organized, with headquarters at Alexandria, to build a line across the State of Louisiana. John F. Shepley, of the Union Trust Company, St. Louis, Mo., is president. (June 26, p. 1607.)

WISCONSIN SOUTHERN (Electric).—Bids are being received, it is said, to build 32 miles of railway in the state of Wisconsin. The company was organized to build from Madison, Wis., northeast via Sun Prairie, Columbus, Beaver Dam, Juneau, Horicon, Mayville, Knowles, Lomira, Campbellsport, and Dundee to Plymouth; also from Knowles north via Brownsville and Oakfield to Fond du Lac. C. D. Smith, president and general manager, Fond du Lac, Wis.

RAILWAY STRUCTURES

CHARLESTON, S. C.—An officer of the Holston Corporation organized to carry out the work on new terminals for the Carolina, Clinchfield & Ohio writes that the contract for the dredging for Charleston terminals has been let to the Atlantic Gulf & Pacific Co., New York. The contract for the concrete dock and foundations has been let to McArthur Brothers, New York. (July 3, p. 40.)

CHARLESTOWN, W. VA.—An officer of the Norfolk & Western writes that a contract has been given to Wade & Graham, Roanoke, Va., for building a brick passenger station 27 ft. x 107 ft. 3 in. and a brick freight house 27 ft. x 100 ft. at Charlestown. The estimated cost of the improvement is about $25,000.

CLINTON, IOWA.—The Chicago & Northwestern is contemplating building a 180-car capacity repair yard at Clinton, Iowa. There will be a total of four buildings, one brick veneer mill building, 60 x 150 ft., one brick veneer shop building, 50 x 100 ft., one frame store building, 22 x 150 ft., and one frame lumber shed 22 x 100 ft. The contract for this work will be let in the next few days. The estimated cost is about $80,000.

FLORENCE, S. C.—A contract is reported let to D. J. Rose, Rocky Mount, N. C., for improvements at Florence, to include a roundhouse, a turntable, planing mill and machine shop for the Atlantic Coast Line.

JACKSON, TENN.—An officer of the Mobile & Ohio writes regarding the report that the company will put up new shops at the Claymore yard and will make repairs to the existing shops at Jackson, that no definite plans have been prepared for these improvements.

METROPOLIS, ILL.—The Paducah & Illinois Railway, a subsidiary of the Chicago, Burlington & Quincy, and the Nashville, Chattanooga & St. Louis, has let a contract for seven pneumatic piers for a double track bridge over the Ohio river at Metropolis, Ill., to the Union Bridge & Construction Company, Kansas City. These piers will be sunk about 90 ft. and will require about 84,000 yd. of concrete. The entire structure will be 5,630 ft. long, and will include one 722 ft., four 555 ft. and one 304 ft. spans. The estimated cost of the structure is $3,500,000, while the amount involved in this contract is $1,100,000. C. H. Cartlidge, of Chicago, is chief engineer.

NEW YORK.—The New York Public Service Commission, First district, will open bids on July 23 for the finish work in six stations on the extension of the Fourth avenue subway in the borough of Brooklyn between Fortieth and Ninetieth streets.

THE SPANISH LINES OF THE PARIS, LYONS & MEDITERRANEAN COMPANY.—The Paris, Lyons & Mediterranean has acquired the railways owned by the North-Eastern Company of Spain, a small company operating two or three subsidiary lines in the Barcelona district. The railways thus transferred are those running between Barcelona to Manresa, via Martorell, the Central Catalonia (from Martorell to Igualada) and the Manresa-Berga-Guardiola. Work has been re-started on the extension of the Martorell line to Manresa, and it is expected that this will be opened this summer as far as Olesa de Montserrat. Subsequently the continuation of the Manresa-Berga line will be undertaken with the object of linking up this to the Paris, Lyons & Mediterranean main system at the frontier via Puigcerdá.

Railway Financial News

Altus, Lubbock & Roswell.—This road, which runs from Altus, Tex., to Wellington, 60 miles, has been sold by E. Kennedy to J. M. West, E. C. Noble and Carey Shaw, of Houston, Tex., and O. L. Slayden and F. E. Wheeler, of Lubbock, Tex.

Baltimore & Ohio.—This company, through the Moorefield & Virginia, has taken over the Hampshire Southern, which runs from Romney, W. Va., to Petersburg.

Boston & Maine.—See New York, New Haven & Hartford.

Chicago Great Western.—This company has made arrangements with the Minneapolis, St. Paul, Rochester & Dubuque Electric for this road to take over the Great Western's passenger business between Randolph, Minn., and Mankato.

Cincinnati, Hamilton & Dayton.—Judson Harmon, formerly governor of Ohio and a receiver of the company when it was previously in the hands of a receiver, and Rufus B. Smith, have been appointed receivers of the Cincinnati, Hamilton & Dayton.

Hampshire Southern.—See Baltimore & Ohio.

Kansas City, Mexico & Orient.—On July 6 the property was sold under foreclosure to the reorganization committee for $6,100,000, the upset price.

The reorganization committee has also bought the assets of the Union Construction Company, the International Construction Company of Delaware and the International Construction Company of Texas.

Lake Erie & Northern.—See Canadian Pacific.

Missouri Pacific.—Representative Barton, of Nebraska, claiming that the Missouri Pacific owes the United States Government $4,000,000 on account of subsidiary bonds sold about 30 years ago and the proceeds loaned to this company. It is claimed that $1,600,000 bonds were authorized, the company having the proceeds of the sale and agreeing to pay back the government in full and until this debt was paid to carry the mail free on the 100-mile line which was in part built with the proceeds. The secretary of the treasury has been called upon for information.

New Orleans, Texas & Mexico.—Equipment trust certificates, amounting to $800,000 and to be issued to reimburse the company in part for equipment costing $1,000,000 bought by the receivers, are to be offered to the public within a few days.

New York, New Haven & Hartford.—The Massachusetts legislature passed a bill amending the charter of the Boston Railroad Holding Company permitting the sale by the New Haven of the Boston & Maine, with the proviso that each certificate of stock should be stamped with an agreement under which the purchaser must, at the option of the state of Massachusetts, sell this stock to the state. The New Haven refusing to sell its Boston & Maine stock under these conditions, Attorney General McReynolds has announced that he intends to proceed with a suit for dissolution of the New Haven.

New York, Ontario & Western.—No dividend was declared on the common stock at the regular annual meeting. In 1913 2 per cent. was declared; in 1912, none, and in 1906 to 1911 inclusive, 2 per cent.

Northern Pacific.—J. P. Morgan & Co., the First National Bank and the National City Bank, all of New York, have bought from the company and are offering to the public $20,000,000 of the new refunding and improvement mortgage 4½ per cent. bonds, series A, of July 1, 1914-2047. The offering price to the public is 97, yielding 4.64 per cent. interest on the investment. The bonds are redeemable at 110 after July 1, 1919. The mortgage securing them is a first lien on 847 miles of road and a junior lien on the balance of the 6,271 miles covered by the mortgage. The balance of the bonds under this mortgage may be issued for refunding prior debt and for a face amount equal to the cost of additional property and betterments. After a specified amount, however, is outstanding the bonds may be issued for additional property and betterments only to the extent of 80 per cent. of the cost thereof.

Peoria & Eastern.—John F. Wallace, chairman of Westinghouse Church Kerr & Co.; Lewis E. Waring, of Edward Sweet & Co.; Sydney S. Schuyler, of Schuyler, Chadwick & Burnham, and Thomas Nelson have formed a committee and are asking the deposit on or before September 1 of the income mortgage 4 per cent. bonds.

St. Louis & San Francisco.—Judge Sanborn has ordered the consolidation of the Bankers Trust Company suit against the St. Louis & San Francisco receivers with the general receivership proceedings.

San Antonio, Uvalde & Gulf.—This company has asked the Texas railroad commission to register $1,024,000 bonds to be issued on 43 miles of road recently completed.

Southern Railway.—Voting trust certificates representing the common and preferred stock, which were issued in 1894 and extended in 1902, are called in for July 31, and stock certificates are to be exchanged for them.

DELAWARE & HUDSON

BALANCE SHEET.

Assets.

Items.	1913.	1912.	Increase or Decrease.
Unmined Coal Owned and Controlled	$15,943,915.00	$16,397,240.93	—$453,325.93
Advances on Unmined Coal	354,279.51	354,033.35	246.16
Real Estate	805,713.50	805,850.47	—136.97
Road and Equipment—The D. & H. Co.	67,175,112.75	65,814,079.28	1,361,033.47
Road and Equipment—Canadian Lines	6,464,030.48	6,331,867.72	132,162.76
Floating Equipment	5,931.00	6,726.00	—795.00
Coal Mining Department Equipment, Cars, Motors, Mules, Horses, etc.	1,338,399.81	1,303,362.30	35,037.51
Coal Handling and Storage Plants	63,967.79	61,134.46	2,833.33
Stocks and Bonds	28,100,593.56	27,088,093.56	1,012,500.00
Cash	1,646,653.91	1,182,559.75	464,094.16
Fire Insurance Fund	417,614.67	373,904.51	43,710.16
Cash and Securities in Special Reserve Funds	10,073.00	9,738.00	335.00
Equipment Trust Fund	1,705,235.14	1,441,303.05	263,932.09
Supplies on Hand	3,300,996.73	2,781,672.78	519,323.95
Bills and Accounts Receivable	3,810,660.80	4,118,196.86	—307,536.06
Advances for Construction and Acquisition of New Lines	4,275,292.95	3,427,607.68	847,685.27
Total	$135,418,470.60	$131,497,370.70	$3,921,099.90

Liabilities.

Items.		1913.	1912.	Increase or Decrease.
Capital Stock		$42,503,000.00	$42,503,000.00	
Bonds as follows:				
1st and Refunding Mortgage Gold Bonds, 1943, 4%	$27,704,000			
1st Mtge. Bonds 1917, 7%	5,000,000			
The Adirondack Ry. Co. 1st Mtge. Bonds, 1942, 4½%	1,000,000			
Schenectady & Duanesburgh R. R. 1st Mtge. Bonds, 1924, 6%	500,000			
Debentures, 1916, 4%	13,973,000			
1st Lien Equipment Bonds, 1922, 4½%	9,643,000			
Debentures, 1914, 4%	100,000			
		57,920,000.00	58,171,000.00	—$251,000.00
Loans Payable		4,500,000.00	3,500,000.00	1,000,000.00
Interest, Dividends, etc., Accrued		1,407,985.82	1,405,209.12	2,776.70
Interest, Dividends and Bonds due and not yet collected		227,143.31	195,086.81	32,056.50
Taxes accrued		277,797.71	157,041.56	120,756.15
Special Reserve Fund Accounts		10,073.00	9,738.00	335.00
Audited Vouchers and Pay Rolls		2,940,797.33	3,052,053.77	—111,256.44
Other Accounts Payable		638,976.57	552,479.93	86,496.64
Appropriated Surplus — Additions to Property prior to June 30, 1907, through Income		6,839,487.37	6,751,837.48	87,649.89
Total Liabilities		$117,265,261.11	$116,297,446.67	$967,814.44
General Profit and Loss, being excess of Assets over Liabilities		18,153,209.49	15,199,924.03	2,953,285.46
Total		$135,418,470.60	$131,497,370.70	$3,921,099.90

[ADVERTISEMENT.]

ANNUAL REPORT

THE DELAWARE AND HUDSON COMPANY—EIGHTY-FOURTH ANNUAL REPORT

GENERAL OFFICE.

NEW YORK, N. Y., April 2, 1914.

To the Stockholders of
The Delaware and Hudson Company:

The President and the Board of Managers submit the following statements of the affairs of the Company for the year ended December 31, 1913:

The results from operation of the Coal Mining Department were:

Year.	Coal Mined.	† Revenues.	‡ Expenses.	Net Revenue.
1913	.....7,170,553 tons.	$16,045,308.03	$14,748,615.71	$1,296,692.32
1912	.....6,438,555 "	13,397,557.48	12,811,520.34	586,037.14
Increase	731,998 tons.	$2,647,750.55	$1,937,095.37	$710,655.18

† Excluding dividends received from stock of Coal Companies owned.
‡ Excluding taxes.

Year.	Miles. Operated.	Operating Revenues.	‡ Operating Expenses.	Net Operating Revenues..	Percentage of Expenses to Revenues.
1913	903.99	$24,153,494.73	$15,210,306.85	$8,943,187.88	62.97
1912	†903.99	22,480,102.95	14,066,778.74	8,413,324.21	62.57

The results from operation of the Railroad Department were:

Increase		$1,673,391.78	$1,143,528.11	$529,863.67	.40

‡ Excluding taxes.
† This figure is 26.39 miles greater than shown in 1912, the figures having been recast on account of remeasurements, and also due to the inclusion of various short pieces of main line track, formerly treated as sidings and spur tracks.

RAILROAD DEPARTMENT.

REVENUES AND EXPENSES.

The general distribution of the Operating Revenues and of the Operating Expenses of the Railroad Department was as follows:

	1913.	1912.	Increase or Decrease.
REVENUES:			
From Coal Freight Traffic.....	$11,436,959.90	$10,346,094.92	$1,090,864.98
" Merchandise Freight Traffic (including switching)	8,794,428.57	8,476,850.69	317,577.88
" Passenger Traffic	3,277,928.68	3,076,507.07	201,421.61
" Express Traffic	334,279.74	305,119.40	29,160.34
" Transportation of Mails.	121,793.50	119,445.51	2,347.99
" Miscellaneous Sources ..	188,104.34	156,085.36	32,018.98
Total Operating Revenues..	$24,153,494.73	$22,480,102.95	$1,673,391.78
EXPENSES:			
For Maintenance of Way and Structures	$1,787,613.86	$1,940,352.37	—$152,738.51
" Maintenance of Equipment	3,753,963.16	3,230,742.16	523,221.00
" Traffic Expenses	305,965.69	289,754.01	16,211.68
" Transportation Expenses...	8,584,722.10	7,979,041.22	605,680.88
" General Expenses	778,042.04	626,888.98	151,153.06
Total Operating Expenses..	$15,210,306.85	$14,066,778.74	$1,143,528.11
Net Revenue from Operation..	$8,943,187.88	$8,413,324.21	$529,863.67
Percentage of Expenses to Revenues	62.97	62.57	.40

GENERAL INCOME ACCOUNT OF THE DELAWARE AND HUDSON COMPANY, YEAR ENDED DECEMBER 31, 1913, IN COMPARISON WITH YEAR ENDED DECEMBER 31, 1912.

	1913.	1912.	Increase or Decrease.
COAL MINING DEPARTMENT:			
Gross Revenues	$16,045,308.03	$13,397,557.48	$2,647,750.55
Gross Expenses	14,748,615.71	12,811,520.34	1,937,095.37
Net Revenues	$1,296,692.32	$586,037.14	710,655.18
Taxes Accrued	495,000.00	355,092.68	139,907.32
Operating Income	$801,692.32	$230,944.46	570,747.86
OTHER INCOMES			
Dividends and Interest.....	386,733.52	792,923.61	—406,190.09
Gross Income Coal Department	$1,188,425.84	$1,023,868.07	164,557.77
RAILROAD DEPARTMENT:			
Gross Operating Revenues....$24,153,494.73	$22,480,102.95	1,673,391.78	
Gross Operating Expenses.....	15,210,306.85	14,066,778.74	1,143,528.11
Net Operating Revenues.....	$8,943,187.88	$8,413,324.21	529,863.67
Taxes Accrued	623,107.27	600,944.31	22,162.96
Operating Income	$8,320,080.61	$7,812,379.90	507,700.71
OTHER INCOME:			
Hire of Equipment.....	$213,752.30	$99,596.29	114,156.01
Outside Operations	—26,667.42	—20,733.16	—5,934.26
Dividends and Interest.....	1,121,996.84	1,154,195.93	—32,199.09
Miscellaneous Items	54,322.20	36,359.60	17,962.60
Total Other Income.....	$1,363,403.92	$1,269,418.66	93,985.26
Gross Income Railroad Department	$9,683,484.53	$9,081,798.56	601,685.97
DEDUCTIONS FROM INCOME:			
Rentals	$2,020,228.43	$2,034,256.69	—14,028.26
Interest on 1st and Refunding Mortgage Bonds (1943).....	1,108,160.00	1,108,160.00	
Interest on 1st Mtge. Bonds (1917)	350,000.00	350,000.00	
Interest on Debenture Bonds (1916)	558,920.00	558,920.01	—.01
Interest on 1st Lien Equipment Bonds (1922)	435,038.63*	436,288.26	—1,249.63
Interest on Debenture Bonds (1914)	4,000.00	12,000.00	—8,000.00
Interest on Divisional Bonds..	75,000.00	75,000.00	
General Interest and Discount	205,160.92	95,310.15	109,850.77
Total Deductions	$4,756,507.98	$4,669,935.11	86,572.87
Net Income Railroad Department	$4,926,976.55	$4,411,863.45	515,113.10
GENERAL:			
Miscellaneous Income:			
Dividends and Interest on Securities Owned	$13,516.00	$11,276.00	2,240.00
Rentals, Real Estate.....	37,844.21	42,310.97	—4,466.76
General Interest and Discount	16,634.56	25,469.23	—8,834.67
Total income	$67,994.77	$79,056.20	—11,061.43
Taxes Accrued	8,661.56	8,698.30	—36.74
Net Income General.....	$59,333.21	$70,357.90	—11,024.69
Net fncome Carried to General Profit and Loss.....	$6,174,735.60	$5,506,089.42	668,646.18
	14.53% on	12.95% on	
Percentage to Capital Stock..	$42,503,000.00	$42,503,000.00	

* Excluding taxes.

FINANCIAL.

CAPITAL STOCK AND FUNDED DEBT.

The Capital Stock of The Delaware and Hudson Company on December 31, 1913, was $42,503,000, no additional shares having been issued during the year.

The Debentures of 1914, outstanding at the close of the year were $100,000, having been reduced by the payment, on January 1, 1913, of $200,000, maturing as of that date.

The amount of First Lien Equipment Bonds of 1922, outstanding December 31, 1913, was $9,643,000, bonds aggregating $51,000, having been retired during the year through the operation of the Sinking Fund established in connection with their issue.

The First and Second Mortgage Bonds of the Saranac and Lake Placid Railroad Company aggregating $144,000, matured November 1, 1913, and the money was deposited with the Trustee to redeem them.

In March, 1913, the Company applied to the Public Service Commission, Second District, of the State of New York, for permission to issue $5,000,000, par value, of its First and Refunding Mortgage Four Per Cent Gold Bonds, the proceeds to be used in paying the floating debt incurred for additions and betterments, and to meet the cost of completing the work under way and of other contemplated improvements. On October 9, 1913, the Public Service Commission approved the issue of $4,500,000, at 95 or better, reserving approval of the remaining $500,000, pending the completion of an examination of the accounts of the Company. Approval, at an early date, is anticipated and the full issue of bonds desired will then be available. Although, when the application was filed with the Commission, the officers of the Company as well as the bankers who were consulted believed that the bonds could be sold at a price that would net the Company 95 or better, the subsequent change in market conditions has made it impossible, up to the present time, to realize the price fixed by the Commission.

FLOATING DEBT.

The Floating Debt of the Company amounted to $4,500,000, on December 31, 1913, having increased $1,000,000, during the year. This increase was largely necessary to finance, temporarily, addition and betterment work covered by the proposed issue of First and Refunding Mortgage Bonds; and, in part, was on account of advances to subsidiary companies (principally the Wilkes-Barre Connecting Railroad Company) for which this Company later will be reimbursed.

SINKING FUNDS.

During the year there was paid to the Trustee under the First and Refunding Mortgage the sum of $277,040, being one per cent of the par value of the First and Refunding Mortgage Gold Bonds outstanding May 1, 1913, making the total paid to date, $1,173,550. In accordance with the terms of the trust agreement, this sum has been expended in additions and betterments to the property covered by the mortgage.

A summary of the operations of the Sinking Fund under the First Lien Equipment Trust Indenture, from the date of its creation to December 31, 1912, follows:

RECEIPTS:

Annual payments to Trustees, years 1908 to 1913, both inclusive, $650,000 per year.....	$3,900,000.00	
Interest on cash balances and investments.....	174,446.12	
Total		$4,074,446.12
DISBURSEMENTS:		
Seventy-seven Locomotives acquired..	$1,916,821.71	
Five Milk Cars acquired.....	17,000.00	
One Gas-Electric Car acquired.....	25,217.46	
One Pintsch Gas Transport Car acquired	2,500.00	
Two Gasoline Tank Cars acquired....	1,700.00	
One Bridge Erecting Car and Trailer acquired	14,334.62	
One Steam Wrecking Crane acquired	13,000.00	
One Snowplow acquired	5,040.42	
Fifteen Cabooses acquired	10,500.00	
		$2,006,314.21
Three hundred fifty-seven (357) The Delaware and Hudson Company First Lien Equipment Bonds purchased and retired (including accrued interest)	362,896.77	
Securities and Cash in hands of Trustees.....	1,705,235.14	
Total		$4,074,446.12

In accordance with the ordinance passed May 9, 1899, and amended at the annual meeting of stockholders held on May 10, 1910, there was accumulated in the Coal Department Sinking Fund $216,972.39. This amount has been applied toward advances to The Schuylkill Coal and Iron Company and the Shanferoke Coal Company for the acquisition of anthracite lands in the Schuylkill section of Pennsylvania.

DIVIDENDS.

On December 31, 1913, a dividend for the year 1914, upon the outstanding $42,503,000, of Capital Stock of the Company, at the rate of nine (9) per cent upon the par value thereof, amounting in the aggregate to $3,825,270, was declared out of the earnings of the current and preceding years.

COAL MINING DEPARTMENT OPERATIONS.

During the year 1913 this Company mined 7,170,553 gross tons of anthracite, out of a total of 69,069,628 tons, including product of washeries, produced in the region. This is 731,998 gross tons more than in 1912, the production of that year having been reduced by the suspension of mining from April 1 to May 21, inclusive, due to the strike.

In the report for last year reference was made to an agreement between the Mine Workers and the Anthracite Operators, for a period of four years, to end March 31, 1916. Section "D" of this agreement provides, in detail, a method for the adjustment, without strikes or lockouts, of all differences, including provision for the arbitration of matters not otherwise settled. The Company has at all times observed both the letter and the spirit of this agreement. It is regretted that notwithstanding this agreement the employes continue to strike first and then to invoke the intervention of the machinery provided to prevent strikes, rather than to remain at work and have the differences adjusted in the orderly manner provided by the agreement. During 1913 there were ten separate strikes which caused the temporary idleness of one or more collieries, the total loss of time being equivalent to the closing of one colliery for 491 hours, or 54 5/9 working days of nine hours each.

This Company has endeavored to conduct its mining operations with adequate regard to protection against caving. Recent discussion of this general subject, particularly in the City of Scranton, has been accompanied by extreme demands which, if admitted, would greatly enhance the cost per ton of anthracite recovered and materially reduce the ultimate proportion of the total supply in the ground that could be made available for consumption. It is not believed that these demands will ever be sanctioned by statute or that any statute attempting to sanction them would be valid.

Effective June 28, 1913, the State of Pennsylvania imposed a so-called Ad Valorem Tax of 2½ per cent of the value of anthracite when prepared for market. No tax was imposed upon bituminous coal. This new tax is substantially equivalent to ten cents per ton on the domestic sizes, the only sizes not marketed in competition with bituminous coal, and, therefore, the only sizes from which it could be recovered. It became necessary, therefore, to add ten cents per ton to the market price of each of the domestic sizes.

The new colliery at Archbald, Pa., was completed during the year and placed in operation during April, 1913. At the same time, White Oak breaker was abandoned and dismantled, the coal from that district now passing through the new breaker at Archbald, along with coal from other lands now being developed. A new washery is under construction to reclaim coal from the culm bank at the Marvine colliery, situated in the northern part of the City of Scranton. Work is in progress to connect the underground operations at Plymouth No. 2 with Plymouth No. 5, with a view, upon completion, of abandoning Plymouth No. 2 breaker, and handling all of the output through Plymouth No. 5, thus combining the two operations.

During the year the enlargement of the electric plant at Coal Brook colliery, Carbondale, Pa., was completed and it now furnishes power and light for four collieries located between Jermyn, Pa., and Forest City, Pa. Work was continued on a large electric plant at Olyphant colliery, Olyphant, Pa., which, when completed, will furnish power and light to four collieries located between Scranton, Pa., and Archbald, Pa.

In the past three years about $140,000.00 has been expended for concrete barns in the mines replacing those made of wood; and for the installation of protective apparatus to guard the lives of employes and the Company's property against fire.

Development work was continued and facilities increased during the year, in order to maintain the output. The charges therefor, to Extraordinary Expenses of the Coal Mining Department, amounted to $970,535.80, against $857,975.42 in 1912.

The expenditures of $215,051.72 for new engines, new boilers, boiler houses and fittings; $63,646.07 for new pumps and pump rooms; and $23,840.81 for tracks, compressors, etc., were required mainly to make these facilities sufficient to maintain the present output and were made necessary by the augmented area of underground workings due to increased ages of mines. This is illustrative of expenses other than changes in the wages schedule, which tend to enhance the cost of producing coal from year to year.

RAILROAD DEPARTMENT.

Operating Revenues.

The increase in Operating Revenues over the year 1912 was $1,673,391.78. The revenue from Coal Freight traffic increased $1,090,864.98; the revenue from Merchandise traffic increased $317,577.88; the revenue from Passenger traffic increased $201,421.61; and the revenue from Miscellaneous sources increased $63,527.31.

Operating Expenses.

The increase in Operating Expenses over the year 1912 was $1,143,528.11. Maintenance of Way and Structures Expenses decreased $152,738.51; Maintenance of Equipment Expenses increased $523,221.00; Traffic Expenses increased $16,211.68; Transportation Expenses increased $605,680.88, and General Expenses increased $151,153.06.

The ratio of Operating Expenses to Operating Revenues in 1913 was 62.97 per cent, as compared with 62.57 per cent in 1912.

The decrease in expenses for Maintenance of Way and Structures was largely due to the heavy charges in 1912 on account of maintenance charges incidental to the strengthening of bridges and other additions and betterment work then under way.

The increase in the Maintenance of Equipment Expenses was due to an increase of $215,483.69 in Freight Train Car Repairs and an increase of $233,512.39 in Freight Train Car Renewals. The Freight Train Car Repairs resulted from an increase of 12,564,332 miles, or 7.74 per cent, by freight train cars. The increase in Freight Train Car Renewals was largely due to additions and betterment work. Freight Train Car Equipment is being rebuilt, applying thereto steel in place of wooden underframes. Under the accounting rules, insisted upon by the Interstate Commerce Commission, this rebuilding necessitates considerable charges to Operating Expenses, although its result is to place the Company in the possession of substantially new equipment of the best quality and efficiency at an expense very much lower than would be involved in obtaining it in any other way.

Increased traffic naturally required some increase in the Transportation Expenses. In addition there were large increases in wages, discussed in detail at another place in this report, which resulted from arbitrations, under the Acts of Congress known as the Erdman and Newlands laws, of differences with employes represented by the Brotherhood of Locomotive Engineers, the Order of Railway Conductors and the Brotherhood of Railroad Trainmen. Increases due to the so-called "full crew laws," requiring the payment of superfluous employes, are also discussed elsewhere.

Additions and Betterments—Road.

Work under the program of renewing and strengthening bridges on the main lines to make them capable of carrying E-5 consolidation engines, as mentioned in the Annual Report for 1912, was continued during the year 1913, resulting in charges to Additions and Betterments of $106,845.81 and to Operating Expenses of $40,319.32. This work will probably be completed during 1914. Strengthening the bridges on the line between Saratoga Springs and North Creek, to make them capable of carrying Consolidation Engines of classes E to E-3 inclusive, was undertaken and will be completed early in 1914. The bridge over the Hudson River at Waterford, N. Y., on the Troy Branch has been reconstructed and made capable of carrying heavier engines, in connection with the changes made necessary by the construction of the Barge Canal at that point. The bridge carrying the Troy Road and the tracks of the United Traction Company over the tracks of The Delaware and Hudson Company at Menands, N. Y., is being improved and lengthened so as to provide increased horizontal and vertical clearances and room for additional main tracks in connection with the reconstruction of the Troy Road as a State Highway. There had been expended to December 31, 1913, $43,471.04, of which $23,424.23 is chargeable to Additions and Betterments. A tract of quarry land near Cobleskill, N. Y., has been acquired, to provide material for reballasting the Susquehanna Division.

The installation of block signals between Plattsburgh and Rouses Point, N. Y., has been authorized, and will be completed during the year 1914. The estimated cost is $41,000. When this work is complete the entire line from Binghamton to Nineveh, and from Wilkes-Barre to Rouses Point, will be equipped with modern block signals. The elimination of grade crossings at Slingerlands, N. Y., and Robinson Street, Binghamton, N. Y., mentioned in the 1912 Annual Report, was completed during 1913, and that at Bainbridge, N. Y., will be completed during 1914.

A passing siding extending from West Chazy to Canada Junction, 80-car passing sidings at Wadhams, Crown Point and Montcalm Landing, N. Y., and additional yard tracks at Rouses Point were constructed during the year 1913. The enlargement of the freight house and provision of additional tracks at Green Island, N. Y., and the impovement of the station and yard facilities at Sidney, N. Y., mentioned in the 1912 Annual Report, were completed during the year. The construction of additional yard and car repair tracks, new 5-stall engine house, ash pit, turntable and locomotive coaling plant at Mechanicville, N. Y., was completed during the year. These facilities were necessary to handle the freight traffic interchanged with the Boston and Maine Railroad at that point. Similar improvements have been made by the Boston and Maine Railroad and each Company is now operating its own yard facilities in place of the former joint facilities. The Delaware and Hudson Company expended, to December 31, 1913, on this account $159,916.20. A program for the further development of yards at Carbondale, Pa., has been undertaken, and $24,483.08 has been expended thereon during the year. The work will be continued during 1914 and 1915, with an estimated expenditure of $130,000 each year.

An expenditure of $59,372 for bridge and track construction to reach the new washery and breaker plant to be known as Marvine Breaker No. 2, at Providence, Pa., has been authorized. On this improvement the sum of $26,856.33 was expended during the year, all chargeable to Additions and Betterments. Additional coal and ash facilities at Oneonta, N. Y., and a new coaling plant at Saratoga Springs, N. Y., were completed and put in operation during the year.

An expenditure of $776,000 for improvements at Albany, N. Y., including the purchase of additional lands, rearrangement of tracks, and the erection of a modern general office building and freight terminal, has been authorized. During the year a new passenger station has been constructed at Riverside, N. Y., and the old passenger station remodeled for use as a freight house, at a cost of $17,032.72, of which $15,280.72 is chargeable to Additions and Betterments. There are under way minor improvements to stations and freight facilities at Binghamton, Plattsburgh, Ticonderoga, and North Creek, N. Y.

Addition to power equipment at Oneonta, N. Y., shops, made necessary by the increased car repair work, was practically completed at the close of the year. To December 31, 1913, $46,483.05 was expended, all of which is chargeable to Additions and Betterments. The addition of four boilers and one blower at the Mechanicville power plant was commenced late in the year and will be completed during 1914.

Water facilities were enlarged during the year by the erection of 100,000-gallon tanks at Oneonta and Cobleskill, N. Y. A 50,000-gallon tank at Hudson, Pa., and improvement of the water facilities at Saranac Lake, N. Y., are now under way.

Additions and Betterments—Equipment.

The work of equipping with steel underframes, 200 box cars of 60,000 pounds capacity, 400 coal cars of 80,000 pounds capacity and 200 coal cars of 60,000 pounds capacity, mentioned in the 1912 Annual Report, was completed during 1913 at a cost of $336,872.99. This is a part of the general program of reconstruction, already referred to herein, under which the quality and capacity of this Company's equipment are being improved and increased.

During the year 10 baggage and mail cars were equipped with steel underframes and trucks. Arrangements have been made to equip 10 class E-5 consolidation locomotives with superheaters, thus effecting economy in fuel consumption. This is estimated to cost $25,000.00. There were received during the year 15 Class E15 Consolidation Locomotives, one (1) one-hundred ton wrecking crane and one (1) bridge erecting car and trailer with necessary equipment which were ordered in 1912, all of which were paid for from funds accumulated under the First Lien Equipment Trust Indenture.

The net changes, mostly charges but involving credits as indicated, during the year on account of Additions and Betterments to the Company's railroad (including expenditures on account of items mentioned above) amounted to $1,388,503.58, details of which are as follows:

ROAD:	
Right of Way	$124,368.58
Real Estate (Credit)	*3,200.00*
Protection of Banks and Drainage	14,337.02
Grade Reduction and Change of Line. (Credit)	*37,734.68*
Bridges, Trestles and Culverts	122,490.99
Increased Weight of Rail	32,150.62
Improved Frogs and Switches	3,021.35
Track Fastenings and Appurtenances	36,535.08
Sidings and Spur Tracks	95,078.77
Terminal Yards	54,009.84
Fencing Right of Way	898.56
Improvement of Crossings—Under and over	31,424.73
Elimination of Grade Crossings	12,284.56
Interlocking Apparatus	3,054.04
Block and Other Signal Apparatus	2,502.67
Telegraph and Telephone Lines	3,696.45
Station Buildings and Fixtures	65,482.34
Roadway Machinery and Tools	6,679.35
Shops, Engine Houses and Turntables	54,687.67
Shop Machinery and Tools	249,798.55
Water and Fuel Stations	67,363.55
Dock and Wharf Property	51.90
Other Additions and Betterments	19,306.87
Work in Progress	82,625.66
Total for Year	$1,040,914.47

EQUIPMENT:		
Steam Locomotives	$339,118.00	
Passenger Train Cars	1,170.05	
Freight Train Cars (Credit)	76,143.22	
Work Equipment	48,109.67	
Work in Progress	35,334.61	
Total for Year		347,589.11
Grand Total 1913		$1,388,503.58

Extensive station and yard improvements have been undertaken at Ticonderoga, N. Y., including a new passenger station, for which $45,128.82 had been expended to December 31, 1913. The cost of this work is being paid for from accumulations under contract with the Ticonderoga Railroad Company.

The organization of the Wilkes-Barre Connecting Railroad Company, to construct a railroad connection between the Pennsylvania Railroad and the lines of this Company near Wilkes-Barre, was noted in the Annual Report for 1912. The line has been surveyed, the necessary right of way acquired and the work of grading is nearing completion.

ALLIED STEAM RAILWAYS.

The Greenwich and Johnsonville Railway Company shows an increase in Operating Revenues for the year 1913 of $2,751.02 as compared with the previous year. The Operating Expenses decreased $5,710.89. The Net Income for the year was $26,303.66, an increase of $479.54. A dividend of 6 per cent. for the year ended June 30, 1913, was declared. During the year new abutments for seven bridges were constructed at an expense of $15,501.50, of which $7,909.50 was charged to Additions and Betterments and $7,592.00 to Operating Expenses. Extensive improvements at Greenwich, N. Y., consisting of the reconstruction of the yard, remodelling of the existing station for exclusive use as a freight station and construction of a new passenger station, were completed during the year.

The Quebec, Montreal and Southern Railway Company shows an increase in Operating Revenues of $13,847.50 for the year 1913, as compared with the previous year. The Operating Expenses increased $104,376.12. Income from the Hire of Equipment increased $58,231.84. The Net Income, not allowing for interest charges due to The Delaware and Hudson Company, amounted to $129,292.73, a decrease of $27,086.23. The increase in the Operating Expenses was largely due to the heavy floods in the spring, which carried away the bridges over the St. Francois river and caused serious damage to other property.

The Napierville Junction Railway Company shows an increase in Operating Revenues for the year 1913, of $32,934.88, as compared with the previous year. The Operating Expenses show a decrease of $2,923.12. The Net Income amounted to $52,873.13 or 8.81 per cent on the Capital Stock outstanding, an increase of $33,456.69 over the previous year. A dividend of 3½ per cent for the year ended December 31, 1913, was declared.

Contract has been entered into with the Grand Trunk Railway Company whereby The Delaware and Hudson Company will run one or more of its through Montreal passenger trains, each way daily, between the international boundary line and Delson Junction, Que., over the Napierville Junction Railway.

ALLIED ELECTRIC RAILWAYS.

Increases in Net Operating Revenues were as follows: United Traction Company, $36,652.14; Hudson Valley Railway Company, $10,551.07; Schenectady Railway Company, $41,318.20. The Net Operating Revenues of the Troy and New England Railway Company and the Plattsburgh Traction Company decreased $377.79 and $390.69, respectively. Dividends of 4 per cent for the year 1913 were declared on the Capital Stock of the United Traction Company; 6 per cent on that of the Schenectady Railway Company; 2½ per cent on that of the Troy & New England Railway Company, and 5 per cent on that of the Plattsburgh Traction Company.

The United Traction Company has reconstructed and repaved 2.09 miles of single track—1.52 miles on Pearl Street and Broadway in Albany, N. Y., and .57 mile on River Street in Troy, N. Y.; has re-surfaced, re-aligned and re-paved 5.34 miles of single track—2.44 miles on Hudson, Delaware and Central Avenues in Albany and 2.90 miles on Fourth Street and Second Avenue in Troy; and has constructed one mile of additional second track on Fourth Street between Burden Avenue and the Troy Union Railroad Crossing in Troy. During the year twelve new, double-truck, prepayment cars, each having a seating capacity of forty-six (46), were purchased by the Northern New York Development Company and leased to the United Traction Company, increasing the total number of prepayment cars operated by the Traction Company to seventy-two (72).

The Hudson Valley Railway Company has completed the work of paving Lawrence Street in Glens Falls, N. Y., reference to which was made in the Annual Report for 1912. Tracks on Main Street in the Village of Stillwater were reconstructed and paved for a distance of 5,782 feet in connection with the reconstruction of this street as a State highway. Various stretches of track between Fort Edward and Thomsons, between Glens Falls and Saratoga, and between Mechanicville and Waterford, formerly laid on dirt ballast, have been ballasted with cinders. A new concrete bridge has been constructed to carry the tracks over the barge canal at Ford Edward, N. Y. The high water during the latter part of March, 1913, caused a loss to the company in reduction of revenues and increase in operating expenses of approximately $11,000.00. This resulted principally from the destruction of the bridge over the Hudson River connecting Glens Falls with South Glens Falls, which was replaced by a temporary structure. Contract has been let for a new bridge of concrete construction, toward the cost of which the Hudson Valley Railway Company has agreed to contribute not to exceed $12,500.00, the balance of the cost to be borne by the municipalities. Three (3) new interurban cars each having a seating capacity of fifty-two (52) passengers have been purchased and put in service between Glens Falls and Troy.

ALLIED BOAT LINES.

The Operating Revenues of The Champlain Transportation Company show an increase of $1,033.07 and the Operating Expenses show an increase of $18,904.77 as compared with the year 1912, making a decrease in Net Operating Revenues of $17,471.70 for the year. The Operating Revenues of The Lake George Steamboat Company show a decrease of $820.68 and the Operating Expenses show an increase of $1,962.65 as compared with the year 1912, making a decrease in Net Operating Revenues of $2,783.33 for the year. The Operating Expenses of the Champlain Transportation Company increased by reason of the increased Maintenance of Vessels, $3,754.10; the increased Maintenance of Terminals, $6,267.08, caused by the extreme high water prevailing during the Spring of 1913; the increased price and quantity of fuel consumed, $5,482.89; the increased cost of food stuffs, and a longer operating season for the Steamer "Ticonderoga."

LITIGATION.

During the year, Katharine S. Weld, and others, brought action against the Company, claiming deficiency in royalties paid them, as successors to the interest of Henry B. Rockwell in the coal leased by him to this Company in 1859. This case is now pending.

CREATION OF PUBLIC SERVICE COMMISSION OF PENNSYLVANIA.

An Act of the Legislature of Pennsylvania, approved July 26, 1913, created a Public Service Commission and abolished the former Railroad Commission. The new Commission apparently has power to fix, reduce and regulate rates, to establish joint through rates and the divisions of such rates; to require the publication of rates and schedules; to prescribe and regulate distribution of cars, granting of switches, connections and sidings, and the safety and adequacy of facilities, plant and equipment; to determine and prescribe just, reasonable, safe, adequate and sufficient service, facilities, rules, regulations and practices, and to award reparation to persons injured by unreasonable rates and practices; to regulate crossings by railroads of highways, railroads and street railroads, and to require the relocation of existing crossings; to investigate issues of stocks, bonds, etc., to determine whether such issues are lawful (but approval is not required as a condition precedent to such issues); to establish systems of accounts and enforce compliances therewith; to regulate the sale, leasing and merger of powers, franchises, etc.

CAUSES ADVERSELY AFFECTING RAILROAD INCOME.

Those causes, some of them legislative, and all of them beyond the control of railway managers, which during recent years have continuously operated to enhance the difficulties attending the effort to maintain a reasonable margin between operating revenues and necessary expenses for taxes and for operation, were not less effective during the year covered by this report. Increases in rates of wages, consequent upon arbitrations under Federal statutes which, although nominally requiring the voluntary acquiescence of the railways really operate, under ordinary circumstances, with compulsory force, supplemented by reductions in the hours of labor and relaxations in the conditions necessary to secure from each unit of labor its maximum of reasonable efficiency, and increases in prices of materials and supplies, themselves mainly attributable to higher wages and lower efficiency of labor, have greatly augmented operating expenses. At the same time the taxing authorities have continued to impose upon the railways a heavier proportion of the steadily rising expenditures of government. Concurrently with these increases in necessary expenses, the process of attacking the rate schedules in detail, reducing here a single rate and there a group of rates, has operated to reduce the gross receipts on account of services rendered. While all these adverse forces have been in vigorous operation, the law has interposed to prevent, it is hoped but temporarily, recoupment from any source.

A—INCREASED WAGES AND DECREASED EFFICIENCY.

The award of the arbitrators in the case of the engineers, in effect during eight months of 1912, gave an advance of 4.34 per cent, and during 1913 cost this Company $33,030.92. The arbitrators to whom the demands of the firemen were referred, reported on April 23, 1913, their award taking effect on May 1, 1913. The increase awarded was 8.16 per cent and the cost to this Company, to December 31, 1913, was $27,308.53, or at the rate of $40,962.80 per year. The demands of the conductors and trainmen, under discussion by the General Managers' Association of New York at the close of last year, were submitted to arbitration on July 26, 1913; the Board of Arbitrators reported on November 10, 1913, and the award took effect on October 1, 1913. The increase in wages awarded amounted to seven per cent and the increased expense to this company, from October I to December 31, 1913, to $26,168.02, or at the rate of $104,672.08 per year. An Act of the Legislature of New York, which took effect on September 1, 1913, required the railways of the State to place an additional and unnecessary employe on the majority of their trains. These employes in no degree increase the safety of operation or serve any useful purpose, but from September 1 to December 31, 1913, the added cost to this Company was $40,832.88, or at the rate of $122,498.64 per year. A similar Act of the Legislature of Pennsylvania, in effect since July, 1913, caused this Company an unnecessary additional expense, in 1913, of $40,194.49. Together these items represent an increase in annual operating expenses of $341,358.93, which will, of course, become greater if the volume of traffic increases.

During the year which ended with June 30, 1913, the Railroad Department of this Company paid to its employes the sum of $8,508,673, which was $1,122,780, or 15.20 per cent, in excess of the sum that would have been paid for the same services at the rates of compensation that were in force on June 30, 1910. And this comparison takes no account of increases in wages that took effect after June 30, 1913.

B—INCREASES IN PRICES OF MATERIAL AND SUPPLIES.

There have also been many changes in prices of maetrial and supplies, and while there have been both increases and decreases, the former have affected the most important articles and the most extensive purchases and the latter have not been sufficient to offset them. An analysis of the changes since 1909 in prices of all material and supplies purchased by The Delaware and Hudson Company shows increases in the prices of twenty-eight out of fifty-nine articles of prime importance. The increased cost, on the basis of the purchases of 1912, due to changes in prices, was $326,603.16, being the difference between a total increase of $358,276.60 in the cost of the articles that have advanced and a total decrease of $31,673.44 in the cost of those reduced in price. The aggregate sum expended in 1912 for these materials and supplies was $5,239,288.35, or 6.65 per cent in excess of the sum that would have been necessary had the prices of 1912 been the same as those of 1909.

C—FEDERAL AND STATE REGULATIONS.

In addition to the foregoing burdens, in the shape of increased wages and higher cost of supplies, Federal and State regulation, in the form of hours of service laws for employes, full crew laws, requirements concerning the preparation, filing and posting of rate schedules and annual and periodical reports, locomotive regulations, such as those in regard to washing, testing and inspection, etc., employer's liability acts, elimination of grade crossings and other items of this character, has added the following sums to the operating expenses of The Delaware and Hudson Company:

1907	$78,716	1911	$247,736
1908	143,980	1912	293,329
1909	214,457	1913	325,497
1910	222,204	Total	$1,525.919

Without discussing the propriety of the large expenditures which have been made for safety and signal appliances, it is proper to note that the amounts spent for these purposes aggregated, in the last seven years, $1,509,805.

D—INCREASES IN TAXES.

Taxes have increased even more rapidly than other expenses. Comparing the year ended June 30, 1913, with the average for the past ten years, and also with the year ended June 30, 1910, it will be seen that the following increases have taken place:

	INCREASE.	
	1913 over ten-year average 1903-1912.	1913 over 1910.
TOTAL.	25.68%	7.40%
Property investment	47.56%	46.34%
Taxes	37.19%	21.06%
Operating revenues	43.30%	28.20%
Operating expenses		

Stated in amounts, it appears that there has been an increase from $237,539.55 in 1903 to $621,190.04 in 1913; or, in other words, The Delaware and Hudson Company paid $2.62 in taxes in 1913 for each $1.00 so paid in 1903, an increase of 162 per cent. An increase in taxes, paralleling the increase in property investment, might perhaps be anticipated, but here it will be noted that the increase in taxes is even more excessive, as compared with the increase in property investment, than the increase in expenses.

An Act of Congress of October 3, 1913, imposed an annual tax of one per cent per annum upon the net income of all corporations. Under the Corporation Tax law, previously in effect, they were required to pay one per cent upon net income in excess of $5,000 and were permitted to deduct, in arriving at taxable income, dividends received from other corporations subject to the tax. Under the new law a tax will be paid by companies from which The Delaware and Hudson Company receives dividends, and the latter will also pay on the same items, so far as they are included in its income. This double taxation and the removal of the $5,000 exemption will add about $15,000 to the tax payments of this Company.

The new Income Tax law has been construed by the Treasury Department as requiring one per cent upon interest payments to individuals to be retained by whoever makes the payment. Certain bonds issued or assumed by this Company were issued under mortgages providing for the payment of interest, "free from any tax which the Company may be required to pay thereon or retain therefrom." The Company has paid the interest on such bonds in full, thereby assuming the tax without prejudice however to its right to change its course should it seem proper to do so. The increased tax expense of this Company due to the assumption of the tax on these so-called "tax-free" bonds amounted, for the period covered (March 1 to December 31, 1913), to about $3,000.

E—Rates.

On July 24, 1913, the Interstate Commerce Commission made an order in the matter of express rates, practices, accounts and revenues requiring the express companies to adopt various rules and regulations, and prescribing an entirely new system and schedule of rates for all express services. The rates named by the Commission are materially below those formerly in effect. The application of certain railways to intervene in this proceeding and to be heard in defense of their rights under contracts with the express companies, was denied by the Commission. It is difficult to estimate the loss to this Company consequent upon this action of the Commission, largely owing to the fact that reductions in the revenues of the express companies were also caused by the orders of the Postmaster General increasing the maximum weight of packages carried by Parcel Post, which have undoubtedly resulted in the withdrawal of a large number of packages from the express companies.

The scope of the Federal mail service was extended on January 1, 1913, by the inauguration of the Parcel Post with a weight limit of eleven pounds and a greatly reduced scale of rates of postage. This involved a large addition to the volume of mail carried by the railways and the charge was very inadequately recognized by an addition of five per cent to the mail pay of certain railways. But the lines of this Company and all others on which the mails were weighed during the Spring of 1913 were excluded from the operation of this provision. This early weighing did not, however, provide adequately for the additional Parcel Post mail for the reason that it took place while the new service was in its earliest stage of development. Subsequent to the weighing there was a considerable increase in the number of packages within the eleven pound limit and, moreover, the weight limit has been twice increased, on August 15, 1913, and January 1, 1914, and important reductions in the rates of postage have been made. At present the limit of weight for the first two zones is fifty pounds and for all other zones it is twenty pounds. For these additions to the mail, neither The Delaware and Hudson Company nor any other railway has received any compensation whatever. The injustice thus resulting and the best means of relief therefrom have been carefully considered by the railways' Committee on Railway Mail Pay and the facts have been laid before the Joint Congressional Committee which now has the subject under consideration. The deliberations of this committee ought to lead to a recommendation to Congress, and to legislative action, that would establish a fairly compensatory basis of payment for the postal services rendered by the railways. It is not believed that Congress intended to bring about the present situation, under which the larger portion of the cost of the Parcel Post is borne by the railways to which the whole of that portion of the expense thus becomes a loss, or that its continuance will be contemplated with equanimity.

The investigation by the Interstate Commerce Commission of the rates, rules, regulations and practices governing the transportation of anthracite, which it was stated in the last Annual Report that body proposed making, was actively taken up toward the close of the year 1913, and the taking of testimony is now in progress.

F—Decrease in Net Corporate Income.

The encroachment upon the amount to which capital is fairly entitled as recompense for its share in the accomplishment of the railroad, and the insufficiency of the sums remaining after the payment of operating expenses, taxes, etc., to hold out to the investor adequate assurance of protection to his investment, are shown by the increasing proportion of the total income which they consume.

A study of the amount and proportion of the total annual income from 1903 to 1913, derived from all sources, and the amounts and percentages of such total income classified according to the purpose for which each was distributed, indicates that in 1903 wages and salaries consumed 73.30 per cent of such total income; in 1913 these expenditures had increased to 33.34 per cent. Materials and supplies consumed 18.68 per cent in 1903 and 22.31 per cent in 1913. Taxes consumed 1.59 per cent in 1903 and 2.27 per cent in 1913.

Comparisons of the total income received in 1903 and 1913 and its distribution in the two years are afforded by the following:

	Year Ended June 30			
	1903		1913	
Item.	Amount.	Per cent of total.	Amount.	Per cent of total.
Total income	$14,974,497	.....	$27,338,533	.....
Disposition:				
Wages and salaries	$4,087,442	27.30%	$9,113,657	33.34%
Materials and supplies	2,796,627	18.68%	6,100,427	22.31%
Outside operation expenses	4,315	.03%	144,931	.53%
Taxes	237,539	1.59%	621,190	2.27%
Rents	98,052	.65%	389,019	1.42%
Balance available for interest, dividends, etc.	7,750,522	51.75%	10,969,309	40.13%
	$14,974,497	100.00%	$27,338,533	100.00%

G—Difficulty of Obtaining Necessary Railway Capital.

From the conditions described it has resulted that, although the railways now represent a largely increased investment of capital, they have a smaller annual margin of gross income over necessary expenses and taxes than they enjoyed when the capital employed was much less than it is at present. With this situation, the pressure of traffic upon facilities and the public demand for increased comfort and safety of travel and transportation have continued, so that the railways are required to make large additions to their capital while their ability to attract new capital and even properly to recompense the capital already employed is steadily diminishing. Moreover, there has lately been a world-wide rise in rates of interest, which has affected all classes of American securities, with the exception of those of the great manufacturing corporations. The heavily increased borrowings of American municipalities have led to higher rates of interest on their bonds, which formerly yielded materially lower returns than railway securities. On the other hand, the "industrials," have become stronger competitors because these corporations have succeeded in convincing many investors of the substantial stability of the still higher rates they offer. Thus the difficulty of obtaining needed railway capital has been greatly enhanced by the competition of two classes of applicants for portions of the fund seeking investment, neither of which formerly appealed with much effect to those from whom railway capital must principally be derived.

H—Remedies.

In its earlier stages, the movement which has been set forth was met, more or less effectively, by economies in operation, principally secured by additions to the capital employed. Heavier and more efficient locomotives, larger cars, heavier rails, stronger bridges, additional main tracks, more sidings, passing tracks and yard tracks and facilities, and improved appliances of many kinds, all involved heavy permanent investments, but leading to more efficient performance. By such means, for example, the average freight train load of this Company and affiliated lines was increased from 339.92 tons during the year ended June 30, 1903, to 558.27 tons during the year ended June 30, 1913, and the average car load from 14.24 to 18.63 tons. It is now felt that the limit upon economies of this sort has been at least approximately attained. In other words, with the mechanical arts in anything like their present state, additional capital cannot longer be so economically employed to offset increased operating costs.

That the need of early readjustment, as between the operating expenses, taxes, etc., and the rates of charge from which those items must be defrayed, is widely recognized as is evidenced by an extract from the decision of the Board of Arbitrators, rendered on November 10, 1913, and fixing the rates of pay of conductors and trainmen, is especially pertinent. The arbitrators said:

"This Board has no authority to determine the passenger and freight rates to be paid in the Eastern Territory; neither is it in position to determine whether such an increase is justified, as a matter of fact, by all of the circumstances. This Board, however, believes that it must make its findings as to what is a proper rate of pay to be awarded to the conductors and trainmen as a result of this arbitration, without any reference to the dilemma to which railroads are evidently placed by the laws which make it impossible for them to increase passenger and freight rates without the authority of the Interstate Commerce Commission or of the Railroad Commissions of the various States. To take any other view of the question would be to decide that no increase of pay, while the laws remain as they are, can ever be made except voluntarily by the railroads. Such a decision would render arbitrations like this valueless; and it would be in effect to hold that railroad service in the Eastern Territory must continue to be rendered at existing rates of pay, even though this were to condemn the employes of the railroad to work for rates of pay which have been determined by the most careful inquiry to be inadequate. At the present time a ton of freight is moved in the Eastern Territory more than 3 miles for the value of a two-cent postage stamp. This is the cheapest railroad service to the shipper to be found on the face of the globe. In the face of such a fact, it would be unjust to say that railroad employes must continue to be satisfied only with what can be paid from freight rates as low as this."

Commenting further upon the immense additions to railway capital which they found to be desirable, the arbitrators said:

"Any policy that would make it impossible for the railroads to command this money would be a profound misfortune to the whole nation. Such a policy would be bad enough in its effect upon transportation, because it would reduce the efficiency of the railroads; but it would be criminal, in the sense that it would make the great army of railroad employes, who are numbered by the hundreds of thousands, follow their hazardous occupation under conditions more hazardous than are necessary, and indeed more hazardous than are justifiable in a country like this. The increasing safety of passengers is equally involved."

Impelled by these conditions, in March, 1913, the railroads in Official Classification Territory petitioned the Interstate Commerce Commission to reopen the proceeding, known as the Eastern Advanced Rate Case, in which that body, in 1911, prohibited certain proposed increases in rates, and, in that proceeding, to authorize an advance of 5 per cent in the rates to be charged on all freight. This reopening was denied on June 21, 1913, but on the same date the Commission instituted an inquiry upon its own motion into the matter of "Revenues of Rail Carriers in Official Classification Territory." New tariffs containing the new rates proposed were subsequently filed with the Commission. In view of the fact that the Interstate Commerce Commission had under way at the time an investigation of the rates, regulations and practices governing the transportation of anthracite it was not considered suitable to propose an advance in the rates on anthracite pending the determination of the inquiry then before the Commission. However, notice was filed with the Commission that this was not to be taken in any sense as conceding that the anthracite rates should not be included in the advance. The new tariffs were suspended by the Commission until September 15, 1914, and the proceeding on this suspension was combined with the general inquiry. The presentation of proof of the urgent need of the railroads for increased revenues and the reasonableness of the rates proposed was immediately undertaken. Prior to December 31, 1913, several hearings were had before the Commission, and a vast amount of data showing the situation of the railroads was filed with that body. The submission of testimony is still in progress.

By order of the Board of Managers,

L. F. LOREE,
President.

Note—The data in Sections D, F and H include the operations of this Company and affiliated lines submitted to the Interstate Commerce Commission for the fiscal years ended June 30, while the statistical tables in this report exclude the affiliated lines and cover the calendar years ended December 31. [The Balance Sheet is on p. 81.]

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VOLUME 57 JULY 17, 1914 NUMBER 3

Contents

*Illustrated.

Popular clamor for the recall of a judicial decision prohibiting the granting of aid to a railroad company is the mixed situation in Colorado as the result of the decision by the state Supreme Court that the contract under which Denver was to furnish $3,000,000 for building the Moffat tunnel was not constitutional. Colorado's constitution prohibits a city lending its credit directly or indirectly in aid of any corporation or entering into a partnership with a corporation or of making a donation to a corporation. After the bankruptcy of the Denver, Northwestern & Pacific, Newman Erb undertook to reorganize the company as the Denver & Salt Lake, and persuaded the city of Denver to issue $3,000,000 bonds to pay for two-thirds of the cost of the tunnel which will make possible the extension of the Moffat road, which now runs from Denver to Steamboat Springs, to Salt Lake City. Denver has voted three times by a substantial majority to make a municipal bond issue to build a tunnel and to let railroad companies use the tunnel. The Supreme Court of the state, however, has held that this amounts to entering into a partnership agreement with a corporation and lending aid to the corporation. When this decision was announced there was a clamor for a recall, which is provided for in one of the amendments to the Colorado constitution. As it is pointed out, however, by Colorado lawyers commenting upon the decision, the recall provision may not apply to this particular case, and even if it should eventually be found to do so, the Denver city bonds, if issued immediately with the ban of the Colorado Supreme Court upon them, could not be sold. It may even be possible that the state of Colorado, in its effort to tie its own hands against aid or comfort to the enemy corporations, has very effectually done its utmost to prevent the entrance of a new railroad competitor into the transcontinental freight business with resulting loss to the rest of the United States.

Colorado and the Moffat Tunnel

The Interstate Commerce Commission has issued in abstract its customary statement, for the year ending June 30, 1913, of the total mileage, equipment, capital, and revenues of all roads in the United States earning more than $100,000 each, together with traffic statistics and the number of persons in the companies' service. The main features of this abstract are reproduced on another page. There has also been issued this week the "text" of the commission's final statistical report for the twelvemonth ending one year before that, or June 30, 1912. This is dated November 17, 1913. The term "text" is used to denote the statistician's introduction to the report, which embodies the tables that give aggregates for the whole country. This matter fills 65 pages. The final unabridged report—the bound volume, costing a dollar—may be expected some time in the future. The efforts of the statistical office of the commission to get out the annual statements as early as possible—while the facts which they give are still of some current value—are very commendable; but the task is one of such magnitude that evidently it is difficult to decide what to do first; and the effect is slightly bewildering. One who wishes to use the statistics needs a schedule of dates as elaborate as a court calendar. First comes the brief report of income account for roads having annual operating revenues of $10,000,000. This, for the fiscal year ending June 30, 1913, came out with the commission's annual report to Congress in December last. Next, revenues and expenses of roads of Class 1, those earning over $1,000,000 each. This also came in the December report. This is only a half-page statement, based on monthly reports. Next, a pamphlet of 179 pages giving full, but uncorrected, statistics of each road in Class 1. This contains all the different classes of statistics, but no totals for the country as a whole. This, for the fiscal year 1913, is dated January 1, 1914, and reached this office in April, 1914. Next, the totals for the country for the year of all roads having each an annual

Statistics of Varied Vintages

revenue of $100,000 or more (Classes 1 and 2). This, for 1913, filling a half dozen pages, is dated July 1, 1914, and is the one reprinted by us today. It deals with a variety of statistics, as noted above; but it gives no information about individual roads. It is "preliminary"—subject to correction—and also is incomplete in that it omits Class 3 roads, those earning less than $100,000 each. The final report for 1913, giving individual statements for all roads, and the corrected totals for the whole country, is yet to come. This final report for 1911 has been out several months. For 1912 a part of the final report (the "text" above referred to)—facts two years old—has just come out, and the remaining part may be expected within from six to nine months. This for 1912; the final report for 1913 will be due twelve months after that. As to the fiscal year 1914, which has just ended, all that can be said is that the year "has passed into history." But getting facts out of history is quite a different matter!

A New Leaf on the Western Maryland

Expenses for May on the Western Maryland were 114 per cent. of gross earnings. Carl Gray became president of the Western Maryland in March, and the very heavy expenditures and charges for maintenance in April and May are the result of a drastic policy of cleaning up deferred maintenance. June expenses are expected to be as heavy as those of May. In May, 1914, $181,000 was spent for maintenance of way as against $96,000 in May, 1913, and $266,000 for maintenance of equipment as against $107,000 in 1913. The management announces that part of the heavy maintenance for May is in extraordinary repairs to roadway and locomotives, but a considerable portion is due to an inventory shortage which was discovered at the time of the change in management. Previous to the change in management, the Western Maryland had been making a very poor showing, and it now appears that even this poor showing was better than the actual facts warranted. The improvement in the ratio of transportation expenses to revenue in the last few months is marked. The ratio in February was 58 per cent., in March 51 per cent., in April 43 per cent., and in May 41 per cent. The new management expects that June will be the last month of the extraordinary charges necessary to put the property in good physical shape, and to clean off deferred charges. The Western Maryland has been playing in hard luck ever since it was singled out to become the eastern outlet for the projected Gould transcontinental system. When this project fell through, the necessities as far as the Western connections of the Maryland road were concerned were met by the construction of the Connellsville line to connect with the Pittsburgh & Lake Erie, which it was thought would supply a very good outlet to the East for the shippers of steel and similar commodities along the line of the latter road and its connections. The advantages that should have followed the opening of this line have not as yet materialized, but it is beginning to appear as if this was due rather to serious mistakes of the old management than to the impossibility of securing large and important amounts of traffic from this connection. Apparently the newly elected management of the Western Maryland is going about bettering conditions in the proper way.

Safety at Grade Crossings

A simple and sensible method of dealing with one of the important factors in the highway grade crossing problem, which promises to produce immediate results, has recently been adopted by the Cook county public safety commission of Illinois. The grade crossing question has been constantly agitated in Illinois for several years, as in most other states, and the railways have already expended many millions of dollars for track elevation and other improvements, not only in the cities, but throughout the rural districts. The grade crossing committee of the safety commission, however, has hit upon a way of removing dangerous conditions at hundreds of highway crossings where the situation does not demand or warrant heavier expenditure, but which present serious possibilities to automobile and other vehicle drivers. This committee, accompanied by the county coroner, himself a former railroad man, has recently made a number of inspection trips over the lines running out of Chicago, and has discovered scores of places where the principal requirement is the removal of obstructions to the vision of pedestrians or drivers of vehicles on the highways approaching the crossing. In most instances the obstructions are not upon the property of the railway, but consist of trees or shrubbery that could easily be removed or trimmed to give a clear view of the railway track for some distance from the crossing. The committee has been accompanied on each of these trips by officers of the railway and by the mayors or other officials of the cities and townships through which the line passes, and both the railway men and the public officers have been easily persuaded to undertake the slight expense involved, or to co-operate wherever necessary to remove the dangerous obstructions at once. Thus the cause of safety has been promoted at the cost of very little money simply by bringing the right people together and pointing out to them how simply conditions may be remedied and at how little cost.

A SENSATIONAL REPORT ON A STALE SCANDAL

IT is significant that the report of the Interstate Commerce Commission in its investigation of the financial transactions of the New York, New Haven & Hartford, which is abstracted at some length elsewhere in this issue, is signed, not by any individual member of the commission, but, like the reports on overcharge claims amounting to $50 or thereabouts, "By the Commission." The facts brought out by this investigation should have been brought out, and if it is possible for the New Haven stockholders to recover any part of their money which has been spent illegally, court proceedings should be begun at once. But the method of bringing out these facts which has been followed in this report is so grossly improper that the only charitable assumption is that the commissioners were so taken up with the rate advance case that the preparation of this report was left to Mr. Folk or to others who took this occasion to make a play for popular attention at the expense of the common decency of the commission.

Frederick W. Whitridge, president of the Third Avenue Railway, of New York, in commenting on the New Haven report, is quoted as calling it the exposition of "a stale scandal." During the greater part of the time that this scandal was being actually enacted, the Interstate Commerce Commission was charged with the duty of regulating the management of the railroad companies of this country and clothed with plenary power, and during the time that the accounting irregularities, which quite properly are so bitterly commented on by the commission, were being carried on, the commission was accepting without comment the New Haven's monthly and annual statements showing its financial transactions. The commission had the legal power to make an investigation of these accounts at any time. The commission therefore lays itself open to the charge of being simply a destructive critic, where it might conceivably have prevented some of the waste and loss that has taken place.

It is unnecessary for the *Railway Age Gazette* to comment on the negligence of the directors of the New Haven, or on Mr. Mellen's ethical attitude toward the stockholders other than the late J. P. Morgan—most of the facts that the commission so sensationally blazons forth in this report were already public knowledge from the testimony at the hearings. On the other hand, it is entirely fair and pertinent to ask the commissioners whether or not, by giving their stamp of approval to the New Haven's annual reports for 1908-09-10-11 and 12, they are tarred at least in some measure with the same brush which they wield so vigorously against dummy directors.

THE AUTOMATIC TRAIN STOP—II

IN discussing in our issue for July 10 the report of the American Railway Association Committee on this subject, we rehearsed the arguments concerning the excellence of the train service on American railroads and those evidences of progress that the principal roads are making in safety measures, which tend to justify that committee in holding that automatic stops are not at present to be recommended; and we called attention to those difficulties connected with the stop problem which support the view that the general adoption of this safeguard would be so costly, compared with the value of the expected protection, that the expenditure would not be warranted.

But there is another side to the question. The safety of American railroad trains is excellent, but it is not perfect. There is progress in safety, yet collisions continue to occur often enough to keep fresh in the railroad manager's mind the fact that this progress is halting and in many cases slow and imperfect. Dependence on improved vigilance on the locomotive, which is a main feature in this committee's theory, is not a wholly satisfactory safeguard. Engine runners occasionally disregard signals because of defects or deficiencies of mind or body which, it is admitted, are incurable by any process within the control of the railroad superintendent, and the idea of perfecting some device outside the engine, to stop it when the runner fails to do his duty in that respect, has therefore appealed not alone to congressmen and to ambitious inventors in secluded laboratories, but to hard-headed railroad officers as well. And when the failure of an engineman results in a score of deaths, the public demands a cure of the evil at any cost (except at the cost of low speed—nobody proposes that as a remedy). The arguments in favor of automatic train stops therefore merit attention.

The main point in favor of automatic stops is that they are extensively used already, on the underground railroads. The Interborough (New York) has used them nearly 10 years and the officers of the company class them as a valuable safeguard. The differences between the Interborough subway and ordinary railways are matters of detail; very costly and troublesome details, perhaps, yet details. The public cannot be convinced that mere details should warrant a trunk line in ignoring the experience of the Interborough except after a thorough demonstration. After a five years' demonstration on the Interborough, the Hudson & Manhattan, the Pennsylvania tunnels and the London tubes adopted the stops. The system is no mere experiment. On these roads, it is true, the motorman has no companion in the cab (except on the Pennsylvania), but there is little force in the argument that a monitor makes the automatic stop unnecessary, for the reason that our fireman-monitors have so often failed. Two men will forget together. On freight trains eight men have coincidently forgotten a despatcher's order.

If anyone is disposed to argue that these city roads need stops because their motormen are not high grade men, like regular locomotive runners (and that roads employing firemen do not need them), he may as well dismiss the question, for it is not a practical issue. "High-grade" is an unreliable term. Mr. Rudd's appeal to the honor and the conscience of the engineers will not afford us any satisfaction. Not that the majority of runners are devoid of honor and conscience; the question is, can the superintendent be sure of the right qualities in the whole of his force? He, as an individual, is responsible for efficiency. Exhorting the units has no tangible effect. One of the hardest problems of the superintendent is to cultivate, in enginemen, that brand of conscience which will admit a mistake when the result of that mistake may mean dismissal. Again, the directors of a large railroad, when considering the problem of perfecting their enginemen, must recognize that their superintendents—perhaps a score of them—are far from perfect. They will not always get 100 per cent. out of their runners even if the making of the 100 per cent. is there. A big railroad is such a complicated machine that no one has yet got near the ideal in operation. For many of the elements of many of our good records we have to thank a benevolent Providence rather than scientific efficiency.

It is not all a question of discipline, however. The most perfect enginemen, under the best administration, may break down. Mr. Long, the general manager of the Pennsylvania, speaking at the meeting of the American Railway Association last year, mentioned collisions that he had heard of which were due to "preoccupation of the engineman." The man was awake, had his head out of the cab window, looked at the signals, saw them, but did not obey them. The sense of sight was not sufficient. Many people, said Mr. Long, think that cases like this are becoming so frequent that something ought to be done. Every one knows that enginemen sometimes go on duty with powers of mind or body impaired by sickness, or with minds burdened with debts, or divorce or other domestic difficulties, or the death of a friend. They have not the combined courage and discretion to lie off and lose a day's pay. The wisdom described by some of the writers of our articles, published last winter, on "How to Keep a Good Lookout" is not universal. With the mass of facts like the foregoing, it would be easy enough to show that automatic stops are desirable if only they were proved practicable and not unreasonably costly.

The Interborough not only uses the stops but recommends them. In the first year a very serious collision was undoubtedly prevented. On the Boston Elevated, where stops have been used 15 years, an officer gives the significant testimony that disregard of stop signals *has been done away with.* With its low speeds this road has not the most difficult problems, but it is noticeable that the fine results reported have been made without the aid of a recording apparatus. And here, as well as on all the subways mentioned, the stops are not self-detecting. It is possible for a stop to fail and the failure not be promptly discovered. But the improvement of discipline is such a pronounced benefit that the officers prize the system highly without demanding that it shall be ideally infallible. On the Interborough a satisfactory degree of certainty in operation is maintained by the ordinary inspection, such as is given other signal apparatus.

There are bold signal engineers ready to adapt automatic stops to trunk line railroad conditions. The Chicago & Eastern Illinois, as noted in the *Railway Age Gazette* June 5, page 1246, has equipped 90 engines, and proposes to protect trains on about a hundred miles of road. Unless some fairy can give assurance that no more collisions of the first magnitude are going to occur anywhere, it would seem to be the duty of railway officers generally to keep very close track of all such experiments as this; or, if those experiments are not in all respects of a satisfactory kind, to start something better. And when we see the underground roads satisfied with a device which theoretically is imperfect, and the French government requiring cab signals installed on thousands of miles of road, it may be claimed, with reason, that sticking forever at the difficulties of the automatic stop, is not the part of wisdom. One of the difficulties, the overlap, can be overcome by adding "speed control" apparatus. Why should not speed control be thoroughly tested? All troubles with snow and ice are supposed to be avoidable by the use of magnetic or induction apparatus, having no contacting parts. Should not this supposition be proved? If brake-applying apparatus is to be finally rejected as not usable, the fact ought to be settled, and the next best thing tried. Cab signals and Mr. Cade's audible roadside signal have well known drawbacks; but they involve no difficulty with brakes; and *if* automatic stops cannot be made satisfactory and

if the public is not going to be satisfied with our present system, it may become expedient to encourage some such device.

This, it seems to us, is the line of argument of the more level-headed of the automatic stop advocates; and these advocates are too numerous to be ignored. Congress and other public bodies blindly demand that the railroads do something. It is not fair to keep the public in the dark. It is not even consonant with enlightened self-interest to maintain a silence which is interpreted as indifference. Except as continued freedom from collisions may keep Congress in a somnolent condition, the fundamental issue still hangs over our heads.

Between the ideas of the advocates of stops, whose position we have here outlined, and those of the conservatives, recounted in our first article, there are some pretty radical differences, although at first thought it might seem that they differ only as to details. The opposing sides have never met each other in fair and free debate. But the importance of the parties, if not the importance of the subject, would seem to demand that this anomalous condition be brought to an end. This phase of the problem will be considered in a third article.

THE STOKER SITUATION

As to whether the mechanical stoker for locomotives is to be considered a success or not, in the present stage of its development, depends on the viewpoint of the person expressing the opinion. If the opinion is based purely on up-to-the-present performances insofar as coal consumption per unit of work done is concerned, the answer would probably be in the negative, for undoubtedly stoker-fired do burn more coal than hand-fired engines. But if the question is to be viewed from the standpoint of ability to maintain steam pressure, and of handling all the coal burned, then the stoker is a success. It was, however, remarked two years or more ago at the Master Mechanics' convention that it is, apparently, a comparatively simple matter to design a stoker that will maintain steam pressure under ordinary and even extraordinary working conditions.

It is, of course, of prime importance that an engine should be kept hot. That is the first task imposed upon the fireman, and for its accomplishment all other things must take second place, even to that of lookout for signals, because it would be a hazardous excuse to offer for a steam failure that the fire was neglected to call signals. Full steam pressure means relief to the engineer, as he can work his machine to its full capacity; he can make the time, and the despatcher knows that he can count on trains reaching meeting points at the estimated time. If to this we add a certainty as to steam pressure at all times, regardless of grade, loads, speed, length of run and weather conditions, we have eliminated many of the uncertainties of train operation and put confidence in the heart of the operating department. This can now be done by the stokers on the market. They can remove that factor, "the fatigue of the fireman," from consideration and give the despatcher confidence that a weary man at the end of a long division is not one to be reckoned with. It means that the engine can really be loaded to capacity without danger of steam failure and that it can be counted upon to work to its maximum efficiency to the end of the run. And, as a necessary consequence, its rating is increased. The engineer in this is relieved of the necessity of favoring his fireman. He can work the engine as he would like, regardless of the man. He is not called upon to trade water for steam, and lose time lest he lose pressure. In short, he can keep both eyes on the lookout instead of keeping one always on the steam gage. This the present stokers can accomplish.

If, then, the stoker burns more coal per engine mile or per ton mile, the question is, are not the results worth it? It is generally conceded by those railroad men who have been most successful in the use of stokers and have the largest number in service, that the engines so equipped do burn more coal than those that are hand-fired. But the comparison is apt to be made on the basis of the engine mile. Sometimes tonnage has been increased, but always operation has been improved, so that the actual increase of coal consumption is subject to a discount dependent upon the actual increase of tonnage and the value that may be put upon the improvement in operation. Hence the apparent extra fuel cost may be either entirely eliminated or, at least, greatly reduced, dependent on the modifying factors that may be used in making the calculation.

As for the extra fuel consumption, there is a very good reason for its present existence, but, apparently, none for its continued existence. As already stated, the first condition imposed on the fireman is that he should maintain his steam pressure. When he is firing by hand, and especially towards the end of a run, he favors his own back by using as little coal as he can, and so saves coal. With a stoker he has his eye on the steam gage, and takes no chances, and, as it requires no effort to put coal into the firebox, he makes sure that he is putting in enough, which means that he always puts in too much. But he holds the pressure. It is, then, a matter of the education of the fireman to train him so that he will put in enough and not too much coal, that he will watch his fire at all times, with even greater care than when hand firing, and that he will give the stoker operation his constant and unceasing attention. The work done by the locomotive on the road varies from minute to minute and almost from second to second, and if the best results are to be obtained with a stoker, its adjustments should follow each other with the same rapidity as the variations in the work done by the engine.

On general principles, there is no reason why a stoker-fired engine should burn more coal than one that is hand-fired, and many reasons why it should burn less. The firebox can be designed so as to secure the best conditions of combustion; the door need not be opened, and the air supply above and below the bed can be adjusted to secure the best results. But we still have the human element of indifference and carelessness to contend with, with every inducement towards an excessive fuel supply. How these can be overcome is a difficult problem. A fuel premium has been suggested as a proper and possible solution.

Based on the sentiments of the men using the stoker, it is a success. The men like it. After they have become accustomed to it, they have confidence in it and its labor-saving qualities recommend it. But it is new, and men have to be educated up to it. It frequently happens that a stoker will be a perfect failure on one run, and the men will declare it unfit for use, and then on the next run, without any work having been done on it, it will do a one hundred per cent. job of stoking with a different crew. In short, the personal equation is still an important factor in stoker operation.

Large engines with cylinders of 25 in. diameter or over can do a great deal of work if they are properly fired, but they must be supplied with large quantities of fuel and this means heavy labor for a man if the locomotive is to be worked to capacity. The man tires, the stoker does not. With the man, engine efficiency falls; with the stoker it can be maintained to the end of the division. The stoker does, and for some time probably will, burn more fuel than the man, but it is on the whole reliable. Its cost of maintenance is at present unknown, but will probably range from one-half to one cent a mile. The troubles which it will develop will probably increase with the number of stokers in use. It will require constant attention and supervision. It will add another element of care to be looked after by the mechanical department. But in spite of these added burdens, it looks very much to an outside observer as though its advantages outweighed its disadvantages, and that the time is not far distant when it will be considered an economical necessity.

NEW BOOKS

The Validity of Rate Regulations, State and Federal. By Robert P. Reeder, of the Philadelphia bar. 440 pages, 6 in. by 9 in. Bound in buckram. Published by T. & J. W. Johnson Company, 535 Chestnut street, Philadelphia.

This book is a treatise dealing with the principles of constitutional law which are involved in the various phases of rate regulation by the federal and state governments, and which are fundamental to an understanding of the many problems connected with rate regulation. Established principles are stated clearly, accompanied by many quotations from the decisions of the courts in the rate cases themselves, and many unsettled problems are discussed at length by going into a broader consideration of the purposes of those who placed in the federal constitution the provisions which bear upon rate regulation.

The treatment covers the contrast between state and federal power, the methods of making and enforcing regulations, the principles governing the valuation of property for rate-making purposes, the constitutional rate of return, discrimination in regulations, and the impairment of contracts. Especially valuable is the discussion on valuation of property and on the relation of the due process provision of the constitution to substantive law. The chapter headings are as follows: "The Commerce Clause," "The Distribution of Governmental Powers," "The Due Process Clauses—Position of Court," "Due Process Clause—Discussion," "Equal Protection Provision," "Just Compensation," "Impairment of Contracts," "Preferences to Ports," and "Limitations Upon Federal Judicial Power." The book contains four thousand citations, with parallel references.

Railroad Statistics. Published by Price, Waterhouse & Co., 54 William street, New York. 9 in. by 12 in. 70 pages.

This is a combination of statistics derived largely from the annual reports of the larger railroad companies to their stockholders, and in the case of rates conveying to their stockholders from December 31 of statistics reported to the Interstate Commerce Commission. Compiled by an accounting firm of international reputation, it may, of course, be relied upon for accuracy and some of the derived figures are unusually interesting and informing. The principal railroads of the country are divided among eight groups: eastern trunk lines, anthracite railroads, southern and southeastern lines, trunk lines west of Pittsburgh and Buffalo, middle west lines in the north, middle west trunk lines, mountain lines and Pacific lines. The figures cover from 1909 to 1913 inclusive. The units selected are used intelligently, for instance freight and passenger renewal is based on per mile of road operated, while rail renewals, tire renewals, etc., are based on mile of single track operated and maintenance of locomotives on the per locomotive per pound of tractive power per locomotive mile and per locomotive mile per thousand pounds of tractive power basis. The average figures for each group are given on an average for all groups.

List of Publications Pertaining to Government Ownership of Railways. Compiled by the Bureau of Railway Economics, Washington, D. C. 74 pages, 6 in. by 9 in. Bound in paper.

The Bureau of Railway Economics has compiled and issued a very comprehensive bibliography of the available literature on the subject of government ownership, whether good, bad or indifferent, or whether favorable to or against government ownership, which may be found in the principal libraries of the country. Sixty libraries are included in the list and all books and pamphlets listed are accompanied by key letters indicating in what library they may be found. The references are grouped under a general head and under the various countries, and in the case of the United States, under the separate states. There is also a separate list of authors. In view of the present keen interest in the subject of government ownership, this bibliography should be of great value to railway men and to all interested in the subject.

Letters to the Editor

THE POSITIVE MEET; FEWER ORDERS NEEDED

BOSTON, June 4, 1914.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

I have been reading, in your issue of May 29, the letter of A. C. D., referring to the use on the New York, New Haven & Hartford of the positive meet, and maintaining, in effect, that in Oklahoma it would be impossible to carry out the practice which prevails on the New Haven.

I do not suppose that you care to give space in your columns to a controversy on this subject, and, indeed, I do not wish to waste time in contradicting; but A. C. D. has overlooked a few simple facts.

In the matter of operating lines where the telegraph offices are far apart, the New Haven is no better off than other roads. Sending out trains to turn around at some obscure industry track is as common here as elsewhere.

And the argument that men will make mistakes under one system the same as under another, which the writer repeats, has no force (or, rather, it is as favorable to the New Haven as to the other side) because, regardless of whether the men are well informed or ill informed, whether they have much knowledge or little knowledge, the simpler you make their train orders, and the smaller the number of orders issued, the less the liability to confusion and misunderstanding. With the positive meet, the despatchers issue a very much smaller number of orders.

Your correspondent also seems to have overlooked the fact that the despatchers who testify to the merits of the New Haven system have had experience under both systems.

NEW HAVEN.

TRANSVERSE FISSURES IN RAILS

NEW YORK, July 9, 1914.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

The report of H. W. Belnap, general inspector of safety appliances, to the Interstate Commerce Commission, dated April 24, 1914, covering investigation of an accident which occurred on the New York, New Haven & Hartford near Westerly, R. I., on October 13, 1913, contains the general conclusion drawn by James E. Howard, engineer-physicist, that the cause of the so-called internal "transverse fissure" is the action of high wheel loads upon hard steel rail.

Owing to the publicity attending reports of this nature and the reliance which the general public may assume can be placed upon the findings of government investigators, it is well to enlarge somewhat upon this subject.

The subject of internal transverse fissures, although old (see article by Robert Job, *Railway Age Gazette*, February 6, 1914), has recently received renewed interest and investigation, principally because it has been brought into prominence by a report by Mr. Belnap to the Interstate Commerce Commission. In fact, it is being given undue prominence, since this type of failure, comparatively speaking, is of infrequent occurrence. This fact in itself is in contradiction to Mr. Howard's theory, for if fissures have been developed in normal rail by existing wheel loads, why have they not developed in adjacent rails of the same weight and manufacture which were laid at the same time and have necessarily carried the same tonnage? If Mr. Howard's theory were correct, the development of a fissure in any rail would roughly determine the service life of all rails of that or lighter weight laid at the same time or at any earlier date in track having like service, which, of course, is untenable.

Furthermore, all railroads with the same wheel loads and rails from any makers would show the same results as regards breaks due to transverse fissures.

As a matter of fact, under like operating conditions and the same rail specifications, some roads have had less trouble of this

character with all of their rails than have other roads and the output of some rail mills has proved better than that of other mills.

It appears that to date neither the rail experts of the railroads nor of the manufacturers have been able to definitely prove the primary cause of such fissures, although much progress has been made within the last few months, and all the evidence so far produced appears to indicate as the cause defective material in the rail.

It has been discovered that the so-called "transverse fissures" may be longitudinal, horizontal or inclined in any direction to the axis of the rail; they have been discovered in rail in which the carbon percentage is moderate and below the upper limit of the standard specifications for the section involved; there is no evidence of segregation in these rails; in no case reported have two or more adjacent rails shown transverse fissures, and several fissures have been found in a single rail.

It is true that this type of break is disclosed by traffic, as is every other form of break. It is also true that the lighter the traffic the less frequently are these and other rail breaks apt to occur. An unsound rail, no matter what may be its type of unsoundness, should and does give way under a load well within the limits of the carrying capacity of sound rails and a rail suffering from the deep-seated disease under discussion is no exception to this general rule.

It is to be hoped that the real cause of transverse fissures may be brought to light, but until such is the case it is not just to attribute such failures to assumed imprudent practices of the railroads. Such an attitude constitutes an illogical and unwarranted attempt to make capital by following the popular practice of ascribing all faults, without proof, to the railroads.

ENGINEER.

POOR OPERATORS AND THE TROUBLES OF THE DESPATCHER

HAILEYVILLE, Okla., June 26, 1914.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

The paper on the training of telegraph operators, by Mr. Sheldon, of the Union Pacific, which was printed in the *Railway Age Gazette* of May 29, will be read with much interest by a great many railroad officers and employees.

Mr. Sheldon's somewhat optimistic views will lead many a despatcher to ask numerous questions. Looking at the subject broadly, and taking in the whole western country, the question frequently recurs whether there cannot be something done to improve the quality of the operators now entering the service on nearly all of the principal roads. It may be that, as Mr. Sheldon says, three or four months in a training school, with a few more months of training under some agent out on the road, will make an operator; but what is the percentage of failures?

The advent of the telephone has made a radical change in the problem of the education of operators. Many officers carelessly assume that anyone can operate the telephone. But as long as we use the telegraph, whether for long distance work or for anything, we need competent telegraphers. It requires just as much proficiency to operate the wire now as 20 years ago. It requires more, for the reason that we are working faster than at that time. It is too readily assumed that as soon as a man can receive 15 or 20 words a minute he is an operator. What about his sending? Has anyone ever passed on that? Is it not just as important, or more so, that he send well? The copying operator makes fewer mistakes with good sending than with bad. How many officers think of that feature?

As a general rule, the young operator, as soon as he secures a position, buys what they call a "bug"; and in the novice's opinion the proposition is solved. But it requires several weeks to learn how to operate the thing, and, in fact, some never learn; and during this time he works an imposition on everyone else, in trying to use the bug. This, with his other shortcomings, helps to make life a burden for all who deal with the new operator. A railroad company should not allow such instruments to be used. A good sender with his hand can send as fast as the average operator can put it down in good shape. Good hand senders are scarce. Add to this a half dozen beginners trying to handle their bugs and the despatcher certainly has his troubles.

Again, the average chief despatcher, who generally employs the operators, does not examine them on their sending or their receiving, or on wire testing. He gives the operator a note to the examining physician and if he passes the physical examination this seems about all that is necessary. He goes out on the road and is charged with the serious duty of handling train orders and the other business of the company. Then who has to worry with him? No one but the despatcher, who has his hands full already. Yet he is expected to make a good showing in expediting the movement of trains, with poor men as well as with good. Students are sometimes sent to a heavy train order position. Human lives are intrusted to these men. If the despatcher complains, he is put down as a kicker and a crank. The operator thinks he is abused if the despatcher loses his patience and criticizes him, but who wouldn't lose it? Some of the timber sent out on the line will justify any amount of anger.

The young operator, just setting out, usually can tell more about the operators' pay schedule than he can about the block or train order rules. If he works the meal hour or thirty minutes over his time, an overtime slip is sent in, and is referred to the trick despatcher by the chief with a big "Why" in boxcar letters. The student does not take into consideration that possibly you have let him off for a couple of hours a few nights before. And this is just as true of the old head as with the new. What would some of the operators of the present day have done 20 years ago when 12 hours was a day's work and no overtime, no lunch hour? In addition to this operators made themselves generally useful around the station as clerks to the agent and the section foreman, in the way of doing clerical work and handling the switch lamps. Nowadays, if an operator handles switch lamps, he gets paid for it, and it is a hard matter to get him to do the least bit of station work, to say nothing of sweeping out the office. In those days we received from 30 to 40 dollars a month; now it is a minimum of from 55 to 60 and overtime every time they turn around; and a nine-hour day.

Operators receive more solid training from the train despatcher in one week than from any other employee in a month. It is often noticeable that the despatcher will worry along with an operator for months trying to educate him up to the standard, thinking he will eventually make a good man. But in a large proportion of cases he fails, and all the time he is handicapping himself.

I have many times, in case of students, asked conductors to come to the telephone and get their orders on account of the operator being too slow; yet the operators are complaining today because the railroads are putting in emergency 'phones to facilitate business. Why shouldn't the 'phones be put in? The time is fast coming when if the telephone fails business operations will cease at some stations simply because the operators are not competent to operate the telegraph wire.

With the high salaries now paid there is no reason why we should not have a better class of operators. If schools are necessary to secure the right men, let us have them. As long as no more attention is given to the qualification of operators when hired than is usual at present, we shall continue to have poor service. With the increased responsibilities and increased territory the despatcher does not find much time to educate operators to enable them to hold their jobs. It is about all the despatcher can do to hold his own.

J. L. COSS.

SIMPLON TUNNEL BETWEEN ITALY AND SWITZERLAND FLOODED.—The Simplon tunnel was inundated on July 7 by a subterranean stream which burst through the retaining wall and flooded the tunnel to a depth of two feet. A train was derailed in the middle of the tunnel, but no one was hurt. The passengers, however, were obliged to walk several miles to Iselle. Trains had to be diverted via the St. Gothard route.

Results of the Electrification of a Congested Italian Line

A Line with Very Heavy Grades and Long Tunnels on Which the Capacity Was Increased 100 Per Cent

By L. Pontecorvo

One important economic reason which determines the electrification of a steam line is the necessity of increasing its capacity. Results of electrification brought about by conditions of congestion are, however, quite unknown, as nothing has been published in connection with such cases. An examination of all single phase trunk lines with heavy freight and passenger service shows no case where the electrification was determined by the necessity of increasing the capacity of the line.

All the tri-phase installations of the Italian State Railways,

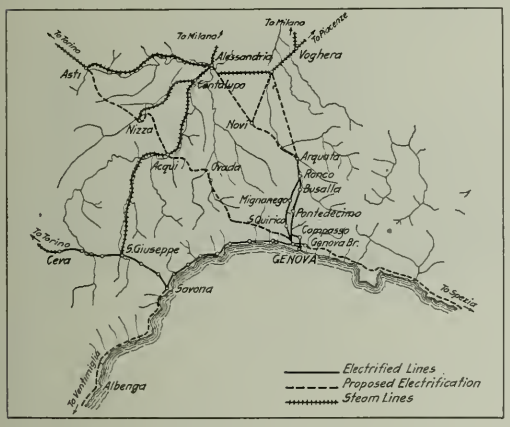


Fig. 1—Map of the Railway Lines Radiating from Genoa

with the exception of the Valtellina lines electrified 12 years ago for experimental purposes, were determined by the necessity of increasing the capacity of the line, and to this was certainly due the choice of the system, the Italian State Railways having found the three-phase system the most suitable for increasing the capacity of trunk lines with very heavy grades. We will, therefore, describe the actual results obtained on a line presenting the most difficult service conditions, and where the steam service had exhausted all its resources and could not be improved on.

The line referred to, the Giovi line in Italy, can be considered completely regenerated by the three-phase traction, having acquired, as regards freight service, which is the most important on that line, the same, if not a greater, capacity than the parallel line, the so-called "Giovi Subsidiary Line," which has grades half as steep and the most up to date block system.

To make these results better understood the electric railway system in Italy and its development, particularly as regards the Giovi line, which is one of the oldest trunk lines in Italy, will be briefly described.

Italian Electric Railway System

The Italian State Railways has a large number of electric lines which are situated in that part of Italy, where most of the industries are located, as shown in Fig. 1. Table A gives their most important characteristics.

The Milan-Porto Ceresio line, the first built, has a direct current of 600 volts, and the electric service is limited to passenger trains. All the others are three-phase 3,000-3,300 volts 15-16⅔ periods, with electric service both for passenger and freight trains. These railway lines are equipped with same system of traction, and are operated by the same type of locomotives, and constitute the most complete example of railway electrification in Europe.

The Valtellina line was electrified in 1902 for experimental purposes only. However, it has derived many advantages by the electrification, and has shown itself more economical than the steam service. In 1897 the operating expenses per axle with steam service were Lire .129 = (2.5 cents), and in 1902-3 with electric service were Lire .114 = (2.21 cents); that is, a reduction of 12 per cent., including interest and depreciation on the investment.

Of the other lines, the old Giovi line (double track) was electrified in 1910 to increase its capacity, and as were the Bassaleno-Modane line (partly single and partly double track) electrified in 1912-1914, and the Savona-San Giuseppe single track line. The electrification of the Monza-Lecco line was due to various reasons, chiefly the advantage of improving the service on a line which connects an important city like Milan with one of the most attractive valleys of the Alps.

The Traffic of the Giovi Line.

Considering now the Giovi line, and especially the Section Pontedecimo-Busalla, which offers the greatest difficulty to the operation. The tonnage in and out of the harbor of Genoa, which in 1878 amounted to less than a million tons a year, has been increasing rapidly, reaching 7,368,000 tons in 1912, of which 84 per cent. represents import and 14 per cent. export business.

There are five railway lines leading to Genoa which handle this traffic. The two Giovi lines, which constitute the direct connections between Genoa and the greatest manufacturing provinces of Italy—Piedmont and Lombardy—handle the most

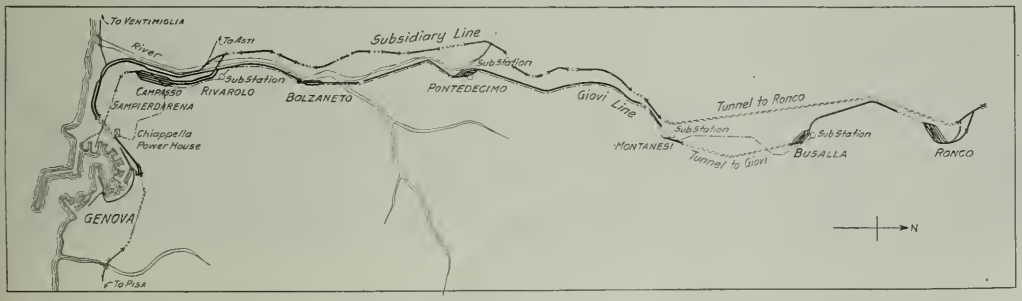


Fig. 2—Map Showing the Giovi Three-Phase Electric Lines

TABLE A—LINES ELECTRIFIED (a)

Lines	Year	Length of the line in miles single track	Maximum grade, per cent.	Line voltage	Current and frequency	Number of sub stations	Total capacity of substations in kws. or kva	Voltage of primary trans. line	Capacity of power house in h. p.	Energy produced at central station during 1912-1913, million "kw." hour	Number of locomotives	Miles run during 1912-13	Capacity of locomotives, h. p.
1—Milano-Varese	1901	70.2	1	650	Direct current	7	14,000, of which (2) 7,000 as standby	45,000	20,000, of which 5,000 as standby	8.5	47 (14)	1,380,000 (11)	18,200
2—Lecco-Sondrio-Chiavenna (Valtellina)	1902	65.8	2	3,000	A.C. 15 cycles	11 (3)	5,360, of which (4) 1,480 as standby	20,000	6,000, of which 2,000 as standby	5.7	24 (14)	514,000	22,600
3—Giovi	1910-13	28.8	3.5	3,000	A.C. 15 cycles	4	12,000, of which 3,000 as standby	13,000	12,000, of which 6,000 as standby	9.0 (8)	24	380,000 (8)	48,000
4—Bussoleno-Bardonecchia	1912	35.8	3	3,300	A.C. 16⅔ cycles	5 (5)	18,500, of which 8,000 as standby	50,000	6,800 (6)	4.1 (6)	16	165,000 (9)	32,000
5—Savona-Ceva	1914	28.3	2.5	3,700	A.C. 16⅔ cycles	5	15,000, of which 3,700 as standby	56,000	..... (7)	...	24	.....	48,000
6—Monza-Lecco (15)	1914	27.4	1.2	3,400	A.C. 15.8 cycles	4	15,750, of which 6,750 as standby	20,000	..... (13)	...	13 (10)	.....	29,000 (10)
7—Bardonecchia-Modane (15)	1914	23.6	3	3,300	A.C. 16⅔ cycles	0 (2)	0 (2)	56,000	..... (2)	...	8 (10)	.....	16,000 (10)

(a) This table does not contain the Simplon three-phase line, as it is operated by the Swiss Federal Railway, although it runs for half of its length in Italian territory.
(1) To this number must be added a portable substation used as reserve.
(2) This line will be supplied by feeder from a substation of line No. 4.
(3) To these figures should be added 2 flywheel sets used to take care of the pick loads.
(4) These figures include the portable substation.
(5) At present the current on this line is supplied from a 50,000 volt, 50 cycles line and transformed. This is only a temporary arrangement.
(6) As above.
(7) Energy is supplied by power house of Negry Company, which reserves for this service 10,000 kw. with picks of 15,000.
(8) The electric service on the whole line was started only in October, 1913.
(9) These figures are for the period July-October, 1913.
(10) Estimated figures, as service is not started yet.
(11) Includes a branch line, Varese-Porto Ceresio.
(12) These substations are so equipped as to allow lines 2 and 6 to be connected and supplied with energy from either of the two power houses.
(13) Energy is supplied from power house of Edison Company, which reserves for this service 4,000 kw. with picks of 5,000 kw.
(14) Some of these are passenger motor-cars capable of hauling several passenger cars.
(15) On these lines the electric service will be started shortly.

of the freight traffic, approximately 80 per cent.; the Genoa-Spezia handles 8 per cent., the Genoa-Asti 7 per cent., and the Genoa-Ventimiglia the remaining 5 per cent. While the Genoa-Asti connects Genoa to the Piedmont it has a very limited service due to heavy grades, single track and poorly ventilated tunnels. At present the electrification of this line is under consideration.

The old Giovi line, opened to service in 1853, was proposed and built by the famous statesman Cavour, who early foresaw the importance of the harbor of Genoa in the industrial development of Italy. It is a mountain road which rises from

purpose as the old line, but offers considerably better service conditions, having uniform grades not exceeding 1.6 per cent., and reaching 1.16 per cent. in the longest tunnel. The total length from where it branches off is 13.7 miles, and the highest point is 1,060 feet above sea level.

In 1906-7 the maximum quantity of freight accumulating on the docks at Genoa amounted to 575,000 tons, and the average between October and January was 450,000 tons. To improve conditions, at the end of 1907, a new type of steam locomotive (Fig. 5), designed particularly for this service by the Italian

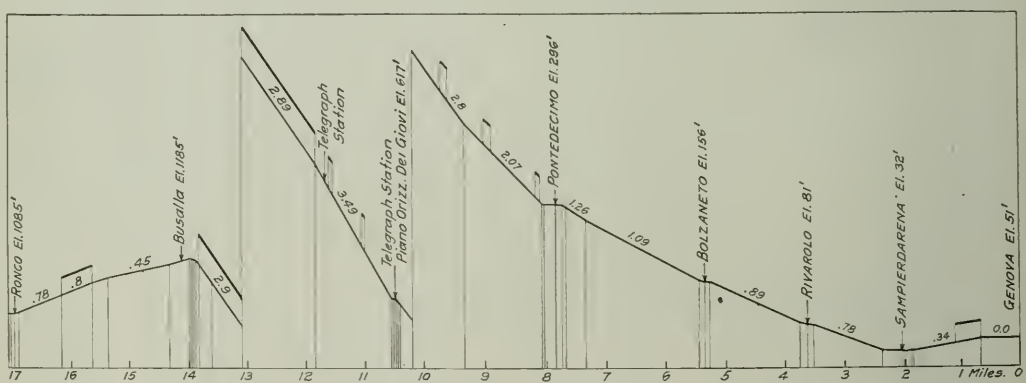


Fig. 3—The Profile of the Giovi Line

the sea level, crosses the Apennines, and descends in the valley of the river Po. It has maximum grades of 3.5 per cent., six tunnels, of which the longest, the Giovi tunnel, is 2.02 miles. These conditions make the operation with heavy and long freight trains most difficult. The line has a total length of 14.4 miles, and a difference in level of 1,150 feet between the lowest and the highest station. On account of the great difficulty of operation with steam locomotives, and in consideration of the continuous growth of the traffic in the harbor of Genoa, the Giovi Subsidiary line (double track) was built in 1889. It branches off the old Giovi line, and runs parallel to it on the other side of the valley, and crosses the mountain pass under a tunnel 5.15 miles long, and then joins the old line. It serves the same

State Railways, was put in service, producing a considerable improvement. These locomotives were of the compound 4-cylinder type, and had the following characteristics:

Number of coupled axles	5
Weight in working order	75 tons
Weight of tender, loaded	28 tons
Total heating surface	2,060 sq. ft.
Working pressure	229 lb. per sq. in.
Diam. of high pressure cylinders	14.7 in.
Diam. of low pressure cylinders	24 in.
Length of stroke	25.6 in.
Diam. of driving wheels (when new)	53 in.

During the official tests carried out by the Italian State Railways the following results were obtained.

(1) When hauling a train of 204 tons (exclusive of locomotive)

Speed on 2.5 per cent. grade	25 miles an hour
Drawbar pull on 2.5 per cent. grade	12,200 to 13,400 lb.
Indicated horsepower	1,200
Drawbar horsepower	800

(2) When handling a train of 272 tons (exclusive of locomotive)

Speed on 2.5 per cent. grade	15.5 miles per hour
Drawbar pull on 2.5 per cent. grade	16,600 lb.
Indicated horsepower	900
Drawbar horsepower	650

These new locomotives on the old Giovi line could haul the following loads at a speed of 15.5 miles per hour:

Single locomotive	170 tons
Double locomotive	310 tons
Triple locomotive	450 tons

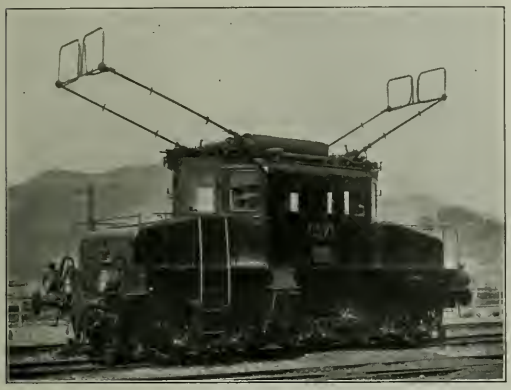


Fig. 4—Westinghouse Electric Locomotive (Type F. S. 050) Now Used on Italian Giovi Line

By the use of these more powerful locomotives it was possible in 1907-8 to reduce the quantity of goods accumulating on the docks at Genoa to a maximum of 430,000 tons, and to an average of 350,000 tons during the months from October to January. However, this improvement did not last long owing to the continuous increase in tonnage, and in 1909-10 the quantity of goods on the docks reached maximum and average amounts, respectively, of 545,000 and 484,000 tons. This condition, of course, represented an enormous loss due to the delay caused to trade in general, and the damage and deterioration of perishable freight.

ELECTRIFICATION OF GIOVI LINE

This state of affairs and the conclusions arrived at by the committee appointed by the government led to the decision of building another subsidiary line to take care of the natural and continuous growth of one of the most important harbors of Italy. This new line, called "the direct line," was to be a double track line with low grades, and cross the Apennines through a tunnel 11.8 miles long. The estimated cost was $30,000,000, and the necessary appropriation was voted by congress. However, the above mentioned committee in its report to the government, in consideration of the fact that the building of this new direct line with such a long tunnel would require many years, and having in mind the successful experiments of double traction carried out on the Valtellina and Simplon electric lines, suggested besides other improvements the electrification of the old Giovi line as the means of increasing its capacity.

In consequence of the satisfactory results obtained on the Simplon and Valtellina lines the three-phase, 15-cycle system was chosen for this electrification. It was also decided to increase the speed of the trains on this line to 28 miles per hour on the up grade, and to increase the power of the locomotives to the maximum amount allowed by the type of rolling stock.

Westinghouse locomotives (type F. S. 050), having two running speeds of 14 and 28 miles per hour, were chosen for the service. These locomotives (Fig. 4) were designed by Mr. de Kando, and built by the Italian Westinghouse Company at Vado Ligure, Italy. They are equipped with two slip ring induction motors, 3,000 volts. Their characteristics are as follows:

Number of coupled axles	5
Adhesive weight of locomotive	60 tons
Diameter of wheels (when new)	42.5 in.

The motors are connected to the wheels by a special triangular yoke.

With trains of standard composition (which is the maximum allowed by the draft gear of the cars, but which can be increased as far as the locomotives are concerned as shown by tests), when running at 28 miles an hour, the maximum horsepower developed is 1,770. When starting on a grade of 3.5 per cent., hauling the same train, there is developed 2,180 horsepower. The capacity of the locomotives on the Giovi line was fixed as follows:

Single locomotive	190 tons
Two locomotives	380 tons
Three locomotives	530 tons

The electric service was started in 1910.

Fig. 5—Steam Locomotive Formerly Used on the Giovi Line

SERVICE RESULTS OF ELECTRIFICATION

The increased capacity of the line is, of course, due to the greater power of the electric locomotives and the increase in speed. The peculiar condition of the line allows us to verify the calculated increase in the capacity of the line after the electrification. The steam locomotives had a maximum running speed of 15.5 miles per hour on the steepest grades. The electric locomotive runs at 28 miles per hour on the 3.5 per cent. grades.

Similarly on the down grades, owing to the electric braking, and to the constant speed and absence of shocks, it is possible to allow a speed of 28 miles per hour for passenger trains where the maximum speed allowed for the same trains with the steam service was 18.6 miles per hour. In addition with the steam trains a safety stop of all trains was made on a level section of the line about half way down the grade. This compulsory stop has now been done away with.

If we take into consideration the commercial speed of the trains on this section of the line it represents an increase of 88 per cent. and 75.5 per cent. on the up and down grades, partly due to the shorter time taken by the electric locomotive for acceleration. This increase is clearly shown by the time tables (Figs. 7 and 8) of the steam service on its last year 1910, and of the electric service now in operation.

With the steam service it was possible to run a maximum of 28 up trains and 23 down trains per day, spread over a period of 20 hours. However, the average number of trains per day was considerably lower. In the last year of the steam service, 1909-10, a total of 8,793 up and 7,792 down trains were run, or

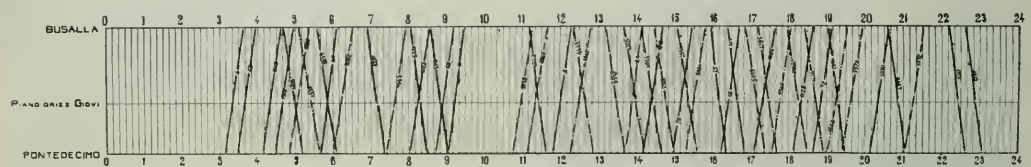


Fig. 6—Schedule of Steam Service in Summer of 1910

Fig. 7—Schedule of Electric Service in 1914

Extra fare trains.
Express trains.
Local trains.
Freight trains.

an average of 24 up and 21.3 down trains per day. With the electric service there were run in 1911-12 12,024 up and 8,050 down trains, or an average of 33 and 22, an increase of 37.5 per cent. in the number of up trains, constituting the increase in the capacity of the line. It was not necessary to increase the number of the down trains, the greater number of cars being empty on the down trip.

With operation by steam the above figures were not susceptible of appreciable increase, both because of the limited speed of the locomotive and the difficult work of ventilating the Giovi tunnel; the steam service shown in the schedule in Fig. 7 was only possible by strong artificial ventilation of the tunnel by means of a special blower driven by a 500 horsepower motor.

With the electric service the average figures given above refer to a schedule spread over a period of 17 hours per day (Fig. 8), and therefore they could be increased considerably. For instance, during the month of April, 1913, on the same section of the line referred to, 223 trains were run in addition to those shown in the schedule, corresponding to an average of 7.45 trains per day, of which 5.2 were up and 2.25 down trains. The maximum number of additional trains per day during the same month of April, besides the trains shown in the schedule, was 13, of which nine were up and four were down trains. Therefore, the average and maximum values for the month of April would be 38 and 42 respectively, which compared to the 28 of the steam service represents an increase of 36 and 50 per cent.; and if we consider that the electric service is limited to 17 hours instead of 20, the increase would amount to 61 and 77 per cent. The same results were obtained during certain days in the month of August when numerous extra trains were run for the purpose of testing the new electric locomotives.

These figures do not represent the maximum obtainable by the electric service. This maximum was determined when the project of electrification was being considered, and all the fixed installations, such as the central station, sub-stations and transmission lines were designed for a service having trains starting every 10 and 15 minutes. Such service, as has been shown experimentally, is possible both because of the size of the electric installations, and because of the block system existing on the line, as the time taken to cover the length of the tunnel is 9 minutes, and therefore with a train starting every ten minutes one train would leave the station at the entrance of the tunnel when the preceding had reached the telegraph station at the other end.

Assuming the utilization coefficient* of the Italian State Railways as .70, and assuming 20 working hours per day, as was the case with the steam service, the average number of daily trains with electric service would be:

Trains leaving every 15 min., .7 x 20 x 4 = 56
Trains leaving every 10 min., .7 x 20 x 6 = 84

These figures, as compared with 28 of the steam service, represent an increase of 100 and 200 per cent. respectively.

ELECTRIC LOCOMOTIVES

On account of the higher speed of the electric locomotives and their suitability for switching operations in the yard, it was possible with electric operation to make a rather large reduction in the number of locomotives, and therefore in the train crews. At present the service on this section is handled by ten locomotives of which eight are in actual service, one is held in reserve and one is under inspection. During 1909-1910 with steam service the average number of steam locomotives was 15. If we consider that with the electric service there are 34 trains to 28 with steam service, the number of steam locomotives was 82 per cent. greater than the number of electric locomotives. The daily service of the electric locomotive could easily be increased by increasing the working hours to 24, because the maximum temperature of the Westinghouse electric motors was only 73 deg. after 16 up and 16 down trips, hauling the normal weight of train and regenerating energy on the down trip, the last two trips having been made without forced ventilation of the motors.

TRACTIVE EFFORT AND COMPOSITION OF TRAINS

A comparison between the maximum weight of train permissible with the steam locomotive and the standard weight

*Utilization coefficient is the ratio between the average daily number of trains actually run and the number of trains given in the schedule.

of train prescribed for the electric locomotives, as allowed by the existing type of rolling stock, shows how much more powerful the electric locomotives are.

TABLE B

	Weight of train (exclusive of locomotive)	
	Steam traction	Electric traction
Single locomotive	170 tons	190 tons
Double locomotive (one locomotive pulling and one pushing)	310 tons	380 tons
Triple locomotive (one locomotive pulling and two pushing)	450 tons	530 tons

Considering that with electric traction an overload of 10 tons is permissible, there is an increase over steam operation of 17½, 26 and 20 per cent. respectively. However, as has already been pointed out, the tractive effort and the motor capacity of the locomotive are far greater, so that it is possible with two locomotives to haul on the same section of the line without any difficulty trains up to 450 tons at 28 miles per hour. As compared with the operation by steam, this means an increase in the drawbar pull of 45 per cent. without considering that the adhesive weight of the steam locomotives is 25 per cent. greater than the electric.

The make-up of the passeger trains on this line is not uniform, and varies from 200 to 370 tons. With operation by steam passenger trains left Genoa station hauled by one three-coupled locomotive. When this section of the line was reached two additional five-coupled locomotives were added, one pulling and one pushing. Very light trains were hauled by only two locomotives. With electric operation all passenger trains are hauled by two locomotives.

The freight trains were nearly all hauled by three locomotives, one pulling and two pushing. With electric service the freight trains have a uniform composition of 380 tons (being mostly freight cars of the same type loaded with coal), and are hauled by two locomotives, one pushing and one pulling. In the case of freight trains, if but one locomotive is used, it must be placed at the rear of an ascending or the front of a descending train, as the cars have no air brakes. If we refer to the last table, and consider that the Westinghouse electric locomotive, type 050, weighs 60 tons, while the steam locomotive 92 deg. 470 weighs (including the tender two-thirds loaded with water and coal) 97 tons, we find that the steam locomotive represents 57 per cent., 62.7 per cent. and 64 per cent. respectively of the hauled weight, while the electric locomotive represents only 30, 30.8 and 33.5 per cent. As compared to the total weight of the trains, the weight of the steam locomotive represents 36.3, 38.5 and 39.3, while the weight of the electric locomotive represents only 23.1, 23.5 and 25 per cent.

NUMBER OF CARS

From the preceding it follows that the number of cars delivered over the line after the electrification has been greatly increased. During the last year of the steam traction there was a total traffic of 109,963 cars (passenger and freight) on the up grade and 133,000 in the other direction. In 1911-12 after the electrification the number increased to 172,063 and 146,113, an increase of 56.5 and 10 per cent., respectively, without considering that the weight of the freight cars was also increased. And if we consider only the movement of the freight cars in the ascending direction there was an increase in their number of 109 per cent.

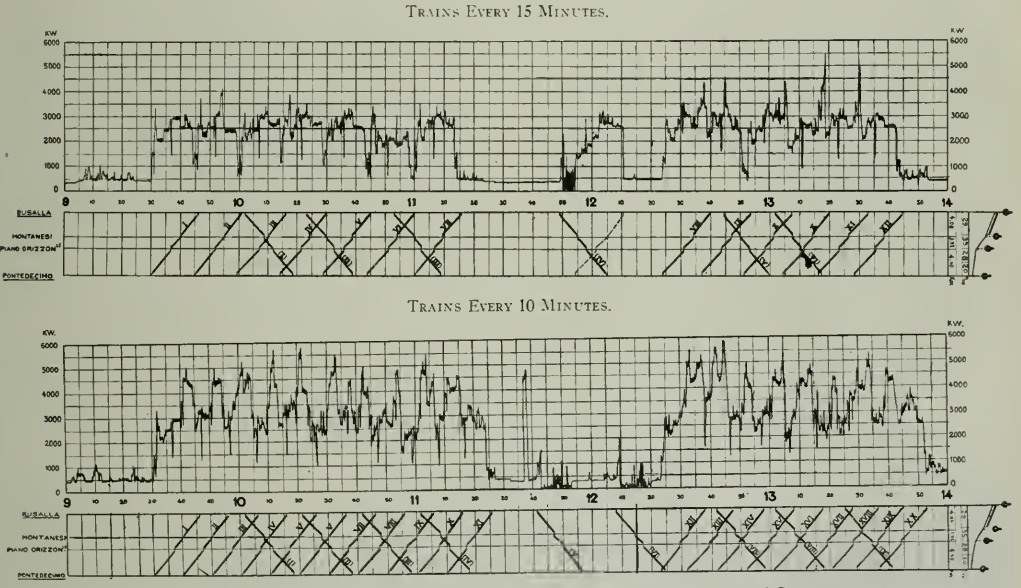


Fig. 8—Schedule of Intensive Electric Service and Load Diagram at Central Station

This would correspond to a daily service of 165 cars (steam traction) and 346 (electric traction). If we refer, however, to the electric service as developed experimentally during the month of August, 1913, for 17 hours daily, it represents an increase of 218 and 214 per cent. This, however, does not represent the maximum of the electric service.

CAPACITY OF THE LINE

We can now determine the capacity of the Giovi line after the electrification and compare it to that before. For the steam service we will refer to the service in the year 1909-10, the last of the steam traction, and to the maximum capacity as estimated by the above-mentioned government committee. For the results of the electrification we will refer to the first year of the service, 1911-12, to the service as tried experimentally during August, 1913, and to the maximum permissible service as estimated by the Italian State Railways.

We will consider only the traffic on the up grade, which is the one that determines the capacity of the line, and limit it to 20 working hours per day, although it should be understood that

with the electric traction this limitation to 20 hours is not requisite. It was necessary with steam traction to allow time for maintenance of the tracks in the tunnel, as on account of the smoke the men could not work in it during the service hours. Besides, we will consider only the hauled weight of trains, which is the most important.

Electric Service 1911-12.—As already stated, the total number of cars was 172,063, divided as follows:

45,927 passenger and baggage cars.
105,132 freight cars.
16,897 fast freight cars.
4,107 empty cars.

The weight of these cars can be assumed as follows:

Passenger and baggage cars	30 tons
Freight cars, mostly coal cars	21 tons
Fast freight cars	12 tons
Empty cars	8 tons

The total capacity then is:

Passenger and baggage cars	1,380,000 tons
Freight cars	2,210,000 tons
Fast freight cars	203,000 tons
Empty cars	32,800 tons
Total	3,825,000 tons

Electric Service as Experimented with in August, 1913.—The experiments carried out gave the following figures:

41 trains	13,640 tons	644 cars	17 hour service
40 trains	13,712 tons	636 cars	17 hour service

These figures reduced to a year give 5,000,000 tons for 17 hours' service per day.

Now, assuming the same weight of cars (which is in favor of the steam traction because the weight of the cars has been increased during the last few years), we find the following figures:

Steam traction—20 hours per day.

38,916 freight cars	840,000 tons
19,569 fast freight cars	235,000 tons
49,624 passenger and baggage cars	1,485,000 tons
1,854 empty cars	14,800 tons
Total	2,574,800 tons

Comparing this figure to that of the electric service reduced to 20 hours per day, we find that the service during the year 1911-12 represents an increase of 75 per cent., and the service, as experimented with during the month of August, 1913, an increase of 128 per cent.

In comparing this service with the steam service we will assume the maximum capacity of the steam service, as outlined by the government committee, and will consider double locomotive service throughout. With the 15-minute service during 20 hours, we would have 80 trains per day, of which 15 are passenger and 65 are freight. Assuming a utilization coefficient of .70, we have 65 x .7 x 380, or 17,300 tons daily, or 6,310,000 tons yearly. With service every 10 minutes, we would have 120 trains, of which the 105 freight trains equal 10,200,000 tons yearly.

The maximum steam service would amount to 22 trains of 310 tons, or 6,820 tons daily, or 2,490,000 tons yearly. Therefore, assuming that the passenger trains are the same in both cases, we have an increase in capacity of 153 per cent. with 15-minute service, and 310 per cent. with 10-minute service.

It will take many years before the traffic of the harbor of

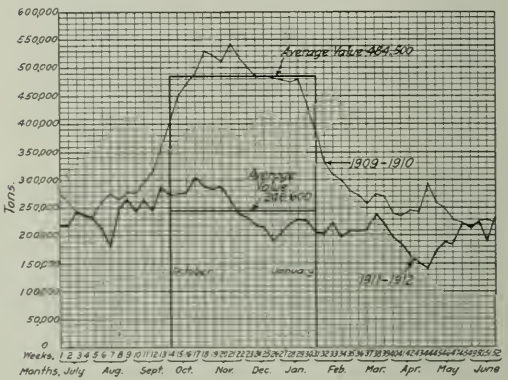


Fig. 9—Weekly Accumulations of Freight on the Docks at Genoa Awaiting Shipment by Rail

Genoa will be such as to require the maximum capacity of the Giovi line. Considering that on account of these results the Italian State Railways have electrified the subsidiary Giovi line and are considering the electrification of the Genoa-Asti line, it will be many years before the new "direct line" will be built.

The effect of the increase in capacity of the Giovi line on the quantity of freight accumulated in the docks may be easily seen from the diagram showing the freight accumulated on the docks

Fig. 10—Coal on the Docks at Genoa Awaiting Shipment

waiting shipment by rail. This compares the year 1909-10 (the last of the steam service) with the year 1911-12 (the first of the electric service). From this diagram we see that the maximum quantity of accumulated freight reached 540,000 tons in 1909 and 300,000 tons in 1911. If we consider the worst period of the year, October to January, the average quantity of the accumulated goods was 484,500 and 246,600; that is, a maximum of 80 per cent. and an average of 96.5 per cent. more freight accumulated during the steam service.

This shows that the electrification, besides solving a railway problem, increasing the capacity of a line so as to take care of the growth of the traffic for many years to come, has solved at the same time a serious problem of the excessive accumulation of freight at the docks during a part of the year; which accumulation caused great inconvenience and considerable loss. Thus the electrification has produced an increase in the capacity of the Giovi line and indirectly an increase in the capacity of the harbor of Genoa and very likely may do away with the building of the direct line with the tunnel which was estimated to cost not less than $30.000,000.

CONCLUSIONS

The Giovi line has been regenerated by three-phase operation. The line was of such importance to the traffic that the electrification was decided to improve existing conditions, even if that would mean an increase in operating expenses. However, the results from an economic point of view have been far better than expected, and constitute a very great success for the Italian State Railways. A detailed and careful examination made by the administration of the Italian State Railways has shown that the running expenses, including interest and depreciation on the investment, have been reduced 22.5 per cent., notwithstanding the fact that the electric energy is produced by a steam electric plant and that the central station capacity is not yet fully used. It has been realized in this electrification as Galileo Ferraris stated in 1904, in his speech on the transmission of electric energy, that electrification would render operation most economical in those cases where operation by steam was most expensive.

It is not our intention here to discuss the various systems of traction, especially as the Italian State Railways are satisfied with the three-phase system, and intend to extend it to all their lines as conditions require it. Having already in service 135 electric locomotives, of which 110 are of the Giovi type with a total capacity of 261,200 h. p., they are considering the electrification of new lines, not on theoretical calculations, but from actual results.

On account of the large increase in the capacity of the lines through the three-phase electrification, the Italian State Railways will be able to do away with double tracking single track lines where the traffic is getting too heavy and where the expenditure of double tracking is very high; besides, on account of smoke elimination, they will be able to greatly improve the service on lines with many tunnels, and most of the Italian lines are of that sort. There will also be the advantage of reduction in the running expenses, and by utilizing to a larger extent the hydraulic power not yet developed, importation of coal, which represents a heavy expenditure, may be reduced. But, if in this particular case there is no reason for a discussion of the systems of operation, we will, however, express the conviction that, although the results of the increase in the capacity of the Giovi line are due to electrification, it is also due to the choice of the three-phase system that the results were so striking. We do not mean to refer to the large savings due to characteristics of this system, such as the lightness of the locomotive and the regeneration of power, but to the characteristic of maintaining high speeds on the up grade with high tractive effort and high efficiency, which characteristic determines the capacity of the lines.

It is true that the section of the line referred to is specially suited for three-phase traction, but the electrification of the other sections of the line, which are nearly level and which are served by the same locomotives, has shown (as in the Valtellina lines) that the advantages of a light and powerful locomotive having few and fixed speeds can be felt even on level lines where the traffic is heavy enough to warrant electrification.

CHANGES IN BOILER INSPECTION RULES

The recommended changes and additions in the Boiler Inspection Rules, as published in the *Railway Age Gazette* of May 15, on page 1066, have been approved by the Interstate Commerce Commission, and made effective on and after July 9, 1914. In connection with this the Special Committee on Relations of Railway Operation to Legislation in Bulletin No. 62 has published the following additional interpretations and rules made by the sub-committee of mechanical officers:

Rule 2.—119. Application for extension of time under this rule to be made by individual railways affected.

Rule 10.—120. The removal of superheater tubes every three years will not be required provided the tubes are in good condition, and the boiler can be thoroughly cleaned and inspected without their removal.

Rule 21.—121. All work required to be done monthly should be done when the boiler is taken out of service for inspection. Staybolts should be tested the same day the boiler is washed or before it is returned to service.

122. If staybolts, which are behind brick work on oil burning locomotives or behind grate bearers, have a tell-tale hole three-sixteenths inch in diameter their entire length which is kept open at all times, the removal of the brick work or grate bearers each month for the purpose of hammer testing such bolts will not be required. This will not, however, relieve from making a thorough inspection each time the brick work is removed, nor will it relieve from removing the brick work for an inspection when necessary.

Rule 52.—123. This rule effective January 1, 1915. Until that date quarterly cards, Form No. 2, may be used if in stock. Cab cards need not be certified to.

Rule 54.—124. When any locomotive is condemned, scrapped or sold, a final report on Form No. 3 giving both locomotive and boiler number should be filed with the district inspector. This should be certified to by the chief mechanical officer, or mechanical engineer. Further reports for such locomotive need not be filed. If boiler only is scrapped, and locomotive continued in service with new boiler, report should so state.

Rule 52.—Interpretations 72 and 73 are withdrawn as obsolete.

RAILWAYS IN ASIA MINOR.—It was announced in Rome on May 19 that a definite agreement had been signed by an Italian syndicate and the English Smyrna-Aidin Railway Company regarding railways in Asia Minor.

RAILWAY CONSTRUCTION IN SPAIN.—At the present time there are several railway projects under consideration by the Spanish authorities. A line from Valencia to Calatayud has been built and in operation for some years. A contract and concession for an additional strategic railway from the latter point via Sorisa to Burgos will soon be let. This line is connected with the line from Burgos via Arconada and Monco to Ontaneda, a suburb of Santander, and will give a through route from Valencia to the north coast of Spain. The Ministerio de Fomento has recently approved a project for a strategic line from Ferrol to Gijon via Ribadeo. This line will receive from the government a five per cent. guarantee on the cost of construction; it will connect at San Esteban de Pravia with the line from Ujo to Pravia, thus connecting the latter, Oviedo, Santander, Bilbao, San Sebastian and Hendaye on the French frontier with the Noroeste de Espana Railway. The line will also connect at Ribadeo with the Ribadeo-Valladolid, a project which has also been approved by the government. It is also reported that work on the new line from Palanquinos, near Leon, via Valencia de Don Juan, to Medina de Rioseco is well advanced. A project has also been approved for a secondary railway from Cervera to Saragossa. There is under consideration a project for a line from Cervera to Tarragona, with a branch from Belumet to Igualada and for a line from Zamora to Orense, in northwestern Spain. A company has also been formed to construct and operate a railway from Ribadesella to Gijon, also in northwestern Spain.

MELVILLE E. INGALLS

Melville E. Ingalls, who pieced together the Cleveland, Cincinnati, Chicago & St. Louis, and who was also for twelve years president of the Chesapeake & Ohio, died on Saturday, July 11, at Hot Springs, Va. Mr. Ingalls was 72 years old, and had resigned as chairman of the board of the Big Four in 1912. He was a shrewd Yankee lawyer in good standing when he became president of the Indianapolis, Cincinnati & Lafayette in 1870. Without previous railroad training, he was nevertheless quick to pick up a general knowledge of both operation and traffic. He was a keen business man, and saw the possibilities of buying small railroad properties and combining them into a system. He managed the properties well, and the building up of such a system as the Big Four was probably of great benefit to the territory which the system now serves. On the other hand, Mr. Ingalls' genius did not comprehend a homogeneous railroad system. In part, of course, this was due to the fact that the nature of the territory and of the already existing short lines necessitated a rather patch-work railroad system, but in part also it was because Mr. Ingalls either could not or did not know how to acquire his properties outright. The Big Four, as he built it up, was a network of lines operated by one company, but held under a great variety of forms of tenure. On some there were trackage rights only; with others there was some form of operating agreement; on others an outright lease, and so on. With this system, in the tremendously highly competitive territory in which it is, Mr. Ingalls' administrations did remarkably well.

Melville E. Ingalls

Mr. Ingalls was president of the Chesapeake & Ohio from 1888 to 1900. During that time the mileage was increased from 931 miles to 1,476 miles. The gross operating revenue increased from $7,162,000 to $13,402,000. The coal and coke tonnage increased from 1,465,000 tons to 4,679,000 tons. It is no criticism to say that, as in the case of the Big Four, Mr. Ingalls could not foresee what the future developments of the Chesapeake & Ohio would be. The fact that the Chesapeake & Ohio is not as firmly intrenched today in the coal fields of West Virginia as is the Norfolk & Western is in part due to the difference in policy pursued by the management of the Norfolk & Western in the ten years 1890 to 1900, and that pursued by Mr. Ingalls' management of the Chesapeake & Ohio.

Melville Ingalls was born in 1842 in Maine. He became president of the Indianapolis, Cincinnati & Lafayette in 1870, and in the following year was made receiver. The company was reorganized in 1873 with Mr. Ingalls as president, but in 1876 the company had again got into difficulties, and went through another receivership under Mr. Ingalls, being reorganized in 1880 as the Cincinnati, Indianapolis, St. Louis & Chicago. Mr. Ingalls was president of this company up to June 27, 1889, when it was consolidated with the "Bee" Line, the Cleveland, Columbus, Cincinnati & Indianapolis. The consolidated company was the Cleveland, Cincinnati, Chicago & St. Louis, of which Mr. Ingalls was president until February 1, 1905, at which time he resigned to become chairman of the board, holding this office until November, 1912. From 1881 to 1883 Mr. Ingalls was president of the Kentucky Central, and, as previously mentioned, was president of the Chesapeake & Ohio from 1888 to 1900.

THE CAPE COD CANAL

The Cape Cod canal, connecting the waters of Cape Cod Bay with those of Buzzard's Bay, and separating Barnstable County from the rest of Massachusetts, is nearly finished, and it is announced that it will be opened for traffic on July 29. But it has not yet been dug for the full depth throughout its length, and at first no vessels will be admitted to the canal except those drawing 15 ft. or less. Larger vessels cannot pass through before September, when it is expected to have a depth of 25 ft.

The length of the canal is 8 miles, and the distance from deep water on the east to deep water on the west is about 13 miles. The width of the canal at the bottom is 100 ft., but at two places it is made twice as wide to provide meeting places. By this canal, the water route between Long Island Sound and Boston harbor is shortened about 70 miles; and it is calculated that the saving in time will be greater in proportion than the sailing distance because outside of Cape Cod fogs are more prevalent. In a given time the duration of fogs at Pollock Rip was 1,066 hours, as compared with 625 hours at the eastern entrance of the canal. The cost of marine insurance also is expected to be considerably less.

There is no lock in this canal, and the difference in the height of the tides at the east and the west ends is never greater than 5 ft. At the highest point of land the surface of the water in the canal is 29 ft. below the top of the cut. The canal is spanned by three drawbridges, two for highways and one for the tracks of the New York, New Haven & Hartford Railroad.

The canal has been dug by the Boston, Cape Cod & New York Canal Company, of which August Belmont, of New York, is president, and J. W. Miller, formerly at the head of the Fall River Line of steamers, is vice-president. The chief engineer is W. Barclay Parsons. The work has taken five years, and the cost of it is given as $12,000,000.

The Cape Cod Construction Company, with headquarters at 43 Exchange Place, New York City, acting as agent for the canal company, has issued the following tariff of tolls:

For Vessels Less Than 16 Gross Tons Based on Length Over All

	Class A*	Class B†	Class C‡ With cargo	Class C‡ Without cargo
Minimum less than 15 ft...	$3	..	..	.....
15 ft. to 19 ft.....	4	..	..	.....
20 ft. to 24 ft.....	6	..	..	.....
25 ft. to 29 ft.....	8	$8	$6	$3.00

30 ft. to 34 ft.	10	10	7	3.50
35 ft. to 39 ft.	12	12	8	4.00
40 ft. to 44 ft.	15	15	10	5.00
45 ft. to 49 ft.	17	17	12	6.00
50 ft. to 54 ft.	20	20	14	7.00
55 ft. to 59 ft.	22	22	15	7.50
60 ft. to 64 ft.	25	25	17	8.50
65 ft. and over and less than 16 gross tons	30	30	21	10.50
FOR VESSELS OVER 16 GROSS TONS				
16	25	25	17	8.50
17	26	26	18	9.00
18	28	28	19	9.50
19	30	30	20	10.00
20 to 24	31	31	21	10.50
25 to 29	32	32	22	11.00
30 to 34	33	33	23	11.50
35 to 39	35	35	24	12.00
40 to 44	37	37	25	12.50
45 to 49	40	40	28	13.00
50 to 74	45	45	31	14.00
75 to 99	50	50	35	15.00
100 to 124	55	55	38	16.00
125 to 149	60	60	42	17.00
150 to 199	65	65	45	18.00
200 to 249	70	70	48	19.00
250 to 299	72	72	50	20.00
300 to 349	74	74	52	21.00
350 to 399	76	76	53	22.00
400 to 449	78	78	54	23.00
450 to 499	80	80	56	24.00
500 to 549	82	82	..	.....
550 to 599	84	84	..	.....
600 to 649	86	86	..	.....
650 to 699	88	88	..	.....
700 to 749	90	90	..	.....
750 to 799	92	92	..	.....
800 to 849	94	94	..	.....
850 to 899	96	96	..	.....
900 to 949	98	98	..	.....
950 to 999	100	100	..	.....

*Yachts, motor boats and vessels not engaged in commercial trade. Government vessels shown in government books under Gross Tonnage.
†Vessels engaged in commercial trade carrying passengers only, passengers and freight, and miscellaneous freight, or in ballast.
‡Vessels carrying crude material in bulk cargo lots.

For Class A and Class B vessels of over 1,000 gross tons the rate is ten cents per gross ton per single passage. In Class C vessels over 500 gross tons will be charged on the basis of their having on board 800 tons of cargo at 7 cents per cargo ton per single passage. Vessels over 500 gross tons without cargo, five cents per gross ton per single passage. The total tonnage of cargo in vessels in tow is to be computed as if on board a single vessel. Tolls include the towing tug provided by the owners of barges or schooners.

The officers of the canal company calculate that the saving in time and the increase in safety will draw to the canal route 7,000,000 tons of coal and lumber yearly—this is only about a third of the twenty or twenty-five million tons of freight carried through Vineyard Sound every year—and they also expect to attract passengers, as well as freight, for the summer resorts of the Cape Cod region. It does not appear that any of the large shippers have as yet made application for the privileges of the canal, or that the canal company has tested the acceptability of its rates, from the standpoint of the vessel owners; but attractive rates ought to be practicable even allowing for some exaggeration in the estimates of economies; for the average trip of coal schooners and barges around the cape is said to be four days longer than will be necessary by the direct route through the canal.

WESTERN MARYLAND CONSOLIDATION LOCOMOTIVE

The American Locomotive Company recently delivered 20 consolidation type locomotives, having a tractive effort of 61,300 lb. each, to the Western Maryland. These were built to give the greatest possible tractive effort obtainable within the axle load limitations.

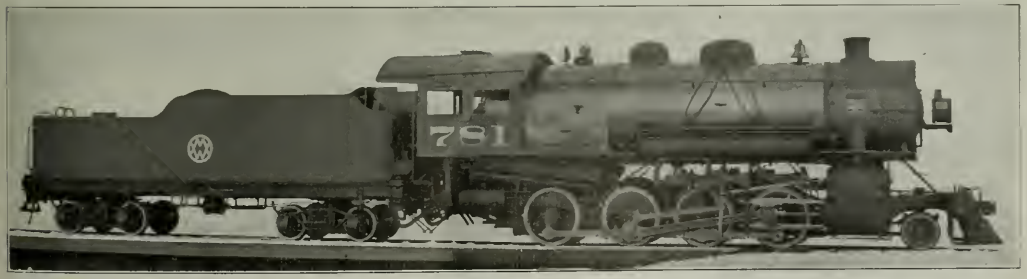
The mechanical department of the Western Maryland, after carefully studying the physical conditions of the division on which these locomotives are to be used, decided that the comparatively low factor of adhesion of 3.55 could be safely used. By the use of this factor of adhesion and driving wheels 51 in. in diameter, the tractive effort of 61,300 lb. was obtained without sacrificing boiler capacity. It is, therefore, interesting to note the work these locomotives are doing, showing the possibilities of this type with a relatively small driving wheel for service where speed does not become a factor.

After leaving Cumberland, eastbound, the line runs over an undulating profile, on which the maximum grade against eastbound traffic is 0.3 per cent. for 74 miles to Williamsport, Md. From here it rises on a one per cent. grade into Hagerstown, about six miles. On this division the railway estimated that these locomotives would haul 4,725 tons.

On May 20, 1914, one of the locomotives left Cumberland at 2:30 a. m. with 114 loaded cars, weighing 7,014 tons, and arrived at Williamsport at 9:18 a. m. At this point 15 loads were set off, and the train was given two Mallet helpers, leaving at 10:04 a. m., and arriving at Hagerstown at 11:05 a. m., the crew having been on duty 8 hr. 35 min. from the time they were called until released at Hagerstown. Many similar runs have since been made.

The boiler is of the straight top type, 82 in. in diameter at the front end and 87 in. at the largest course. There are 239 tubes, 2¼ in. in diameter, and 36 flues, 5½ in. in diameter and 15 ft. 3 in. long; the tube spacing is 13/16 in. The firebox is 110 in. long and 80¼ in. wide, and has a throat depth of 22 in., measurement being taken from the top of the grate to the center of the lowest tube.

According to the American Locomotive Company's new ratios, 25 in. cylinders with 200 lb. boiler pressure give 2,252 cylinder horsepower. One horsepower hour requires 20.8 lb. of superheated steam, and the total steam required per hour is 2,252 times 20.8, or 46,840 lb. The firebox and firebox water tubes give an evaporation of 55 lb. of steam per square foot of heating surface; tubes 2¼ in. in diameter, 15 ft. 3 in. long, spaced 13/16 in., give an evaporation of 10.605 lb. per square foot of heating surface; and flues 5½ in. in diameter, 15 ft. 3 in. long, spaced 13/16 in., give an evaporation of 11.625 lb. per square foot of heating surface. This boiler has a heating surface in the firebox and firebox water tubes of 228.5 sq. ft.; in the tubes, 2,133.7 sq. ft., and in the flues 785.6 sq. ft.; the evaporation for the firebox and water tubes is 228.5 x 55, or 12,570 lb.; for the tubes, 2,133.7 x 10.605, or 22,630 lb.; for the flues, 785.6 x 11.625, or 9,200 lb., giving a total evaporation of 44,330 lb. The evapora-



Western Maryland Consolidation Locomotive with 51 inch Drivers

tion of the boiler, 44,300 lb., divided by the evaporation required, 46,840 lb., indicates a 95 per cent. boiler.

Maximum cylinder horsepower would not be reached until this engine was running 31 miles an hour. As the service in which the engines are working will not require any such speed, a 95 per cent. boiler should have ample steam making capacity. H. R. Warnock, superintendent motive power of the Western Maryland, states that with the poorest quality of coal he has ever seen, the fireman had no trouble in opening the second safety valve.

This design was developed by the mechanical department of the Western Maryland in co-operation with the American Locomotive Company as a part of the program of this road in reducing operating costs. The details employed in the construction include the Baker valve gear, firebrick arch, superheater, outside steam pipes, Woodard engine truck, long main driving box, Foulder main rod and vanadium cast steel frames.

The principal dimensions follow:

General Data

Gage	4 ft. 8½ in.
Service	Freight
Fuel	Bit. coal
Tractive effort	62,500 lb.
Weight in working order	244,500 lb.
Weight on drivers	217,500 lb.
Weight on leading truck	27,000 lb.
Weight of engine and tender in working order	424,000 lb.
Wheel base, driving	16 ft. 8 in.
Wheel base, total	26 ft. 2 in.
Wheel base, engine and tender	68 ft. 0 in.

Ratios

Weight on drivers ÷ tractive effort	3.52
Total weight ÷ tractive effort	3.91
Weight on drivers ÷ total equivalent* heating surface	53.84
Total weight ÷ total equivalent* heating surface	60.53

Cylinders

Kind	Simple
Diameter and stroke	25 in. x 30 in.

Valves

Kind	Semi-plug
Greatest travel	6½ in.
Outside lap	1 in.
Inside clearance	Line and line
Lead	1/8 in.

Wheels

Driving, diameter over tires	51 in.
Driving journals, main, diameter and length	11 in. x 20 in.
Driving journals, others, diameter and length	9 in. x 12 in.
Engine truck wheels, diameter	30 in.
Engine truck, journals	6 in. x 12 in.

Boiler

Style	Straight top
Working pressure	200 lb.
Outside diameter of first ring	83¾ in.
Firebox, length and width	111 in. x 80¼ in.
Firebox plates, thickness	3/8 in.
Firebox, water space	4½ in. and 4 in.
Tubes, number and outside diameter	239—2¼ in.
Flues, number and outside diameter	36—5½ in.
Tubes, length	15 ft. 3 in.
Heating surface, tubes and flues	2,919.3 sq. ft.
Heating surface, firebox	202.0 sq. ft.
Heating surface, water tubes	26.5 sq. ft.
Heating surface, total	3,147.8 sq. ft.
Total equivalent* heating surface	4,039.4 sq. ft.
Superheater heating surface	594.4 sq. ft.
Grate area	61.3 sq. ft.

Tender

Tank	Water bottom
Wheels, diameter	33 in.
Journals, diameter and length	6 in. x 11 in.
Water capacity	9,500 gal.
Coal capacity	14 tons

*Total equivalent heating surface = total evaporative heating surface + 1.5 times the superheating surface.

ADDITIONAL ROLLING STOCK FOR THE SWISS RAILWAYS.—The directors of the Swiss railways have recently approved contracts for the delivery of 32 locomotives in 1915 and also contracts for the purchase of 142 passenger cars, 42 baggage cars and 390 freight cars. The project for the reconstruction of the Federal Railways power plant in the Rhone river at Brieg and the laying of high power transmission cables in the second Simplon tunnel has also been approved, as well as that for the erection of other transmission lines in that vicinity for which a total expenditure of $378,280 will be required.

RAILROAD STATISTICS TO JUNE 30, 1913

The Interstate Commerce Commission has issued its preliminary statement of the earnings, expense and traffic and financial statistics of *railroads having annual operating revenues of over* $100,000, and of subsidiary non-operating companies operated by them, but not including switching or terminal companies, for the twelve months which ended one year ago. The principal items of the statement are tabulated below, but some of the figures for the year preceding are taken from the statement issued last year, which was given in the *Railway Age Gazette* of August 1, 1913, page 180. Where statistics of operating companies include transactions which are reported also by owning companies, there is a duplication, at end of year the amount of which does not appear. Other items, such as capital stock of one road owned by another, make a fictitious element in the totals.

Statistics of Class 1 and Class 2 Railroads—Year Ending June 30, 1913

	Year ending June 30, 1913	Year ending June 30, 1912
Miles of line operated at end of year	244,418	240,239
Miles of trackage rights included in above	11,163	10,825
Average miles operated during year	242,657	238,220
Miles of track	369,580	360,952
Locomotives	63,378	61,276
Locomotives per 1,000 miles	259	255
Cars, passenger service	51,700	50,606
Cars, freight service	2,273,564	2,203,128
Cars, company's service	120,244	114,924
Cars, total	2,445,508	2,368,942
Cars, per 1,000 miles	10,005	9,860
Passenger miles per passenger locomotive	2,341,269	2,263,019
Ton miles per freight locomotive	7,843,663	7,077,428
Employees, June 30	1,815,239	1,699,941
Employees per 100 miles	743	707
Capital stock, *thousands*	$8,610,611	$8,469,561
Funded debt, *thousands*	$11,185,514	$11,064,190
Dividends declared	$368,606,327	$400,432,752
Dividends, average, per cent.	4.28	4.73
Dividends, average, per cent. on dividend-paying stocks	6.38	7.20
Cost road and equipment, *thousands*	$16,351,639	$15,874,579
Passengers carried, *thousands*	1,033,680	994,372
Passengers carried one mile, *thousands*	34,575,873	33,039,111
Passenger mileage per mile of road	143,067	140,393
Freight carried, *thousands* of tons	2,058,035	1,818,796
Ton miles, *millions*	301,399	263,780
Increase, *millions*	37,619	.....
Ton miles per mile of road	1,245,158	1,110,811
Average freight train load, tons	445	410
Average receipts per passenger mile, cents	2.008	1.985
Average receipts per ton mile, mills	7.29	7.43
Average receipts per passenger train mile	$3.36	...
Average receipts per freight train mile	$3.24	...
Average receipts per revenue train mile, freight and passenger	$2.45	$2.30
Average operating expenses per revenue train mile	$1.70	$1.60
Per cent. expenses	69.44	69.30
Passenger revenue, *thousands*	$695,988	...
Freight revenue, *thousands*	2,198,931	...
Total revenue, including miscellaneous, *thousands*	3,125,136	$2,826,958
Operating expenses, *thousands*	2,169,969	1,959,095
Operating expense details, *thousands*—		
Maintenance of way	421,232	363,496
Maintenance of equipment	511,561	448,304
Traffic	62,850	60,569
Transportation	1,096,253	1,013,341
General	78,072	73,254
Revenue per mile	12,873	11,881
Operating expenses per mile	8,939	8,234

The item, cost of road and equipment, in 1913 is $477,059,640 larger than in 1912. The changes are explained as follows:

	Expenditures for additions and betterments.	Expenditures for new lines and extensions.	
From cash or other working assets	$329,511,772	$54,819,241	
From special appropriations	48,079,165	473,281	
Through issue of securities	162,597,278	63,692,746	
Not assigned to any of the above classes	5,801,127	10,263,251	
Total	$545,989,342	$129,248,519	$675,237,861
Miscellaneous charges not classified			4,847,012
Total expenditures during year			$680,084,873
		Credits.	
Property retired or converted		*$79,495,571*	
Adjustments		*5,058,790*	
Difference between record value of grantor and purchase price of grantee in cases of roads sold, merged, consolidated, etc.		*118,470,872*	
Total			*203,025,233*
Net increase during year			$477,059,640

The capacity of freight cars is reported as follows:

	Number	Aggregate capacity. Tons
Box	1,032,585	35,607,134
Flat	147,541	5,151,054

	Number	Aggregate capacity. Tons
Stock	78,308	2,421,827
Coal	871,339	38,314,920
Tank	8,216	327,727
Refrigerator	43,389	1,357,403
Other cars in freight service	91,911	3,798,080
Total	2,273,289	86,978,145

CONDENSED INCOME ACCOUNT

Following is a condensed income account of the roads included in this list, below which is a similar statement for the controlled, non-operating companies, both incomplete because of the omission of a few unsatisfactory returns. The accounts of the operating roads include both operating and financial transactions, while the accounts of the non-operating roads are confined for the most part to receipts and payments under leases, contracts and agreements. For a number of items, such as dividends, taxes, etc., both statements must be taken into consideration in order to learn the aggregates of such items for the railways of the United States therein represented.

Thus the aggregate of dividends declared during the year, $368,552,632, includes those declared out of current income and those declared from surplus both by the operating roads and by the non-operating roads. This amount includes dividends declared on railway capital stock owned by other railway companies.

OPERATING ROADS

Income Account

Rail operations:		
Operating revenues	$3,125,135,798	
Operating expenses	2,169,968,924	
Net operating revenue		$955,166,874
Outside operations:		
Revenues	$67,982,036	
Expenses	65,953,702	
Net revenue from outside operations		2,028,334
Total net revenue		$957,195,208
Taxes accrued		122,005,424
Operating income		$835,189,784
Other income		283,063,093
Gross income		$1,118,252,877
Rents, interest, and similar deductions from gross income		629,706,398
Net corporate income		$488,546,479
Disposition of net corporate income:		
Dividends declared from current income	$241,750,512	
Appropriations for additions and betterments	48,022,688	
Appropriations for new lines and extensions	70,159	
Miscellaneous appropriations	14,991,076	
Stock discount extinguished through income	6,497	
Total		304,840,932
Balance to credit of profit and loss		$183,705,547

Profit and Loss Account.

Credit balance on June 30, 1912	$1,078,765,200
Credit balance for year 1913 from income account	183,705,547
Total	$1,262,470,747
Dividends declared out of surplus	85,706,629
Difference	$1,176,764,118
Appropriations for additions and betterments	$15,158,827
Appropriations for new lines and extensions	449,652
Miscellaneous appropriations	68,723,482
Other profit and loss items—debit balance	20,691,684
Total	105,023,645
Balance credit June 30, 1913, carried to balance sheet	$1,071,740,473

NONOPERATING ROADS

Income Account

Gross income from lease of road	$124,332,275	
Taxes accrued	5,326,536	
Net income from lease of road		$119,005,739
Other income		7,777,635
Gross income		$126,783,374
Interest, and similar deductions from gross income		68,568,734
Net corporate income		$58,214,640
Disposition of net corporate income:		
Dividends declared from current income	$38,845,422	
Appropriations for additions and betterments	2,140,855	
Appropriations for new lines and extensions	59,491	
Miscellaneous appropriations	1,274,520	
Total		42,320,288
Balance to credit of profit and loss		$15,894,352

Profit and Loss Account.

Credit balance on June 30, 1912		$57,158,330
Credit balance for year 1913 from income account		15,894,352
Total		$73,052,682
Dividends declared out of surplus		2,250,069
Difference		$70,802,613
Appropriations for additions and betterments	$500,665	
Appropriations for new lines and extensions	208	
Miscellaneous appropriations	29,945,358	
Other profit and loss items—credit balance	2,932,044	
Total		27,514,187
Balance credit June 30, 1913, carried to balance sheet		$43,288,426

THE LOUISVILLE & NASHVILLE PASS INVESTIGATION

The Interstate Commerce Commission has submitted a preliminary report to the Senate in compliance with Senate Resolution 153 relating to the financial relations, rates and practices of the Louisville & Nashville, the Nashville, Chattanooga & St. Louis and other carriers. The report is a response to paragraph 13, in particular, and contains what is considered by the commission to be startling information concerning the granting of passes by these roads. The results cover only one year, whereas the resolution requires the commission to investigate passes granted to the specified classes for a period of three years. The results for this one year apparently so fully reveal prevailing conditions in this respect that the commission doubts the necessity of covering 1912 and 1911.

During the year ending December 31, 1913, the Louisville & Nashville issued to or on account of members of legislative bodies and other public officials, attorneys, newspaper representatives, and various other persons, 11,805 free passes, involving 4,577,928 miles of travel, the value of which was $130,840.

These were distributed as follows:

Class	Number of passes	Mileage	Value
Members of legislative bodies and other public officials	6,578	2,155,465	$61,727
Attorneys	1,402	874,341	24,520
Newspaper representatives	2,631	1,119,060	32,247
Various other persons	1,194	429,062	12,346
Total	11,805	4,577,928	$130,840

The resolution made particular reference to passes issued to and at the request of members of legislative bodies or other public officials:

Total of all forms of passes	Number of passes	Mileage	Value
Issued to such members or officials	1,942	1,152,130	$32,632
Issued at their request	4,636	1,003,315	29,095
Total	6,578	2,155,465	$61,727

The passes shown above as issued on account of members of legislative bodies or other public officials were distributed as follows:

On account of	Number of passes	Mileage	Value
United States senators	1	...	...
United States representatives	2	204	$6
Other United States officials	139	56,558	1,676
State senators	1,556	390,383	11,324
State representatives	2,183	505,201	14,850
Other state officials	1,769	839,567	23,996
County officials	228	167,802	4,674
City officials	611	149,290	4,021
Judges	89	46,460	1,180
Total	6,578	2,155,465	$61,727

In the same period the Nashville, Chattanooga & St. Louis issued to or at the request of members of legislative bodies and other public officials, attorneys, representatives of newspapers, and various other persons 22,255 passes, involving 7,133,944 miles of travel, the value of which was $209,421.

These were distributed as follows:

Class	Number of passes	Mileage	Value
Members of legislative bodies and other public officials	16,580	5,573,135	$164,525
Attorneys	291	153,261	4,443
Newspaper representatives	1,310	348,738	10,096
Various other persons	4,074	1,058,810	30,447
Total	22,255	7,133,944	$209,421

Passes were issued to and at the request of members of legislative bodies and other public officials as follows:

Total of all forms of passes	Number of passes	Mileage	Value
Issued to such members or officials	1,247	613,420	$18,087
Issued at their request	15,333	4,959,715	146,438
Total	16,580	5,573,135	$164,525

The passes shown above as issued on account of members of legislative bodies and other public officials were distributed as follows:

On account of	Number of passes	Mileage	Value
United States senators	...	...	...
United States representatives	...	...	...
Other United States officials	151	37,757	$1,097
State senators	5,814	1,788,560	52,961
State representatives	8,439	2,969,038	87,713
Other state officials	1,086	444,158	13,089
County officials	388	130,540	3,700
City officials	532	143,125	4,165
Judges	170	59,957	1,800
Total	16,580	5,573,135	$164,525

The commission's comments on these figures are as follows:

It must be remembered that the passes here enumerated cover only passes held by classes of persons specified in the resolution. The list does not embrace, for instance, passes granted to officers and employees of railroad companies.

The examiners of the commission have reported only the amount of travel actually established through an examination of the companies' records. Due to the incompleteness of the reports of the conductors of passenger trains the exact amount of free travel on the part of the classes of persons embraced within the inquiry could not be correctly ascertained. It is doubtless substantially greater than what is here reported.

The examiners also compiled illustrative correspondence tending to show the motives which actuated recipients and givers in these pass transactions. These letters, as might be expected, reflect many varieties of states of mind on the part of the givers and of the seekers after favors from the timidly suggestive to the boldly intimidating and threatening.

In order to properly compile the required information lists of pass holders in the various classes were prepared. Such lists reveal the manner in which these carriers have dipped into practically every domain of public and private life through the instrumentality of the free pass. There is scarcely a walk of life which is not represented in this procession of recipients of passes from the federal bench to the local politician and the sheriff who summons the jury. The threads represented by these passes tie thousands of citizens to the carriers through improper relations. The lack of morality reflected by the facts here compiled is a menace to the institutions of a free people. These citizens who sell their influence quite as much as though they accepted money bribes seem to be as willing to be tied as the carriers are ready to tie them. Men pledge their influence quietly in the home or school or club, in the professions, in business, in city councils; in administrative boards, in courts of justice, in legislative halls and at the polls.

As shown by the above tables the aggregate value of the actual travel upon these passes which it was possible to establish statistically is $340,261. This is a substantial sum. If all the travel upon the passes in question could have been established the sum would doubtless have been materially increased; yet it is not an amount which can financially cripple any large system of railways. The financial magnitudes involved, however, are as nothing compared with the impairment of public and private morality shown to have resulted from this giving and receiving of passes. The lamentable features of the situation are so perfectly obvious that they scarcely require further characterization.

This investigation being pursuant to a resolution of the Senate is not one in which the commission can make an order. It states, however, that it has had in progress for some time a general investigation of free transportation, and that it is its intention in that investigation to issue an order dealing with that practice.

MOTION PICTURES OF RAILWAY MISHAPS

The use of motion pictures by the Pacific Electric Company for teaching the importance of certain regulations for the prevention of collisions and for inculcating other rules was noticed in the *Railway Age Gazette* of June 26, page 1567. Following are descriptions of some of the pictures used:

One reel represents a dangerous crossing. The track of a steam railroad, hugging the bank of a river, makes a sharp curve at this point, and the road of the electric line emerges from a maze of warehouses and other large buildings to enter upon a bridge beyond. The picture shows a crowded electric car approaching the crossing. The motorman stops the car a few yards short of the crossing track, and the conductor, stepping off and absently glancing at a newspaper held in his hand, which some passenger has handed to him, walks out in front of his car. Still absent-minded, he glances down the crossing track in one direction, and gives the signal to the motorman to proceed. The car begins to move. At the same instant, from the direction in which he failed to look, comes into view a noiseless but swiftly moving switching engine. It is rapidly nearing the crossing. The conductor, at last hearing the sound, drops his paper and stands for just a second, paralyzed with horror. Then he rushes in front of the electric car and begins to frantically wave his arms. But the motorman has already seen the danger, and has quickly shut off the current and applied the brakes. The passengers have in the meantime also observed the impending danger and are panic-stricken. The brakes are set, the wheels slide and the car comes to a stand within less than five feet of the crossing. The conductor scarcely has time to step to one side to safety as the switch engine goes whizzing by.

This constitutes the first scene. The companion picture shows the proper procedure for such situations.

Another set shows a car that has become stalled on a suburban track at night. It is a track used exclusively by fast trains, and the electric cars are scheduled to run only a few minutes apart. The line has a number of curves and traverses several deep cuts. A flagman is sent back to place torpedoes and to give a lamp motion signal to possible approaching trains. But he is tired and careless, and neglects to go back a sufficient distance. He waits for several minutes, and finally sits down on one of the rails with his lantern between his feet. Soon there is a flash of a headlight playing on the sides of the cuts, and the flagman jumps up and begins to swing his lantern. The approaching train comes on, traveling at perhaps forty miles an hour. The motorman of this train then sees the signal, and quickly applies his brake, but he passes the flagman with grinding wheels, while still going at uncontrollable speed; and, the distance allowed by the flagman being insufficient to overcome the momentum, crashes into the standing car.

Just such an accident actually occurred on one of the lines of this company several months ago, and several lives were lost.

A companion picture shows how the signaling should have been done, according to the rules.

As pedestrians persist in walking on railway bridges and trestles, most electric railways require their motormen to slacken speed when entering on a bridge or trestle, especially within city limits. One of the pictures shown in the instruction department of this Los Angeles company shows a pedestrian trespassing on a bridge, when a car swoops down upon him, and the car is only brought to a standstill just as the guard strikes the trespasser. The conductor escorts the careless pedestrian to one end of the trestle, and directs his attention to the warning sign.

Another reel constitutes a warning against the practice of alighting from one car, passing around behind it, and, without looking, stepping directly in front of another car moving in the opposite direction on the other track. The motorman of the moving car when passing a standing car from which passengers are alighting is supposed to slacken speed and ring his bell. Often, however, he is careless and fails to observe the rule. Pictures are shown to illustrate how accidents may be caused

in this way, and also how care should be exercised to avoid them.

The motion pictures are used also to inculcate habits of courtesy toward passengers. One shown by the Pacific Electric presents a more or less familiar and humorous episode—the conductor of an electric car, a handsome young fellow, standing and talking to a pretty young woman sitting in a seat at the front end. He is entirely oblivious to everyone except the girl. A fat old lady rises from one of the rear seats and approaches the exit. She has reached her street and wants to get off. Instead of stopping to permit her to do so, however, the car passes on, while the old lady waves her hands and yells to the conductor. Finally some other passenger directs the conductor's attention to the excited passenger, and after carrying her three or four blocks beyond her destination, he stops the car and lets her off.

These are only a few of the pictures used. They illustrate all phases of train management, including a portrayal of how trains should be handled through interlocking plants; the operation of electric train-staff machines; how to use crossover tracks on a four-track line in high-speed sections where the view is obstructed; what to do when unable to clear the leaving time of an opposing superior train, and proper procedure at steam railroad grade crossings; how to make tests of air brakes, how to couple and uncouple cars; picking up broken trolley wires; the necessity of complying with the rule when approaching curves protected by the "slow" sign; the danger of giving the back-up signal without ascertaining if it is safe to move backward; what to do when approaching a dangerous road crossing where there is no flagman or flagging device; hand and lamp signals; how to use fusees and set torpedoes, and numerous other things.

This method of instruction has proved to be not only effective in giving trainmen a clear, comprehensive knowledge of their duties, but, being highly interesting and entertaining, it eliminates the necessity of using coercive methods to get them to attend instructions. The advantage of being able to instruct a large class of men in much less time than formerly is important, as the company employs nearly 5,000 men, of whom nearly 2,000 have duties in connection with train operation.

The Pacific Electric Railway Company's system serves an area of approximately 2,500 square miles in the vicinity of Los Angeles, and operates over 1,067 miles of track. It has 650 passenger cars, 1,452 freight cars, of different kinds, and 66 electric locomotives of from 200 to 1,000 horsepower each. It carries approximately 97,000,000 passengers annually, or about 266,000 daily. A total of 7,172 passenger trains, of from one to three cars each, is despatched over the system daily. Although it is primarily a suburban system, being entirely independent of the system handling the city traffic of Los Angeles, 4,800 trains each day handle city traffic, principally in the small cities and towns surrounding Los Angeles. If all service on the system were to be suddenly stopped and re-started at one time, 50,000 horsepower of electrical energy would be required. The lines extend from sea level to a point 5,800 feet above sea level.

Railway Construction in Spanish Africa.—The chief engineer of public works in the colonial section of the department of state of Spain has submitted a project for a complete system of railways in the Spanish colony of Fernando Po. The total length of the proposed system when completed will be 115 miles, as follows: From Santa Isabel to San Carlos, 28 miles; from San Carlos to Ococo, 12 miles; from Santa Isabel to Concepcion, 44 miles; from Concepcion to Ureca, 12 miles, and from Rilaja to Moca, 19 miles. It is urged that the line from Santa Isabel to San Carlos, which will run through the richest and most popular section of the colony, should be first constructed, beginning at Santa Isabel. This line, in conjunction with the proposed line from Santa Isabel to Concepcion, will serve the north and the middle of the island while the line from Rilaja to Moca will give access to the healthy plateaus.

GENERAL FOREMEN'S CONVENTION

The tenth annual convention of the International Railway General Foremen's Association was held at the Hotel Sherman, Chicago, July 14-17, W. W. Scott, of the Delaware, Lackawanna & Western, at East Buffalo, N. Y., presiding. The meeting was opened with prayer by Reverend Peter J. O'Callaghan, after which an address of welcome was delivered by Leo N. Hornstein, on behalf of the mayor of Chicago. This was responded to by W. T. Gale, of the Chicago & North Western.

President Scott, in his address, said: "As far as the mechanical department is concerned our efforts have not been sufficiently brought to the light of public recognition." He then made the following recommendations: That the subjects presented at this convention for discussion be retained for next year except for the two subsidiary papers; that the number of members named on committees be increased to ten, and that their selection be from widely separated territory in order that all data due to climatic or any other unusual conditions may be observed; that subject 2 (valves, cylinders, crossheads, pistons and guides) cover erecting, bench and machine work; and that closer relationship be sought between the General Foremen's and the Tool Foremen's Associations, if possible a plan being worked out whereby the two organizations would meet during the same week.

F. A. DELANO ON SCIENTIFIC MANAGEMENT

F. A. Delano, president of the Chicago, Indianapolis & Louisville, in a brief address, referred to modern efficiency methods as a new application of old ideas. He gave the following definition of scientific management, which was developed by the members of the United States Commission on Industrial Relations from a number of definitions given before the commission by efficiency experts. Scientific management is essentially an effort to eliminate waste. More specifically, scientific management is that kind of management which aims at an accurate study, measurement and analysis of the various steps in any operation with a view to eliminating error, waste, false motions, etc. While scientific management does not carry with it any particular system of payment for work done, it does contemplate the essential necessity of complete cooperation between employer and employee and it has been generally assumed that this could not be obtained unless the employee shares with the employer in the benefits derived and thereby finds it to his interest to cooperate in attaining the results. With this object in view many and various systems have been devised, such as premium, bonus and others, but these are obviously only the methods adopted as an incentive to obtain the results, and are not to be confounded with the thing itself. Scientific management seeks to accomplish by improved methods what inventions of new machinery seek to accomplish, but the promoters of such methods, recognizing the necessity of cooperation, urge at all times the importance of giving the employee a share in the savings effected and not permitting the employer to take it all. In the best sense scientific management carries with it profit sharing by the employer with the employee; hence it is reasonable and proper that the employee should be consulted directly or through a representative shop committee in the fixing of price or wage schedules, bonuses, or premiums.

ENGINE HOUSE EFFICIENCY

The following is taken from a paper on this subject by W. W. Smith (C. & N. W.): In the report on engine house efficiency presented last year, the different phases of the subject were treated in a general way. The subject was continued so that new material could be added to stimulate discussion. The relation that good locomotive performance bears to railway earnings is now generally recognized, and hence new methods are constantly being devised to secure safety and efficiency of service. Strictly speaking, some of the items mentioned in this report do not come

under the head of engine house efficiency, but they have been included because of their important relation to the subject.

Engine Mileage.—An increase in engine mileage is equivalent to increasing the number of locomotives in through freight service. The operating department, by cooperating with the mechanical department, can do much to increase engine mileage. Trains are often too long on the road due to poor train despatching or overloaded engines; engines are delayed to and from the train yards and the engine house; they are delayed by yard forces not having trains made up; and often trains come in or are ordered out in bunches, so that the engine house organization cannot handle the engines in the way they could if the trains had been properly spaced.

Good judgment in shopping engines for repairs, and storing them during dull periods is an important item to be considered. While it is not economy to limit engines kept in service to a point that might delay freight, on the other hand it is uneconomical to have engines needlessly lying ready for service. In storing engines, those should be kept in service whose mileage comes nearest to entitling them to a shopping. If poorer engines are stored, the good ones are being worn out during the dull season.

There is undoubted economy in long runs for passenger engines, even though they are more conducive to engine failures. When locomotives in passenger service are on long runs, the running repairs are somewhat less per mile run and per car hauled, the oil and coal account is slightly less, and the cost of maintenance of the added number of engine houses is saved. In order to make long runs a success, locomotives must receive very careful attention at engine houses. By the use of stoker and oil fired engines, it is possible to make still longer runs.

Pooled or Assigned Power.—Whether it is best to pool power, or assign each engine to a regular crew, is an important consideration in engine house efficiency. When an engine is assigned to a regular crew, it is given more attention by the crew, there is less likely to be delay in getting away from the engine house, failures are less likely to occur, and the cost of maintenance is sure to be less. The assigned engine is always in better condition because the engine crew is continually reporting work, and following it up to see that it is done.

A system of regular assigned engines has been inaugurated on some of the divisions of the Chicago & North Western with gratifying results. With this system all engines in through freight service on one division must be of the same hauling capacity, and in equally good condition, so that they are suited for a fast freight one trip and a drag freight the next trip. The runs are pooled; that is, regular engines are not assigned to certain runs, but an engine crew with a regular engine will take any run that its turn on the board entitles it to. Of course with this system, more engines are required, as it is necessary to hold engines for the crew's rest, and one or two extra engines are required so that a regular crew can be furnished with a locomotive when the regular engine is held in for work.

Terminal Delay.—Out of each 24 hours the locomotive spends on an average, 6 hours in the engine house. The greater cost and earning power of recent locomotives makes it more necessary than ever to keep them in service. The question of turning engines promptly is one of system and supervision. It is not possible to reduce the time required for repairs to any great extent, so that any material saving effected must be in the handling. Ordinarily, the maximum period of delay occurs at the clinker pit, but where the piece-work system of cleaning and knocking fires has been introduced the delay has been cut down to a surprisingly low figure, and at the same time the cost has been greatly reduced.

In turning engines at terminals, the most valuable units of power should be given the preference; that is, when several different classes of engines are used in freight service. Also the ash pit tracks should be arranged so that engines not requiring washing out, or other heavy work, can be run around those requiring washing out. It often happens that engines are held in the engine house for work, or for other reasons, until they cool off, and thus considerable time is consumed in getting them steamed up again. Where a hot water fill-up line is provided, a considerable saving in time can be made by letting water out of the boiler and re-filling with fill-up water which is nearly at a boiling temperature. When it is the custom not to fire engines until they are ordered, this method is also of advantage, as it is sometimes difficult to get engines steamed up quickly with cold water.

The engine house foreman should always be in a position to quickly and accurately advise the transportation department when he expects engines to be ready for service. Then a definite prospective time should be given to the yardmaster two hours before the engine will be ready, from which time the engine should be ordered.

Engine Delays.—Delays in getting engines out of the house at the time for which they are ordered occur at times in spite of all efforts made to prevent them. When engines are ordered on prospective times, given before the engine is ready for service, initial delays may occasionally result, but this method actually saves about two hours delay to the engine. At busy terminals, where important trains are despatched, whenever possible an extra freight and an extra passenger engine should be fired and ready for service, so that in case of the unexpected happening, there will be an engine to fall back on. Delays sometimes result from the failure of either the day or night engine house foreman to notify the other concerning repairs that are left unfinished. When a running log book is maintained delays from this source are minimized.

Mileage Between Shoppings.—The aim of the engine house management should be to keep engines out of the shop as long as possible, having due regard to excessive lost motion and injury to track due to worn tires. It is probably best to compute locomotive costs on a ton mile basis so there will be a tendency on the part of master mechanics and others to keep engines in 100 per cent. efficiency as long as possible, and then when it proves impracticable for the engine house to further maintain them at their full hauling capacity, to shop them. As an average figure for all roads, freight locomotives do not make more than 40,000 miles between shoppings, and passenger engines not more than 80,000 to 100,000 miles. It costs on an average about $2,000 to give an engine a general overhauling so that a considerable saving is made by prolonging the time between shoppings. Occasional records of very high mileage have been made, and indicate what can be accomplished by care in construction, maintenance, and operation of locomotives.

Fuel Economy.—There are unlimited possibilities for saving fuel at the engine house. Cylinder and valves blowing, cylinder cocks and relief valves that do not seat, leaky whistle and pop valves, leaky boilers, steam leaks in the cab, improperly drafted front ends, bushed nozzles, etc., are all sources of waste that are caused by imperfect maintenance. The care of the boiler jacket and insulation and covering on steam pipes and cylinders, is also important, as the radiation from uncovered surfaces causes losses. Then there are direct losses of fuel at engine houses due to tanks being overloaded, to uneconomical methods of firing up engines, to engines popping off on the cinder pit track while waiting to have the fire cleaned, to engines fired too long before they are ordered, etc.

Engine Supplies.—There is spent annually in the United States between $4,000,000 and $5,000,000 for locomotive supplies alone, and nearly an additional million for labor in connection with the maintenance of this equipment. This means that the cost of upkeep per locomotive per year averages about $100. By close supervision at engine houses this high cost can be cut down. The list of tools carried should be cut down to the limit; then at each engine house there must be one or more good, reliable supplymen, or tool checkers to fill shortages, and see that damaged articles are repaired. Each engineman should have an individual tool box, which, together with the oil cans, should be removed from the engine at the end of the trip by

the supplyman. Engine cushions should be securely fastened to the seats, and suitable boxes or racks should be provided in the cab for lanterns, emergency signals, etc. In order that each fireman may have his own shovel, a suitable rack should be placed in the engine house to which shovels may be chained and locked.

Handling of Switch Engines.—The importance of effective switching service is often overlooked. When switch engines are delayed at the engine house, or are so poorly maintained that they cannot do effective work, the train service is correspondingly impaired. The engine house should make every effort to furnish switching power on time at the beginning of the day and when engines are in to have the fires cleaned. As an aid in doing this, the work at the cinder pit should be very closely supervised at noon and at midnight, when a number of engines are in at the same time to have the fires cleaned. Whenever possible a relief engine should be fired and ready for immediate service. Switch engines should be held in for inspection and repairs at stated intervals, and the grate rigging, etc., should be gone over carefully at this time, so there will be no occasion for a delay from that source when the fires are cleaned.

On several roads, at important terminals, a system of relief engines has been adopted. With this plan a relief crew is engaged in taking engines to and from the engine house and yard, and the regular yard engine crews do not come to the engine house with the engines. When an engine that is working needs to come to the engine house to have the fire cleaned or for work, the relief crew brings out a relief engine, and exchanges it for the other engine.

Co-operation.—The fundamental principle involved in getting good engine house service is the individual interest of every employee concerned, and the co-operation of all. Probably no other one thing can do quite as much to reduce the net earnings as friction or ill will between the operating and mechanical departments. The closer officials of the two departments get together, the better will be the results. The master mechanic or foreman should call up the the train despatcher the first thing in the morning, and help him to line up things, thereby heading off probable failures, and in return receiving valuable information for his department.

Then a friendly spirit of co-operation should exist between master mechanics and foremen of different divisions. It often happens that engines from one division run into the terminal of another division, and unless there is harmony between the men of the two divisions the best interests of the company must be sacrificed.

Terminal Facilities.—In order to efficiently handle the large engines of the Mallet, Mikado and Pacific types, now in general use, improved locomotive terminal facilities are absolutely necessary. The engine terminals used prior to the introduction of the heavy power are now entirely inadequate. The importance of up to date terminals has been quite generally recognized, as is shown by the care that has been taken in the design and construction of recent terminals.

Maintenance Costs.—Locomotive maintenance costs depend largely on the facilities provided and the cost and quality of the labor to be had. Then when the work is more liberal and thorough the costs are correspondingly increased. Of course large engines are more costly to maintain than smaller ones, and certain types and designs are more troublesome to keep up than others. For that reason it is uneconomical to run large engines on runs that can be handled by lighter power. Locomotive maintenance costs continue to increase, but when we make allowance for the increase in wages, the increased cost of material, and the added complexity of the modern locomotive, the cost of repairs per unit of work has been actually decreased. The practice of standardizing many parts of the locomotive, particularly those requiring frequent repairs or renewal, is general, and results in reduced maintenance costs. When parts and castings are arranged to be used either right or left the costs are still further reduced. Then, as far as possible, all parts should be so constructed and placed that they can be readily removed and replaced; otherwise repairs will be far more expensive than they would have been had the parts been more accessible.

As a further means of keeping down costs, all important engine houses should be furnished with an ample supply of spare parts, such as air pumps, lubricators, injectors, bell ringers, etc., which should be used to replace defective apparatus, whenever it will take less time to exchange than to repair. As a general proposition repairs to such accessories can be made to the best advantage at the shop, where special tools and machinist specialties are available.

Locomotive Inspection.—Rapid and accurate locomotive inspection is a matter of the greatest importance from a maintenance standpoint. Where the most satisfactory results are attained, inspection is made by a force of special inspectors who have been trained to inspect certain parts of the engine. This practice is followed at some of the important division points on the Pennsylvania Railroad.

DISCUSSION

W. F. Lauer, of the Illinois Central, stated that the greatest objection to assigned engines comes from the transportation department. On the Illinois Central the average time at terminals is less with assigned than with pooled. Engines and assigning power has reduced repair expenses and the number of mechanics required in engine houses. The consensus of opinion was against pooling. Mention was made of the advantage of a cold water line in engine houses to fill tenders before leaving and thus avoid delay if work is late on the engine. One member considered terminal delays mainly due to lack of organization. Mr. Smith stated that many engine failures could be prevented by careful study of failed parts, by proper discipline, and by periodical examinations and tests. One member claimed that most engine failures were due to lack of proper organization and inspection. Mr. Smith laid stress on the value of shifting shop and engine house men to give them all around training.

J. S. Sheafe, of the Baltimore & Ohio, made a brief address on the relationship of the general foreman to shop efficiency. An account of the Thursday and Friday sessions of this convention will appear in next week's issue.

RAILWAY EXTENSION IN CHINA.—The head office of the Chinese Eastern has received permission to begin the construction of a branch line from Pervaya Retchka (First River) to Churkin on the southern side of the Golden Horn Bay at Vladivostok. The line will be ten versts (6.7 miles) long and will include a tunnel 2,400 ft. in length. The total cost of construction will be $1,731,000, of which $250,000 is allotted for this year. The work will be finished in 1916.

RAILWAY PROGRESS IN THE CAUCASUS.—Last year was one of comparative activity in railway construction work in the Caucasus. The Armavir-Maikop-Tuapse Railroad is nearly completed and will soon be opened to traffic. The Kars-Sarikamish branch of the Transcaucasian State Railways was completed and opened to traffic toward the end of 1913. Surveys on the Sarikamish-Karaurgan section are in progress and the extension line will soon be commenced. Preliminary and survey work on the Black Sea Railroad was completed and the work of building the line will also soon commence. This road will extend south from Tuapse and it has been decided to have it join the Poti-Samtredi branch of the Transcaucasian State Railways at Kvaloni. The distance from Tuapse to Kvaloni is 213 miles. Progress was made on the Kakheti Railroad from Tiflis to Signakh and it is proposed to extend this line to Baku. The Djulfa-Tabriz Railway was begun and by the close of the year rails were laid for 8½ miles in Persian territory. The Vladikavkaz Railway completed two branch lines from Ekaterinodar in 1913, one to Yeisk and the other to Akhtari, both on the Sea of Azof; and a line from Krimskaya to Bataisk, near Rostoff-on-Don.

The Interstate Commerce Commission's Report on the New Haven

An Abstract of the Report with the Commerce Commission's Language Preserved, In So Far as Possible

In the present proceedings the commission has inquired into the financial affairs of the entire New Haven system. Since the former investigation there has been a change in the executive officers of the New Haven system. In justice to the present management, it is but fair to say that its chief executive officer and his special council have cooperated with the commission and rendered it substantial assistance throughout this investigation. The witnesses, other than the accountants for the commission, were in the main hostile, and with few exceptions their testimony was unwillingly given.

The result of our research into the financial workings of the former management of the New Haven system has been to disclose one of the most glaring instances of maladministration revealed in all the history of American railroading. In the course of the investigation many instances were uncovered of violation of the laws of different states. As these were not understood to be pertinent to our inquiry under the senate resolution we did not follow them into their details. As pointing to violations of state laws, we have turned over the evidence concerning local occurrences in New York City to the district attorney for the proper district, and the testimony relating to irregularities in Massachusets and Rhode Island have been laid before the proper authorities of those states. The commission has also furnished the Department of Justice with a complete record of the testimony.

The difficulties under which this railroad system has labored in the past are internal and wholly due to its own mismanagement. Its troubles have not arisen because of regulation by governmental authority. Its greatest losses and most costly blunders were made in attempting to circumvent governmental regulation and to extend its domination beyond the limits fixed by law.

The subject matter of this inquiry relates to the financial operation of a railroad system which, on June 30, 1913, had a total capitalization of approximately $93,000,000, of which $79,000,000 was stock and $14,000,000 bonds. In the ten years from June 30, 1903, this capitalization was increased from $93,000,000 to $417,000,000, exclusive of stock premiums, or an increase of $324,000,000. Of this increase approximately $120,000,000 was devoted to its railroad property and was expended for betterments and equipment. This leaves the sum of $204,000,000, which was expended for operations outside of its railroad sphere. Through the expenditure of this sum this railroad system has practically monopolized the freight and passenger business in five of the states of the Union. It has acquired a monopoly of competing steamship lines and trolley systems in the section which it serves. The financial operations necessary for these acquisitions, and the losses which they have entailed, have been skilfully concealed by the juggling of money and securities from one subsidiary corporation to another.

SIGNIFICANT INCIDENTS

Marked features and significant incidents in the loose, extravagant, and improvident administration of the finances of the New Haven as shown in this investigation are the Boston & Maine despoilment; the iniquity of the Westchester acquisition; the double price paid for the Rhode Island trolleys; the recklessness in the purchase of Connecticut and Massachusetts trolleys at prices exorbitantly in excess of their market value; the unwarranted expenditure of large amounts in "educating public opinion"; the disposition, without knowledge of the directors, of hundreds of thousands of dollars for influencing public sentiment; the habitual payment of unitemized vouchers without any clear specification of details; the confusing inter-relation of the principal company and its subsidiaries and consequent complication of accounts; the practice of financial legerdemain in issuing large blocks of New Haven stock for notes of the New England Navigation Company, and manipulating these securities back and forth; fictitious sales of New Haven stock to friendly parties with the design of boosting the stock and unloading on the public at the higher "market price"; the unlawful diversion of separate funds to political organizations; the scattering of retainers to attorneys of five states, who rendered no itemized bills for services and who conducted no litigation to which the railroad was a party; extensive use of a paid lobby in matters as to which the directors claim to have no information; the attempt to control utterances of the press by subsidizing reporters; payment of money and the profligate issue of free passes to legislators and their friends; the investment of $400,000 in securities of a New England newspaper; the regular employment of political bosses in Rhode Island and other states, not for the purpose of having them perform any service, but to prevent them, as Mr. Mellen expressed it, from "becoming active on the other side"; the retention by John L. Billard of more than $2,700,000 in a transaction in which he represented the New Haven and into which he invested not a dollar; the inability of Oakleigh Thorne to account for $1,032,000 of the funds of the New Haven intrusted to him in carrying out the Westchester proposition; the story of Mr. Mellen as to the distribution of $1,200,000 for corrupt purposes in bringing about amendments of the Westchester and Port Chester franchises; the domination of all the affairs of this railroad by Mr. Morgan and Mr. Mellen and the absolute subordination of other members of the board of directors to the will of these two; the unwarranted increase of the New Haven liabilities from $93,000,000 in 1903 to $417,000,000 in 1913; the increase in floating notes from nothing in 1903 to approximately $40,000,000 in 1913; the indefensible standard of business ethics and the absence of financial acumen displayed by eminent financiers in directing the destinies of this railroad in its attempt to establish a monopoly of the transportation of New England. The combination of all these has resulted in the present deplorable situation in which the affairs of this railroad are involved.

NEW YORK, WESTCHESTER & BOSTON

The Westchester is a story of profligate waste of corporate funds. The enormous sum of $36,434,173 was expended for a road only 18.03 miles in extent, which is being operated at an annual loss of approximately $1,250,000. The Westchester acquisition was planned and executed by a special committee of the board, consisting of Directors Morgan, Rockefeller and Miller, with President Mellen as chairman. The full board was not taken into the confidence of these directors, who wanted the securities of the two proposed competing lines purchased, and no report was ever made by this committee placing the situation as they found it before the board.

In a letter of October 30, 1906, to C. S. Mellen, from the attorney, Francis Lynde Stetson, who was representing all the parties in the deal; namely, J. P. Morgan & Co., the Millbrook Company, Perry and Thorne, and the New York, New Haven & Hartford, there was the following language, which is significant as to the course the committee was pursuing:

> Referring to the conversation this morning, between yourself, Mr. Thorne and myself, it has occurred to me that it is possible that Mr. Thorne's purchase and even his payments may have to begin before he shall have ascertained the validity of the two principal properties which he has acquired, and that in the event of the development subsequently of their invalidity, it might be that the money spent would be money lost.

The report of this committee, however, was unanimously approved, ratified and confirmed at a meeting of the board

of November, 1907, at which the following directors were present: Mellen, Rockefeller, Morgan, Milner, Thayer, Brooker, Brush, Warner, Cheney, Miller, Skinner, Barney, Taft, Wittemore, Elton, Hemingway, Robertson, Robbins and Parker.

The New Haven had now acquired two franchises with roads parallel to each other and its own line, at a distance of only a few hundred yards apart. There was conflicting litigation pending, and matters were necessarily in a most unsatisfactory state and at a tangled stand-still. The solution of the difficulties was the further expenditure of $1,524,072.77. This was arranged by having the New Haven, on June 15, 1908, transfer to its subsidiary the New England Navigation Company, 8,000 shares of its stock at $150 per share, which the Navigation company in turn transferred to Charles S. Mellen, the president of both corporations, who conducted the negotiations. On March 5, 1909, an additional 1,495 shares of New Haven stock at $158 per share was in like manner placed in Mr. Mellen's possession, and certain sums of money were also advanced to him from time to time.

In explaining how these negotiations were conducted, Mr. Mellen testified that it was intended that one share of New Haven stock would be exchanged for three shares of Westchester stock. When New Haven stock was not immediately at hand, he issued to the messenger who brought the Westchester stock a duebill, which was in terms an order on himself to pay on demand to the bearer a specified number of shares of New Haven stock, or its equivalent in cash, at $150 per share with accrued dividends.

No comment is necessary to make clear to the mind the corrupt and unlawful nature of these transactions, and it would seem that the amount illegally expended can be recovered from Mr. Mellen and the directors who authorized it.

When the details of this acquisition were exposed in this investigation it was urged in explanation that by reason of the heavy terminal charges exacted from the New Haven on passengers delivered at the Grand Central station, it was very desirable that the New Haven have another entrance into New York City, and that the Westchester provided such an entry. A very casual study, however, of the map of the Westchester and the New Haven lines into New York impeaches the reasonableness of any such explanation. The New Haven, over the lines of the Harlem River & Portchester, a route then owned by it, had an entrance into New York City via Second Avenue and Third Avenue elevated lines. The Westchester is not constructed to use the tracks of the Harlem River & Portchester from 174th street into New York via these elevated stations. The subway has been constructed as far as Westchester avenue, and is being extended to 180th street, where a transfer station will be established with the Westchester, the two being some 300 feet apart at this point. At 174th street, however, the subway is only two or three blocks removed from the Harlem River & Portchester. If the New Haven had wanted an entrance to New York City via the subway, it could have established a transfer station somewhere with this Harlem River line, just as it is preparing to do with the Westchester at 180th street. It should be noted here, however, that this subway line is to be extended through to Mt. Vernon, paralleling the Westchester to that point, and furnishing a through rapid service into New York City. Again, the Westchester has no feasible connection with the main line of the New Haven below New Rochelle, and it cannot relieve the New Haven of a larger part of its commuter traffic, on which the Grand Central terminal charges are so serious a burden, than could the Harlem River & Portchester.

RHODE ISLAND TROLLEYS

The purchase of the Rhode Island trolleys was another instance of Mellen's waste in acquiring properties that bring an annual deficit instead of a surplus, and constitute a liability instead of an asset in the New Haven system.

When the details had been worked out by Mr. Mellen for assuming this additional burden, the directors without question acquiesced. Mr. Mellen testified that in addition to the cost of the Rhode Island trolleys, the Connecticut trolleys represented a payment of about $10,000,000 more than their value.

The Rhode Island and Connecticut trolley ventures are further evidence of the prodigality in the expenditure of the money of the New Haven stockholders in carrying out an unlawful policy of transportation monopoly.

STEAMSHIP LINES

The New Haven from time to time had felt the competition from steamship lines. Restless of any limitation of this power, President Mellen proceeded to acquire the steamship lines and thereby stifle these interferences with the New Haven activities.

The Hartford & New York Transportation Company cost the New Haven $2,538,917; the Eastern Steamship Corporation, $4,200,000; the Merchants' & Miners', $5,774,500; the New Bedford, Marthas Vineyard & Pawtucket, $141,700; the New England Steamship Company, $12,100,000; the Maine Steamship, $17,300, or a total of $24,772,417. The testimony shows that the physical value of the properties acquired as a result of these outlays is something like $10,000,000. The New Haven advises that it has recently disposed of its holdings in the Merchants' & Miners' Transportation at a loss of $3,594,500.

When Mr. Mellen had obtained control of every boat line of any importance in New England he suddenly changed his attitude when the public discovered the real ownership. It was then he proposed and urged that they be disposed of, but in this was overridden by his board.

BOSTON & MAINE

Before the New Haven secured control of the Boston & Maine stockholders of the latter had realized substantial dividends for a period of more than fifty years. Its credit was high and its stock was in the year 1900 valued by the railroad commission of Massachusetts at $190 per share.

There is reason for belief that this railroad in the hands of its former management would have continued to pay dividends and serve its constituency of passengers and shippers with reasonable rates and adequate facilities. The New England Navigation bought 55,000 shares of stock of the Boston & Maine owned by the American Express Company, and other stock of the Boston & Maine was gathered in by the New England Navigation Company, acting on behalf of the New Haven, until the latter road had a controlling interest in the Boston & Maine. This move, disastrous as it was to prove to both roads, was illegal under the Massachusetts laws, and without doubt under the Federal Anti-Trust Law, but impolitic, unwise, illegal and disastrous as it was to prove, it was undertaken with the realization of the illegality of this control of the Boston & Maine stock. Then began a series of transfers, shifts and evasions by which it was made to appear that the New Haven had divested itself of the Boston & Maine stock, while all the time it was being retained in friendly hands and under the control of the New Haven.

It may be of interest to note the passage of a controlling number of shares of the Boston & Maine stock:

First, from the American Express Company and others to the New England Navigation Company.

Second, from the New England Navigation Company to John L. Billard, nominally.

Third, from John L. Billard to the National City Bank as collateral.

Fourth, from the National City Bank to the New Haven.

Fifth, from the New Haven to the New England Navigation Company.

Sixth, from the New England Navigation Company to the Boston Railroad Holding Company.

The management of the Boston & Maine by the New Haven was unwise. It began in illegality and in a lust for extended

monopoly, and has resulted in great depreciation and serious impairment of credit.

When the New Haven was ordered to sell its Boston & Maine stock it was transferred to John L. Billard, a coal merchant of Meriden, Conn., where he paid taxes on property listed at $30,000. The Navigation company took in payment $11,000,000 raised by Billard on a note on the National City Bank secured by the stock as collateral, and a note of Mr. Billard, unsecured, for $2,743,500.

The New Haven at once set in motion its agencies for influencing public opinion, which resulted in the incorporation of a bill in the Legislature of Massachusetts authorizing the creation of a company known as the Boston Railroad Holding Company. This company bought back the Boston & Maine stock at $150 per share, which resulted in Billard receiving credit for $2,748,700 more than he was charged originally for the stock.

It is quite evident that it was not the understanding of the board that Billard should receive a profit of $2,748,700 out of this transaction, but that at most he was to receive only a reasonable compensation, estimated at from $100,000 to $500,000. All the assets of the Billard company belong to the stockholders of the New Haven. All the money sunk in this operation belonged to the New Haven. A suit shonld be maintainable by the New Haven against Billard and all who have participated in this fraud upon stockholders.

MANIPULATION OF ACCOUNTS

Several transactions appear of record which show that by no stretch of imagination can the irregularity of recording be qualified as due to carelessness. In February, 1911, the New Haven bought 23,520½ shares of Rutland stock from the New York Central, giving in exchange therefor its check on the Farmers' Loan & Trust Company for $2,364,977. No entry can be found in the record of the New Haven company which reveals this transaction. The stock thus acquired was on the same day, with a check for $135,023, delivered to the New England Navigation Company in exchange for a note for $2,500,000. The fact of the recording of this transaction is that the sum paid to the New York Central for the stock shows as a cash advance to the New England Navigation Company.

PURCHASES WITHOUT BIDS

Purchases of cars and coal are two large expenditures that railroads make. The New Haven purchased cars almost exclusively from James B. Brady without competition and to the extent of some $37,000,000. Mr. Brady as a witness made no secret of his generosity to the officers with whom he did business. His methods were justified by him on the ground that the officers of the New Haven were old friends.

Locomotives were bought from a company in which a director of the New Haven was also a director. Many supplies obtained by the New Haven were from companies having directors who were also directors of the New Haven. Corporate economy is not practicable where gifts and obligations arising from friendship tend to obscure official duty.

INTERLOCKING DIRECTORATES

The practice of one man serving on many boards of directors cannot be too strongly condemned. The man who holds directors' positions in a dozen corporations may be thoroughly honest in his relations with each, but it is not practicable for him to give the stockholders of each corporation the full benefit of his ability and energy when, in truth, he can afford only a small fraction of his attention to each corporation. If he is not permitted to know of the real workings of the corporation and, when he serves on so many boards, that is in the nature of things impossible, the corporation gets an indorsement to which it is not entitled.

There are too many ornamental directors and too many who have such childlike faith in the man at the head that they are ready to indorse or approve anything he may do.

A director should be an active, not a passive, force. He should understand the affairs of the corporation to which he gives the prestige of his name, at least to the extent of knowing the integrity of its designs and the absence of law-breaking methods in its operation, and he should not accept positions which he cannot fill in this comprehensive way.

Through the control of voting strength resulting from stock ownership by other corporations, a few persons whose individual holdings were small in comparison with the volume of stock of the company were enabled to perpetuate their full control of the New Haven company.

While the Connecticut laws require the majority of the directors to be residents of that state, the selection of Connecticut directors depends entirely upon the choice of the controlling and dominating interests in the company. In a similar manner the control of other great corporations is maintained by means of interlocking directorates.

The handling of bank deposits and security sales of these corporations is massed in a few hands, carrying with them a power and domination over large amounts of banking capital as well as the control of great railroad systems. These and other evils as the result of interlocking directorates are now well recognized and known, and they have been emphasized by the disclosures of this investigation.

FUNDS TO BE RECOVERED ON BEHALF OF THE STOCKHOLDERS

From the facts developed in this investigation, it would seem that there is little question concerning the recovery of a substantial amount of the stockholders' money that has been wasted. Several items of this nature have already been suggested herein and will be briefly summarized:

Overpaid Perry and Thorne in commissions	$303,750.00
Illegally spent in obtaining Westchester franchise changes	1,524,072.77
In the Billard transaction	2,748,700.00

Note.—The money with which Billard acquired the 15,755 additional shares of common stock and 5,826 shares of preferred stock of the Boston & Maine Railroad Company was furnished by the New England Navigation Company. This stock was turned back to the Navigation Company for $3,370,082. It would seem that a suit by stockholders for the recovery of the profit, if any was made by Billard in the transactions involving these additional shares, could also be maintained.

If any expenditures were made in violation of the anti-trust laws of the United States, are not such expenditures *ultra vires*, and is it not the legal obligation of the directors to satisfy out of their own fortunes any loss which results to the company?

These are all pertinent questions in the light of the developments brought about by this investigation.

Only lawful expenditures are authorized.

All illegal disbursements are *ultra vires*.

Directors cannot without accountability deplete a corporate treasury in ventures which are in violation of the laws of the land.

DIRECTORS CONSCIOUSLY TRANSGRESSING ANTI-MONOPOLY LAWS

The evidence shows that in pursuance of the policy of transportation monopoly the New Haven purchased the Connecticut trolleys, the Rhode Islands trolleys, the Massachusetts trolleys, steamship lines, the Boston & Maine Railroad, and other means of transportation that were available and purchasable. That this plan was done in violation of the federal statute it seems quite clear, for competition was sought to be destroyed. That the directors were conscious they were proceeding along lines that were probably inhibited by law is evidenced by the testimony of Director Elton, that as each line was purchased some one would ask the question in the board of directors if it were not in violation of law, and that Mr. Robbins, general attorney for the New Haven, would state to the board that the New Haven charter permitted them to do anything.

It appears, therefore, that not only were these consolidations contrary to law, but these directors were cognizant of that fact.

and contented themselves with the advice of counsel that under the company's charter it could do anything it pleased.

THE QUESTION OF IMMUNITY IN SECURING EXPOSURE OF ABUSES

In the investigations the commission is required to make from time to time it has, in accordance with its usual custom, exercised due caution not to require the testimony of witnesses where immunity might result except when it is necessary in order to get at the truth. The purpose of the immunity statute, as the commission understands it, was to aid in the search for facts by removing the obstacle of witnesses refusing to testify on the ground of self-incrimination, and under the statute the commission has always endeavored to exercise a sound discretion in this regard. In carrying out the instructions of the Senate in this case the commission has therefore kept in mind the warning of the Department of Justice to carefully consider before placing a witness upon the stand the effect his testimony might have in the way of immunizing him from criminal prosecution. The commission has only used such witnesses as seemed necessary to fully answer the Senate's inquiry and has refrained from calling those witnesses whose evidence, while interesting, might be merely cumulative.

With respect to Mr. Mellen, former president of the New Haven system, it was the belief of the commission that his testimony was necessary in this investigation, and the result, in our opinion, fully justifies this position.

Evidence of wrongdoing such as was disclosed in this hearing is difficult to obtain. Men do not conduct such transactions in the open, but rather in secret and in the dark. Only those involved, as a rule, have direct information. So some of the evidence of necessity must come through participants.

The commission has proceeded upon the idea that it is better to expose wrongdoing, even if in doing so it would be necessary to use a few witnesses whose testimony might bring them immunity, than through fear of bestowing immunity on some, leave facts unknown and uncovered and thereby give immunity to all, not only as to prosecution, but to the stigma of exposure as well.

NEW HAVEN MONOPOLY CORRUPT

This investigation has demonstrated that the monopoly theory of those controlling the New Haven was unsound and mischievous in its effects. To achieve such monopoly meant the reckless and scandalous expenditure of money; it meant the attempt to control public opinion; corruption of government; the attempt to pervert the political and economic instincts of the people in insolent defiance of law. Through exposure of the methods of this monopoly the invisible government which has gone far in its efforts to dominate New England has been made visible. It has been clearly proven how public opinion was distorted; how officials who were needed and who could be bought were bought; how newspapers that could be subsidized were subsidized; how a college professor and publicists secretly accepted money from the New Haven while masking as a representative of a great American university and as the guardians of the interests of the people; how agencies of information to the public were prostituted wherever they could be prostituted in order to carry out a scheme of private transportation monopoly imperial in its scope.

DIRECTORS CRIMINALLY NEGLIGENT

It is inconceivable that these wrongs could have gone on without interference if the members of the board of directors had been true to the faith they owed the stockholders. A number of directors appear in many instances to have voted without knowledge and to have approved the expenditure of many millions without information. According to the testimony of some of the directors they merely approved what had been done by some committee or by some officer of the company. The directors' minutes reveal that it was largely a body for ratification and not authorization, as the law intended a board of directors should be. None of the directors would have been so careless in the handling of his own money as the evidence demonstrates they were in dealing with the money of other people. The directors actively or passively acquiesced in the efforts of the Mellen-Morgan-Rockefeller régime to extend the domination of this corporation over the whole transportation field in New England.

If these directors who were faithless to their stewardship were held responsible in the courts and at the bar of public opinion for the failure to do those things they should have done, the lesson to directors who do not direct would be very salutary.

Most of the directors of the New Haven accepted their responsibilities lightly. They failed to realize that their names gave confidence to the public and that their connection with the corporation led the public to invest. When these directors were negligent and serious losses resulted therefrom they were guilty of a grave dereliction of duty and a breach of trust that was morally wrong and criminal in its fruits.

Directors should be made individually liable to civil and criminal laws for the manner in which they discharge their trust. A corporation can be no better or worse than those who operate it. It should be just as grave a crime to plunder stockholders or the public through a railroad corporation as it is to personally rob an individual.

SUBSIDIARY CORPORATIONS CONDEMNED

It was found in the investigation of the New Haven system that there were 336 subsidiary corporations, and the books of the New Haven road proper reflect only a small part of the actual financial transactions of the railroad. Many of these subsidiary corporations served no purpose save an evil one. They were used to cover up transactions that would not bear scrutiny, and to keep from the eyes of public officials matters that were sought to be kept secret. The commission should have the power to examine not only the books, records, papers and correspondence of interstate carriers, but of subsidiary companies as well.

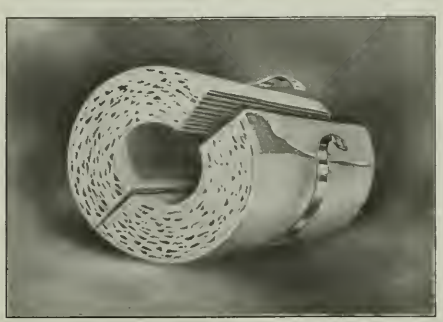
REMEDY IN PUBLIC CONSCIENCE AND LAWS

The insuring of honesty throughout the management of the great railroads of the country is a most important question before the people today, and only when through exposure of wrongdoing and an awakened public conscience coupled with effective laws this result is produced, may railroading be placed upon the high level that it should occupy. The revelations in this record make it essential for the welfare of the nation that the reckless and profligate financiering which has blighted this railroad system be ended, and until this is fully done there will be no assurance that the story of the New Haven will not be told again with the stockholders of some other railroad system as the victims.

DUST ON THE PARIS SUBWAY SYSTEMS.—Because of complaints received the Conseil d'Hygiène of Paris took in hand, about two years ago, some experiments as to the air on both the Métropolitain and the Nord-Sud and a report thereon has just been issued. This shows that the air on the former is much more vitiated than on the latter. The principal cause of the trouble is attributed to the rails. On the Métropolitain the wear is very pronounced, especially owing to braking, in the stations; but on the Nord-Sud the rails are, apparently, of harder steel, and the braking has had little effect. On the former line the brake-shoes are of cast-iron; on the latter they are faced with a tar-treated fabric, and, incidentally, the trains on the Nord-Sud stop much more smoothly and with less noise. The report refers to the fact that the floor of the coaches on the Métro has longitudinal strips along the upper surface, so cannot be swept clean, but on the Nord-Sud the floors are covered with a conglomerate material forming a uniform and non-slipping surface, which can be cleaned with sawdust. It is, therefore, proposed that in these matters the Métropolitain should follow the example of the Nord-Sud, also that the ballast in and near the stations be covered by tiles, so as to reduce the dust, and which can be swept.

STEAM PIPE COVERINGS

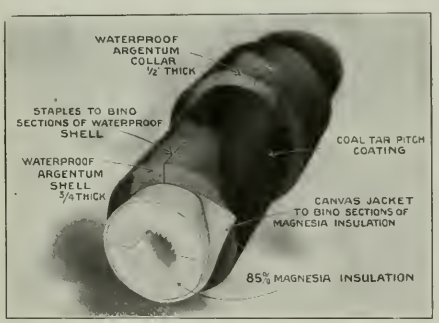
The Philip Carey Company, Cincinnati, Ohio, has placed on the market two new types of pipe covering, one for pipes used above ground, and another for underground installations. The first is termed the Carocel. It is made up of alternate layers of plain and corrugated pure asbestos paper, the corrugations measuring about ⅛ in. in depth. This construction has been used in order to provide as many dead air spaces as possible, which, of course, is one of the best insulating mediums to be had. With these layers pressed firmly together sufficient air space is left to give



Carey Carocel Sectional Pipe Covering

the necessary insulation and all chance of circulation is eliminated. The ends of the covering are so trimmed that all the air spaces are practically sealed. Another advantage is that there is no possibility of circulation around the pipe, thus preventing the opportunity for heat leakage at the point where the two halves come together. This insulation is of light weight, and yet firm enough to withstand the rough handling received in service. It is covered with pure asbestos fibre, and the sections are held together by brass bands, as shown in the illustration.

The underground insulation is known as the Carey Argentum-Magnesia sectional pipe covering. Its construction is clearly



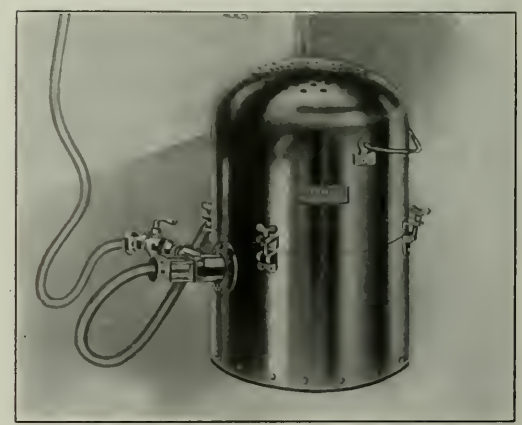
Carey Argentum-Magnesia Covering for Underground Pipes

shown in the illustration, being made up of the regular 85 per cent. magnesia covering, with the water-tight armor of Argentum applied over and thoroughly protecting the magnesia insulation. These Argentum shells are water-proof and strong enough to protect the insulation from injury, being made of a chemically treated wool felt. They are exceptionally tough and are furnished in sections 3 ft. long and ¾ in. thick. Collars 6 in. long and ½ in. thick, made of the same material, are furnished for each section to be applied over and seal the joints of butting Argentum shell sections. The purpose of this new type of insulation is to provide a water-tight insulation. For underground pipes the greatest trouble is had in the loss of heat through contact with water, which is very much greater than with contact with the air.

VACUUM CLEANER FOR PASSENGER CARS

A compressed air operated vacuum cleaner adapted to the cleaning of passenger cars is shown in the illustration. The equipment consists of an aspirator attached to a dust collector, and a ½ in. hose for connection to the source of compressed air supply. A 1 in. vacuum hose connects the tools with the aspirator. The complete outfit weighs about 35 lb., and is therefore easily portable.

The vacuum is produced in the aspirator by means of a small compressed air jet, about ⅛ in. in diameter. With 65 lb. air pressure the consumption is about 20 cubic feet of free air per minute, and the vacuum produced is equivalent to a 12 in. mercury column. With higher air pressure the vacuum may be considerably increased. In operating this machine the first part of the cleaning should be done by blowing the cinders and dust out of the ventilators and crevices with compressed air, the vacuum



Compressed Air Operated Vacuum Cleaner

tools not being effective where contact with the surface to be cleaned is impossible. After this is done the compressed air hose is attached to the apparatus, and the cleaning finished by the vacuum process.

This cleaner is in use on the Chicago & Alton, where it is claimed that one man can clean 14 standard railway plush seated coaches or chair cars per day. It is manufactured by the Thurman Vacuum Cleaner Company, St. Louis, Mo.

Railway Construction in Siam.—Plans are now being made for the new station buildings for the Siamese Southern at Bangkok Noi which will be necessary for the increased traffic which is expected on the completion of the extension of the railway, which when completed will be about 813 miles long. The line is now open for traffic from Potchaburi to Prang, about 147 miles. A further extension of 41 miles to Koh Lak was expected to have been opened the first of June of this year. It is expected that the line as far as Singora will be opened for traffic in 1916. Construction was started in 1909 at three places, namely: Potchaburi Singora and Prang, and at that time it was hoped that the whole system would be ready for traffic in 1915.

Maintenance of Way Section

One of the obstacles which have retarded the adoption of concrete for railway building construction where appearances were an important consideration, as in stations, has been the difficulty of securing a paint which would adhere permanently to the concrete without undue discoloration. Several early attempts along this line proved unsatisfactory, for which various reasons have been assigned. To solve this problem indirectly bush hammering and other practices have been adopted to provide a pleasing untreated concrete surface. There are, however, occasions where a paint treatment is to be desired, and the discussion of this subject elsewhere in this issue should therefore be of general interest in showing that it is entirely possible to secure permanent and satisfactory results with certain kinds of paints.

The Painting of Concrete

The point raised by Mr. Crites in his discussion of Uneconomical Track Economy on another page in this issue is one realized too frequently only in the abstract, if at all, when retrenchment is under way. It is common knowledge that maintenance of way expenditures are reduced first and to the greatest extent because it is felt that the results of such action will not be evident at once, although it is generally realized that larger sums will have to be expended in the end. The effect of poor track in reducing train tonnage and thereby increasing the cost of operation is not so generally realized. Only a few years ago most railroad men gave little credit to such a theory and some refuse to accept it even at this late date. However, the experience of numerous roads has shown conclusively that the adoption of heavier rail and more ballast and a higher standard of maintenance have enabled the tonnage of trains to be increased without any change in grades or motive power. Thus, when an order is given to reduce maintenance of way expenditures to a point where existing track standards cannot be maintained, it is equivalent to arbitrarily inserting heavier grades, the result of which will be reflected either in decreased train loads or in more delays and overtime, in this way increasing expenses, the very thing which the officers are trying to avoid.

Track Maintenance and Tonnage

The three primary qualifications of a foreman in charge of any class of maintenance work are, his knowledge of the methods of properly performing the work, his ability to prepare the proper time rolls and other records, and his ability to handle the men in his gang. As a laborer in the gang he secured his knowledge of the methods of performing the work, while the supervisor instructs him in the manner of preparing his reports. Unfortunately, in most cases, he receives little or no instruction regarding the way to handle the men in his gang to secure the maximum amount of productive work from them. Regardless of the fact that the men selected for foremen probably possess considerable natural ability along this line, there is no question but that the more experienced supervisor can give them valuable assistance in this regard. Probably as many foremen fail because of the lack of this qualification as because of the absence of either of the other two. Further than this, many foremen are only partially successful in securing the greatest returns for the company because they do not know how to handle their men to the best advantage. The really successful and valuable foreman is the one who combines the ability to handle men with the other necessary qualifications. It is to the interest of the road that the efficiency of all foremen be brought to the highest practicable level, and for this reason this subject is of sufficient importance to justify the serious consideration of every supervisor. There is much of merit in what Mr. Schott, who is himself a section foreman, says in another column regarding this phase of the training of foremen.

Instructing Foremen in the Handling of Labor

One road recovered over $50,000 worth of material by increasing the distance between extra rail posts from one to two miles; another road reclaims 50 per cent. of all maintenance scrap collected other than rails and angle bars. Similar savings are, or can be, made in the distribution of new material and the collection of scrap on other roads. The maintenance of way department is directly interested in the handling of its material to insure that it is received when needed, that a sufficient but not a surplus stock is available, that obsolete material is not allowed to accumulate, that second-hand or scrap material is collected as soon as released, and that no material suitable for further use is disposed of as scrap. Different roads have attacked the various phases of this important problem in different ways and with varying degrees of success. A thorough discussion of this subject, with descriptions of methods which have been worked out or suggested, will be of value to those roads which have already given this subject attention, and of greater value to the lines on which this important problem has been neglected. To secure as complete a discussion as possible we are conducting a contest on "The Distribution of New Material and the Collection of Scrap," for which we solicit the co-operation of all who have given this subject serious consideration. To stimulate interest in this contest we will pay $25 and $15 for the two best papers received and our space rates for all other papers accepted and published. The award will be based on the practicability of the methods described and the completeness with which the subject is covered. All contributions should be sent to the Engineering Editor of the *Railway Age Gazette*, 608 South Dearborn street, Chicago, to be received not later than July 25.

Handling New and Scrap Material

One of the most important advantages of concrete as a construction material is the fact that local materials can be very largely employed, and it is this fact which has led to its rapidly increasing use for a wide variety of purposes on maintenance work. With its very general adoption for small as well as large work, there arises an increased necessity for the careful instruction of the supervisors and foremen regarding the proper selection and inspection of the sand, gravel and stone used as the aggregate. In general the cement is properly inspected and tested before being shipped to the work. On large work the materials composing the concrete are in most cases carefully tested, frequently by the testing department itself. On smaller jobs where the material is secured adjacent to the work this is not practicable. It is important, for this reason, that the supervisor or foreman selecting these materials should be instructed regarding the ordinary objectionable materials which should be avoided in concrete. For all ordinary purposes this instruction need not be elaborate or in detail, but if the injurious ingredients commonly encountered are called to the attention of the supervisor he will be able to reject materials now sometimes incorporated in the concrete. It is almost universally true that whenever a failure of concrete occurs the cement is blamed. Careful analyses of such failures have shown in so many instances that the cement

Inspection of Concrete Aggregates

is not at fault, that the prominent cement companies maintain special departments to investigate such complaints, and to ascertain the real difficulty. In a paper presented before the American Society for Testing Materials a couple of weeks ago, several instances were cited where studies of failures of concrete showed the difficulty to rest primarily with the sand and gravel, and often with the water. One remedy is to select the aggregate from a few locations of known quality. A better way is to instruct the supervisors and foremen regarding the deleterious materials which may reasonably be expected.

The Magnitude of Railway Construction Work

There is an old saying that distance lends enchantment to the view. This applies equally well to such sordid matters as railway construction. Railway men close to their work are apt to lose sight of the real magnitude of many phases of the work which the roads are capable of doing, and are actually doing. The magnitude of the problems involved in the construction of the Panama Canal has been heralded around the world. While not intending to detract in the least from the credit due for this work, a few comparisons may give the railway man a higher impression of his own work. The last issue of the *Canal Record* gives the total wet and dry excavation since the United States assumed control of the Canal Zone as 220,826,656 cu. yd., spread over an interval of ten years, or an average of 22,082,657 cu. yd. per year. The highest individual year's record was 37,116,735 cu. yd. in 1908. By way of contrast a statement was published in the daily issue of the *Railway Age Gazette* of March 19, showing that the Chicago, Milwaukee & St. Paul alone moved 23,750,200 cu. yd. of material in 1912, and 24,553,411 cu. yd. in 1913. During those same years 30,269,349 and 27,177,960 cu. yd., respectively, were moved on the Canal Zone. In 1912 the St. Paul deposited 246,823 cu. yd. of concrete, and in 1913 316,989, or a total in the two years of 563,812 cu. yd. During the same years 1,040,158 and 337,419 cu. yd. of concrete, respectively, were placed in the Gatun, Pedro Miguel and Mira Flores locks. Thus the St. Paul alone handled over 75 per cent. as much earth work, and almost 45 per cent. as much concrete during those two years as the Isthmian Canal Commission, with comparatively little notoriety or advertisement. Furthermore, the railroad work was scattered over a wide area, making it more difficult to handle. Other railroads, including the Northern Pacific, the Erie and the Lackawanna, have made similar records in recent years. Such comparisons as this show the magnitude of the problems encountered from time to time in the regular railway routine.

RUSH THE MAINTENANCE WORK

UP to this time maintenance of way expenditures have been very seriously curtailed this year. However, all indications now point to a very material increase in traffic within the next two months, especially on the granger roads. This will result in an increased burden on the track which it is none too well prepared to carry. The conclusion is evident. Every effort should be exercised for the next 60 days towards getting the track into the best possible condition to carry a heavy traffic with the minimum delay to trains. To do this attention should now be concentrated on the tracks and structures directly concerned with the movement of trains. Work, such as the rebuilding of fences, should be deferred in favor of the laying of rail, the surfacing of track, and the necessary renewal of bridges. Then when the traffic is heaviest, and the resulting interference with maintenance forces the greatest, this deferred work can be resumed. In this way the track and structures will be brought up to their proper condition at the earliest date, and it will also be possible to do this work more economically now than later, because of the smaller amount of interferences caused by traffic.

More important than this, however, these forces will in turn cause less interference with traffic if work is handled in this way. The main business of a railway is to provide transportation. In times of heavy traffic when the public demands the maximum amount of service, all departments should co-operate with the operating department in handling the peak load. The maintenance department can assist very materially in getting trains over the road by maintaining the tracks in such condition that the number of derailments will be reduced to the minimum, and by creating the smallest practicable number of slow orders and other delays, all of which result in still further increasing the congestion.

Any work put on the track now will tend to reduce the number of derailments later. It is common knowledge that with each rapid increase in traffic the number of derailments increases faster than the traffic, indicating that the track is unable to keep up with the increased demands made on it. Every derailment tends to further increase congestion, and is therefore cumulative, the resultant congestion being in most cases of much greater consequence than the mere cost of the damage to the track and equipment.

This warning applies to yard, as well as to main tracks. In times of heavy traffic it is in the yards that the most serious congestion usually occurs. Under such conditions the taking of a track out of service not only decreases the capacity of a yard by that amount, but tends to disorganize the operation of the entire yard at a time when smooth running is most essential. Now is the time to prepare for the expected increase in traffic, and give the operating department a chance.

THE SYSTEMATIC TRAINING OF SUPERVISORS

THE practice of most roads is to recruit their supervisors from the ranks of the foremen. As a result, on those roads on which there now exists the greatest scarcity of high grade foremen, a shortage of material from which to create supervisors is also beginning to be felt. Numerous attempts have been made from time to time to recruit supervisors from technically trained college graduates, but for various reasons most of these plans have failed. As described in another column, the Pennsylvania has had in operation for many years a definite system whereby technically trained men are secured for supervisors, and there is no prospect of a shortage of material from which to recruit these supervisors, as it has at all times a sufficient number of men to fill its requirements for some time in advance.

It is not the intention at this time to discuss the relative merits and shortcomings of supervisors recruited from track foremen and technically trained men, except to state that if the course provided for the college graduate after he leaves school is so arranged that he can secure the requisite practical experience he should be the more valuable man because of his technical training. The difficulty with the various track apprentice systems which have been tried has been that they were in most cases local experiments of short duration, and with only a hazy and indefinite future for the student. On the Pennsylvania this practice has been so firmly established, and the methods of promotion so clearly outlined that a man knows that if he makes good his future is assured.

While it might seem at first glance that such a course of training would involve a considerable outlay for unproductive work while the student is in training, these men are all employed in work for which other men would be required if this course of training did not exist, and in fact the salaries in the classified service are somewhat lower than for similar positions in the unclassified service where there is no similar chance for advancement.

The success of the Pennsylvania's system has resulted from a carefully outlined plan of operation which has been in force a sufficient length of time to enable it to become firmly established. The practical results are indicated not only by the very large number of the Pennsylvania's officers who have risen through the maintenance of way department, but also by the many responsible officers of other roads who have received this same training. While this somewhat elaborate plan would not be practicable in all of its details on many other roads operating under other conditions, the underlying principles are sound, and are capable of application elsewhere. Three elements are necessary, a definite system, a supply of men and a sufficient reward.

The Magnolia Cut-off of the Baltimore & Ohio

This Road Is Building a 12-Mile Line Involving Very Heavy Work, and Costing Approximately $6,000,000

The Baltimore & Ohio is now building two additional tracks between Orleans Road, W. Va., and Little Cacapon, a distance of 12 miles, which involves some of the heaviest railway construction work now under way in this country. This line is known locally as the Magnolia Cut-off, and involves moving over 3,200,000 cu. yd. of excavation, over 90 per cent. of which is rock; the driving of four double-track tunnels with a combined length of 7,225 ft.; the construction of two crossings over the Potomac river, with a total length of 2,054 ft., and the building of 5,200 lineal feet of concrete retaining walls. This line is estimated to cost over $6,000,000, or $500,000 per mile, and will eliminate 5.95 miles of distance, and 877 deg. of curvature. It will also reduce the maximum grade against eastbound traffic from 0.5 per cent. to 0.1 per cent., eliminating a helper grade 2.8 miles long, and releasing two pusher engines.

This cut-off is located on the east end of the Cumberland division, Little Cacapon being 16.7 miles east of Patterson Creek, where the double-track line from Cincinnati and the West Virginia coal fields unites with that from Pittsburgh and Chicago. There are now three tracks from Patterson Creek to Little Cacapon, and also from Orleans Road east 25.4 miles to Cherry Run. At Cumbo yard, a short distance east of Cherry Run, a considerable amount of coal and other traffic is turned over to the Cumberland Valley road. The line between Patterson Creek and Cumbo yard carries a very heavy traffic and the two-track section between Little Cacapon and Orleans Road, with its pusher grade, has been the cause of serious congestion.

The two new tracks will be used for eastbound traffic, while the present double-track line will be used for westbound traffic, thus providing a four-track line between Little Cacapon and Orleans Road. Except at Doe Gully the old line closely follows the southerly bank of the Potomac river, and has a large amount of curvature with a maximum of 9 deg. of Kessler's curve. The maximum grade eastbound on the present line is 0.5 per cent., and westbound 0.55 per cent., leading up to the present Doe Gully tunnel in both cases. On the new line the maximum grade eastbound is established at 0.1 per cent., while the maximum westbound on the old line is being reduced to 0.4 per cent. by lowering the east end of Doe Gully cut about 12 ft. The maximum curvature on the new line is 5 deg.

Starting from a connection with the old line a short distance west of Orleans Road, the new line ascends on a 0.4 per cent. grade to the west end of the present Doe Gully tunnel, and is being built as a four-track road to reduce the existing 0.55 per cent. grade westbound. At Doe Gully tunnel the new line leaves the old and extends west generally parallel to it, but on a 0.1 per cent. descending grade, for two miles to Hansrote, and is located on a bench adjacent to, but considerably above the operated tracks. At Hansrote the new line turns abruptly into the hill and after passing through Stuart tunnel crosses the present line and the Potomac river, passes through Graham tunnel, and again crosses over the river and the existing line. It then continues parallel to the present road for over a mile, but on a bench about 40 ft. above it. It passes through the southerly limits of the town of Paw Paw, and joins the old line at Little Cacapon, the 0.1 per cent. grade being almost continuous from the summit at Doe Gully.

Map and Profile of Magnolia Cut-Off

DOE GULLY CUT

Starting from Orleans Road the first work of special interest is at Doe Gully. Here a double-track tunnel is being replaced by a four-track open cut with a maximum depth on center line of 195 ft., and requiring the removal of 1,350,000 cu. yd. of material, nearly all of which is rock, lying in strata tilted sharply on end. In addition to the amount and character of the material to be removed, the excavation of this cut was complicated by the necessity of keeping the present double-track tunnel in continuous service. As shown in one of the photographs, the material on the west side of the cut and over the tunnel was excavated by

steam shovels in the regular manner to within 10 ft. of the roof of the tunnel. A vertical ledge 16 ft. wide was then left west of the west wall, and the west half of the cut was taken out approximately to grade. A temporary double-track line was then laid through this cut for emergency use in case the tunnel should be blocked during its removal. A small steam shovel is now engaged in removing the remaining material from above the tunnel, after which it will be dismantled and the cut widened on the east. Five steam shovels

Looking East at West Portal of Old Doe Gully Tunnel

have been employed in this cut, while as many as 22 have been working at one time on the entire cut-off.

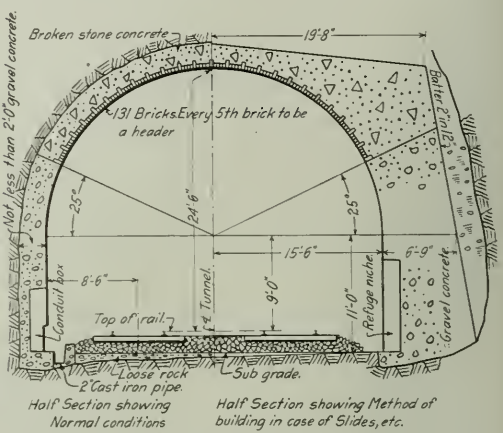
Because of the depth of the cut and the character of the material the slope on the west side has been benched at intervals of 50 ft. vertically, while the opposite slope will be treated in the same manner after the tunnel has been removed. These benches are designed to afford drainage and to prevent slides, and have been built on grades of 3, 2 and 1½ per cent. on the upper, middle and lower levels respectively. The material from these benches was wasted at the elevation of the benches at the ends of the cut.

Immediately west of Doe Gully cut the new line goes through a point by means of a tunnel 1,025 ft. long, known

Looking East Along Bench Towards Randolph Tunnel. Old Tracks in the Foreground

as Randolph tunnel, the four tunnels on this line being named after chief engineers of the road. This tunnel is located on a 4 deg. curve. Here a top heading 9 ft. by 16 ft. was first driven. Following this a Model 20 Marion air-operated shovel widened the heading to the full arch section. The bench was then removed by a large shovel.

The arch was lined with timber as the excavation progressed, and this was replaced with the permanent concrete lining as soon as the steam shovels had completed their work. It was first planned to deposit the concrete by means of compressed air with a mixer at one end and this method was tried, but after encountering considerable difficulty because of the pipe line clogging with the coarse crushed stone aggregate used, and the length of the conveying line, this method was abandoned. The standard lining consists of concrete up to the 25 deg. line, faced with one course of brick above this point. To secure a bond with the concrete every fifth brick



Section of Standard Double Track Tunnel with Concrete Lining

was made a header. Blaw steel forms were used. Refuge niches were inserted on each side at intervals of 100 ft. and cable and switch boxes were placed 300 ft. apart.

BENCH WORK NEAR HANSROTE

One of the most interesting portions of the work is that from Randolph tunnel southerly 1½ miles to Hansrote. Be-

Looking East Over Magnolia Bridge

tween these points the new line is closely adjacent to the existing line and on a bench above it. Because of this close proximity it was decided to handle this section by force account, and over 400,000 cu. yd. of rock is being removed in this manner. Most of this material is being removed by steam shovels, excavating benches not to exceed 8 ft. in

depth and it is wasted in ravines at the level of the different lifts. A considerable amount is also being placed on the river side of the present tracks by station men to permit these tracks to be thrown out at certain locations, in this way reducing the maximum degree of curvature from 5 deg. to 3 deg.

To guard against the danger of accidents to trains on the operated line, an operator is stationed on this work who is in constant communication with the despatcher, and no shots are fired without first learning the location of trains. Flagmen are also sent out in each direction in advance of each shot. To guard against any danger of blocking the main tracks by excessive or poorly placed shots, four powder inspectors are stationed on this portion of the work, one of whom personally supervises the loading and firing of each charge.

Traveller Used for Constructing Retaining Wall East of Paw Paw

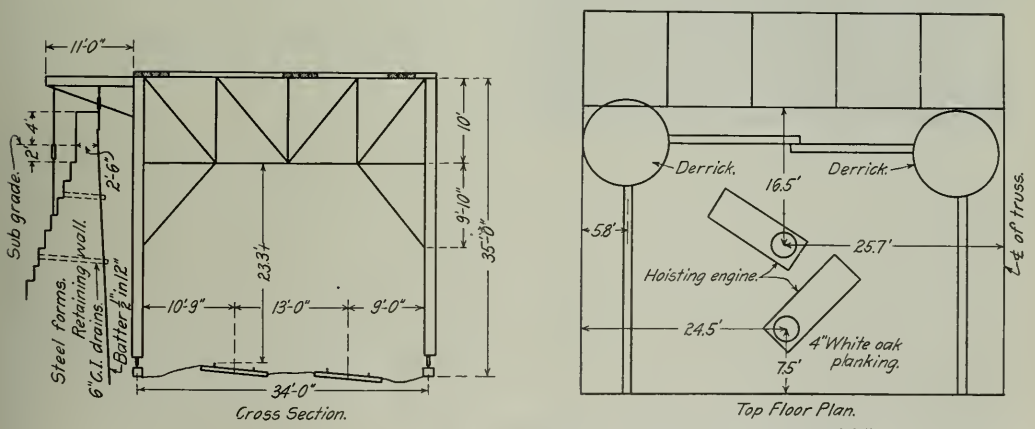
STUART TUNNEL

At Hansrote the new line leaves the old and turns abruptly into the hill, crossing the divide through Stuart tunnel 3,600 ft. long. The east approach to this tunnel required the removal of 205,000 cu. yd. of rock. About 90,000 cu. yd. of similar material was removed from the west approach. At the latter point considerable difficulty has also been encountered in establishing the portal because of the sharply inclined and badly broken strata. This tunnel is on tangent except for 371 ft. of spiral within the east portal.

This tunnel was driven from two shafts 117 and 40 ft. deep, and also from the west portal, the east approach cut not being completed in time to enable a heading to be driven from the east portal. As in the Randolph tunnel 9 ft. by 16 ft. center headings were first driven, working in this instance from five points. These headings were widened to full section by hand except for the first 1,000 ft. in from the west heading, where a small Model 20 Marion shovel was used. With this shovel it was possible to widen and timber 60 to 70 lineal feet of the arch section per week as compared with 45 ft. by hand. The shovel also removed 6 ft. of the bench at the same time to secure the necessary working clearance. The bench was then taken out with large shovels.

Because of the difficulty encountered in establishing the portal at the west end and the uncertain character of the material at the east portal, the center heading was driven from the shaft to within 72 ft. of the east portal, at which point it opened into two wall plate drifts. The entire arch section was then removed for 30 ft., after which the wall plate drifts alone were driven leaving the center support for the roof for 42 ft. in from the portal until the portal was turned.

The West Portal of Paw Paw Tunnel



Plan and Cross Section of Traveller Used in the Construction of the Concrete Retaining Wall

Both steel and timber centers were used in this tunnel. The steel centers were used in those sections of the tunnel where especially bad material was encountered while the wooden centers were used elsewhere.

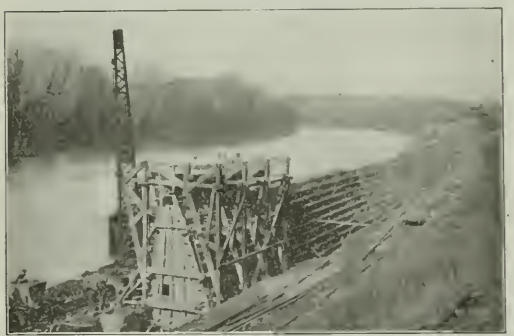
THE RIVER CROSSINGS

A short distance west of Stuart tunnel the new line crosses the old at Magnolia station, continues across the Potomac river, passes through a point in a tunnel 1,600 ft. long, and

again crosses the river and the operated line, all in a distance slightly over one-half mile. The crossing at Magnolia consists of six 100 ft., three 80 ft. and two 75 ft. deck plate girder spans on concrete piers, with the new grade 50 ft. above the old line and 60 ft. above the water. The crossing at Kessler's curve consists of four 100 ft. and six 75 ft. deck plate girder spans with three skew girder spans over the old line, with a combined length of 202 ft. 6 in. Both structures are designed for Cooper's E 60 loading.

The piers for both structures are founded on rock about 5 ft. below the river bed. One of the accompanying views shows clearly the different steps in their construction. About 23,000 cu. yd. of concrete was required at these two crossings. As far as possible the concrete at each structure was deposited by means of a tower located either on the bank or at the first river pier where material could be delivered to it by a derrick. The tower at the west crossing was 185 ft. high. Concrete was deposited by air in the upper portion of a few of the piers at each crossing above the reach of the tower, and one or two piers were completed by depositing concrete directly with a derrick.

Graham tunnel, located between the two bridges, differed from those previously described primarily in that it passed through a stable rock instead of the broken, rapidly weathering material found at the Stuart and Randolph tunnels. It was driven by the same methods employed at the other



Constructing the Retaining Wall West of Paw Paw

points, and it is planned to place the concrete lining with an air mixer.

THE CONCRETE RETAINING WALLS

From Kessler's curve west for a mile the new line is again closely parallel to the old, and on a bench about 40 ft. above it. Over 80,000 yd. of rock is being removed along this bench at elevations varying from 40 to 100 ft. above the present track. This material is being handled by force account under methods similar to those employed east of Hansrote. To prevent slides and other difficulties all of the high side-hill cuts are being benched.

At the west end of this section it was necessary to construct 1,900 lineal feet of concrete retaining wall between the two lines. This wall is of gravity section non-reinforced, and with a maximum height above the footing of 31 ft. The elevation of the top of footing is established at 3 ft. below the top of rail of the lower line. The construction of this footing has involved considerable difficult work, as in some cases it has been necessary to go as much as 14 ft. below the elevation of the top of footing to secure a proper foundation, while in other cases it has been necessary to remove a 40 ft. rock face to secure sufficient room. The top of the wall is 4 ft. above the elevation of sub-grade of the new line.

This wall requires the placing of 22,000 cu. yd. of concrete which is being deposited by means of a movable traveler spanning the two operated main tracks. This traveller is of steel construction, with a horizontal clearance of 32 ft. 9 in. and a minimum vertical clearance of 23 ft. 3 in. above the high rail on curves.

Two derricks with 50 ft. booms, and two boilers and hoisting engines are placed on the upper platform. In this way all excavation for the wall footings and the depositing of the concrete are handled by the derrick without interfering with the main track, and without any material crossing the tracks at grade. The forward derrick handles the excavation ahead of the wall, while the other one deposits the concrete. Because of the lack of sufficient room at the site of the wall, the concrete mixing plant is located nearly one-half mile west, and the material is brought to the traveller in small cars, which are picked up by the derrick and dumped in the forms.

The wall forms are of steel, and are supported by a cantilever projection from the traveller. Their position relative to the traveller is regulated by turnbuckle adjustments in the vertical and horizontal supporting rods. When moving from one section of wall to the next the forms are lifted free of the completed work. The traveller moves on two rails, supported on timber blocking.

The wall is built in 50 ft. sections, and a section can be completed in two days. With the other necessary work it has been found that two sections can be completed per week, although the average to date, including all delays, has been one and one-half sections. At the joint between the first and second day's pouring a bond is secured to the adjacent rock face to which additional form supports can be fastened as required. After the wall is completed the new roadbed is back filled behind it. This traveller has proved very satisfactory for this work, and has enabled about 4,000 cu. yd. of concrete to be deposited monthly during the past spring without any interference with traffic, although the train movement is almost continuous.

THE PAW PAW WORK

A short distance west of this wall the new line leaves the old and passes through the southerly limits of the town of Paw Paw. Shortly after leaving the main line the new location passes through Carothers tunnel, 1,000 ft. long. The material encountered here and the methods of driving are similar to those described at the other tunnels.

One of the largest cuts on the line is at Paw Paw, where over 500,000 cu. yd. of material, largely earth, was removed. The maximum depth of the cut at this point was 96 ft. This material was hauled west to a point where the old line is to be thrown towards the river and raised 7 ft. to give room for a four-track line without disturbing the rock bluff and at the same time to raise the grade of the old line above high water.

A portion of this new fill extends into the river, and to protect it without at the same time encroaching on the stream, another retaining wall similar to that east of Paw Paw is being constructed for a distance of 3,300 ft. This wall has an average height of 24 ft. and is being built in the same general manner as the wall previously described, but here, as it was not necessary to span any tracks, a wooden traveller was provided to carry the forms only, and the concrete was deposited with a locomotive crane. Two sets of steel forms were provided for 30 ft. sections, and these are being used alternately. About 25,000 cu. yd. of concrete is required for this wall.

With the exception of the two crossings on the Potomac river, the only steel bridge on the line is an overhead highway structure crossing Paw Paw cut. There are also two 12 ft. and two 8 ft. concrete arches and several smaller openings. There are no grade crossings with highways.

One interesting feature of the work is the measures taken to prevent the workmen engaged in the construction of those portions of the line adjacent to the operated tracks, from be-

ing struck by trains. Because of the almost continuous movement of trains, and the necessity of men passing back and forth over the work, footpaths were constructed outside the tracks, either on the shoulder of the fill or where the bank was narrow, of trestle construction, and all employees are required to use these paths instead of walking on the track. Special instructions were printed by the road and given to the different contractors and company foremen for individual distribution among the men, who are required to read and sign them. The company has also stationed a number of private policemen along the line, whose duty it is to see that these instructions are obeyed.

This work was started in May, 1913, and it is expected that the new line will be placed in operation during the coming winter. The grading was 85 per cent. completed on July 1; the driving of all four tunnels has been completed; the lining of Randolph tunnel has been finished, and this work is actively under way on the other three tunnels. It is expected the track laying will be started before September 1. The substructures of both river bridges are completed and the erection of the steel work has begun. Automatic signals will be installed on this line, and interlocking plants will be built at each end.

This work is being handled under the direction of Francis Lee Stuart, chief engineer, and J. T. Wilson, district engineer, with E. M. Graham, T. C. Marshall and T. Ellett, Jr., resident engineers. Starting at the east end, the contractors on this work are: Section No. 1 and part of No. 3, Kefauver and McLaran, Baltimore, Md.; sections No. 2 and No. 4, and part of No. 3, H. S. Kerbaugh, Inc., New York; sections No. 5 and 7, Bennett and Talbott, Greensburg, Pa.; part of section No. 6, Sheesley & Janney, Johnstown, Pa.; part of sections No. 6 and No. 8, Smith-McCormick Co., Easton, Pa.; part of section No. 8, The James F. McCabe Co., Baltimore, Md. The American Bridge Company is fabricating and erecting the two bridges across the Potomac river.

ORGANIZATION OF THE MAINTENANCE OF WAY DEPARTMENT OF THE PENNSYLVANIA RAILROAD

At the present time there is a great deal of complaint about the inability of the roads to retain college-trained engineers in their employ, and also about the difficulty of securing a sufficient number of men capable of taking charge of maintenance of way work and of rising through this department into the operating department. On at least one road, however, these complaints are not found. This road is the Pennsylvania. Here, at the present time, a large majority of the operating officers, including division superintendents, rose from the maintenance of way department, from which it is evident that this road is retaining a large number of its technically-trained men who entered the service in that department. It is also evident that this must be the result of a definite system, and it is the purpose of this article to outline briefly the manner in which this system has been developed.

The Pennsylvania organization is strictly divisional, each division superintendent having on his staff a division engineer and reporting to a general superintendent, who, in turn, has an engineer on his staff with the title of principal assistant engineer. The general superintendents report to the general manager, who has on his staff an engineer maintenance of way. The engineer maintenance of way has three immediate assistants, the assistant engineer in charge of roadway and track, the assistant engineer in charge of structures, and the signal engineer.

Since the division is the unit in the operating organization, it is in the division engineers' offices that the maintenance corps of engineers is recruited. The different division engineers hire all men for the classified service, as this branch of special training is termed, as well as for the unclassified service, and applications received by the engineer maintenance of way and by the principal assistant engineers are referred to these officers. In this way there are always more applications for positions than there are vacancies.

Only graduates of engineering colleges of recognized standing are employed and they are started as classified rodmen on the division engineer's corps, either on field work or as draftsmen. Previous to employment they must pass the physical examination required of all employees of the road. They start at a definite fixed salary for the first year, and, if their services are satisfactory, they advance automatically at the end of the year to the second class at a higher salary, and, likewise, at the end of that year to the third class, and are known as third-year rodmen. The principal assistant engineers also maintain more or less of an engineering force in their respective offices, the men on which are drawn from the third-year rodmen in the division offices as vacancies occur. Some six or seven transit men are also attached to the office of the engineer maintenance of way and are drawn from the offices of the principal assistant engineers. Between 60 and 70 men are retained in the classified service in the division and district offices.

After spending from three to five years in the offices of the division and principal assistant engineers, the men in the classified service are brought into the office of the engineer maintenance of way at Philadelphia, where they are given a course in the elements of accounting, signals, maintenance of way records, bridge and building maintenance and valuation. From six to seven men take this course at a time, spending from one to two months in each department. From this office the men are sent out as assistant supervisors on branch line divisions.

An assistant supervisor in the district assigned him has the same authority and performs the same duties as the supervisor. In most cases he relieves the latter of the routine detail matter connected with the office work and the organization of the forces, so that the supervisor is enabled to spend most of his time out on the track. From branch line subdivisions the assistant supervisor is transferred to a main line sub-division, the main line being that portion of the road between Pittsburgh and New York and between Philadelphia and Washington. As vacancies occur the men are promoted from assistant supervisors on main line to supervisors on branch lines. The next move for the man is then to supervisor of main line sub-division. On the four-track main line a supervisor has charge of from 20 to 33 miles of road, while on branch lines of lighter traffic the sub-divisions are longer and may include as much as 150 miles of line. The supervisor reports to the division engineer. An average of from six to eight years is required from the time the man enters the service until he becomes a supervisor on branch lines.

The next promotion is to division engineer, first on branch lines and then on the main line. In this position he has charge of all maintenance work on the division, including the care of the track, bridges, buildings, water service and signals, and has reporting directly to him the supervisors of track, the master carpenter and the supervisor of signals, the master carpenter and the supervisor of signals having, in general, the same territory as the division engineer. From the time they enter the classified service and as they advance through the various grades, and are promoted to positions of greater responsibility, these men are under close personal observation of their superior officers as to their ability, capacity and application, all of which, as well as seniority, are taken into consideration in selecting men to fill vacancies as they occur. From division engineer the men may be promoted either directly to division superintendent or to principal assistant engineer and then to division superintendent.

Aside from the men in the classified service, the remainder

of the men required in the offices of the division engineers and the principal assistant engineers are in what is termed the "unclassified" service where the rate of pay of permanent force is slightly higher than in the classified service, but where there is no similar opportunity for promotion. While all of the men in the classified service are technical graduates, the same requirement is not exacted in the unclassified service and only a portion of the men here have a college education. Also in some few instances assistant supervisors are selected from promising young foremen, although the general practice is to secure men for these positions from the classified service. As indicated above, seniority alone is not considered in making appointments of supervisors, division engineers, division superintendents, etc., but the relative ability of the individual men is also considered. In this way some men rise to positions as supervisors or division engineers and are not promoted beyond this point.

By this system the Pennsylvania has in training at all times a sufficient number of men trained in its methods of operating and familiar with its standards to fill any vacancies which may reasonably be expected, and no men are appointed to positions of responsibility in the maintenance of way or operating departments from other roads. In this way the men also know that vacancies will be filled by promotion from the ranks.

MEANS OF INCREASING THE EFFICIENCY OF TRACK FOREMEN IN HANDLING LABOR

By W. E. Schott
Section Foreman, Southern Pacific, Gila Bend, Ariz.

With the increasing operating expenses of the last few years it has been necessary to reduce maintenance expenditures to the minimum, requiring roadmasters and section foremen to study means of securing the most labor from each man. To the greatest extent this task falls upon the section foremen, and since the material from which foremen are created is varied, more attention should be paid by railroad officers to their education and to instructing them either verbally or by monthly meetings regarding methods of working labor to the greatest advantage.

In most cases the roadmaster now judges his foremen by their ability to turn out the work, by the quality of the work and by their ability to secure, organize and retain laborers. If a foreman does not possess these qualities he is considered unfit and is replaced with a more capable man as soon as possible.

While this view is entirely correct under present conditions, and there is no remedy advocated or applied, it seems that by paying more attention to this subject this could be materially improved. The great disadvantage of present practice is the fact that a foreman discharged from one road will secure employment on another railroad, so that the procedure now consists mainly in exchanging inefficient foremen from one road for those of another road without really accomplishing anything.

There are innumerable suggestions which, if impressed upon the average foreman, will increase his value to his employers immensely. Large department stores endeavor to make their employees more valuable by giving them lessons in salesmanship. It is hard to understand why railroads have so far overlooked an item involving such great expenses as that connected with track labor. To gather such information and to convey it to the foremen in plain, easily understood language can and should be done by all railroads.

One of the foremost requirements which a foreman must possess to secure the best results from any gang is the good will of all his men. It is impossible for any foreman to work men to advantage if he is disliked by them. Brute force on the part of the foreman is a thing of the past and laborers will either quit or, as frequently happens, refuse to obey orders.

I would not suggest that laborers be allowed to take things easy or advocate a foreman becoming too familiar with his men in order to gain their favor. I think the latter attitude will tend more to undermine the respect for the foreman than anything else. He should be firm and should treat his laborers absolutely justly and without any partiality. By studying his men he will realize that in some cases a remark made in a joking manner will do more good than a severe reprimand, and vice versa. Many a good man has left the service because his foreman did not understand him.

Another important factor to be considered in handling labor is the locality. It stands to reason that a foreman employing a gang of Mexicans in Kansas, especially if there is a surplus of labor, can be more exacting and can work the men a little harder than a foreman employing Mexicans close to the border. In fact, the men work harder themselves if they are in a strange community where they cannot expect support from outside sources.

Another handicap of the average foreman is his lack of patience with the faults of his men. To be a good foreman he must realize the relatively small amount of intelligence possessed by the average foreign laborer. His patience will be taxed many times to the limit, but it is always better to tell a man repeatedly how to perform a task than to get mad and discharge him, for the chances are that the laborer whom the foreman will secure in his place will be even worse. By exercising patience many foremen will discover that cases of supposed stubbornness are not nearly as frequent as they had thought. Endeavor to keep the same gang if possible. It is no advantage to the employer or the employee to work continually with a gang of new men. An experienced man, even if of inferior intelligence, is always preferable to a green hand in track work, for, if for no other reason, it is safer to work with him. No foreman can make any progress without a well-trained gang any more than he can without good tools, and he should realize that it is to his own advantage to take good care of his men instead of abusing them and then ordering others from a labor agent.

All of these points can and should be impressed upon the section foremen at monthly meetings held at some convenient place and in charge of an officer who is able to make the meetings interesting and to secure the co-operation of the foremen. The section foreman out on his blind siding has to rely upon his own judgment more than any other railway employee and the roads would gain much if they would make efforts to improve this judgment. A good foreman is an asset for any railroad, while an inefficient one is a liability. To change many of these liabilities into assets should be as important to our railroad managements as any other movement for the betterment of the service; at least, it is worthy of a careful trial.

Up to the present time our track foremen have received their entire education during their apprenticeship under some experienced foreman and there is no doubt that many of these men have absorbed incorrect ideas with reference to handling labor. The average section foreman, like many other railway employees, has not received a high school education, and since a man equipped with a technical education is undoubtedly able to secure better results in these matters by applying up to date methods, the railroads should make it a practice to appoint such men to these positions for the purpose of having them transmit as much of their knowledge as possible to other employees who have so far been practical without any guidance in that line.

Railway Electrification in India.—At the present time there are under consideration three important projects for electrification of railways in India as follows: the suburban railways of Bombay, the Ghats section of the Great Indian Peninsula and the suburban section of the Eastern Bengal State Railway at Calcutta.

Practical Considerations in Installing Turnouts*†

A Discussion of Important Elementary Principles of Assistance to the Foreman Putting in Switches

By W. F. Rench
Supervisor, Pennsylvania Railroad, Tacony, Pa.

The correct and expeditious placing of switch connections requires special qualifications both on the part of the foreman and his men and any important operation of that character should be placed in the hands of a gang expert in such work. Especially should the foreman be one whose ability and taste in the refinements of switch installation have been demonstrated beyond question, although it is almost equally important that his men be expert workmen, as generally what is to be done must be done quickly and completely.

Each supervisor's division should have several such gangs available and other gangs should be constantly in training so as to be able to take up such work when occasion requires. For this purpose the less important switch work, such as new sidings in private industry tracks, additional spurs in isolated locations, etc., should be delegated to the less experienced gangs and their efforts should receive greater assistance from the supervisor. Combining in the larger work a less experienced gang with an expert one is of excellent advantage to the former and no detriment to the general result.

The number of men required to constitute a first class gang for expeditious application of switch facilities in busy main line tracks over which passenger traffic is carried at speed and in considerable volume should be no less than 24, exclusive of the foreman and his assistant. Two of the laborers should be men qualified to act as flagmen; a third, whose dependability is unquestioned, should watch for the approach of trains and convey proper warning; a fourth is needed to carry water and look after the tools; ten should be capable spikers and all should be useful in general lines of work. Each individual of the gang should have a specific duty to perform when the rush is on after the use of the track has been given. The entire gang should fall into their allotted duties naturally and without the necessity of a preliminary line up.

The men who flag should be alert to display the warning signal the moment its necessity is communicated and should be educated to hold the banner against trains until unmistakably recalled. The display of the danger signal at the immediate location of the work should be the signal to proceed and should be the cue for the distant flagmen to act.

Only when the movements of all are automatic and instantaneous can the gang be regarded as well organized. Any members who are slow or awkward or inclined to run into the way of danger should be eliminated. The efficient foreman is able to indicate his instructions with a word, even a gesture, and should exact instant obedience. With the knowledge that his ideas have been trained by thorough familiarity with correct rules, he proceeds unerringly and his confidence inspires efficient co-operation in his men.

SPECIAL TOOL EQUIPMENT FOR THE SWITCH GANG

Besides the ordinary stock tools of any gang the switch gang should have a rail dolly to move rails quickly from place to place; a rail saw to cut the rails of proper length (a very frequent necessity in extensive interlocked switch work carrying specific locations of insulated joints); pneumatic rail drills for use whenever access to a compressed air line is possible; a hydraulic rail bender to break rails for temporary connections, to bend stock rails for accurate adjustment with the switch rail, and in certain cases to bend the rails to conform with the curve of the sharper turnouts, and, not least in importance, a tool which may be called the pick adze, because generally made in the blacksmith shop from an ordinary tamping pick, which is exceedingly useful in switch work for adzing beneath the rails, cutting off tie plugs used in respiking or cutting about spikes to facilitate their withdrawal.

The track gages employed should be only those whose accuracy has been tested and a steel tape divided into twelfths is practically a necessity for nice work. A metallic tape is good enough for measuring the lengths of the switch ties or to lay off their places in the connection, which should always be done by continuous measurements, particularly in slip switch work. A ball of twine for lining should never be lacking. As the switch gang is a floating one a substantial tool box is required and the design of one that has been found very acceptable is appended.

PRACTICE IN INSTALLATION

One of the essential details in switch work is a nice arrangement of the joints. Whether "housing" of the switch points is approved or not, the joints in advance of the point rails should follow a uniform standard. The joints in the two stock rails admit of little staggering, but this should be such that each joint has independent tie support. With the longer switch points no intermediate ties between the joints are possible unless long stock rails are used, the utility of which is doubtful.

Assuming 33 ft. stock rails and a 30 ft. point switch the joint on the main stock rail should be the one nearer the point of switch, because this will enhance the efficiency of the joint at the other end of this rail, which is a part of the main track structure. The distance in advance of the point of switch should be 4 ft. 7 in., which allows sufficient space ahead of the switch for the splice bar and spaces the joint at the reverse end of the rail one tie interval from the heel of the switch. The joint of the turnout stock rail should be 8 ft. 3 in. in advance of the point, which spaces the other end of this stock rail three tie intervals from the heel of the switch. The preservation of this uniform arrangement is desirable even though it may always require the cutting of shorter rails into the main track, and even though if space be limited it may necessitate a resort to the shortening of the lead somewhat, which may be done within the limits of 2 ft. for a No. 6 connection with an 18 ft. switch or of 8 ft. for a No. 20 connection with a 30 ft. switch and of lengths in due proportion for intermediate numbers. This uniformity is of course a necessity when stock rails "housed" at the mills are employed. As switches which occur together are usually part of a route across multiple track systems, the suggested arrangement would be duplicated for the adjoining switch with the result that the two switches would be separated 12 ft. 10 in., which, it will have to be granted, is a very favorable distance.

The elimination of joints from guard rails, desirable at all times, but essential with the employment of guard rail clamps and their fillers, is a well known requirement of nice work. The further arrangement of joints should be such as to use the shorter odd lengths of rail that are supplied with all rail orders to the usual amount of 10 per cent. and whose presence at other points is undesirable. For the best line no rail length less than 15 ft. should be employed. All rails should

†An article on the important elements in the design of turnouts by Mr. Rench was published in the *Railway Age Gazette* of June 19, 1914, page 1542.

be drilled and the joints full bolted and tightened as much as possible before final line is established.

The point at which to introduce the angle in the turnout stock rail is one concerning which practice varies. A computation of the distance from the actual to the theoretical point of switch, assuming the former to be generally ⅛ in. thick, shows it to vary between 3 in. for a 10 ft. switch and 8 in. for a 30 ft. switch. But it is not possible to bend a rail to an exact angle at any point and the distance for each length of switch is soon found by practice for the bending apparatus available. The set should be made in the stock rail leading to the less important track, even though this would normally be the tangent from which the turnout seemingly springs. The important feature is to provide a smooth route for the faster or higher class traffic.

The spacing of the switch ties is a detail which should have careful attention. In main running tracks carrying fast passenger or heavy freight traffic with ties of about 9 in. face a spacing center to center of 22½ in. should be employed, which is equivalent to 18 ties to a 33 ft. rail and is equal in bearing area to 20 ties of a width averaging 8 in. This spacing is a convenient one because in the application of the rule for computing the bill of switch timber (described in the *Railway Age Gazette*, June 19, 1914) the increments become even fractions of an inch for the three most used of the higher numbers of frog, viz., ⅜ in., ¾ in. and 1⅛ in. for No. 20; ½ in., 1 in. and 1½ in. for No. 15, and ¾ in., 1½ in. and 2¼ in. for No. 10.

While this spacing would appear somewhat difficult of application by continuous measurement for the average foreman, facility may readily be acquired in adding 2 ft. and dropping back 1½ in. each tie space.

In private sidings and yards a spacing center to center of 27 in. is sufficient, which is equivalent to 15 ties to a 33 ft. rail or equal in bearing area to 17 ties of a width averaging 8 in. While this may seem excessive for such points from the standpoint of support for the rail, it is none too much to fully conserve the requirements of alinement. This spacing renders the increments in computing the bill 1⅛ in., 2¼ in. and 3⅜ in. for No. 8, and 1½ in., 3 in. and 4½ in. for No. 6. It is, of course, quite a simple procedure in laying out the spaces to go forward 2 ft. and 3 in. each time. The spacing in both cases would have to be modified in the event that hewn switch ties were employed.

It is desirable that non-interlocked switches in main running tracks should have the ground lever so placed that when set for the main track the rod connecting the switch with the switch stand is in tension. For switches that connect ordinary sidings whenever possible the switch stand should be on the right hand side of the switch as one faces the connection. Wherever a siding connects with a main track a derail should be installed in the siding at the clearance point to prevent cars being moved beyond that point by the wind, by error of train crews or by malicious persons, when no lamp or other indication would warn a train approaching on the main track of the danger. When no substantial bumper is provided the blind ends of sidings should be curved away from the main track. This should not be done in the case excepted, because if the momentum is great buckling toward the main track is certain, while if the siding continues parallel the chance of buckling away from the main track is an even one.

PRACTICE IN MAINTENANCE

Whether preliminary to the installation of a new connection or to the renewal of the timbers in the old it is of decided advantage to remove the ballast entirely to the bottom of the ties throughout the length of the connection. In no other way can economy of time be effected in the general respacing of ties that occurs both in their original application and renewal. An exception might be made when spotting of switch timbers only is being done, but this excellent and generally prescribed rule for renewal is seldom practicable, as the timbers are almost certain to be in a fairly uniform state of wear and decay. The entire removal of the old ballast assures a cleanly ballasted track, which is of great benefit both to the riding of the connection and to the life of the ties.

The tamping should receive especial attention, as the comfortable riding of switch connections is the exception rather than the rule. The practice of elevating the switch rail for safety introduces a very neat problem for the expert maintainer. A plotted profile of a succession of closely bunched switches in a main track is calculated to instill despair of fine results in riding, but it is well known that such results can be attained. In general, the joints at the heel of switches and block joints require the hardest tamping and the most frequent surfacing.

Proper line seldom obtains through main track switch connections because enough pains were not taken in the original installation to attain the maximum advantage in this respect. Correction can sometimes be made by separating the main track and the turnout between the switch and frog into independent units by unspiking the respective tracks upon alternate ties and throwing with the bars, completing the adjustment by careful spike lining. The latter should always be done by widening the gage rather than narrowing it. Care must be taken at the frog to preserve the correct guard rail gage at all times that service is permitted.

The cleaning and lubrication of the plates and other bearing surfaces of switches and of movable point and spring rail frogs is a very important item of maintenance. The prevention of sanding over switch connections relieves the maintainer of much useless labor and the road of much unnecessary expense for oil consumed. At the approach of freezing weather it is generally customary to remove the ballast from the tie spaces at frogs, switches and guard rails to facilitate the removal of snow and ice.

Frequent inspection of switches, both by the track foreman and signal maintainer, is necessary to guard against lack of adjustment, which may result in accident. These inspections should be made monthly for general condition, weekly for detail defects and daily whenever possible to detect small irregularities which might assume dangerous degrees in brief time. The limit of safe wear is a variable one, but as regards the frog it is about reached when the half inch point is worn one-half inch below the original top surface of the frog. As regards the switch, this can only be determined by the judgment of the inspector. Stock rails represent only nominal maintenance expense and should be kept in first class condition at all times.

Accurate line through the connection having been secured by careful attention to the rules given, the preservation of this can be assured only by a faithful use of tie plates and the rule should be made inviolable that every switch tie should be protected by these accessories. It is doubtful if treated switch ties, which are frequently of inferior soft woods are safe in connections of heavy service without the addition of tie plates. The use of white oak for all switch ties would be a desirable but probably unattainable ideal. The troublesome maintenance question caused by the running of switches can be largely met by a generous use of anti-creeping devices, both throughout the connections and for some distance along the main track in the opposite direction to that of the traffic.

PRACTICE IN OPERATION

In long ladders a great advantage in operation is secured by a plain designation of the switch leading to each individual track. Time is frequently lost in seeking the right switch and not infrequently greater time is wasted by correcting a false drill movement occurring through error in choosing the switch. This may be avoided by the addition of a target to the switch stand carrying the designating number or letter, so placed that the light from the switch lamp will fall upon

it and slightly inclined so the brakeman riding the car will receive information as to the track he is about to go upon. This banner should not be a fixed board that one might stumble over, but should be integral with the switch stand.

The important question from an operating point of view is what power should be allowed to work through certain numbers of switch connections and what speed limits such operation should carry. On account of the great variation in switch connections through local features of layout this question is better determined by the degree of curve that obtains for the particular turnout. When the use of no less radius than 175 ft. shall be general it may be considered that all classes of switch engines may safely use such a minimum curve.

It is a fair assumption that all ordinary types of road power may operate on a 23 deg. curve, or that of a No. 6 connection from tangent track. The speed should, however, not exceed 5 m. p. h. through No. 8 and No. 10 connections from tangent track, or from light curves at 15 m. p. h., and No. 15 and No. 20 connections similarly at 30 m. p. h. The degree that should be fixed as the limit for operation at 30 m. p. h. with no superelevation of track is 3 deg. 30 min., which represents an unbalanced elevation of 1½ in. for a speed 10 per cent. greater than that specified by the rule.

GIRDER ERECTION WITHOUT FALSE WORK

By William S. Wollner

An interesting example of the manner in which girder bridges may be erected without the use of false work is illustrated by the method used by one of the Pacific Coast railroads now constructing a line through the Coast Range mountains. The building of this road involves many stream crossings and the largest part of the cost of bridge erection is represented in the expense of hauling the material for false work to the bridge sites (when false work is used) and its erection for use. In some places it was found practically impossible to haul false work material to the bridge sites

Lowering a 60 ft. Span Into Place

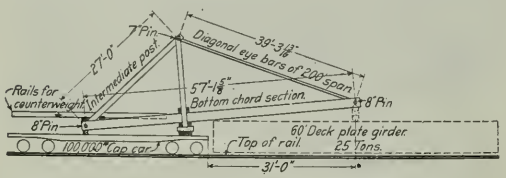
until track was laid to them and it was then necessary to stop laying track until the false work was erected and the bridges placed.

In order to reduce the cost of erecting bridges a method was sought which would obviate the use of false work and would at the same time create the minimum delay to the track laying. It should be remembered that this work was on a railroad under construction and that the methods used at times for placing girders on roads under operation could not be applied. The heaviest crane available for this work was of only 12 ton capacity and it was not considered advisable, in view of the small amount of work to be done, to endeavor to obtain a larger machine, which, if available, would have to be transported a long distance to the work. It was decided, therefore, to construct a derrick from parts of a 200 ft. deck truss span which was on hand awaiting erection when the track reached its location.

The equipment used for erecting these girders consisted of:

One 100,000 lb. capacity flat car,
Parts of a 200 ft. deck truss span,
Rails for counterweight,
12 ton capacity locomotive crane,
Blocks and tackle.

Two bridges were erected by this method; one consisting of three 60 ft. deck plate girder spans and the other of two



Derrick Car Made of Bridge Timbers and Used for Erecting Plate Girder Spans

60 ft. and two 50 ft. deck plate girder spans. The principal dimensions of these girders and the characteristics of the bridge sites were:

Bridge No. 1

Three 60 ft. deck plate girder spans, weighing 52,067 lb. each.
Center to center of girders, 7 ft.
Bottom to bottom of angles, 6 ft. 5¾ in.
Number of panels per girder, 10.
Height of South Abutment, 26 ft.
Height of Pier No. 1, 44 ft.
Height of Pier No. 2, 44 ft.
Height of North Abutment, 14 ft.
Alinement, 10 deg. curve.
Grade, —0.133 per cent.

Bridge No. 2

Two 60 ft. deck plate girder spans, as described above, and
Two 50 ft. deck plate girder spans, weighing 35,000 lb. each.
Center to center of girders, 7 ft.
Bottom to bottom of angles, 5 ft. 11¾ in.
Number of panels per girder, 8.
Height of South Abutment, 2 ft.
Height of Pier No. 1, 58 ft.
Height of Pier No. 2, 60 ft.
Height of Pier No. 3, 54 ft.
Height of North Abutment, 13 ft.
Alinement, 10 deg. curve.
Grade, —0.1053 per cent.

The accompanying sketch gives a general outline of the derrick. The boom consisted of a bottom chord section of the 200 ft. span made up as a latticed box girder 57 ft. 1⅝ in. long (between pin holes), 1 ft. 8½ in. bottom to bottom of angles, 2 ft. 9 in. deep. The back boom stay consisted of an intermediate post from the same structure, 27 ft. long (between pin holes), made up of channels, angles and plates and measuring in cross section 1 ft. 5⅛ in. square. The forward boom stay consisted of a diagonal eye bar from the 200 ft. span 39 ft. 3 13/16 in. between pin holes and 8 in. by 1¼ in. in cross section.

The girders were all riveted up in the general material yard and were hauled on flat cars to the site of the structure. As close to the nearest abutment as it was possible to place them they were unloaded onto rails placed upon the ground along the track and from these they were skidded on to the track. The derrick described above was mounted upon a 100,000 lb. capacity flat car with the pin hole 31 ft. ahead of the front of the car and this allowed the 60 ft. girder spans

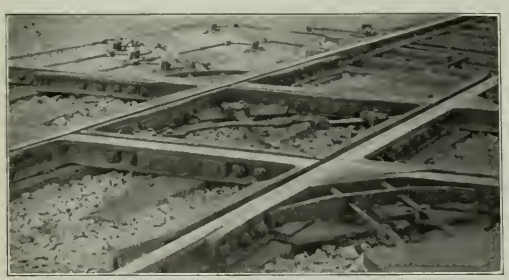
to be handled with one foot clearance between them and the end of the car.

The derrick car was then propelled by the 12 ton locomotive crane to a position immediately behind the span, and tackle consisting of steel wire cable and bridge blocks was run from the center of the girders to the hoisting drum of the crane. The girders were then raised to clear the track and the whole outfit was then moved forward by the propelling mechanism of the crane until the span was immediately above its final position on the abutment and pier. It was then lowered into place and the tackle removed. The next span was then placed upon the track and the operation repeated, with the exception that this time the movement was made over the girders already placed to reach the piers upon which the suspended girders were to be placed.

Placing 60 ft. Girder Span With Derrick Working on Adjacent Span

THE EYMON CONTINUOUS CROSSING

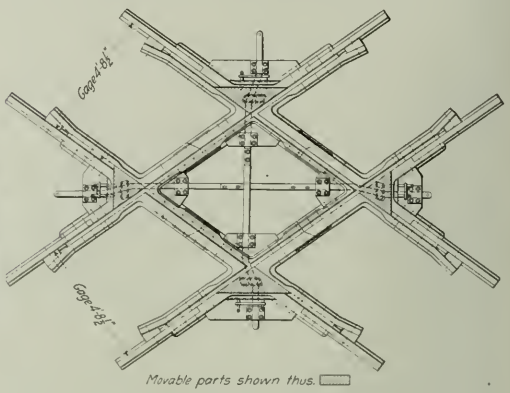
One of the principal disadvantages incident to steam road crossings is the break in the continuity of the running rails which is necessary with any rigid form of construction. These breaks not only transmit a jar to a train as the wheels pass over the interval, but the wheels themselves transmit severe blows to the projecting surfaces of the crossing, wearing these parts rapidly, and making it difficult to maintain any proper line and surface. For this reason there has existed a demand for a movable point crossing which will give a continuous running rail on either track as desired.



The Eymon Continuous Crossing

One of the simplest designs which have yet been brought out for this purpose is that of the Eymon Continuous Crossing Company, Marion, Ohio. This design consists essentially of four triangular movable frog points at the intersections of the gage lines whose movements are controlled by rods passing under the base, with horizontal offsets moving through lugs in the movable castings. These bars are directly connected with an interlocking tower, and move the points from one position to the other by the direct forward or backward movement of the bar without any intermediate points. To prevent the points from moving under a train, each corner is bolt-locked in its proper position by two bolt lugs, also operated from the tower independently of the movement controlling the point.

One of these crossings was installed in the main track intersection of the Pittsburgh-Toledo and the Columbus-Sandusky branches of the Pennsylvania lines at Carrothers, Ohio, on May 25, 1914, and have been in continuous service since that date.



Plan of Eymon Continuous Crossing

Both lines at this point are single track, and carry a relatively heavy traffic. Twelve passenger trains, and over 1,500 freight cars, many of which are heavily loaded with coal, pass over this crossing daily. While it is too early to secure any definite or conclusive data regarding the cost of maintenance, it is reported that no expense has been required to date.

The Eymon Continuous Crossing Installed at Carrothers, Ohio, Showing Interlocking Connections

This crossing is at an angle of about 70 deg., and is built of 85 lb. rail. It is of manganese construction, and weighs 6,900 lb. Before installation it was connected up at one side, and was then slid into place. A gang of 16 men removed the old crossing, placed the new one, and connected it to the interlocking plant, with the exception of the bolt locking, ready for a train to pass in 32 minutes.

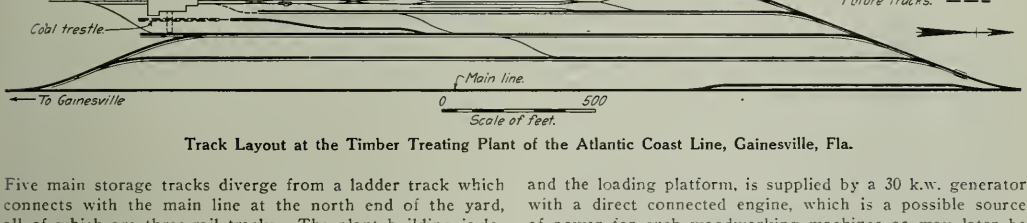
The Creosoting Plant of the Atlantic Coast Line

A Description of the Layout, Equipment and Method of Loading Ties at This Modern Southern Installation

The creosoting plant of the Atlantic Coast Line is located on a tract of level ground adjoining the main line tracks, just north of the city limits of Gainesville, Fla. The plant and storage yard cover about 30 acres, while there is sufficient additional space to provide for any probable expansion in the future.

As is common in Florida, the soil is light and sandy, and quickly absorbs the heavy rainfalls of the wet season. Permanent moisture lies at depths varying from 18 in. to 7 or 8 ft., and caused considerable difficulty in building the foundations for the main building and other structures. This was overcome by the use of Lackawanna steel sheet piling. The heavy loads are all supported on piling. The piling was driven and the concrete foundations were placed entirely by company forces.

The general arrangement is shown on the attached print.



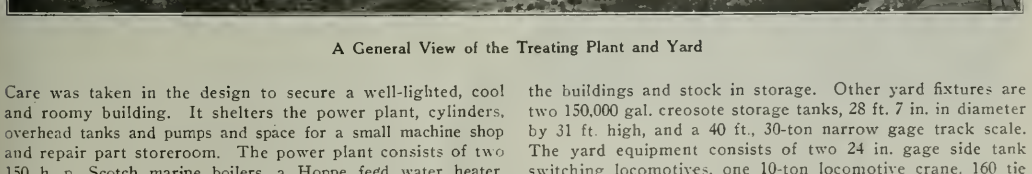
Track Layout at the Timber Treating Plant of the Atlantic Coast Line, Gainesville, Fla.

Five main storage tracks diverge from a ladder track which connects with the main line at the north end of the yard, all of which are three-rail tracks. The plant building is located at the south end of the yard, and is connected with the main storage tracks and the loading platform by a system of 24 in. narrow gage tracks. A spur track connecting with track No. 2 reaches a proposed coal trestle on the east side of the main building, which is not yet built. The main building, machinery, power plant, storage tanks, water tower and water system, and tie trucks were furnished and erected by the Allis-Chalmers Manufacturing Company, of Milwaukee.

The main building is of steel frame construction covered with corrugated iron, and is provided with the usual steel shutter doors, wire glass windows and ventilating monitors, provided with doors at both ends, and designed for 200 lb. working pressure; two 24,000 gal. working and measuring tanks 10 ft. 9 in. by 37 ft. 5.5 in., of 5/8 in. plate and built for 100 lb. working pressure; one 35,000 gal. underground tank, 10 ft. by 60 ft., of 5/16 in. plate; one 1,500 gal. drain tank; two sap drums; one air receiver; one 12 in. by 19 in. by 14 in. air compressor; one 10 in. by 16 in. by 10 in. vacuum pump; two 7.5 in. by 5 in. by 6 in. pot valve pressure pumps, and one 12 in. by 8.5 in. by 12 in. general oil service pump. The arrangement is such that the Rueping process can be used to the greatest advantage, but the Bethell process can also be employed. Prominent features are the large vertical overhead working tanks, and the mercury gages from which their contents is read.

Light for the main building, the office, the pump house and the storehouses, as well as for the narrow gage yard and the loading platform, is supplied by a 30 k.w. generator with a direct connected engine, which is a possible source of power for such woodworking machines as may later be found necessary. A small complete experimental plant of standard design is included. The equipment of gages, both plain and recording, is complete.

Excellent boiler feed water is provided by an open surface well situated at the foot of the water tower and adjacent to the pump house. The latter contains one 10 in. by 6 in. by 12 in. water pump and one 14 in. by 7.5 in. by 12 in. standard underwriters' fire pump, both connected with the well and with the water tower. The tower is of standard steel construction and has a capacity of 45,000 gal. A 6 in. fire main with eight hydrants provides fire protection for



A General View of the Treating Plant and Yard

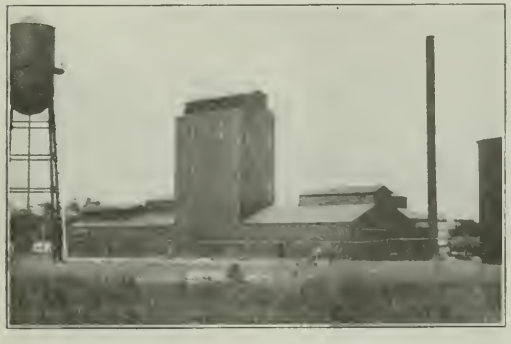
Care was taken in the design to secure a well-lighted, cool and roomy building. It shelters the power plant, cylinders, overhead tanks and pumps and space for a small machine shop and repair part storeroom. The power plant consists of two 150 h. p. Scotch marine boilers, a Hoppe feed water heater, the necessary water feeding installation, and a 48 in. by 90 ft. self-supporting American ingot iron stack. It is separated from the cylinder room by a brick fire wall.

The main operating machinery consists of two cylinders, 6 ft. 2 in. in diameter and 138 ft. 7.5 in. long, of 3/4 in. plate, the buildings and stock in storage. Other yard fixtures are two 150,000 gal. creosote storage tanks, 28 ft. 7 in. in diameter by 31 ft. high, and a 40 ft., 30-ton narrow gage track scale. The yard equipment consists of two 24 in. gage side tank switching locomotives, one 10-ton locomotive crane, 160 tie trucks and 24 piling trucks.

A storage capacity of 1,250,000 gallons of creosote is provided on deep water at Export Terminals, Jacksonville, Fla., by four tanks. The plant at this point is equipped with a boiler and pump for heating and transferring the oil in stor-

age. Six 10,000 gal. tank cars are employed in transferring creosote from Jacksonville to Gainesville.

On the Coast Line practically all crossties are bought delivered in stacks along the right-of-way. In order to load these economically for shipment to the plant, specially equipped flat cars have been assigned to this service, and a modified log-loader purchased to load them. The log-loader



View of the Main Building

places the ties on the flat cars in tiers parallel to the length of the car and the tiers are then securely strapped down to the car by chains fitted with log-binders. The outbound loading of treated ties at the plant is done either with the crane or by hand. Cars thus loaded may be handled to and from the plant either in regular freight service or in special trains. This method of loading and shipping ties in large

Looking Into the Retort Room

quantities was worked out on this railroad, and so far as is known, is new. It is proving satisfactory and economical.

Up to November, 1913, only longleaf heart pine ties bearing a small percentage of sap were treated by the Bethell process. Since then the Rueping process has been adopted for ties, and the specifications modified so as to include the coarser-grained, or "sap" ties. Pine piling and heavy timber and lumber are preserved by the Bethell process of treating.

The "eight-by-one" stacking method is followed, and the necessary seasoning period averages four months for crossties. Experience has shown the climate at Gainesville to be favorable for seasoning the classes of material handled.

The piece-work system of payment has been adopted throughout for handling crossties, except where mechanical handling is practiced. This works especially well with the negro labor with which the yard is manned, and results in making the negro a fairly satisfactory hand. Not enough material other than crossties has yet been treated to make possible the establishment of piece rates in such cases, but here "tasking" has been substituted for the piece rating wherever possible, and provides almost as great stimulation to the negro as the latter.

The plant is operated by Wm. A. Fisher, superintendent of timber preservation, under the direction of E. B. Pleasants, chief engineer.

PAINT PROTECTION FOR PORTLAND-CEMENT SURFACES*

By H. A. Gardner

In many instances it has been found desirable to decorate certain kinds of Portland-cement structures with moisture-proof coatings.† The appearance is thereby made more pleasing and the cement is protected from the destructive action of the elements. The author has occasionally come across statements which would tend to create an impression to the effect that Portland-cement surfaces are highly alkaline and cannot be satisfactorily decorated with oil paints. That such an impression is incorrect, seems to be the opinion of all investigators who have made painting tests of an extended nature. In fact, there is much evidence to show that Portland-cement surfaces are quite as well suited to receive paint coatings as iron, wood and other kinds of structural materials. Moreover, the results of well-conducted tests have shown that pure oil paints, such as are used upon wooden structures, may be used with equal satisfaction upon cement.

That the painting of cement is not a new art, is evident from the many references in the literature which describes methods of decorating and rendering damp-proof all classes of cement. Soon after Portland cement came into general use, it was customary to decorate certain kinds of constructions made from this material, the prevailing method being to apply varnishes containing copal, shellac, rosin or other resins, admixed with oil, turpentine and benzine. Subsequent to the application of such primers, a finishing coat of enamel made by grinding color pigments with the primer, was then applied. The principles underlying these old methods have since been followed with varying success, and up until a few years ago it was a common procedure for painters to apply a coat of varnish suction primer to cement and plaster walls, previous to painting them. Surfaces thus treated were filled, and made less absorptive, and from this standpoint they were in a somewhat better condition than bare walls to receive the final coat of paint or enamel.

The suction varnishes or fillers made for this purpose were of two classes. One widely used was made of rosin dissolved in benzine and admixed with linseed oil. The rosin was sometimes made more suitable by dissolving therein certain drying agents, such as red lead or lime. Lead or calcium resinate would thus be contained in these fillers. Varnishes made of the more expensive resins, such as Manila and copal, have also been used for the same purpose.

Whether these suction varnishes actually enter into chemical combination with the lime or other materials in cement or

* Abstract of a paper presented before the American Society for Testing Materials, in convention at Atlantic City, June 30 to July 3.

† This paper does not refer to treating cement masonry which is subjected to hydrostatic pressure and which may be in a very wet condition. Such masonry requires waterproofing rather than moisture-proofing treatment.

plaster, or whether they simply act as insulation coats, is a matter which has received considerable attention. If chemical reaction really occurs when a varnish coating is applied to cement, varnishes of the highest acidity, such as those made of colophony resin (common rosin), would be most efficient as lime neutralizers and better suited as primers, provided the durability of the coating is dependent upon the amount of calcium resinate which might be formed. Varnishes which have been prepared from the expensive resins generally show an acid number of from 5 to 10, while varnishes made from colophony resin (rosin) generally have an acidity of from 40 to 80. The author is inclined to doubt the possibility of lime neutralization by the use of suction varnishes. It is not a simple matter to produce calcium resinate under the most favorable conditions. Even molten rosin of 150 acidity requires prolonged heating at a high temperature, in order to take up as little as 2 to 3 per cent. of lime. When a varnish of low or high acid value is applied in the cold to a cement surface, drying occurs in an exceptionally short time, and there is no opportunity for the small proportion of resin present in such an extremely thin coating to effect a reaction which even under high temperatures takes place with the greatest difficulty. The effect which is really produced when a varnish is applied to a cement surface is not chemical, but of a physical nature, the varnish having a binding and filling effect upon the cement similar to the binding and filling effect which is produced by the application of certain types of oils to cement surfaces.

Probably too much importance has been attached to the alleged destructive action of lime upon cement surfaces. It is well known that setting Portland cement develops free lime, but the amount to be found upon a Portland-cement structure should be considered as negligible in most instances, as far as it might affect a well-designed paint. If indeed it is advisable to neutralize this small amount of lime, previous to painting the cement surface, such a result is not to be properly accomplished with an organic substance, but rather with an inorganic material which readily reacts therewith. A solution of zinc sulphate has proved most efficient for this purpose and has been used for many years with practical results, especially upon freshly laid cement. It might be well to point out at this place that the priming or ground-coating of cement is often improperly carried out when clear primers of any kind are used. If, for instance, a clear varnish is applied to a cement surface, the primed surface is difficult to differentiate from the untreated area. Consequently, the workmen using clear primers often leave untreated laps or "holidays," as they are technically known. For this reason, the use of color primers should be adopted wherever possible.

The dusting of cement floors, which is brought about by abrasion, may be effectively stopped through the use of oil-pigment paints. If the floor has been freshly laid and is damp, the possibility of lime reaction may be removed by treating the surface with a solution of tinted zinc sulphate. The oil paint may then be applied. Boiled linseed oil, sometimes mixed with Chinese wood oil, may be used as the liquid portion of the paint. These oils have a remarkable binding action when applied to a cement surface. When mixed with pigment, they form paints which are eminently suited as first coaters for cement floors. The first coat will dry rapidly and form a dense surface. Over this may be applied a second coat and, if a high gloss surface is desired, a portion of varnish may be added to this final coat. The various floors of the author's laboratory were treated in this fashion, with prepared floor paints made from such materials, one week after placing of the cement. The zinc-sulphate primer was used only upon the damp areas. The floors have since been subjected to much abrasion from constant walking and the moving of heavy apparatus. Oils and chemicals of various kinds have come in contact with the floors, and soap and water have been used upon them very often for cleaning purposes. After three years' continued service, the floors have not dusted and have never required repainting. The paint films are still in good condition. This service record would tend to show that placed Portland cement may be made dust- and wear-proof and highly desirable as a flooring material, through the application of oil paints.

In April, 1912, the writer instituted a series of tests to determine the durability of various types of paint upon Portland-cement surfaces exposed to the weather. The panels for the tests were prepared by constructing a long board wall to which was fastened expanded metal A mixture of 1 part of Portland cement and 2 parts of clean Potomac River sand was made and applied to the expanded metal, forming a cement wall 3 in. in depth. The wall was divided into 35 sections or panels, each 30 in. wide and 40 in. high. Three coats of paint were applied to each panel by a practical journeyman painter. In order to make the test more severe, nearly all of the paints were applied in white. (Tinted paints are known to be much more durable than white paints.) A stripe of chrome green, 6 in. wide, was placed over the top of the third coat of paint, in order to determine whether the lime which might be present on the surface of the cement would have any effect upon the paint coating. Fading of the green to a yellow would indicate such action.

The general results of the tests at the end of a 2-year period, together with an outline of the composition of the paints tested, is given as follows:

Class No. 1.—Single-pigment paints made with white lead or zinc oxide ground in pure linseed oil. These paints are in very good condition throughout.

Class No. 2.—Combination-pigment paints made of mixtures of white lead, zinc oxide or similar pigments ground in pure linseed oil. These paints are in generally excellent condition.

Class No. 3.—Combination-pigment paints ground with mixtures of raw and heavy-bodied linseed oil or with treated Chinese wood oil. The viscosity of these oils requires the use of considerable turpentine or other thinner in the manufacture of such paints, in order to make them of the right viscosity for application. Semi-flat surfaces are therefore produced during the drying. Most of these paints are in excellent condition.

Class No. 4.—Single and combination pigments ground in oil varnishes containing acid resins. These paints are checking and scaling in many spots. Such varnish paints are apparently not suited to exterior exposure.

Class No. 5.—Paints containing resins dissolved in volatile spirits (spirit varnishes) with or without pigments. These paints are not giving very satisfactory service, the clear varnishes having entirely decayed in some cases. Those to which pigment has been added are in somewhat better condition.

Class No. 6.—Paints made with single and combination pigments ground in a water medium containing glue or casein as a binder. These paints are chalking rapidly and are not moisture-proofing the cement. The pigment binder has been destroyed by the weather.

Opaque white pigments, such as basic-sulphate white lead, basic-carbonate white lead, zinc oxide, and lithopone, were present in the paints which gave the best results. In some of these paints there was also present a percentage of inert pigments, such as barytes, asbestine, whiting, China clay, gypsum and silica.

The results of these tests are quite in line with the results obtained by Ware and Schott in a series of paint exposure tests made upon exterior concrete surfaces. They also agree with previous long-time exposure tests made by the author.

As a result, therefore, it can be stated that concrete surfaces may be decorated with excellent results through the use of high-grade oil paints. When the cement surface is freshly laid and damp, such paints may be safely applied after treating the cement with a zinc-sulphate primer.

THE BAGDAD RAILWAY OF ASIA MINOR.—The section of the Bagdad railway from Bagdad to Sumike, a distance of about 39 miles, was opened for traffic on June 3.

Discipline in the Maintenance of Way Department

Three Further Discussions of This Important Subject Which Is Now Receiving More Careful Attention

A discussion of methods of enforcing discipline in the maintenance of way department, by J. T. Bowser, was published in the *Railway Age Gazette* of June 19, page 1547. This subject has aroused considerable interest and we publish herewith three further discussions.

DISCIPLINE IN THE MAINTENANCE DEPARTMENT

By E. R. Lewis

Assistant to General Manager, Duluth, South Shore & Atlantic, Duluth, Minn.

Discipline in its broadest sense depends directly on the dispensation of exact justice. On the successful application of this principle depends the existence of all governmental bodies. The selection of officers in any organization, from the highest to the lowest, should be made with the administration of justice clearly in view.

To dispense justice, a man must necessarily have been well schooled in self government. Discipline, like charity, should begin, but not end at home. Unless he is able to govern himself, one cannot expect to successfully govern others. It is possible for a man of judicial temperment to learn the details of a business to be carried on under his direction after his appointment. It is hardly possible for a man who has not his own personality well in hand, to succeed as an employer or officer in charge over other men, be he ever so well versed in business details.

The ideal railway officer is one who is able and determined, by virtue of early training in self government, and by knowledge of the details of that which is to be done under his direction, to dispense exact justice in every case presented to him for decision, be it great or small. Such a man will select subordinates similarly equipped. His success will depend very largely on his ability to recognize and to keep men of this stamp. Much of discipline depends on the ability and persistence of officers to teach their subordinates these precepts, as well as their routine duties. Therefore, personality must ever be a prime factor of discipline.

Given an organization composed of officers and foremen so educated, the lines of authority must be most clearly defined and adhered to in order to obtain the best results. Confusion of authority is always to be deplored. Discipline is impossible under such circumstances. The wise officer will devote much thought to so arranging the spheres of action of his subordinates that there will be no possibility of overlapping authority. He will place as much responsibility on each man's shoulders as he shows himself capable of carrying. He will give to the business in hand the closest possible personal supervision, at the same time insisting on his subordinates doing likewise. The results, through the survival of the fittest, cannot but be of the best.

Justice, co-operation and close supervision are necessary to the success of large undertakings. There are many wrong ways and but one right way to maintain discipline. It applies to the maintenance department of a railway as well as to other departments or to other organizations. Discipline, in the sense of punishment, should be rarely necessary in a maintenance department which is well organized. That it is necessary at times, is universally recognized.

The provision of incentive to co-operation of all members of the department for the ultimate welfare of the company as a going concern is of the utmost importance. For with such co-operation, with each employee alive to the fact that his interests are identical with and bound up in those of the employing company, the necessity for punishment is reduced to a minimum.

The writer believes that the infliction of punishment by suspension and the presenting of cash prizes for excellence are alike opposed to the best interests of a railway company. The cash prize has a discouraging effect on the unsuccessful, while it tends to over confidence and carelessness in the successful. Many foremen are hired by the maintenance department to perform certain almost identical duties. They are all paid about the same wage. That wage is accepted as sufficient for the service rendered. There would seem to be no more reason for giving prizes for the best performance at the year end, than for offering bribes for services expected. Suspension is a direct loss to the department. From a feeling of disgrace on the first suspension, the victim passes to a resentful and irresponsible state of mind, making of his punishment an enforced holiday.

What, then, must be the incentive to co-operation? It must be something considered desirable by all concerned. Promotion and increase in wages are probably most appreciated. Choice of location and honorable mention are also desirable.

Where wages are fixed and promotions slow, as is the case in most maintenance departments, the merit system has been suggested and is undoubtedly of much value. Records of service should include in as much detail as possible, the personality and history of the subject. They should be checked with the periodical physical examinations; and they should be comparatively graded with a view to possible promotions. The value of merits, demerits and special honorable mention depends very largely on the publicity given them among members of the staff. Distribution of circulars to the staff announcing acts of special merit or demerit gives the necessary publicity so desirable in this connection. It is a small expense, its results are beneficial to the whole staff and the effects are far reaching. There should be a "best man" in every gang, capable of taking the foreman's place during leave or enforced absence from duty, during which periods the "best man" receives foreman's pay.

Most potent among the factors of excellence in the maintenance department is the permanent employment of the men. An efficient section-man or bridge carpenter, or pumper must have had experience. Steady employment and steady pay are the returns necessary to retention of desirable men, who are thus assured of that stability of income which will permit them to invest in homes in the vicinity of their headquarters. It is the inborn desire of every normal human being to possess a home.

The unfortunate, the abnormal, the mentally and morally deficient, the irresponsible rover and the untutored beginner only, are attracted by temporary employment. To such men discipline is synonymous with punishment only. The indifferent results obtained from the employment of such transient labor demonstrates the false economy bred of alternately sudden curtailment and augumenting of maintenance forces. The matter of discipline is as old as civilization and depends on the same broad, fundamental principles.

RECORDS VERSUS SUSPENSIONS AS DISCIPLINARY MEASURES

By Frank M. Patterson

District Engineer, Chicago, Burlington & Quincy, St. Louis, Mo.

Among the many suggestions offered for encouraging and retaining efficient help in the maintenance of way department the article of J. T. Bowser is worthy of serious consideration. It is trite to say that conditions in railway service are not what they used to be and it is the very truth of this oft repeated assertion that makes it trite. In a former period when our

stallation is illustrated in the accompanying photograph and drawing. The operation of this double reversing valve is so timed that the air pressure in one well chamber is at a maximum at the moment when the pressure in the other chamber is at a minimum. These pressures are predetermined and are adjusted by the weights on the valves. The compressed air is brought into the top of the reversing valve shown as *J* in the drawing. From this chamber it is directed by means of the slide valve to one of the air lines *N* or *O*, leading to the upper and lower stages of the pump respectively. The main valve is of the three-ported slide valve type, similar to those used in steam engines and direct acting steam pumps. The slide (15) is moved automatically by the spool shaped plunger (101) to open and close the ports *A* and *C* alternately to admit and exhaust the air to and from the pump chambers.

In the accompanying illustration the slide valve is about to move to the left to shift the pressure from the upper to the lower stage. As shown by the gages *K* and *K1*, the pressure in the upper pump chamber has reached the maximum, forcing the water up through the discharge pipe and the pressure in the lower chamber is at the minimum, practically all of the air having been forced up the pipe and out through the exhaust inlet to the compressor by the incoming water. The movement of the slide valve to the left which is about to occur is effected by transmitting the working pressure through the port *L* to a piston acting upward against the weighted lever (548). When the pressure in the air line *N* reaches the maximum, it is just sufficient to force up this weighted lever which has just occurred in the position shown in the sketch. The raising of this lever opens the release plunger (735), permitting the escape of air from the auxiliary ports *D E* which are connected to the chamber *J* through the small port *F*. The release of the pressure in *E* unbalances the main plunger (101) since momentarily the pressure is greater in the port *E1* at the right hand end. In the drawing this unbalanced pressure is about to cause the movement of the slide valve to the left. This movement will deflect the compressed air through the pipe line *O* to the lower stage of the pump closing the valve *A A* and opening the valve *B B* to refill the intake chamber of the upper stage. At the same time the upper stage air line will be connected to the exhaust inlet through the port *B*, allowing the air to escape from the upper chamber as the water enters.

As mentioned above, this exhaust air enters the compressor cylinder and is used over and over. The air supply valve for making up losses due to absorption or leakage is shown at *H H*. Two retarding or buffer valves *M* and *M1* are provided, connecting with the exhaust *B* to prevent premature and irregular reversals of the valve. As the upper surface of these pistons is subject to the pressure in the exhausting pipe, these valves serve to keep the weighted lever in place until the air is fully exhausted from one chamber and has reached the full working pressure in the other chamber. These pistons can also be adjusted for vacuum control when desired.

The top of the lower chamber is placed about 10 ft. below the pumping water level to insure a sufficient head to completely fill the intake chamber of the lower stage by gravity. The valve *X X* in the water discharge pipe is provided for flowing wells, so that when the pump is not running the water can be kept out of the reversing valve. The discharge pipes are usually designed to retain a water seal over the discharge opening. To do this, the maximum working pressure should always be less than the pressure required to force all of the water out of the intake chamber down to the level of the discharge pipe valve. This difference in pressure is usually fixed at 2 or 3 lb. The reversing valve is adjusted to allow the water chamber to fill completely with water. The number of reversals depends upon pumping conditions. In general two reversals per minute are to be preferred to four. The discharge from a two-stage pump is intermittent, but the load on the compressor varies uniformly and the receiver pressure is nearly constant.

Each of the pumps at Proviso is operated by a 10 in. by 10 in. air compressor driven by a 35 h. p., 440 volt, three-phase, 60 cycle, 1,200 r. p. m. motor, the air being stored in a 36 in. by 80 in. air receiver. The power exerted by the motor during each cycle varies between that required to overcome friction of the parts and about 33 h. p., making the average about 20 h. p. Although the maximum load is only instantaneous during each cycle, the motor is designed for this load to prevent heating. The compressors, air receivers and motors are located at the well in order to get the greatest efficiency out of the return air arrangement as explained above. The pumps at wells 1, 3, 5 and 9 were tested soon after the installation was made with the following results for 1, 5 and 9. The test on well 3 was not satisfactory owing to the fact that the area between the pump chamber and the well casing was too small to permit a sufficient velocity of inflow. The small casing has since been replaced by a larger one and larger well fittings have also been substituted, bringing the performance of this pump up to that of the others.

Well No.	1	5	9
Pump run (gal. per minute)	95	105	128.81
Current used, k.w. per hour	18.87	...	21.2
Current used, k.w. per thousand gallons	3.3	3.43	2.74
Current cost at 2c. per k.w.	6.6	6.86	5.48

The receiver pressure during these tests was about 100 lb. and the pressure in the pump chambers about 98 lb. per sq. in. These tests showed a pump run varying from 95 to 128.81 gal. per minute. These pumps are designed for a capacity of 150 gal. per minute, pumping from an elevation 250 ft. below the surface to 60 ft. above ground, but this capacity could not be obtained in these wells because all the water that the wells yielded is represented by the figures shown in the test. This fact was proven by a very elaborate experiment undertaken with one of the Weber company's internal exhaust type of air pumps. This pump was placed about 400 ft. below the ground surface and was supplied with air through a 4 in. main from a large 1,600 cu. ft. compressor. No attempt was made to meter the air, as the desire was simply to determine the maximum yield of the well to a given pumping water level. After a series of tests of this kind the yield was practically the same as that shown by the two-stage displacement pump.

In reference to the cost of pumping shown above the manufacturer regularly guarantees for these pumps in this service a cost of one cent per 1,000 gal. for every 100 ft. of lift, this price assuming the use of a steam-driven compressor with coal costing $3 per ton. For the Proviso installation, requiring a lift of 300 ft. this would mean a cost of about three cents per 1,000 gal. This checks quite closely with the cost determined by the tests since the cost of electric current is approximately twice that of a steam-driven compressor on account of the double conversion of power. The cost of six cents per 1,000 gal. under these severe pumping conditions is considered very favorable. The advantage of reliability was even more important in the selection of these pumps than that of efficiency and low cost. It is stated that up to date the repair account on these pumps has been negligible, although they have been in continuous operation more than a year working 24 hours a day most of the time. The maintenance cost for these pumps is kept low by the slight valve wear characteristic of the ball valve. Except when seated, this valve is balanced by the water pressure on all sides and it is free to seat in a new place each time. A 4½ in. ball which has been in service three years is said to be only 0.006 in. out of true.

ARGENTINE RAILWAY EXTENSION.—A government decree has recently approved the plan presented by the Central Argentine Railway for the construction of a branch between Las Rosas and Villa del Rosario. The government has also ordered that the following sums be paid to the administration of the state railways: For completing the line from Dean Funes to Laguna Paiva, $212,300; for equipment on the state railways and maintenance of way, $2,654,000; for the construction of a railway from Nare to San Javier, $255,000, and $212,300 for the construction of the railway line from Talapampa to Rodeo de las Latas.

The Extra Gang Versus the Regular Section Gang

A Discussion of the Relative Merits of These Two Forces in Handling the Routine Maintenance Work

By W. J. Potter

The present demands of railroad maintenance call for extensive renewals of track and roadbed and give rise to a condition which requires the organization of an extra and efficient labor force, or a decided increase in the present established gangs. There are roads whose traffic conditions and engineering features are such as to cause more rapid depreciation of roadbed in some places than in others. Upon these roads the extra gang is at once a problem and the solution of a problem. The extra gang is an efficient institution only so long as it appears to aid in the proper and economic maintenance of track. It is the result of the operation of conditions which tend to prevent the proper type of labor from remaining on the track. The meagre pay, the onerous work and the lack of consideration shown the track laborer have all combined to drive the best types of labor from the field.

EXTRA GANG A NECESSITY

To make extraordinary replacements and extensive renewals, while at the same time maintaining the track up to standard, requires an increase in the regular forces. This seasonal increase is a recognized maintenance cost. It is in the distribution and administration of this labor that the most trouble arises. The extra track gang must perform any task in connection with the track or roadbed. The neglect of trackmen which all railroads have been guilty of has so reduced the efficiency of the supervisory force that four foremen in every five are unable to install a slip-switch or derail. The extra gang must install turnouts and crossovers, as well as renew rail and ballast when any considerable stretch is to be replaced. It must assist in routine work when the regular gang falls behind. In short, any and all work over and above the ability of the regular forces falls to the extra gang for completion.

The field of the extra gang and the reason which should justify its existence is the most neglected. I speak of the extra gang as a training school for prospective section foremen. The adoption of this idea would eliminate haphazard selection of supervisory material, would enable the prospective foreman to learn every type of maintenance, and give him a thorough understanding of the higher ideals of track work—the maximum results at the minimum outlay. By coordinating theory and practice these student foremen would become proficient in a year's time. They should be paid $1.75 per day and be given sections as soon as vacant. They should be recruited from the road sections in the first place and appointment to the extra gang should be considered as a promotion.

DOES THE EXTRA GANG PAY?

The work of the extra gang is not as a rule entirely satisfactory. The nature of track work requires that maximum results be achieved during the eight mild months of the year. Regardless of cost the work must be done, but one cannot increase by any considerable margin the maintenance cost of this predecessor, or his fellows on other divisions. The extra gang performs the overflow work. Upon the formation and direction of this gang depends whether or not it becomes an excessive maintenance cost. The extra foreman, overseeing a force too large for proper supervision, and charged with the rapid completion of the work and also knowing that there is little or no possibility of small discrepancies in the work being laid at his door, rushes the job, often at the cost of permanence and strength. The old dilemma of quality versus quantity is here exemplified. Like a profit and loss statement the gross returns show large, but it is the net returns that should determine a man's standing. So with the work of the extra gang—the report of work done shows large, but the discounting of mistakes and duplications, and the necessity of work done being ripped out and done over considerably reduces the ultimate gain.

The men in the extra gang pattern themselves after their foreman in subserving permanence to outward show. I have seen track which had been raised by an extra gang where the tamping was so poorly done that there was very little ballast under the ties. In rapidly inspecting work the average foreman will not take a pick and test for firmness if he sees the rock well scratched. It takes a blow of at least 30 lb. to properly test a tamped joint. The average foreman is not going to put in a couple of hours each day doing this, and at the same time attempt to properly supervise a gang.

LOSSES IN THE EXTRA GANG

While visiting an extra gang this summer my attention was attracted to three men who were a little apart from the rest of the gang, yet within easy reach of the foreman's voice. I took a record of the actions of these men for an hour and at the end of this time I found that, deducting the time these men wasted, the time actually worked averaged 40 minutes to the hour. One Italian visited the water pail four times during the hour and the other two each twice. Each rinsed the dipper thoroughly, drank deeply and when satisfied threw away at least half a dipper full each time. The time consumed at the water pail by the men was eight, four, and three minutes, respectively, or an average of five minutes each for water alone. Of course this would have been noticed in the gang proper, if every man did likewise, but a record of the average time lost per man in the gang proper was ten minutes per hour. The men had no rest periods, so whenever a man felt tired he straightened up for a minute. The gang was working in cinders and it was a revelation to see how the laborers fooled the foreman. When he would get a little distance away one would stop working and stand with knees bent inward over his shovel and back bent. When several men were directly in line, as they were in tamping, the foreman could not tell if one man was "soldiering" or not.

In this gang of 30 men 300 minutes mere lost every hour, equivalent to $0.80 lost every hour, or $8 every day. Figuring that one-half of the time lost was really necessary for recuperation this still amounted in the season of 200 days to $832. Some will say the foreman has enough to do without bothering with such trifles, and so he has, but an assistant foreman at $2 a day could pay for himself and at the same time save the company money by watching such trifles. In this gang when every man went to the water pail when he felt thirsty it took two men to furnish sufficient water. Upon drawing the attention of the foreman to the waste, a new system was inaguraed whereby twice an hour the water pail went down the line and every man drank as much as he wished. The water boy was instructed to see that the men drank all they took, and that they did not take any more than they could use. The result was that one man was taken off the water bucket and put on the regular work. This was direct gain of the man's wages, representing $1.60 per day, or $332.80 in the season.

The extra gang performs the overflow work, yet the manner of so doing results directly in two sources of loss to

the railroad. First, the morale of the department suffers. Where prizes are offered for the best conducted sections, the mere presence of the extra gang on a foreman's section detracts from his percentage. Knowing this and also the fact that all mistakes will be chargeable to him, and that he will be still further hampered by going over the same work for a couple of days after the extra gang has departed, makes the foreman apathetic and less scrupulous.

After the extra gang has departed the results of the work begin to show. A rail kinked in unloading and spiked in begins to buckle. Poor tamping causes the rail to sag and the ties to churn under traffic. Rails spiked off gage must be gaged and respiked.. Then the treated tie has a hole that should be plugged, and even when plugged the tie has received a wound that results in its destruction before the normal time. When stone is being placed the grade is often neglected, and as a result the regular gang puts in a couple more days rectifying this. All this duplication is a direct loss and works additional hardship on the regular foreman, as his own work is being neglected while correcting errors that a little more care would have prevented in the first place. The following typical time sheets illustrate the extent of this duplication:

EXTRA GANG LABOR SHEET

Date	Foreman	Assistant foreman	Men	Time starting	Time completing	Hours worked	Job
May 31, 1912	1	1	30	7:30 a.m.	5:30 p.m.	9	Relaying rail.
June 1, 1912	1	1	29	7:30 a.m.	5:30 p.m.	9	Relaying rail.
June 2, 1912	1	1	29	7:30 a.m.	5:30 p.m.	9	Installing derail.
June 3, 1912	1	1	29	7:30 a.m.	5:30 p.m.	9	Installing Xover.
June 4, 1912	1	1	30	7:30 a.m.	5:30 p.m.	9	Installing Xover.
June 5, 1912	1	1	32	7:30 a.m.	5:30 p.m.	9	Installing Xover.
June 6, 1912	1	1	24	7:30 a.m.	5:30 p.m.	9	Relaying rail.
June 7, 1912	1	1	29	7:30 a.m.	5:30 p.m.	9	Relaying rail.
June 8, 1912	1	1	30	7:30 a.m.	5:30 p.m.	9	Ballasting and scrap collection.
June 9, 1912	1	1	30	7:30 a.m.	5:30 p.m.	9	Ballasting and scrap collection.

SECTION NO. 40—TIME SHEET

Date	Foreman	Men	Time starting	Time completing	Hours worked	Job
June 10, 1912	1	10	7 a.m.	6 p.m.	10	Grading, lining, removing kinks.
June 11, 1912	1	11	7 a.m.	6 p.m.	10	Grading, lining, removing kinks and surfacing.
June 25, 1913	1	14	7 a.m.	6 p.m.	10	Leveling anchor beams at derail.

The above record shows a complete loss of 350 hours' time at $0.16 per hour, or $56 in addition to the depreciation of the anchor beams, plus the added transportation of extra material, and the loss occasioned by the absence of the regular gang from its own work.

THE PROPER ORGANIZATION OF THE EXTRA GANG

In assembling an extra gang many little but nevertheless important details are passed over as too trivial for consideration. I find that in track work it is the small things that reduce or increase expenses, for the reason that they are not as carefully watched as the larger counts. The first consideration to be decided on is whether the gang shall work from a fixed base or be moved from siding to siding as needed. On the Scranton division of the Lackawanna extending from Washington, N. J., to Scranton, Pa., two extra gangs are located at Stroudsburg, and at Tobyhanna, each with a working radius of about 40 miles, the maximum efficient working radius. I think the fixed base is the best and the cheapest.

The next consideration is whether one gang shall handle only one type of work or shall be called upon for every class of work in track maintenance. Except on track requiring highly specialized work, such as installing interlocking systems, I think the gangs should perform all types of work.

The question of nationality in the making up of gangs is an important one. The Hun is a steady worker, but he is ignorant and hard to teach; the Italian learns quicker, but he is temperamentally lazy. Bickering among men of different nations is continuous, so, to prevent dissension, it is well to man a gang entirely from one group or divide the men into groups of like nations. I have heard the plan advocated of collecting men of different nationalities into one gang, but this creates bad blood in the gang and disrupts it.

The extra gang must be of a size easily handled. No man can properly supervise more than 25 men. I suggest the following organization for a ballast gang:

Foreman

Assistant foreman	Assistant foreman
2 jackmen	2 jackmen
1 jack tamper	1 jack tamper
1 sledgeman	1 sledgeman
2 men filling in	2 men filling in
15 tampers	15 tampers
1 flagman	1 flagman
1 water boy	1 water boy

This gang ought to reballast and surface three miles of track after an 18 in. raise in a month at a cost of $220 per 1,000 ft. of track.

The following is the most efficient sized gang for laying steel:

1 foreman	10 tongmen
2 assistant foremen	8 spike pullers
1 flagman	8 spikers
1 water boy	10 miscellaneous
8 adzemen	

This gang will lay track, taking out the old steel and replacing with new, at the rate of about 6,000 ft. per day. In doing this with 101 lb. new rail they will place 42.86 tons of rails, 134 pairs of splice bars, 804 track bolts, 804 nut locks, 5,700 screw spikes, 2,400 tie plates and 1,000 yd. rock ballast, at a cost, counting material and labor, of $2,580.94.

HANDLING WORK WITH A REGULAR SECTION GANG

While it would be profitable from an economic standpoint to maintain section gangs of a size sufficient to handle all renewals, it would materially increase the maintenance cost of track. For a three-mile section of heavy traffic under a capable foreman all renewals and replacements can be handled by a force of twelve men in summer and eight men in winter. This would necessitate paying a higher salary to the foremen. The present cost of maintaining a section with eight men in summer and four in winter is:

Foreman, 12 months at $70	$840.00
8 men, 208 days at $1.60	2,662.40
4 men, 104 days at $1.60	665.60
Annual expense per section	$4,168.00

With the plan of permanent section gangs the cost would be:

Foreman, 12 months at $80	$960.00
12 men, 208 days at $1.60	3,785.60
8 men, 104 days at $1.60	1,331.20
	$6,076.80

Comparing a 35 section division:

Total cost of sections ($4,168 × 35)	$145,880.00
Cost of two extra gangs	17,500.00
Total labor cost of one division	$163,380.00

On a 35 section division without the extra gangs and with the large permanent gangs the cost would be ($6,076.80 x 35) $212,688.

These figures are based on every man working every day. The $49,308 difference between the two methods could be cut down at least 50 per cent, leaving the margin as the price of safety.

The expense of the extra gang is alone 10 per cent of the total labor maintenance cost. The annual expenditure for labor at present is $163,380, of which the cost of the extra gangs is $17,500, or over ten per cent.

Regular gangs of ten men in summer and eight in winter can relay one mile of track in five days, taking out the old steel and can put under and surface one mile of rock ballast in one month, tamping 14 rail lengths in ten hours, or about ten days to a mile. With a proper foreman (the kind $80 a month would supply) one can do without extra gangs en-

tirely. These regular groups would install switches and crossovers, lay steel and stone and maintain a high standard of track excellence.

THE MIDDLE WAY

Some roads make a practice of combining adjacent section crews for particular kinds of work. This is a good idea, which, if overworked, is spoiled. Where all section foremen are competing for the annual prizes, this system takes a man from his own track to help his neighbor. He fears that he is giving another and perhaps a poorer workman the benefit, and the results, of his own ideas and discipline. His neighbor does not want him, as the presence of additional labor on the section detracts from his percentage and record. The men of the visiting gang do not like it, as quitting time finds them too far from home. They regard it as an added hardship without any additional reward, so they make up for it in soldiering.

This method as practiced places a premium on inefficiency and chokes honest effort on the part of the man who really wants to get ahead. It sometimes places a good foreman under the direction of a poorer man and this is galling to an efficient worker. Tools get mixed with resultant bad feeling.

Renewals should be gradual and universal rather than extensive and local. The establishment of permanent regular sections and the abolishment of the extra gangs is but a matter of time. When the railroads cease pursuing the penny-wise, pound-foolish policy of retrenchment in the maintenance department we will have maximum efficiency. The extra gang has its place in the railroad organization, but the end of its day is at hand. It can train the men who are to supervise the permanent sections and then gracefully follow the untreated tie, and the wooden bridge.

UNECONOMICAL TRACK ECONOMY

By G. S. Crites
Southern Pacific, Tucson, Ariz.

It is regrettable that so many American railroads find it necessary to curtail their expenditures for track maintenance in order that they may make some showing in net revenue.

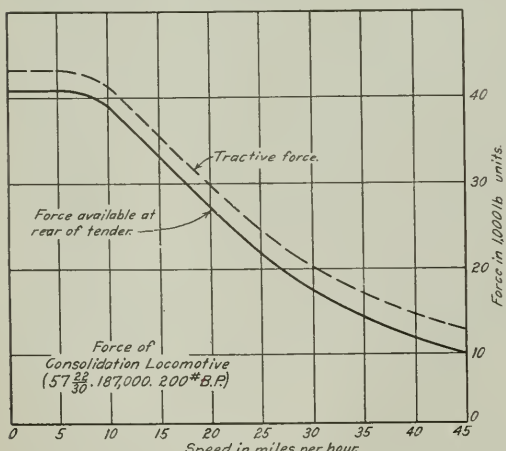


Fig. 1

At best, such an expedient is very temporary, and indications are that savings thus obtained are soon absorbed by increased transportation costs brought about by poor track conditions. On poor track much energy is taken up by concussions, damped oscillations, increased flange friction and other causes, and as all energies of a train in motion, except on a down grade, come from the motive power, the loss due to neglected track is a direct pull against net earnings.

Some of the larger systems are securing dynamometer cars, and it is hoped that, thus aided, they will determine the effect of track conditions upon energy expended by the motive power and thereby show the effect of track conditions upon net earnings. Until the results of such tests are known, it would seem desirable to analyze the effect of rough track with the best approximations possible.

The following diagrams show (Fig. 1) the tractive force

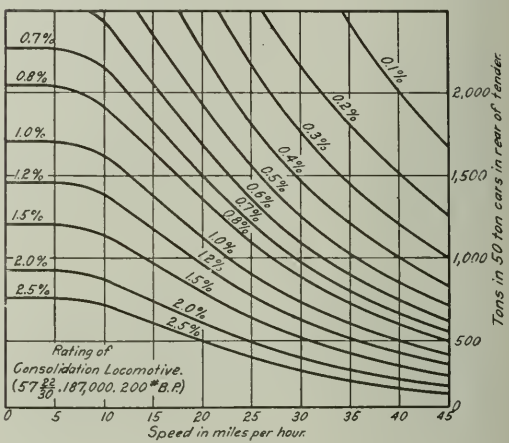


Fig. 2

and available drawbar pull of a consolidation locomotive (Fig. 2), the rating of this locomotive is 50 ton cars (Fig. 3), the velocity head plus head due to rotating parts at various speeds and grades of uniform retardation from such heads and (Fig. 4) the force per 1,000 lb. necessary to acceleration.

Suppose this locomotive, with maximum effort, is hauling 1,200 tons at a speed of 25 miles per hour and encounters a mile of track of such condition that the best that can be

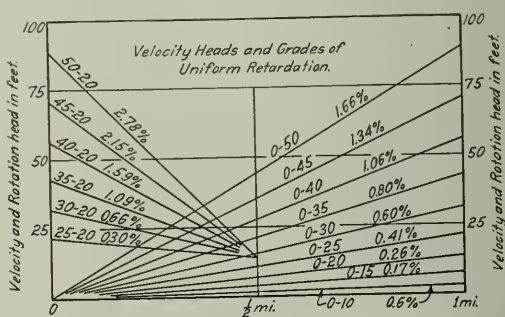


Fig. 3

done is 20 miles an hour. From Fig. 1 it is noted that the engine is exerting 5,600 lb. extra on this mile, consuming 15 h. p. hours. If the speed of 25 miles is regained 11 h. p. hours will be taken up in acceleration. The total loss will approximate 100 lb. of coal and 100 gal. of water.

Again suppose this train finds a slow order out on this piece of track, and reduces speed to 10 miles an hour. From Fig. 3 it is seen that a head of almost 18½ ft. is lost, making

a loss of over 50,000,000 ft. lb. If it picks up its former speed of 25 miles per hour the acceleration will absorb nearly 26 h. p. hours, amounting to about 100 lb. of coal and 100 gal. of water.

It can be seen that many trains on long stretches of weak track will burn much fuel to overcome track resistance. The

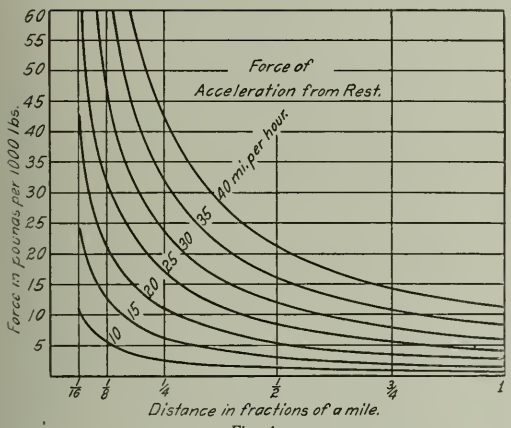


Fig. 4

exact point where the cost of this fuel will equal the money not spent for track maintenance is not known, but judging from the financial showings that have been made by some roads that have skimped on their track repairs, it would seem that good track maintenance pays at all times.

ABSTRACT OF ENGINEERING ARTICLES

The following articles of special interest to engineers and maintenance of way men, and to which readers of this section may wish to refer, have appeared in the *Railway Age Gazette* since June 19, 1914:

Jersey Central Engine Terminal at Communipaw.—The Central Railroad of New Jersey has recently completed a large and unusually complete engine terminal at Communipaw, N. J., to handle the engines entering Jersey City. These facilities were described in an illustrated article in the issue of June 26, page 1585.

The Valuation of Railways.—This subject was discussed in some detail in an article by Logan G. McPherson, lecturer on transportation at Johns Hopkins University, in the issue of June 26, page 1588.

Observations on Finishing Temperatures and Properties of Rails.—A summary of a paper to be published shortly by the Bureau of Standards, prepared by G. R. Burgess, J. J. Crowe, H. S. Rawdon and R. G. Waltenberg, of this bureau, was published in the issue of June 26, page 1592. The investigations reported in this paper are intended to show that the shrinkage clauses commonly found in American rail specifications do not serve their purpose of limiting the finishing temperatures to a value slightly above the critical range.

The Valuation of Railway Property and the Distribution of Earnings and Expenses According to Use.—The railways operating in the state of Oklahoma have recently prepared a formula by which the properties and expenses are divided between states and between "line" and "terminal," while both "line" and "terminal" property and accounts are further subdivided between freight and passenger, and between main and branch line. The apportionment of main and branch line freight and passenger accounts, both "line" and "terminal," are further subdivided between intrastate and interstate. The method by which this was worked out was described in the issue of July 3, page 17.

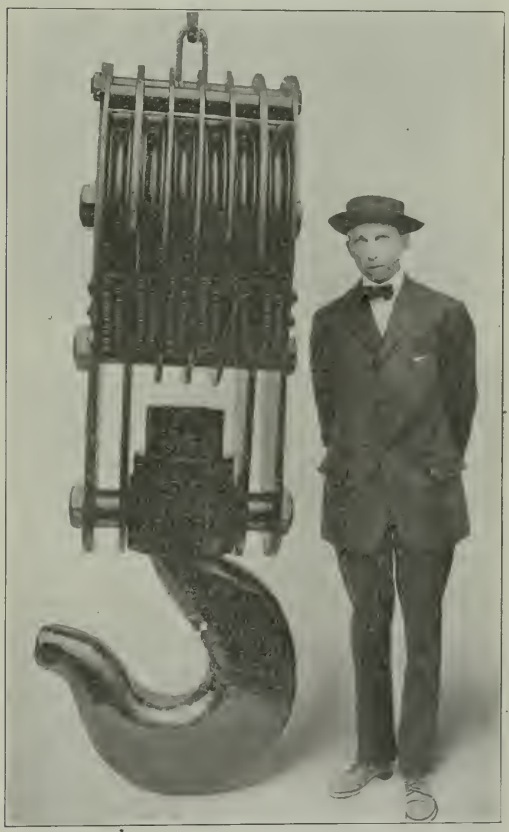
New Pennsylvania Elevator at Philadelphia.—On July 1 the Pennsylvania placed in operation a new reinforced concrete elevator with a storage capacity of 1,000,000 bushels, and a loading capacity of 60,000 bushels per hour. This elevator was described in an illustrated article in the issue of July 3, page 19.

New York Central's Improvements at Utica, N. Y.—The New York Central has been engaged for some time in the construction of a new passenger station and freight houses, and a large classification yard and engine terminal at Utica. The interesting details of the construction of these facilities were described in the issue of July 10, page 47.

A LARGE HOOK BLOCK

A hook block, which is, so far as known, the largest ever built, has recently been constructed for the Illinois Central by the W. W. Patterson Company, Pittsburgh. This block is designed for a working load of 50 tons, with a factor of safety of 3½ and weighs 2,500 lb. This block is provided with a ball-bearing hook which was forged from an 8 in. by 8 in. special billet, which was flattened until it measured 10⅝ in. by 6½ in. This hook and the beam which supports it in the block weigh 1,040 lb. alone.

The block itself is built with strap 8 in. by ⅝ in. by ½ in. plates and ¾ in. plates between the first and second sheaves on each side, which plates support the hook beam. The



A 50-Ton Hook Block Weighing 2,500 Lbs. Complete

inside plates are ½ in. thick. The tail bolt is 2 in. in diameter, the sheave pin 3 in. in diameter, with a ½ in. dog to prevent it from turning, the head bolt is 3 in. in diameter and the lugs of the beam which support the hook are 3½ in. in diameter. Instead of the usual gas pipe separators, this block is provided with four heavy cast iron separators between each pair of plates, making it unusually rigid.

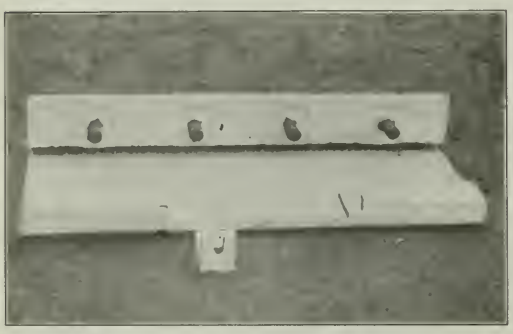
The sheaves are 20 in. in diameter and are ground smooth in the groove for a ⅞ in. wire cable and are bushed with Metaline bushings. The edges of all plates are ground and filed smooth to prevent the cutting of the cable.

This block will be used on a 50-ton Mitchell derrick car

on bridge erection. Although of special design and construction throughout, it was shipped 23 days after the order was placed.

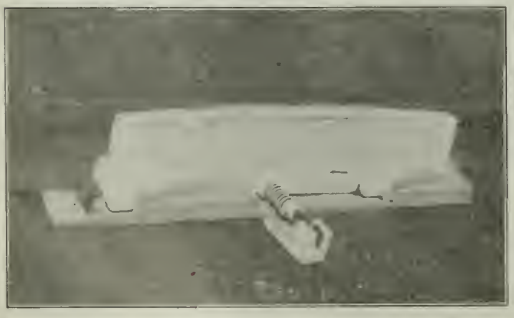
THE AUTOMATIC CONTINUOUS RAIL JOINT

The Automatic Continuous Rail Joint has been under test in a side track of the Chicago & Eastern Illinois at Coaler, Ill., two miles south of Watseka, since last fall, and this road is now making preparations to place others in its No. 4 freight main track near Momence in the very near future. This joint consists essentially of a base plate with an inside angle bar



Base Plate and Inside Angle Bar Section

and lugs to engage the bolt holes in the rail, an outside angle bar and riser, and a pawl and spring to hold the joint in place. In applying the joint the combined base plate and angle bar is inserted under the rail. The other angle bar is then placed in position and driven endwise until the wedging action brings it in contact with the rail. The pawl and the spring hold the joint in place, as shown in the photograph. It is claimed that in this manner the joint is always tight, eliminating the expense and attention required to keep the bolts tight, that the riser prevents the battering of the rail, and that the joint is prevented from opening by the lugs on the inner angle bar. As installed in the Chicago & Eastern



View of Complete Joint in Place

Illinois tracks, the joint is 26 in. long and weighs 100 lb. While in the side track these joints have been carrying the heavy Mikado engines of the Chicago & Eastern Illinois and the Elgin, Joliet & Eastern, drawing tonnage coal trains at speeds up to 10 to 15 miles per hour, and are reported to have required no maintenance in this interval. This joint has been patented and is made by Charles Troup, Watseka, Ill.

TWO METHODS OF TRAINING SECTION FOREMEN

The problem of securing a sufficient number of capable section foremen is common to nearly all roads, and is the subject of much study and thought. As a result several plans have been tried out experimentally on different roads. On the eastern roads this problem is especially urgent because of the almost complete absence of native laborers in the gangs.

To alleviate this condition one eastern road has inaugurated a plan whereby assistant foremen are selected from outside industries. The standard rate of pay for section laborers is $0.175 per hour. A rate of $0.215 has been established for assistant foremen, and one such man is allotted to each section gang. In putting the plan into effect, each section foreman was instructed to secure a promising native man in his vicinity and was authorized to pay him the higher rate at once. All men were selected under the supervision of the supervisor. This man started work with the other laborers, doing the same tasks required of them, but was given more opportunity to develop into a foreman. After he has shown sufficient progress, he is made an assistant foreman of an extra gang at $65 a month, where he has an opportunity to learn the details of switch work, ballasting, rail laying, etc. The assistant foremen of the extra gangs are called on to take the places of section foremen temporarily when they are absent from work because of sickness or other reasons and are eligible for promotion to the position of regular section foreman as vacancies occur.

While it has been the practice on this road to draw the section foremen from assistant extra gang foremen for five or six years, the part of the plan relating to assistant section foremen has been in effect for only 1½ years. It is too early to observe the full results of this plan at the present time, but one noticeable condition is that 12 sons of section foremen have already secured positions as assistant foremen, whereas, previously, it was the almost universal practice for foremen to encourage their sons to go into other lines of industry. Also, while it was supposed that the bonus of $0.04 per hour paid the inexperienced assistant foremen would be lost at first, the officers in charge of this experiment believe that the pace set by these men has stimulated the gangs sufficiently to make the higher rate worth while from the start. The main advantage, of course, is that this road now has a sufficient supply of men capable of promotion to the positions of foremen. In one instance 10 extra gangs were put on because of a large amount of work at one important terminal and all of the foremen for these gangs were secured from the ranks of these apprentice foremen.

However, believing that the day is not far distant when the railways will be unable to secure sufficient native foremen with these inducements, and that the roads must rely upon foreign foremen, this road has recently organized two night schools, one for Italians and one for Slavs, with an attendance of about 30 men each. These students are recruited from the track gangs, and they meet two nights each week in an old passenger car which is provided by the railway company. A course covering two years has been arranged, at the end of which it is expected that the men will have acquired a sufficient knowledge of English to handle the routine work required of them as section foremen. The first course consists of 15 lessons in English, which is followed by an elementary commercial course and then by 17 lessons in track work. This work is being handled in connection with the assistance of the Y. M. C. A., which is providing the teachers. The only cost to the men is $0.02 per lesson to pay for the stationery. The two classes already organized are now starting the track course. It is planned to extend this work to other points as fast as sufficient interest is aroused among the men.

Progress of the Bagdad Railway in Asia Minor.—Another section of the Bagdad Railway from Jerablus, on the Euphrates, to Tel Abiad, about 60 miles to the east, was opened on July 1.

General News Department

The strike at the Westinghouse Works at East Pittsburgh was called off July 9 and it was voted to return to work July 13. Large numbers of the men returned on the 10th and 11th.

Nicholas Roginsky and W. Landburg, officers of the Moscow-Kazan Railway, are inspecting the automatic block signals on the Lehigh Valley. Mr. Landburg is assistant to the chief traffic manager and Mr. Roginsky is assistant to the chief of the telegraph department.

The moving picture promoters have revived an American industry which had long been languishing—show collisions for the amusement of crowds. Such a collision of locomotives was produced at Wharton, N. J., last Sunday and 2,000 persons are said to have witnessed it. The engines collided on a trestle about 50 ft. above the ground. One of the engines was knocked off, and when it struck the ground there was an explosion which wrecked it. The engines were old ones, owned by the Wharton Iron & Steel Company.

A train on the Missouri, Kansas & Texas was stopped by robbers near Matson, Mo., on the night of July 9 and the express car and mail car, after having been detached and run forward some distance, were robbed of their valuables. The safe in the express car was blown open. Three masked men stopped a train of the Oregon-Washington Railroad & Navigation Company near Pendleton, Ore., July 2, subdued the trainmen and proceeded to rob the passengers; but Deputy Sheriff McDuffey, who was in one of the coaches, fired at the robbers and killed one of them. McDuffey, himself, was wounded and one of the robbers was wounded, but he and his uninjured companion got away.

Officers of the engineers' and firemen's brotherhoods representing the men employed on the roads west of and including the Illinois Central renewed their conferences concerning their demands for increased wages and changes in working conditions with a committee of general managers, headed by A. W. Trenholm (Chicago, St. Paul, Minneapolis & Omaha), at Chicago on July 14. Since negotiations were broken off early in June the men have taken a strike vote. On presenting the result of the strike vote to the committee of managers, the brotherhood committee gave the newspapers a long statement in which they said that they would reject any proposition to arbitrate. The managers' committee asked for a detailed statement of the strike vote.

Application has been made to the Federal District Court at Dallas, Tex., by J. W. Robbins, receiver and president of the Trinity & Brazos Valley, for permission to cancel certain trackage agreements with five other railroads because they are unprofitable. These are as follows: Missouri, Kansas & Texas, between Dallas and Waxahachie. For the use of this track the Trinity & Brazos Valley pays an annual rental of $24,000. Chicago, Rock Island & Gulf, Fort Worth to Dallas. Annual rental paid by the T. & B. V. is $60,000. Gulf, Colorado & Santa Fe, Fort Worth to Cleburne and Houston and Galveston. The T. & B. V. pays $48,000 annually. Galveston Terminal, Houston to Galveston. The T. & B. V. pays $72,000 annually. Dallas Terminal and Dallas Union Depot, trackage rights in the city of Dallas. Rental $6,825 annually.

Railway Mail Pay

In reference to the publication yesterday of a report from Washington that the House Committee on Post Offices had taken action designed to increase the allowance made railways for the transportation of the mails, Ralph Peters, chairman of the Committee on Railway Mail Pay, authorized the following statement:

"The bill introduced by Congressman Moon had proposed to reduce the railway mail pay at least $3,000,000 below what had already been appropriated for this fiscal year. The amendment apparently made to the Moon bill merely provides for the restoration of substantially the $3,000,000 by which it had been proposed to cut the pay.

"The railroads have contended and they still insist that they are already underpaid at least $15,000,000 a year. Congress now has at work a bi-partisan commission investigating the question of fact as to whether the railroads are or are not underpaid for this service. It is obviously impossible to properly consider a readjustment until the question of fact has been established.

"The railroad committee believes, therefore, that in justice to the railroads and in justice to the public the report of the joint Congressional commission should be awaited. The railroads are confident that that report will submit a finding on the main question of fact, which will be fair to all concerned.

"When that report is submitted and the question of fact is determined, the railroads' committee will be prepared to co-operate with the government in developing a method of re-adjusting the underpayments or overpayments in such a manner that the interests of all may be properly protected."

Preliminary Valuation Work

The following is the text of the Interstate Commerce Commission valuation circular No. 1:

At the meeting between the engineers of the commission and the committee of railway engineers on February 26, 1914, there seemed to be some uncertainty in the minds of the railway people as to exactly what should be done first in preparing upon their part for the work of valuation. This circular is issued for the purpose of explaining that matter, and has been delayed owing to conferences with the committee of railway presidents touching methods of co-operation.

All carriers having reason to believe that their maps and profiles already in existence will be received under the order effective February 1, 1914, pertaining to specifications for maps and profiles, should at once assemble such maps for inspection. It is not necessary in case of systems of considerable extent that all maps and profiles should be brought together at one point, when this would involve undue labor upon the part of the carrier, but it is indispensable that they should be put into such orderly shape that they can be seen and readily examined.

As soon as the maps and profiles are ready for inspection, the commission should be notified of the place or places where they are and should be requested to make the examination. This will be done as promptly as the work of the commission permits, and when several carriers are awaiting examination at the same time the commission will first act in case of those carriers whose property is to be first valued.

Ordinarily the commission will give at least three months' notice of its intention to begin work upon the property of a given carrier, and it will, so far as may properly be done, consult the reasonable convenience of the carrier in the prosecution of the work. Carriers desiring to obtain copies of cross section and chaining notes, with which to complete their maps and profiles, thereby avoiding a duplication of work, may do so by expressing their willingness to sign the agreement, copy of which is printed at the foot of this circular, at the time they give written notice that their maps are ready for examination.

As soon as the commission has passed upon the maps and profiles, the carrier should proceed to make the changes or additions required in present maps and profiles or to prepare new ones, as the case may be. Carriers having no maps and profiles, or whose maps and profiles are clearly of such a character as to be insufficient for this work, should at once proceed to prepare those called for by the order of the commission. In doing this the requirements of that order must be strictly followed with respect to right of way and station maps. Carriers may, if they elect, prepare a tentative profile, omitting the vertical projection of the original ground surface, but showing the subgrade and giving information as to structures called for in subdivision (b), paragraph 17, of the order of the com-

REVENUES AND EXPENSES OF RAILWAYS

Month of May, 1914.

Name of road.	Average mileage operated during period.	Operating revenues: Freight.	Passenger.	Total. inc. misc.	Operating expenses: Maintenance: Way and structures.	Of equipment.	Traffic.	Transportation.	General.	Total.	Net operating revenue (or deficit).	Outside operations, net.	Taxes.	Operating income (or loss).	Increase (or decr.) comp. with last year.
Atlantic City	167	$65,643	$141,628	$216,003	$39,616	$18,192	$1,838	$78,029	$992	$138,567	$77,436	—$3,089	$15,000	$59,347	$25,763
Central of New Jersey	676	1,761,187	470,919	2,306,450	316,004	405,001	26,591	754,126	49,923	1,551,645	754,805	—32,702	111,838	610,265	—106,181
Chesapeake & Ohio Lines	2,347	2,341,716	511,549	2,994,832	399,795	645,078	58,151	1,018,684	88,712	2,210,420	784,412	11,273	120,671	675,014	99,828
Ft. Worth & Denver City	454	198,515	99,181	318,648	53,312	45,215	7,903	145,631	15,304	267,365	51,283	—825	13,300	37,158	—58,597
Georgia	307	137,926	72,127	229,576	28,884	48,135	13,714	107,084	8,467	206,284	23,292	.....	2,566	20,726	—5,891
Mobile & Ohio	1,122	908,134	123,043	1,085,279	123,887	232,390	45,083	427,398	34,647	863,405	221,874	—2,988	36,597	182,289	108,716
Pere Marquette	2,322	854,672	267,587	1,241,350	457,275	*2,681,904	35,622	602,482	52,352	3,829,635	—2,588,285	102,820	56,577	2,747,682	2,956,216
Philadelphia & Reading	1,020	3,158,981	593,820	3,934,622	535,800	695,921	45,019	1,301,227	69,931	2,647,898	1,286,724	64,477	102,753	1,248,448	—330,815
Port Reading	21	108,836	.....	120,698	14,647	2,088	38	33,722	104	50,599	70,099	6,043	19,000	57,142	—32,423
St. Louis & San Francisco	4,742	2,020,635	845,886	3,113,180	900,044	412,765	80,540	1,211,920	100,590	2,705,859	407,321	.....	117,039	290,282	—497,619
Southern in Mississippi	281	47,365	30,457	84,990	25,846	8,580	2,792	41,798	4,138	83,154	1,836	.....	7,750	—5,914	20,938
Texas & Pacific	1,885	930,951	351,075	1,373,944	211,301	256,744	35,428	645,014	44,078	1,192,565	181,379	—2,271	62,000	117,108	86,369
Toledo, St. Louis & Western	451	292,300	28,508	347,697	37,996	34,363	16,360	132,268	9,322	230,309	117,388	.....	19,500	97,888	—34,836
Ulster & Delaware	129	68,051	24,224	96,543	9,439	8,993	3,183	38,246	4,183	64,044	32,499	—56	2,500	29,943	9,870
Wabash	2,515	1,545,625	562,332	2,304,225	435,624	454,123	79,726	987,674	69,219	2,026,366	277,859	—3,445	99,192	175,222	—242,755
Western Maryland	661	560,513	75,014	669,382	181,170	266,323	21,598	273,845	20,218	763,154	—93,772	.....	24,500	—118,272	250,191
Western Pacific	943	331,540	100,477	447,397	117,499	65,405	27,660	157,209	20,684	388,457	58,940	—2,468	34,871	21,601	—86,956

Eleven Months of Fiscal Year Ending June 30, 1914

Atlantic City	167	$694,034	$1,311,040	$2,118,447	$416,494	$153,354	$28,374	$1,054,586	$14,885	$1,667,693	$450,754	—$33,470	$129,000	$288,284	$31,078
Central of New Jersey	676	18,998,101	5,100,114	25,008,262	2,974,753	4,276,629	342,771	8,077,461	507,493	16,179,107	8,829,155	—77,661	1,224,308	7,527,186	—2,245,930
Chesapeake & Ohio Lines	2,344	26,444,637	5,569,738	33,528,862	3,694,693	7,156,311	610,376	11,143,967	852,199	23,457,546	10,071,316	26,915	1,266,465	8,831,766	478,194
Fort Worth & Denver City	454	2,838,349	1,335,290	4,407,618	545,982	670,888	78,364	1,830,925	172,970	3,299,129	1,108,489	—5,828	169,153	933,508	—487,230
Georgia	307	2,018,107	850,067	3,089,287	307,395	534,973	130,124	1,371,553	96,959	2,441,004	648,282	.....	30,048	618,234	288,990
Mobile & Ohio	1,122	9,808,870	1,401,897	11,895,402	1,387,142	2,444,756	461,275	4,568,517	368,306	9,229,996	2,665,406	—17,833	385,369	2,262,204	—408,498
Pere Marquette	2,322	10,250,967	3,594,416	15,189,072	2,586,385	*6,070,363	378,122	6,723,493	470,476	16,228,839	—1,039,767	—125,690	580,257	—1,745,714	—4,736,464
Philadelphia & Reading	1,020	34,976,356	6,427,760	43,423,190	4,639,573	8,038,919	478,421	15,004,577	723,098	28,884,588	14,538,602	321,390	1,129,508	13,730,484	—4,210,904
Port Reading	21	1,205,861	.....	1,248,223	149,464	4,327	428	417,115	3,824	575,158	673,065	41,236	155,000	559,301	—392,124
St. Louis & San Francisco	4,742	26,585,749	9,881,405	39,208,316	6,672,460	6,510,988	802,326	13,571,157	1,113,343	28,670,274	10,538,042	.....	1,298,309	9,239,733	—2,872,515
Southern in Mississippi	281	705,397	405,857	1,205,929	272,219	117,464	27,632	506,029	44,719	968,063	237,866	.....	93,114	144,752	152,601
Texas & Pacific	1,885	11,898,678	4,308,431	17,381,259	2,092,380	2,714,411	412,477	7,474,665	477,443	13,171,376	4,209,883	—40,120	668,541	3,501,222	846,293
Toledo, St. Louis & Western	451	3,588,397	334,990	4,191,901	433,644	554,800	180,850	1,631,290	101,782	2,902,366	1,289,535	.....	185,000	1,104,235	—66,701
Ulster & Delaware	129	596,818	315,617	963,164	129,297	136,279	17,384	429,900	43,789	756,649	206,515	444	37,500	169,459	—68,921
Wabash	2,515	18,659,855	6,593,090	27,684,839	3,558,819	5,193,574	933,088	11,812,909	764,133	22,262,523	5,422,316	—53,160	945,118	4,424,038	—1,326,539
Western Maryland	661	6,283,788	934,054	7,556,588	1,399,031	1,688,793	256,519	3,531,802	233,787	7,109,932	446,656	.....	236,100	210,556	—1,207,855
Western Pacific	939	4,303,502	1,128,800	5,588,133	1,219,162	740,622	307,717	2,070,374	278,843	4,616,718	971,415	—25,048	365,839	580,528	—689,290

*Depreciation for back years included.

mission, except that the location of these structures need not be stated with absolute accuracy. Blue prints of this tentative profile shall be furnished the commission and the information obtained by the surveys of the commission may be subsequently utilized by the carrier in completing the profiles as called for by said order.

All carriers should at once prepare a list of their lands, showing grantor, grantee, instrument, etc., as called for in the order. If the carrier prefers, it may in the first instance prepare typewritten schedules which may be so arranged upon separate sheets as to be mechanically transferred to the maps finally. In the end the schedule of lands must appear upon the map as set forth in the order pertaining to maps and profiles.

Roads which have a gross income not exceeding $100,000 annually are excused for the time being from preparing this information. It is possible that the present order may be modified in some respects as to such railroads, and if so, due notice will be given. If no such change has been noted by October 1, 1914, such railroads should prepare to comply with the order of the commission as it now stands.

It should be noted that this circular does not of itself modify the order of January 12, 1914, but simply indicates those modifications which may be made by the commission in due time upon application.

Topics for Next International Railway Congress*

Section I.—Way and Works

I.—Construction of the Roadbed and of the Track.—Arrangements to be adopted in constructing the roadbed and the track, in view of the increase in the weight of locomotives and the speed of trains. *America.*—H. U. Mudge, president, Chicago, Rock Island & Pacific.

II.—Maintenance and Supervision of Track.—Measures to be taken to provide an economic organization for the maintenance and the supervision of the track, taking into consideration the increase of traffic and speed as well as the rise in wages and in the cost of materials. Use of mechanical appliances. Results obtained. *America.*—Epes Randolph, president, Southern Pacific of Mexico.

III.—Special Steels.—Use of special steels, both for the track generally and in particular for the track appliances (points, crossings, etc.). *America.*—W. C. Cushing, chief engineer M. W., Pennsylvania Lines.

IV.—Reinforced Concrete.—Use of ordinary concrete and of reinforced concrete on railways. *America.*—C. H. Cartlidge, bridge engineer, Chicago, Burlington & Quincy.

Section II.—Locomotives and Rolling Stock

V.—(I. of Section 2)—Economic Production of Steam on Locomotives.—Economic production of steam; different systems; results obtained: *(A)* Superheating the steam; *(B)* heating the feed-water; *(C)* special devices; water-tube boilers, etc. *Countries Using the English Language.*—G. J. Churchward, chief mechanical engineer, Great Western Railway of England.

VI. (II. of Section 2)—Trucks, Axles and Springs of Locomotives.—Best arrangement of the bogies, axles and springs of locomotives, especially of locomotives for high speeds, with long wheel bases, so as to facilitate running around curves and to ensure the proper stability of the engines. No American reporter.

VII. (III. of Section 2)—Passenger Carriages.—Improvements to be made in the design of carriages and rules to be observed in the makeup of trains, so as to increase the safety and comfort of passengers. *America.*—B. F. Bush, president, Missouri Pacific.

VIII. (IV. of Section 2)—Electric Traction.—Electric traction on lines with much traffic; production and transmission of energy; type of current; locomotives, motor cars. Technical and financial results obtained. Comparison with the results of steam traction. *America.*—George Gibbs, chief engineer of electric traction, Long Island Railroad.

Section III.—Working

IX. (I. of Section 3)—Terminal Stations for Passengers.—Arrangements for reducing the number of movements of locomotives and empty rolling stock at passenger terminal stations. *America.*—(Vacancy).

X. (II. of Section 3)—Goods (Freight) Stations.—Organization of the receiving and the delivering stations so as to accelerate their business. Arrangement of the buildings and tracks so as to simplify shunting (switching) operations and handling, particularly as regards goods in bulk. Mechanical appliances. *America.*—Howard G. Kelley, vice-president, Grand Trunk.

XI. (III. of Section 3)—Slow Freight Traffic.—Organization of slow freight traffic, in order to increase the effective operation of the rolling stock and the lines. Advisability of using, according to circumstances, heavy or light trains, fast or slow trains. Through trains. Pick-up trains (distributing trains). Shuttle services. *Countries Using the English Language.*—H. A. Walker, general manager, London & South Western.

XII. (IV. of Section 3)—Locomotive Cab Signals.—Repeating and recording the track signals on the locomotive. Different systems already used or tried. Results obtained. Recording the running speed of locomotives. No American reporter.

Section IV.—General

XIII. (I. of Section 4)—Net Cost Rates.—Determination of the net cost of carriage (passengers and goods), taking capital charges into consideration. Its relation to rates charged. *America.*—Fairfax Harrison, president, Southern Railway.

XIV. (II. of Section 4)—Customs Examination.—Organization to be adopted for the customs examination of luggage so as to reduce to a minimum the inconvenience to passengers, while safeguarding the interests of the custom house and of the railway. Establishment of international custom house stations. No American reporter.

XV. (III. of Section 4)—Interchange of Rolling Stock.—Interchange of goods rolling stock (freight cars), and penalty charges in case of delay in the return of that stock: *(A)* Rules to be adopted in the relations between the railways themselves; *(B)* rules to be adopted in the relations between the railways and the consignors and consignees. *America.*—Arthur Hale, general agent, American Railway Association.

XVI. (IV. of Section 4)—Workmen's Dwellings.—How is the problem of dwellings for their workmen and lower-grade employees solved by the railways? How do the administrations assist the individual efforts made by the staff, in particular as regards the building of dwellings for the use of laborers and employees? *America.*—A. F. Banks, president, Elgin, Joliet & Eastern.

Section V.—Light Railways

XVII. (I. of Section 5)—Carriages and Wagons for Light Railways.—Types of carriages and of wagons for narrow-gage railways. Special wagons for facilitating unloading, transshipment and change of gage. No American reporter.

XVIII. (II. of Section 5)—Simplifications in the Operation of Light Railways.—General simplifications to be considered in the operation of light railways. Special methods for collecting fares; issue of tickets at booking offices, before starting; issue on the trains; different types of tickets; auditing systems. No American reporter.

XIX. (III. of Section 5)—Special Methods of Traction on Light Railways.—Special methods of traction applied on light railways. Results obtained. *America.*—H. B. Spencer, vice-president, Southern Railway.

XX. (IV. of Section 5)—Safety Appliances on Light Railways.—Cheap appliances for ensuring safety on light railways. No American reporter.

*The International Railway Congress Association will meet next at Berlin, Germany, in 1915. The questions to be discussed are given in the list here printed, together with the names of American authors of papers.

International Railway General Foremen's Association

The following is a list of the exhibitors at the convention of the International Railway General Foremen's Association held at the Hotel Sherman, Chicago, on July 14 to 17:

Allen & Co., Edgar, Ltd., Chicago—High speed steel.

American Car & Foundry Company, Chicago. Represented by O. F. Schubert and Mr. Spears.

American Steel Foundries Company, Chicago.—American adjustable pilot coupler pocket with Alliance coupler, Vulcan cast steel truck, Vulcan and Hercules brake beams, Economy draft arms. Represented by H. J. Melchert and W. G. Wallace.

Ashton Valve Company, Boston, Mass.—Locomotive safety valves; steam, air and test gages; wheel pressed recording gage, gage testers and appliances. Represented by Jos. F. Gettrust.

Barco Brass & Joint Company, Chicago.—Flexible joints, roundhouse blower sets and washout connections. Represented by F. N. Bard and C. L. Mellor.

Carborundum Company, Niagara Falls, N. Y.—Carborundum and aloxite wheels and aloxite and carborundum cloths and valve grinding compounds. Represented by C. C. Schumaker, H. P. Frost and E. P. Ritzina.

Celfor Tool Company, Buchanan, Mich.—Drills, reamers, flue cutters, boring tools, etc. Represented by C. O. Montague.

Chicago Pneumatic Tool Company, Chicago.—Air and electric drills, pneumatic hammers, speed recorders. Represented by C. E. Walker, P. F. Flaven, J. C. Campbell, J. L. Camby, C. B. Coates and Chas. H. Schumasken.

Colonial Steel Company, Pittsburgh, Pa.—High speed saws, drill rods, 11/16 in. punch shown through 1 ⅛ in. steel, examples of steel fractures, photographs. Represented by T. W. McManus and M. P. Spencer.

Crerar, Adams & Co., Chicago.—Jacks, die starters, pipe benders, wrenches. Represented by Russel Wallace and W. I. Clock.

Crucible Steel Company of America, Pittsburgh, Pa. Represented by Mr. Baskerfield.

Detroit Lubricator Company, Detroit, Mich.—Lubricators. Represented by A. D. Homard and A. G. Machaney.

Duff Manufacturing Company, Pittsburgh, Pa. Represented by Geo. A. Edgin and Chas. N. Thulin.

Edna Brass Manufacturing Compaoy, Cincinnati, Ohio.—Lubricators, injectors. Represented by H. A. Glenn and E. O. Corey.

Ewald Iron Company, St. Louis, Mo.

Flannery Bolt Company, Pittsburgh, Pa.—Tate flexible stayholt. Represented by R. R. Davis.

Galena Signal Oil Company, Franklin, Pa. Represented by W. J. Walsh and Bloss P. Corey.

Garlock Packing Company, Palmyra, N. Y.—Throttle, car cock and air pump packing. Represented by J. P. Landreth.

Goldschmidt Thermit Company, New York.—Thermit welding compounds and sample welds. Represented by H. S. Mann and A. Beaulien.

Greene, Tweed & Co., New York.—"Palmetto" packiogs, "Manhattan" packings. Represented by A. T. Richardson.

Grip Nut Company, Chicago.—Testing machines, deflecting machines, samples grip nuts. Represented by B. C. Hooper.

Hunt-Spiller Manufacturing Corporation, Boston, Mass.—Gray irons for cylinder bushings, packing valve gages, boxes, etc. Represented by J. M. Morse and E. J. Fuller.

Independent Pneumatic Tool Company, Chicago.—New electric tools, new air turbines, small S. S. compound drills. Represented by Robert T Scott, George Wilson, Harold Hendricks and Wm. Gummere.

Jenkins Bros., New York.—Globe, angle Y and check valves, standard medium pressure and extra heavy gates. Represented by B. J. Neely.

Jones & Co., B. M., Boston, Mass. Represented by J. M. Moore.

Keystone Lubricator Company, Philadelphia, Pa.—Model driving box. Represented by J. W. Mowery.

Locomotive Superheater Company, New York.—Boiler tools and unit distributing Presser gages. Represented by G. E. Ryder and Geo. Fogg.

Lutz-Webster Engineering Company, Philadelphia, Pa.—Lutz no-set screw lathe dog, Lutz no-handle ratchet, Lutz one-piece drill ratchet, Lutz adjustable self-feed drilling post—solid and swivel arm, Lutz compression wrench for all finished or rough surfaces—stud driving. Represented by William H. Lutz.

McCord & Co., Chicago.—Model McCord force feed lubricator, pressed steel journal box. Represented by O. H. Neal.

Manning, Maxwell & Moore, Inc.; Ashcroft Manufacturing Company; Consolidated Safety Valve Company; The Hancock Inspirator Company, New York.—Hancock inspirators, boiler checks, Consolidated safety valves, Ashcroft pressure gages, prismatic water glasses and other locomotive appliances. Represented by C. L. Brown.

Miner, W. H., Chicago. Represented by John R. Mitchell.

M. C. B. Company, Chicago. Represented by W. E. Marvel.

Nathan Manufacturing Company, New York. Lubricators, water glasses and valves. Represented by George Royal.

National Machinery Company, Tiffin, Ohio.—Single motor driven bolt cutter and die sharpener. Represented by Chas. Harmon, Jr., and K. L. Ernst.

National Boiler Washing Company, Chicago.

Ohio Injector Company, Detroit, Mich.—Injectors, lubricators, flange oilers and boiler fittings. Represented by Wm. S. Furry and A. C. Beckwith.

Okadee Company, Chicago.—Blow-off valves, water gage, tender hose coupler drain valve. Represented by A. G. Hollingshead, M. E. Keig and G. S. Turner.

O'Malley-Beare Valve Company, Chicago.—Multiplate, Globe, angle, check and blowout valves. Represented by E. O'Malley and Thos. O'Malley.

Pilliod Company, The, New York.—Model Baker valve gear, photographs of installations. Represented by F. S. Wilcoxen, F. E. Pilliod and R. G. Graham.

Pyle-National Electric Headlight Company, Chicago.—Electric headlight. Represented by Crawford P. McGinnis.

Racine Tool and Machine Company, Racine, Wis.—High speed metal cutting machines. Represented by J. M. Jones and Wm. Reinhardt.

Rich Tool Company, Chicago.—High speed tool. Represented by O. F. Schubert.

Ryerson, Joseph T., & Son, Chicago.—Model of a punch and boiler tools. Represented by L. H. Bryan, C. R. Gregg, H. C. Williamson and H. G. Merriell.

Strong-Carlisle & Hammond Company, Cleveland, Ohio.—Randall graphite sheet lubricator, Mac-it set screws. Represented by B. E. Carpenter.

United States Metallic Packing Company, Philadelphia, Pa.—Packings, Leach improved hi trap, Gollmar bell ringers, catalogs. Represented by W. M. Wey.

Westinghouse Air Brake Company. Pittsburgh, Pa. Represented by L. M. Carlton, L. Wilcox and A. K. Hohinyer.

Wilhelm Safety Automatic Coupler Company, The, Chicago.—Model air hose coupler. Represented by S. Wilhelm and B. Loewenthal.

Williamson, H. C., Chicago.—Metal band saw. Represented by H. C. Williamson.

MEETINGS AND CONVENTIONS

The following list gives names of secretories, dates of next or regular meetings, and places of meeting.

Air Brake Association.—F. M. Nellis, 53 State St., Boston, Mass. Next convention, May 5-8, 1915, Hotel Sherman, Chicago.

American Association of Demurrage Officers.—A. G. Thomason, Boston, Mass.

American Association of Dining Car Superintendents.—H. C. Boardman, D. L. & W., Hoboken, N. J. Next convention, October, Washington.

American Association of General Passenger and Ticket Agents.—W. C. Hope, 143 Liberty St., New York.

American Association of Freight Agents.—R. O. Wells, I. C. R. R., East St. Louis, Ill.

American Association of Railroad Superintendents.—E. H. Harman, Room 101, Union Station, St. Louis, Mo. Next convention, August 20 and 21, New York.

American Electric Railway Association.—E. B. Burritt, 29 W. 39th St., New York. Annual convention, October 12-16, Atlantic City, N. J.

American Electric Railway Manufacturers' Association.—H. G. McConnaughy, 165 Broadway, New York. Meetings with American Electric Railway Association.

American Railway Association.—W. F. Allen, 75 Church St., New York.

American Railway Bridge and Building Association.—C. A. Lichty, C. & N. W., Chicago. Next convention, October 20-22, 1914, Los Angeles, Cal.

American Railway Engineering Association.—E. H. Fritch, 900 S. Michigan Ave., Chicago. Next convention, March 16-18, 1915.

American Railway Master Mechanics' Association.—J. W. Taylor, Karpen Bldg., Chicago.

American Railway Tool Foremen's Association.—A. R. Davis, Central of Georgia, Macon, Ga. Next convention, July 20-22, Hotel Sherman, Chicago.

American Society for Testing Materials.—Prof. E. Marburg, University of Pennsylvania, Philadelphia, Pa.

American Society of Civil Engineers.—Chas. W. Hunt, 220 West 57th St., New York: 1st and 3d Wednesday, except June, July and August, New York.

American Society of Engineering Contractors.—J. R. Wemlinger, 11 Broadway, New York; 2d Thursday of each month, at 2 P. M., 11 Broadway, New York.

American Society of Mechanical Engineers.—Calvin W. Rice, 29 W. 39th St., New York.

American Wood Preservers' Association.—F. J. Angier, B. & O., Baltimore, Md. Next convention, January 19-21, 1915, Chicago.

Association of American Railway Accounting Officers.—E. R. Woodson, 1300 Pennsylvania Ave., Washington, D. C. Annual convention, April 28, 1915, Atlanta, Ga.

Association of Railway Claim Agents.—C. W. Egan, B. & O., Baltimore, Md.

Association of Railway Electrical Engineers.—Jos. A. Andreucetti, C. & N. W. Ry., Chicago. Annual convention, October 19-23, Chicago.

Association of Railway Telegraph Superintendents.—P. W. Drew, 112 West Adams St., Chicago.

Association of Transportation and Car Accounting Officers.—G. P. Conard, 75 Church St., New York.

Association of Water Line Accounting Officers.—W. R. Evans, Chamber of Commerce, Buffalo, N. Y.

Bridge and Building Supply Men's Association.—L. D. Mitchell, Detroit Graphite Co., Chicago, Ill. Meeting with American Railway Bridge and Building Association.

Canadian Railway Club.—James Powell, Grand Trunk Ry., Montreal, Que.; 2d Tuesday in month, except June, July and August, Windsor Hotel, Montreal.

Canadian Society of Civil Engineers.—Clement H. McLeod, 176 Mansfield St., Montreal, Que.; 1st Thursday, October, November, December, February, March and April, Montreal.

Car Foremen's Association of Chicago.—Aaron Kline, 841 Lawler Ave., Chicago; 2d Monday in month, except July and August, Lytton Bldg., Chicago.

Central Railway Club.—H. D. Vought, 95 Liberty St., New York; 2d Friday in January, May, September and November and 2d Thursday in March, Hotel Statler, Buffalo, N. Y.

Civil Engineers' Society of St. Paul.—Edw. J. Dugan, P. O. Box 654, St. Paul, Minn.; 2d Monday, except June, July, August and September, Old State Capitol Bldg., St. Paul.

Engineers' Society of Pennsylvania.—Edw. R. Dasher, Box 75, Harrisburg, Pa.; 1st Friday after 10th of each month, except July and August, 31 So. Front St., Harrisburg, Pa.

Engineers' Society of Western Pennsylvania.—Elmer K. Hiles, Oliver Bldg., Pittsburgh; 1st and 3d Tuesday, Pittsburgh, Pa.

Freight Claim Association.—Warren P. Taylor, Richmond, Va.

General Superintendents' Association of Chicago.—A. M. Hunter, 605 Grand Central Station, Chicago; Wednesday preceding 3d Thursday, Transportation Bldg., Chicago.

International Railway Congress.—Executive Committee, 11, rue de Louvain, Brussels, Belgium. Convention, 1915, Berlin.

International Railway Fuel Association.—C. G. Hall, 922 McCormick Bldg., Chicago.

International Railway General Foremen's Association.—Wm. Hall, 829 West Broadway, Winona, Minn.

International Railroad Master Blacksmiths' Association.—A. L. Woodworth, Lima, Ohio. Next convention, August 18-20, Hotel Wisconsin, Milwaukee, Wis.

MAINTENANCE OF WAY & MASTER PAINTERS' ASSOCIATION OF THE UNITED STATES AND CANADA.—T. I. Goodwin, C. R. I. & P., Eldon, Mo. Next convention, November 17-19, 1914, Detroit, Mich.

MASTER BOILER MAKERS' ASSOCIATION.—Harry D. Vought, 95 Liberty St., New York.

MASTER CAR BUILDERS' ASSOCIATION.—J. W. Taylor, Karpen Bldg., Chicago.

MASTER CAR & LOCOMOTIVE PAINTERS' ASSOCIATION OF THE UNITED STATES AND CANADA.—A. P. Dane, B. & M., Reading, Mass. Next convention, September 8-11, Nashville, Tenn.

NATIONAL RAILWAY APPLIANCES ASSOCIATION.—Bruce V. Crandall, 537 So. Dearborn St., Chicago. Next convention, March 15 to 19, 1915, Chicago.

NEW ENGLAND RAILROAD CLUB.—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass.; 2d Tuesday in month, except June, July, August and September, Boston.

NEW YORK RAILROAD CLUB.—H. D. Vought, 95 Liberty St., New York; 3d Friday in month, except June, July and August, New York.

NIAGARA FRONTIER CAR MEN'S ASSOCIATION.—E. Frakenberger, 623 Brisbane Bldg., Buffalo, N. Y. Meetings monthly.

PEORIA ASSOCIATION OF RAILROAD OFFICERS.—M. W. Rotchford, Union Station, Peoria, Ill.; 2d Thursday in month, Jefferson Hotel, Peoria.

RAILROAD CLUB OF KANSAS CITY.—C. Manlove, 1008 Walnut St., Kansas City, Mo.; 3d Friday in month, Kansas City.

RAILROAD MASTER TINNERS, COPPERSMITHS & PIPEFITTERS' ASSOCIATION.—U. G. Thompson, C. & E. I. Danville, Ill.

RAILWAY BUSINESS ASSOCIATION.—Frank W. Noxon, 30 Church St., New York.

RAILWAY CLUB OF PITTSBURGH.—J. B. Anderson, Penna. R. R., Pittsburgh, Pa.; 4th Friday in month, except June, July and August, Pittsburgh.

RAILWAY DEVELOPMENT ASSOCIATION.—W. Nicholson, Kansas City Southern, Kansas City, Mo.

RAILWAY ELECTRICAL SUPPLY MANUFACTURERS' ASSOCIATION.—J. Scribner, 1021 Monadnock Block, Chicago. Meetings with Association of Railway Electrical Engineers.

RAILWAY FIRE PROTECTION ASSOCIATION.—C. B. Edwards, Mobile & Ohio, Mobile, Ala. Annual meeting, October 6, Washington, D. C.

RAILWAY GARDENING ASSOCIATION.—J. S. Butterfield, Lee's Summit, Mo.

RAILWAY SIGNAL ASSOCIATION.—C. C. Rosenberg, Bethlehem, Pa. Annual meeting, Bluff Point, N. Y., September 22-24.

RAILWAY STOREKEEPERS' ASSOCIATION.—J. P. Murphy, Box C, Collinwood, Ohio.

RAILWAY SUPPLY MANUFACTURERS' ASSOCIATION.—J. D. Conway, 2136 Oliver Bldg., Pittsburgh, Pa. Meetings with M. C. B. and M. M. Associations.

RAILWAY TELEGRAPH & TELEPHONE APPLIANCE ASSOCIATION.—G. A. Nelson, 50 Church St., New York. Meetings with Association of Railway Telegraph Superintendents.

RICHMOND RAILROAD CLUB.—F. O. Robinson, C. & O., Richmond, Va.; 2d Monday in month, except June, July and August.

ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.—L. C. Ryan, C. & N. W., Sterling, Ill. Next convention, September 8-10, 1914, Chicago.

ST. LOUIS RAILWAY CLUB.—B. W. Frauenthal, Union Station, St. Louis, Mo.; 2d Friday in month, except June, July and August, St. Louis.

SALT LAKE CITY TRANSPORTATION CLUB.—R. E. Rowland, Hotel Utah Bldg., Salt Lake City, Utah; 1st Saturday of each month, Salt Lake City.

SIGNAL APPLIANCE ASSOCIATION.—F. W. Edmunds, 3868 Park Ave., New York. Meeting with annual convention Railway Signal Association.

SOCIETY OF RAILWAY FINANCIAL OFFICERS.—Carl Nyquist, La Salle St. Station, Chicago. Annual meeting, September 15-17, Hotel Aspinwall, Lenox, Mass.

SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—E. W. Sandwich, A. & W. P. Ry., Atlanta, Ga. Next meeting, July 16, Chattanooga, Tenn.

SOUTHERN & SOUTHWESTERN RAILWAY CLUB.—A. J. Merrill, Grant Bldg., Atlanta, Ga.; 3d Thursday, January, March, May, July, September, November, 10 A. M., Candler Bldg., Atlanta.

TOLEDO TRANSPORTATION CLUB.—J. S. Marks, Agent, Interstate Despatch, Toledo, Ohio; 1st Saturday in month, Boody House, Toledo.

TRACK SUPPLY ASSOCIATION.—W. C. Kidd, Ramapo Iron Works, Hillsburn, N. Y. Meetings with Roadmasters' and Maintenance of Way Association.

TRAFFIC CLUB OF CHICAGO.—W. H. Wharton, La Salle Hotel, Chicago.

TRAFFIC CLUB OF NEW YORK.—C. A. Swope, 291 Broadway, New York; last Tuesday in month, except June, July and August, Waldorf-Astoria, New York.

TRAFFIC CLUB OF PITTSBURGH.—D. L. Wells, Erie R. R., Pittsburgh, Pa.; meetings bimonthly, Pittsburgh. Annual meeting, 2d Monday in June.

TRAFFIC CLUB OF ST. LOUIS.—A. F. Versen, Mercantile Library Bldg., St. Louis, Mo. Annual meeting in November. Noonday meetings October to May.

TRAIN DESPATCHERS' ASSOCIATION OF AMERICA.—J. F. Mackie, 7122 Stewart Ave., Chicago.

TRANSPORTATION CLUB OF BUFFALO.—J. M. Sells, Buffalo; first Saturday after first Wednesday.

TRANSPORTATION CLUB OF DETROIT.—W. R. Hurley, Superintendent's office, L. S. & M. S., Detroit, Mich.; meetings monthly, Normandie Hotel, Detroit.

TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, N. Y. C. & H. R., East Buffalo, N. Y. Next meeting, September 15-18, Hotel Sherman, Chicago.

UTAH SOCIETY OF ENGINEERS.—Frank W. Moore, Newhouse Bldg., Salt Lake City, Utah; 3d Friday of each month, except July and August, Consolidated Music Hall, Salt Lake City.

WESTERN CANADA RAILWAY CLUB.—W. H. Rosevear, P. O. Box 1707, Winnipeg, Man.; 2d Monday, except June, July and August, Winnipeg.

WESTERN RAILWAY CLUB.—J. W. Taylor, 1112 Karpen Bldg., Chicago; 3d Tuesday of each month, except June, July and August, Karpen Bldg., Chicago.

WESTERN SOCIETY OF ENGINEERS.—J. H. Warder, 1735 Monadnock Block, Chicago; regular meeting 1st Monday in month, except January, July and August, Chicago. Extra meetings, except in July and August, generally on other Monday evenings.

Traffic News

The Salt Lake City Commercial Club Traffic Bureau has announced that it will change its name to the Traffic Bureau of Utah. This is to avoid misunderstanding because the bureau is not identified with the Commercial Club and members of the latter have objected to the action of the bureau in attacking the Union Pacific extra dividend.

F. R. Hanlon, district freight agent of the Oregon-Washington at Seattle, Wash., has been appointed director of traffic of the Port Commission of Seattle, a public body created by popular vote three years ago to take supervision over the waterfront rights, conduct inland water transportation lines and operate locomotive switching terminal service to and from the city's public wharves. The Port Commission property at present consists of two deep-sea docks and a steam ferry line operating within the corporate limits of Seattle between the mainland and the West Seattle peninsula, three miles. Terminal switching rates are now under discussion by the commission.

The Missouri Public Service Commission has issued an order prescribing rates for the transportation of merchandise by express, based on the plan put into effect by the Interstate Commerce Commission last February, and adopted since then by a number of state commissions. The companies are authorized to make the new rates effective on three days' notice, but not later than August 1. It is said that the new rates average 21 per cent. less than those hitherto in effect. The Missouri commission has been investigating express rates since January 1, but action in ordering the reduction was delayed by an injunction that still existed against the old railroad and warehouse commission. The injunction has been dissolved in the federal court.

Disagreement of the jury is the result of the trial of the suit of the government against the Pennsylvania Railroad, the Keystone Elevator and others, at Philadelphia, for alleged illegal rebates on shipments of grain to the Keystone Elevator. The suit has been on trial in the federal court at Philadelphia for four weeks. The jury was out 23 hours. A new trial will probably take place in September. The government charged that the railroad company favored the elevator by leasing buildings to it at an unreasonably low rate and by paying bills for alleged losses which were based on dishonest weights. A former employee of the elevator had been ordered to destroy certain records of weights, of which he saved some, and these fell into the hands of government inspectors.

A Brave Board of Trade

After three or four meetings between a special committee of the Brunswick board of trade and officers of the Atlanta, Birmingham & Atlantic, the commercial body has finally agreed to allow the road to discontinue two passenger trains between Brunswick and Thalman. Officers of the road showed with figures that these trains were being operated at a loss to the company. Although there was a general kick against permitting the road to discontinue them, the board finally arrived at such a decision.—*Macon Telegraph.*

American Shipbuilding in 1914

During the fiscal year ended June 30, 1914, there were built in the United States and officially numbered 1,291 vessels, of 311,578 gross tons, compared with 1,648 vessels, of 382,304 gross tons, for 1913, according to a report by the Bureau of Navigation. The principal vessels are four American-Hawaiian Company steamships, each of 6,600 gross tons, and three Grace Company steamships, each of 6,300 gross tons, all for the Panama canal trade and averaging 4,000 net tons. The steamship *Matsonia,* for Hawaiian trade, 9,728 gross tons, is the largest vessel built in the United States since 1905, and the *John D. Archbold,* 8,374 gross tons, is the largest oil tanker yet built in the United States. On the Great Lakes 10 steamers of over 1,000 tons each were built, the *Alton C. Dustin,* 7,978 gross tons, being the largest. Only three large schooners were built. In all, 38 vessels of over 1,000 tons each were built, aggregating 169,000 tons.

Car Surpluses and Shortages

Arthur Hale, chairman of the committee on relations between railroads of the American Railway Association, in presenting statistical bulletin No. 171, giving a summary of car surpluses and shortages by groups from March 1, 1913, to July 1, 1914, says: The total surplus on July 1, 1914, was 220,875 cars; on June 15, 1914, 232,994 cars, and on June 30, 1913, 70,740 cars. is a small increase of surplus box cars. In the spring wheat section (groups 6 and 7) there is practically no change in the figures. There is also a reduction in surplus box cars on the Pacific coast and in Canada.

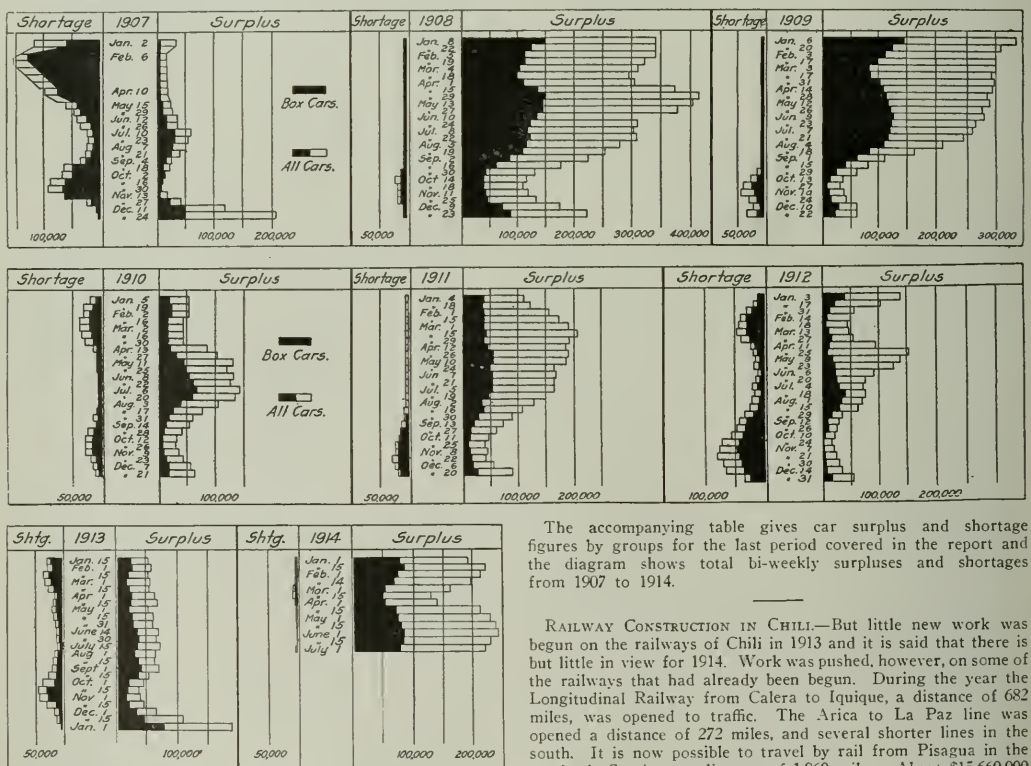
The total shortage on July 1, 1914, was 1,333 cars; on June 15, 1914, 660 cars, and on June 30, 1913, 7,036 cars.

No real shortage has yet developed.

Car Surpluses and Shortages

Date	No. of roads.	Surpluses Box.	Flat.	Coal, gondola and hopper.	Other kinds.	Total.	Shortages Box.	Flat.	Coal, gondola and hopper.	Other kinds.	Total.
Group *1.—July 1, 1914	8	1,113	367	723	318	2,521	40	60	26	27	153
" 2.— " 1, 1914	32	3,382	189	18,769	8,412	30,752	32	0	0	1	33
" 3.— " 1, 1914	29	5,693	991	42,012	4,055	52,751	37	0	200	1	238
" 4.— " 1, 1914	12	6,752	1,096	7,447	1,341	16,636	0	17	0	0	17
" 5.— " 1, 1914	22	1,907	551	9,367	1,920	13,745	216	2	0	75	293
" 6.— " 1, 1914	28	15,868	647	7,055	6,108	29,678	154	22	9	10	195
" 7.— " 1, 1914	4	2,906	48	954	1,684	5,592	0	0	0	0	0
" 8.— " 1, 1914	15	12,797	563	2,147	4,277	19,784	152	38	154	16	360
" 9.— " 1, 1914	14	812	158	107	1,075	2,152	2	0	20	0	22
" 10.— " 1, 1914	21	14,843	1,354	2,699	9,694	28,590	1	0	21	0	22
" 11.— " 1, 1914	4	15,526	526	0	2,622	18,674	0	0	0	0	0
Total	189	81,599	6,490	91,280	41,506	220,875	634	139	430	130	1,333

*Group 1 is composed of New England lines; Group 2—New York, New Jersey, Delaware, Maryland and Eastern Pennsylvania lines; Group 3—Ohio, Indiana, Michigan and Western Pennsylvania lines; Group 4—West Virginia, Virginia, North and South Carolina lines; Group 5—Kentucky, Tennessee, Mississippi, Alabama, Georgia and Florida lines; Group 6—Iowa, Illinois, Wisconsin and Minnesota lines; Group 7—Montana, Wyoming, Nebraska, North Dakota and South Dakota lines; Group 8—Kansas, Colorado, Missouri, Arkansas and Oklahoma lines; Group 9—Texas, Louisiana and New Mexico lines; Group 10—Washington, Oregon, Idaho, California, Nevada and Arizona lines; Group 11—Canadian lines.



Car Surpluses and Shortages, 1907 to 1914

The surplus of 220,875 cars is the largest for the same period in any year since 1909.

There is generally a small reduction of coal car surplus in all groups except in central freight association territory where there is a small increase.

There is a reduction in box car surplus in New England, official classification territory, and in the western half of the southeast. In the winter wheat section (groups 8 and 9) there

The accompanying table gives car surplus and shortage figures by groups for the last period covered in the report and the diagram shows total bi-weekly surpluses and shortages from 1907 to 1914.

Railway Construction in Chili.—But little new work was begun on the railways of Chili in 1913 and it is said that there is but little in view for 1914. Work was pushed, however, on some of the railways that had already been begun. During the year the Longitudinal Railway from Calera to Iquique, a distance of 682 miles, was opened to traffic. The Arica to La Paz line was opened a distance of 272 miles, and several shorter lines in the south. It is now possible to travel by rail from Pisagua in the north via Santiago, a distance of 1,960 miles. About $15,660,000 was expended on railway construction in Chili during the year, more than one-half being private capital guaranteed by the government. English capital controls 867 miles of Chilian railroads at a total investment of $120,096,468. A government commission has been appointed to thoroughly reorganize the operation of the state railways with the view of putting them on a paying basis. In connection with this it is proposed to place a loan for $24,332,500 to purchase rolling stock, to reorganize the repair shops and to complete double-tracking the line from Valparaiso to Santiago.

Commission and Court News

INTERSTATE COMMERCE COMMISSION

In Chicago, July 9, Chief Examiner Smith, of the Interstate Commerce Commission, resumed hearings which had been begun in New York in a general investigation, undertaken by the commission on its own motion, into private telegraph wire contracts, and a large number of grain brokers gave testimony; also representatives of the American Telephone & Telegraph Company, and the Western Union Telegraph Company.

Examiner Pugh, of the Interstate Commerce Commission, held a hearing at Portland, Ore., on July 1, on a complaint filed by the city of Astoria, Ore., asking for an adjustment of westbound rates which would put Astoria on the same basis as Puget Sound points. Representatives of the railways opposed this on the ground that it would cause a further reduction of the Portland rates, on the ground that Portland is 100 miles nearer the interior than Astoria, and that the result would be to reduce the Portland rates and the Puget Sound rates without improving the relative position of Astoria.

Pig Iron Rates from Virginia

Low Moor Iron Company of Virginia et al. v. Chesapeake & Ohio, et al. Opinion by Commissioner Daniels:

The commission finds that the rates on pig iron from producing points in Virginia on the Chesapeake & Ohio and the Norfolk Western (Low Moor being taken as typical of points on the former and Roanoke of the latter) to points in New England and the Middle Atlantic states are unreasonable *per se* and discriminatory as compared to the rates on competing grades of pig iron from furnaces in Pennsylvania and New York. It is, therefore, ordered that the rates from these Virginia points to points of destination involved be not in excess of the following per gross ton: Baltimore, $2.25; Philadelphia, $2.75; New York, $3, and Boston $3.25. (30 I. C. C., 615.)

Coal Rates from Virginia Mines

Opinion by Commissioner McChord:

This case deals with the relationship between the rates on coal to points north of the Ohio from the St. Charles, or Black Mountain, and the Appalachia groups in southeastern Virginia, the mines at Benham, Ky., and the Middlesboro-Jellico group in southwestern Kentucky and northern Tennessee, all of which are served by the Louisville & Nashville. At present, all mines in the Middlesboro-Jellico district take the same rates to points north of the Ohio, but to points south the mines nearer the destinations take lower rates than those more distant. Rates from the St. Charles district to points south of the Ohio are 5 cents above the rates from La Follette, Tenn.; 10 cents above the rates from Middlesboro, Ky., and Jellico, Tenn., and 20 cents in excess of the rates from Links, Ky. To points north of the Ohio, the St. Charles district has the same rates as the Middlesboro-Jellico district. The rates from Appalachia and Benham to the destinations north of the Ohio are from 10 to 25 cents over the rates from St. Charles.

It is proposed, however, to establish rates from the St. Charles mines to a large number of destinations north of the Ohio, which will be from one to 30 cents higher than from the Middlesboro-Jellico group. Changes are also proposed in the Appalachia and Benham rates, but in general the rates from the Appalachia district will bear the same relation to the rates from St. Charles as at present. The proposed Benham rates are in nearly all cases below the Appalachia rates and in some cases below the rates from St. Charles, but in all cases they are higher than the Middlesboro-Jellico rates. Practically all of the changes are in the form of reductions.

The commission finds that there is justification for higher rates from St. Charles than from the Middlesboro-Jellico district in that the cost of handling is greater. It holds, however, that the differential should not correspond to the entire additional operating cost for the distance from St. Charles to Middlesboro, but that it should, instead, bear a fair relation to the out-of-pocket cost which the St. Charles traffic occasions to the carriers between Pennington and Middlesboro. This cost, as defined in *Louisville & Nashville Coal and Coke Rates,* includes the additional cost of fuel and train supplies, the extra wages of the crews and the repairs to locomotives and cars, amounting in all to 10 cents a ton.

It is therefore held that the rates from mines in the St. Charles group to points north of the Ohio within 400 miles from St. Charles should not exceed the rates from the Middlesboro-Jellico group to said destinations by more than 10 cents per ton and that beyond that the differential should decrease not less than one cent for each additional 100 miles. The rates from mines in the Appalachia group and the mines at Benham are not to exceed the rates from the Middlesboro-Jellico group to points north of the Ohio by greater amounts than the present differentials, but in no case are the differentials of Appalachia over the Middlesboro-Jellico district to be less than the differentials of St. Charles over the same district. These differentials are to be regarded as maxima and the carriers may establish smaller ones should conditions so require. (30 I. C. C., 636.)

Fourth Section Applications

In re rates on tropical fruits from Gulf ports to various destinations. Opinion by the commission:

This case relates to two applications covering rates on tropical fruits, viz., bananas, oranges, pineapples and cocoanuts from the Gulf ports to practically all points in the United States which do not conform with the long and short haul clause. Application No. 659 covers rates from Galveston, Port Bolivar, Port Arthur, Texas City, Houston and Orange, Tex. Galveston is taken as representative. Application 2,176 relates to rates from New Orleans and Port Chalmette, La.; Mobile, Ala., and Pensacola, Fla., but the case considers only the rates from New Orleans to points west of the Mississippi and in general the relief asked is by roads who wish to meet the competition of more direct competitors. The principal departures in the rates from Galveston are those in the rates to points on the Missouri river, Kansas City, Mo., and north thereof, comprising what are generally known as Missouri river points, stations basing thereon, and points east thereof. The rates to these stations, via all lines, are lower than to intermediate points. There is no movement from Galveston except on bananas and cocoanuts, so the carriers have agreed to revise their rates on other fruits to conform with the fourth section. The rate on bananas via all routes from Galveston to Kansas City, Mo., is 58 cents, and this rate is exceeded at intermediate points on all lines. The lines reaching Kansas City through Oklahoma carry higher rates, with few exceptions, to all points north of the Texas-Oklahoma line, the rates to such points varying from 62 to 70 cents per 100 lb. On the Kansas City Southern, the rates from Galveston are highest to points in northern Oklahoma and southern Kansas (62 to 70 cents) and begin to grade down just before reaching Kansas City, reaching their lowest level at points on and in the vicinity of the Mississippi (St. Louis, 43 cents) in Illinois and in western and southern Indiana and then grading upward again as the distance from Galveston increases. These rates bear a definite relationship to the rates from New Orleans and were so adjusted in order to place Galveston on a parity with New Orleans. Despite this aid, however, Galveston still bears a minor position in this business as compared with New Orleans.

To most of the territory east of the Missouri river to which petitioners carry lower rates than to intermediate points the distance via their routes from Galveston is greater than the distance via the lines from New Orleans, and while to some of the territory immediately east of the east bank of the Missouri river the distance from Galveston is less than from New Orleans, the commission holds that on the whole these carriers should be permitted to continue to carry rates to all points east of the east bank of the Missouri river the same as or made with relation to the rates from New Orleans and to continue higher rates to intermediate points.

It does not appear that the direct lines from Galveston to points on and west of the Missouri are at any disadvantage in meeting the competition of the New Orleans lines on account of having circuitous routes. Accordingly, the part of the application for relief from the fourth section relating to these rates is denied.

It is held that the Galveston lines are entitled to some relief in respect to rates to points east of the Mississippi which have been reduced to meet the competition from New Orleans. The present disparities between rates to intermediate points and those to more distant points are, however, termed too great.

The short line carrier between Galveston and Kansas City and other Missouri river points and points east thereof is refused permission to maintain rates to these points lower than to intermediate points, but carriers whose mileage exceeds that of the short line by not less than 15 per cent. may meet the rates of the short line and carry higher rates to intermediate points not less than 800 miles from Galveston. It is made a condition, however, that rates to intermediate points 800 miles and less from Galveston shall not exceed 62 cents per 100 lb. and to intermediate points of greater distances than 800 miles from Galveston shall not exceed the rate of 62 cents by more than one and one-half cents per 100 lb. for each additional 25 miles or fraction thereof.

With regard to rates via the circuitous lines from New Orleans relief is granted wherever the long line is not less than 15 per cent. longer than the short line.

The same measure of relief is granted in respect to rates on cocoanuts as on bananas, but where 62 cents per 100 lb. is prescribed as the maximum rate that may be charged on bananas from Galveston to points on indirect lines intermediate to Kansas City not more than 800 miles from Galveston, the rate on cocoanuts shall not exceed 45 cents and the amounts added to this rate to points of greater distance shall not be greater than the amounts added for the transportation of bananas as provided herein, namely, one and one-half cents per 100 lb. for each additional 25 miles or fraction thereof. (30 I. C. C., 621.)

STATE COMMISSIONS

Complaints involving joint rates and through routes between Missouri points have been set for hearing before the Missouri Public Service Commission at Jefferson City, Mo., on July 21. Every railroad in the state has been notified to be present.

The Texas Railroad Commission has issued a statement declining to approve or disapprove of the tariff submitted by the Texas railways, increasing the freight rates from Houston and Dallas to points in East Texas, in accordance with the order of the Interstate Commerce Commission recently sustained by the Supreme Court in the Shreveport case. The commission states that there is no valid reason for action on its part, and that there is no purpose of holding the railroads in fear of suits for penalties, as obedience to a judgment of the Supreme Court of the United States cannot be prosecuted as a wilfull violation of the laws of Texas.

COURT NEWS

In the federal court at Danville, Ill., July 6, the Vandalia Railroad was fined $2,000 for the payment of illegal rebates.

The Supreme Court of Missouri on July 2 issued an order directing the Missouri Public Service Commission to undertake an investigation to determine whether the two-cents-a-mile passenger fare required by the Missouri law is confiscatory as to the Missouri Southern Railroad. That road applied to the commission some time ago for an order permitting it to charge three cents a mile, and the commission held that it was limited by the law to two cents. The railroad then applied to the Supreme Court for a mandamus compelling the commission to make the investigation, and the court issued the order requested.

In the United States District Court at Rochester, N. Y., July 13, indictments were filed against the Pennsylvania Railroad, the Northern Central, the Delaware, Lackawanna & Western and the Delaware, Lackawanna & Western Coal Company for alleged illegal acts in connection with the transportation of coal. Charges of violation of the commodities clause of the Interstate Commerce Law constitute the basis for the indictments against the Pennsylvania, the government alleging that the railroad company is the real owner of certain coal mining corporations and, therefore, the real owner of coal shipped. The Lackawanna is charged with discrimination against outside coal dealers by renting terminal properties at Buffalo at nominal rates.

Railway Officers

Executive, Financial, Legal and Accounting

Frank A. Peil has been appointed assistant to the president of the Oregon-Washington Railroad & Navigation Company, with office at Portland, Ore.

C. H. Carpenter has been appointed freight claim agent of the Alabama, Tennessee & Northern, with office at York, Ala., succeeding Clayton Jones, resigned to go into other business.

President E. Dickinson, of the Kansas City, Mexico & Orient, announces that the positions of general manager and buyer are abolished and the duties of those offices will be assumed by the president. Lawrence V. Guild has been appointed assistant to the president, with headquarters at Kansas City, Mo., effective July 7.

J. P. Pelham has been appointed assistant auditor of the Piedmont & Northern. E. B. Hardin has been appointed traveling auditor, and W. T. Gill has been appointed freight claim agent, with headquarters at Charlotte, N. C. Reports and correspondence relative to station accounts, interline freight and ticket accounts and car service and per diem reports are sent to the assistant auditor.

Operating

T. L. Terrant has been appointed terminal trainmaster of the Baltimore & Ohio in charge of the Lorain, Ohio, terminals.

J. W. Carnes, trainmaster of the Trinity & Brazos Valley, has been appointed assistant general superintendent, with headquarters at Teague, Tex.

H. B. Grimshaw, superintendent of the Alabama division of the Seaboard Air Line at Americus, Ga., has been appointed general manager of the Macon, Dublin & Savannah, with office at Macon, Ga.

P. T. Carmody, assistant trainmaster of the Lehigh Valley at Cortland, N. Y., has been appointed trainmaster, with office at Cortland, and G. R. Lewis, assistant trainmaster at Auburn, has been appointed trainmaster, with office at Auburn.

Rutledge Smith, general agent for the receivers of the Tennessee Central at Nashville, Tenn., has been appointed also superintendent, and D. F. Bunch, trainmaster at Nashville, has resigned on account of illness and his former position has been abolished

T. W. McGaw, superintendent of the Savannah Terminal division of the Seaboard Air Line, has been appointed superintendent of the Alabama division, with headquarters at Savannah, Ga., succeeding H. B. Grimshaw, resigned to go to another company, and the Savannah Terminal division has been consolidated with and is now a part of the Alabama division.

I. L. Boomer, superintendent of the Canadian Northern at Edmonton, Alta., has been appointed superintendent of the newly created Fourth district Western division, with headquarters at Calgary. J. C. O'Donnell, trainmaster at Rainy River, Ont., has been appointed superintendent, with office at Edmonton, succeeding Mr. Boomer. M. G. Hurd, chief despatcher at Saskatoon, Sask., has been appointed chief despatcher and trainmaster, with office at Calgary, Alta., and R. Nelson, chief despatcher at Edmonton, has been appointed chief despatcher and trainmaster, with office at Edmonton.

Ross S. Marshall, whose appointment as superintendent of the Virginia division of the Seaboard Air Line, with headquarters at Richmond, Va., has already been announced in these columns, was born on March 15, 1880, at Rock Island, Ill., and was educated in the high school at Anaconda, Mont. He began railway work in 1896 on the Great Northern, and was chief clerk in the superintendent's office when he left that company in October, 1902, to go to the Chicago, Rock Island & Pacific as division accountant and chief clerk to the division engineer. From September, 1905, to September, 1907, he was chief clerk to the general manager and local auditor of the Panama Railroad at Colon, Panama, and then entered the service of the

New York, New Haven & Hartford as statistician in the general superintendent's office. He remained in this position until November, 1910, and then was appointed assistant to vice-president of the Minneapolis & St. Louis. In September, 1912, he was appointed superintendent at Oskaloosa, Iowa, of the same road, which position he held at the time of his recent appointment as superintendent of the Seaboard Air Line, with office at Richmond, Va., as above noted.

Traffic

F. R. Johnson has resigned as general agent of the passenger department of the Canadian Pacific at Portland, Ore.

I. G. Thompson has resigned as commercial agent of the Rock Island Lines at Ft. Worth, Tex., to engage in other business.

R. W. Foster, commercial agent of the Chicago, Burlington & Quincy at Portland, Ore., has been appointed general agent at that place, succeeding A. C. Sheldon, deceased.

J. F. Dalton has been appointed assistant general freight agent of the Norfolk Southern, with office at Norfolk, Va., and Boyd Suthers has been appointed commercial agent, with office at Pittsburgh, Pa.

Dan C. Pettibone, general agent of mail traffic of the Northern Pacific, has been appointed general baggage agent, with headquarters at St. Paul, Minn. The mail and baggage departments have been combined in one department under Mr. Pettibone.

E. S. Center, general agent of the Atlanta & West Point and the Western Railway of Alabama at Atlanta, Ga., has been appointed assistant general freight agent of both roads, with office at Atlanta, and F. G. Browder, Jr., assistant general freight agent at Montgomery, Ala., has been transferred in the same capacity to Atlanta, Ga.

W. T. Stevenson, whose appointment as assistant general freight agent of the Cleveland, Cincinnati, Chicago & St. Louis, with headquarters at Cincinnati, Ohio, has already been announced in these columns, graduated from the Covington (Ky.) high school in 1890, and began railway work the same year as messenger in the office of the Chesapeake & Ohio at Cincinnati. Subsequently he was successively clerk, stenographer, ticket agent, traveling freight agent and chief clerk, until February, 1902, when he was appointed division freight agent of the Cincinnati Northern at Jackson, Mich. In November, 1907, he was promoted to chief of the tariff bureau of the Cleveland, Cincinnati, Chicago & St. Louis, which position he held at the time of his recent appointment as assistant general freight agent, as above noted.

William O. Sydnor, whose appointment as assistant general freight agent of the Chesapeake & Ohio, with headquarters at Charleston, W. Va., has been announced in these columns, was born on December 18, 1858, in Dinwiddie county, Va., and was educated in the common schools. He began railway work on January 1, 1876, as assistant agent at Burkeville, Va., on the Atlantic, Mississippi & Ohio, now a part of the Norfolk & Western. From 1880 to 1888, he was agent of the Chesapeake & Ohio at Millboro, Va.; in 1889 he was appointed agent and yardmaster at Staunton, Va., and from 1896 to 1900 was purchasing agent of the same road. He was promoted in 1901 to division freight agent at Staunton, and in 1908 was transferred in the same capacity to Charleston, W. Va., which position he held at the time of his recent appointment as assistant general freight agent of the same road, as above noted.

Engineering and Rolling Stock

W. C. Barrett has been appointed division engineer of the Lehigh Valley, with office at Sayre, Pa.

A. G. Kinyon has been appointed superintendent of locomotive operation of the Seaboard Air Line, with headquarters at Portsmouth shops, Portsmouth, Va.

J. W. Williams, assistant chief engineer of the Northwestern Pacific, has been appointed chief engineer construction, succeeding William C. Edes, resigned, and F. K. Zook, engineer maintenance of way, has been appointed chief engineer maintenance and structural engineer, both with headquarters at San Francisco, Cal. William S. Wollner, engineer in charge of the chief engineer's office, has had his jurisdiction extended over the maintenance of way department.

Mr. Williams, who will be the senior engineer on all construction work, was born in 1879 at Milan, Ohio. He graduated from high school in 1897 and began railway work in 1900 as chainman on location survey on the Albuquerque Eastern. Later in the year he worked with the city engineer of Albuquerque and afterwards was employed in the mechanical department of the Atchison, Topeka & Santa Fe at that place. During 1901 and 1902 he was with the Santa Fe Central as chainman, levelman and transitman on location and construction; in the spring of 1903 he was employed as transitman on location surveys for the Eastern Railway of New Mexico, and in July of that year he was transferred to the San Francisco & Northwestern in California, where he was employed on location surveys along the Russian river and the South Fork of the Eel river. In 1904 and 1905 he was assistant engineer on construction of the Oakdale Western and the Ft. Bragg & Southeastern, and in 1906 served in the same capacity on the San Francisco & Northwestern making various surveys and investigations. Mr. Williams was made acting chief engineer of the latter road in August, 1906, and when the Northwestern Pacific was formed in 1907 by the consolidation of several northern California lines, he was appointed assistant chief engineer of that road, which position he held at the time of his recent appointment as chief engineer construction, as above noted.

J. W. Williams

E. C. Sasser, whose appointment as superintendent of motive power of the Northern and Eastern districts of the Southern Railway, with headquarters at Washington, D. C., has been announced in these columns, was born on November 16, 1875, in Wake county, N. C., and was educated at Holden Academy, Raleigh. He began railway work at the age of 16 in the shops of the Raleigh & Gaston, now a part of the Seaboard Air Line, as machinist's apprentice at Raleigh, and at the completion of his apprenticeship entered the service of the Southern Railway at Alexandria, Va., and was then consecutively machinist, machine shop foreman and general foreman. In 1898 he returned to Raleigh and entered the service of the Lobdell Car Wheel Manufacturing Company. The following year he went to the Seaboard Air Line at Raleigh, leaving that company in May, 1901, to become superintendent of the Acme Machine Works, Goldsboro, N. C. He went to the Southern Railway in May, 1902, as erecting shop foreman at Columbia, S. C., and was promoted to general foreman in August of the same year. The following October he left that company to enter the service of the American Locomotive Company at the Richmond branch as equipment inspector. The following year he was promoted to general

E. C. Sasser

machine shop foreman and in March, 1905, left that company to return to the service of the Southern Railway as shop superintendent. He was promoted to master mechanic of the Charleston shops in May, 1908, and in October of the following year was transferred in the same capacity to the Alexandria shops. He was again transferred in May, 1910, as master mechanic of the Spencer, N. C., shops, which position he held at the time of his recent appointment as superintendent of motive power of the same road, as above noted.

D. Hickey, master mechanic of the Southern Pacific at Sparks, Nev., has been transferred to Ogden, Utah, in a similar capacity. T. D. LaMasters has been appointed general car foreman at Ogden.

Purchasing

The office of C. D. Baldwin, purchasing agent of the Bangor & Aroostook at Milo Junction, Me., has been removed to Derby.

T. D. Singletary has been appointed storekeeper of the Macon, Dublin & Savannah, with office at Macon, Ga., succeeding G. S. Pratt, resigned.

Special

The authority of H. R. Buckey, agent of the land and industrial department of the Southern Railway at Bristol, Tenn., has been extended over the Georgia Southern & Florida, the Hawkinsville & Florida Southern and the Macon & Birmingham, with headquarters at Macon, Ga., succeeding C. W. Fitch, resigned to accept services with another department, and F. L. Merritt has been appointed agent, with headquarters at Bristol, Tenn., succeeding Mr. Buckey.

OBITUARY

Robert M. Boyd, general agent of the freight department of the Chicago, Milwaukee & St. Paul at Seattle, Wash., died in the latter city on July 6.

Henry R. Emmerson, formerly from 1904 to 1907, minister of railways and canals for Canada, and previous to that premier of New Brunswick, also a member of the Dominion Parliament, died on July 9, at Dorchester, New Brunswick.

Samuel F. Prince, Jr., formerly superintendent of motive power and rolling equipment of the Philadelphia & Reading, died in New York City on July 13, from the effects of a bullet wound. Mr. Prince was born 62 years ago and previous to January, 1892, was mechanical engineer of the Philadelphia & Reading, and then to the following March was assistant consulting engineer of the Long Island. He was appointed superintendent of motive power in March, 1892, and from February, 1893, to August, 1899, was superintendent of motive power and equipment of the same road. On August 1, 1899, he was appointed superintendent of motive power and rolling equipment of the Philadelphia & Reading and left that company in June, 1904, to enter the service of the Niles-Bement-Pond Company, at New York. He retired some years ago from active service on account of ill health.

Electric Locomotives in England.—Announcement has recently been made to the effect that the Northeastern Railway in England will conduct some exhaustive experiments with electric engines on its line between Middlesborough, Yorkshire, and Bishop Auckland, Durham, which is used for "mineral" traffic. The engines are reported to be of German design and are now being put together at Darlington. They will be able to draw 100 coal or coke cars each containing 20 tons.

Automatic Brakes for Russian Railways.—A committee has recently been formed in St. Petersburg to consider the question of fitting all freight cars with automatic brakes. Should the decision be favorable, the work will be spread over a period of six years.

Signal Statistics of the Great Western Railway of England.—On the 3,007 miles of Great Western Railway of England, there are 1,611 signal towers, 43,456 working levers, 6,784 spare spaces, 20,430 signals, 3,191 interlocked switches and 682 crossing gates.

Equipment and Supplies

LOCOMOTIVE BUILDING

The Toledo Terminal Railroad is inquiring for 5 locomotives.

The Canadian Pacific has ordered 10 locomotives from the Montreal Locomotive Works.

W. R. Grace & Company, New York, are in the market for 2 tank engines (2-8-4 type) for use in Peru.

The Pittsburg & Shawmut has ordered 6 Mikado type locomotives from the Baldwin Locomotive Works.

The International Railways of Central America have ordered 5 locomotives from the Baldwin Locomotive Company.

The Fosburgh Lumber Company, Norfolk, Va., has ordered one Prairie type locomotive from the Baldwin Locomotive Works.

The Grand Rapids & Northwestern is in the market for 3 Mikado type, 5 ten-wheel and a number of six-wheel switching locomotives.

The Green Bay & Western has ordered one superheater Mogul type locomotive from the American Locomotive Company. This locomotive will have 19 by 26 in. cylinders, 56 in. driving wheels, a total weight in working order of 141,000 lb. and a steam pressure of 180 lb.

CAR BUILDING

The Buffalo, Rochester & Pittsburgh is in the market for 10 caboose cars.

The Tampa & Gulf Coast is inquiring for a number of passenger train cars.

The Chicago, Indianapolis & Louisville is in the market for 250 to 260 40-ton box cars.

The Canadian Northern has ordered 8 passenger cars from the Pressed Steel Car Company.

The Delaware, Lackawanna & Western has ordered 200 mine cars from the Magor Car Company.

The Pittsburg & Shawmut has ordered 25 refrigerator cars from the American Car & Foundry Company.

The Chicago & Illinois Midland has ordered 250 gondola cars from the American Car & Foundry Company.

The Pennsylvania Railroad has instructed its Altoona shops to proceed with the construction of 1,000 all-steel box cars.

The Philadelphia & Reading is reported to have ordered 6 baggage cars from its shops at Reading. This item has not been confirmed.

The Southern Pacific is in the market for 2,600 50-ton double sheath box, 400 50-ton flat, 850 40-ton single deck stock, 250 50-ton gondola, 300 12,500 gal. cap., 50-ton tank, and 20 caboose cars and 150 50-ton flat car bodies. The same company has also asked prices on 40 60-ft. passenger coaches.

IRON AND STEEL

The Southern Railway has ordered 15,000 tons of rails from the Tennessee Coal & Iron Company.

The Chicago, Rock Island & Pacific has ordered 17,000 tons of rail from the Colorado Fuel & Iron Company.

The Pennsylvania Railroad has placed orders for 100,000 tons of steel rails with the following companies: United States Steel Corporation, 44,000 tons; Pennsylvania Steel Company, 22,000 tons; Cambria Steel Company, 22,000 tons; Bethlehem Steel Company, 6,000 tons, and the Lackawanna Steel Company, 6,000 tons. All of these orders are to be of 100 lb. section, with the exception of 5,000 tons of the Pennsylvania Steel Company order, which will be of 120 lb. section.

Supply Trade News

Stephen C. Mason, secretary of the McConway & Torley Company, Pittsburgh, Pa., has accepted appointment as an executive member of the Railway Business Association. William McConway, president of the same company, recently retired as an executive member of the association.

H. A. Strauss, consulting engineer, Chicago, has been retained by the bondholders' committee of the Alton, Jacksonville & Peoria Railway, to prepare a complete valuation of the company's property to be submitted to the Illinois Public Utilities Commission in connection with the application for authorization of a reorganization of this company and the issuance of stocks and bonds.

The Railroad Valuation Company has recently been organized, with offices at 25 Broad street, New York, with a staff of engineers, analysts and accountants of wide experience in valuation work for the purpose of preparing maps and other data for railroads who have to submit such data in the federal valuation and may not otherwise have the advantage of a special staff for this work.

Ralph W. Perry, chemist and engineer of tests for the Michigan Central during the construction of the Detroit river tunnel and the improved terminal facilities at Detroit, has severed his connection with the company and has leased its laboratory at Fifth street and River Front, Detroit, renaming it the Perry Testing Laboratory, with the idea of conducting a general chemical, inspecting and testing business.

Mudge & Co., Chicago, are now manufacturing and selling their own passenger car ventilator which is known by the trade name "Mudge-Peerless." Attractive folders illustrating and describing this device are now ready for mailing to those interested. This company is now representing in western territory the Chambers Valve Company of New York. The Chambers throttle valve now being exclusively manufactured by the latter company was recently acquired from the Watson Stillman Company.

On application made in the United States District Court at Buffalo, for the appointment of receivers for the United States Light & Heating Company, Buffalo, N. Y., on the charge of fraud, Judge Hogel has named Guy Walker, a member of the stockholders' investigating committee; James O. Moore, a Buffalo attorney, and H. Henry Ackerman, the present vice-president and general manager of the company. The receivers are under a joint bond of $100,000 and have been instructed to continue the business. The charges on which the application for receivers was based resulted from the findings of the investigating committee, composed of Guy M. Walker, F. R. Humpage and John A. Sleicher. It is alleged that illegal stock issues were made, consisting of $100,000 to William Hawley, of New York; $10,000 to Sanford Adler, and $100,000 to J. Allen Smith. The latter is the president of the company and Mr. Hawley is a director. The action was precipitated by the issuing by the company of a circular to stockholders offering them $1,500,000 6 per cent. bonds for subscription by July 15. This bond issue was authorized at a special meeting of the stockholders, on the suggestion of the stockholders' investigating committee. The bond offering was made to stockholders without the signatures of the members of the investigating committee.

TRADE PUBLICATIONS

COAL PICKS.—The National Malleable Castings Company, Cleveland, O., has recently issued circular No. 67, descriptive of the company's malleable iron coal picks for locomotive tenders.

ELECTRIC METERS.—The Esterline Company, Indianapolis, Ind. has issued catalog No. 321, descriptive of Esterline model E-B graphic efficiency meters. The booklet contains a detailed description of the instruments and views are included showing the various types of meters and their parts.

Railway Construction

AKRON, CANTON & YOUNGSTOWN.—An officer writes regarding the report that the company is carrying out the plans made some time ago to build an extension from Mogadore, Ohio, east to Youngstown, about 40 miles; also that an extension is to be built from Akron north to Cleveland; that it has not yet been definitely decided to extend the line. The company now operates a 10-mile freight line between Akron, Ohio, and Mogadore.

BUTLER COUNTY.—This road has been extended from Styra, Ark., to Piggott, eight miles. (August 22, p. 353.)

CHICAGO, BURLINGTON & QUINCY.—The improvements now under way in the yards, outside of St. Paul, Minn., include the filling of 14 acres of marsh land, the extension of the present tracks to a length of 4,500 ft., the construction of 5 new tracks, a coach ward and 2 new switching leads. There will also be erected a 12-stall roundhouse, a large transfer platform and a steel water tank with a capacity of 100,000 gallons. This repair yard will have a capacity of 200 cars daily. The cost of improvements is estimated at $250,000.

FORT WORTH-DENTON INTERURBAN.—A meeting of the stockholders will be held July 24, it is said, to formally transfer the right of way and other holdings to the Stone & Webster Syndicate, of Boston, Mass., which will build and operate the line from Fort Worth, Tex., north to Denton, 32 miles. As soon as the transfer has been made construction work is to be started. (December 26, p. 1249.)

GREAT NORTHERN.—An officer writes that a contract has been given to Guthrie, McDougall & Company for work on a change of line on 1.3 miles at Paola, Mont. The work is now under way and includes one double-track tunnel 900 ft. long. The estimated cost of the work is about $250,000.

MINKLER SOUTHERN.—This new single-track line, extending from Minkler through Cutler to Exeter, Cal., a distance of about 40 miles, has just been completed by the Atchison, Topeka & Santa Fe. Operation will begin August 1.

MOULTRIE SOUTHWESTERN.—Application has been made in Georgia for a charter to build from Moultrie southwest through the counties of Colquitt, Mitchell, Grady and Decatur to the Florida state line. The right of way has been secured and work is now under way; about four miles have been completed. W. E. Aycock, Moultrie, is interested.

NEWAUKIM RAILROAD.—An officer writes that the plans call for building from Napavine, in the state of Washington, east via Onaloska. Work is now under way by the company's forces on the first 11 miles to Onaloska. There will be a 300-ft. trestle on this section. The company expects to develop a traffic in logs, farm products, merchandise and live stock. William Carlisle, president, Atchison, Kan.; O. O. Ort, engineer, Centralia, Wash.

NORTHERN PACIFIC.—The Mandon north line of the Dakota division has been extended from Stanton, N. D., west to Golden Valley, 34 miles. (May 1, p. 1011).

OKLAHOMA, NEW MEXICO & PACIFIC.—This road has been extended from Wilson, Okla., west to Ringling, 10 miles. (April 17, p. 927.)

OLYMPIA TERMINAL.—See Oregon-Washington Railroad & Navigation Company.

OREGON-WASHINGTON RAILROAD & NAVIGATION COMPANY.—An officer writes that a contract has been given to the Twohy Brothers Company, Portland, Ore., to build under the name of the Olympia Terminal a new line near Olympia, Wash. The maximum grade will be 1 per cent. compensated, and maximum curvature 15 degrees. There will be a pile trestle 795 ft. long and another 570 ft. long. The plans include putting up a station and freight house at Olympia.

REGISTER & GLENNVILLE.—This company, which operates a 39-mile line from Glennville, Ga., north to Register, is making surveys, it is said, for an extension northeast to Statesboro about 10 miles.

Sheffield & Tionesta.—This road is now in operation from Sheffield, Pa., southwest to Tionesta, 41 miles.

Sutherlin, Coos Bay & Eastern.—Surveys are now being made, it is said, and contracts for building the line may be let in the near future. The plans call for a line from Sutherlin, Ore., east about 27 miles to the head of Calapooia river. H. D. Haley, Sutherlin, is engineer in charge, and C. M. Crego, Spokane, Wash., is interested. (June 19, p. 1565.)

RAILWAY STRUCTURES

Buffalo, N. Y.—Contracts are to be let at once for building the new passenger terminal for the Lehigh Valley on Main street, in Buffalo. It will be of Colonial design and is to be built of Indiana limestone. Preparatory work for carrying out this improvement was begun some time ago and actual work on the new terminal must be started by August 1. (September 26, p. 586.)

Clinton, Iowa.—The contract for the construction of the Chicago & North Western repair yard at Clinton, Iowa, noted in the *Railway Age Gazette* of last week, has been awarded to the Walsh Construction Company, Davenport, Iowa.

Galveston, Tex.—The new eight-story office and depot building of the Gulf, Colorado & Santa Fe has just been completed and the offices are being moved from the old building into the new. The building has a frontage of 100 ft. and a depth of 125 ft. It is a fireproof structure of vitreous buff brick and concrete.

North Wilkesboro, N. C.—The Southern Railway has given a contract to Porter & Boyd, Charlotte, N. C., for building a new brick, with tin shingle roof, combined freight and passenger station and covered platform at North Wilkesboro, to replace the old combined station recently destroyed by fire. The improvements will include a platform, 36 ft. by 240 ft. The station will have separate waiting rooms for white and colored passengers, also a freight and baggage room, express room and freight and ticket offices.

Philadelphia, Pa.—Mayor Blankenburg has signed an ordinance under which the city and the Philadelphia & Reading Railway Company will co-operate to do away with a number of grade crossings in Port Richmond. The agreement embodied in the ordinance as to apportionment of cost between the city and the railway has been under discussion for more than a year. The tracks will be elevated to permit the opening of Emerald and Tulip streets between Lehigh avenue and Somerset street. The lines and grades of Aramingo avenue will be revised to conform with the plans. Pike street, from Third to Lawrence, will be abandoned. Construction of additional tracks is also authorized by the ordinance.

Reidsville, N. C.—The Southern Railway has given a contract to J. P. Pettyjohn & Company, Lynchburg, Va., for building a new brick, tile roof passenger station at Reidsville. The building will be 22 ft. by 100 ft. and will include separate waiting rooms for white and colored passengers, also a baggage room and ticket office. The building will be equipped with steam heat and electric light. A contract for the construction of the heating system has been let to the General Fire Extinguisher Company, Charlotte, N. C.

St. Paul, Minn.—A roundhouse and locomotive plant, consisting of a 33-stall roundhouse, a machine shop with 7 repair pits, a tank and paint shop with 5 repair pits, a turntable, coal docks and a three-story brick storehouse for the use of the mechanical department, will be erected near the Union depot at St. Paul by the Northern Pacific. This new plant will be used chiefly for the care of passenger and switching power. The estimated cost is about $500,000.

South Boston, Va.—The Southern Railway has given a contract to the Wise Granite & Construction Company, Richmond, Va., for building a new brick passenger station at South Boston with tile roof. The new building will be 25 ft. by 106 ft. and will include separate waiting rooms for white and colored passengers, a baggage and express room and ticket office.

Tacoma, Wash.—Bids for a new $100,000 freight shed for the Oregon-Washington Railroad & Navigation Company in Tacoma were to be received on Wednesday. This shed is to be built on the tideflats at Fifteenth street and the city waterway. G. W. Boschke, Portland, Ore., is chief engineer.

Railway Financial News

Canadian Pacific.—It is reported that this company has bought the Lake Erie & Northern, which runs from Port Dover to Galt, Ont., 27 miles.

Chicago & Eastern Illinois.—The Bankers Trust Company, New York, as trustee for the refunding and improvement mortgage, has filed in the federal court at Chicago a suit for the enforcement of the mortgage and sale of the property. "The filing of the bill is intended not as a hostile move but as one of the usual and necessary formal steps in connection with the ultimate reorganization of the property.

Chicago, Indianapolis & Louisville.—A mortgage for $4,000,000 has been filed by the company in Indiana; and a mortgage for $2,000,000 has been filed by the Wabash Valley, a short new line which was recently bought by the C. I. & L. It is reported that a connection will be built at Hammond, Ind., about ten miles long.

Greenville & Knoxville.—See Greenville & Western.

Greenville & Western.—This is the name of the company which is to operate the property of the Greenville & Knoxville, which was recently sold at auction.

Kansas City, Mexico & Orient.—Creditors said to have claims aggregating about $700,000 have secured a temporary injunction against the transfer of the property of this road from the receivers to the new proprietors; and it is said also that the Public Utilities Commission of Kansas will refuse to authorize the new company to do business until its capitalization has been investigated.

The new company, organized in connection with the purchase of July 6, has the same name as the old one, and the charter provides for $50,000,000 of stock and $31,000,000 of bonds.

Marietta, Columbus & Cleveland.—The property of this company was on July 10 put into the hands of a receiver, suit having been filed by the Columbia-Knickerbocker Trust Company, of New York, trustee of a mortgage for $250,000 on which interest has been in default for several years. The court appointed Daniel B. Torpy, of Marietta, receiver. This line runs from Marietta, Ohio, westward 45 miles to Palos, connecting at the eastern end with the Pennsylvania and the Baltimore & Ohio, and at the western end with the Kanawha & Michigan and the Toledo & Ohio Central.

New York, New Haven & Hartford.—The special report made by the Interstate Commerce Commission to the Senate concerning the affairs of this company, made public this week, is noticed on a preceding page. Simultaneously with this announcement comes the report from Boston that a well-known law firm, representing stockholders not named, will enter suit to recover untold millions on account of alleged mismanagement of the company in former years.

It is reported in Washington that the attorney general is disposed to defer his proposed suit against the New Haven, charging violation of the anti-trust law, until the directors shall have had more time to consider what action they will take under the recently enacted law of Massachusetts.

Coal for Russian Railways.—The finance and trade commission of the Russian Imperial Duma has consented to the prolongation of the free importation of coal intended for use on railways.

Purchases of Rolling Stock for the French Railways.—In the year 1913, the French home and colonial railways placed orders for 1,485 passenger cars, valued at about $10,000,000, and for 13,768 baggage and freight cars having an estimated value of $13,000,000, or in all $23,000,000. Orders were also given for 260 locomotives and 165 tenders at a price of about $8,000,000. In 1912, on the other hand, the orders for locomotives and tenders amounted to $13,000,000.

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WE GUARANTEE, that of this issue 9,000 copies were printed; that of these 9,000 copies, 7,466 were mailed to regular paid subscribers to the weekly edition, 280 were provided for counter and news companies' sales, 1,173 were mailed to advertisers, exchanges and correspondents, and 111 were provided for samples and office use; that the total copies printed this year to date were 231,700, an average of 9,390 copies a week.

VOLUME 57 JULY 24, 1914 NUMBER 4

Contents

*Illustrated.

Western Enginemen's Controversy

On Monday the United States Board of Mediation and Conciliation went to Chicago to offer its services in an effort to bring about a settlement of the controversy between the western railways and their engineers and firemen. The latter are threatening a strike unless they are granted demands for increases in pay and superimposed changes in working conditions which would cost the 98 roads involved some $33,000,000 a year. The issues involved were fully presented in a statement issued on June 1, by A. W. Trenholm, chairman of the Conference Committee of Managers, which was published in the *Railway Age Gazette* of June 5, page 1240, and in an editorial in the same issue, page 1218. Since that time the brotherhoods have taken a strike vote, the details of which they decline to give, and have issued to the newspapers a statement that they will not submit to arbitration. They even declined to join with the railways in a request for the services of the federal mediators, although they accepted mediation after the roads had requested it. It is perhaps natural that Messrs. Stone and Carter should consider it necessary to present a bigger bluff each time they present their audacious demands, and the advance refusal to arbitrate must be so classed, but it is inconceivable that they should be able to maintain such an attitude. A strike such as they propose, to tie up the western railways at the beginning of the crop-moving season at a time when the business of the country has completely transferred its hopes of prosperity from a Democratic administration to the forces of nature, would be lost from the start without the support of public opinion—and the newspapers have clearly indicated what kind of a reception would be accorded a refusal to arbitrate.

President Wilson and the New Haven

After a conference with the attorney general on Monday a committee of the directors of the New Haven announced that they could not carry out the dissolution plan previously agreed on because of the law passed by the Massachusetts legislature giving the commonwealth the right to buy for a reasonable compensation at some time in the future the Boston & Maine stock which was to have been sold by the New Haven under the agreed on dissolution plan. President Wilson thereupon made public a letter calling on the attorney general to bring suit under the federal anti-trust law, together with the attorney general's letter to the President and to Mr. Hustis, of the New Haven. President Wilson in his letter, in speaking of the New Haven directors' decision, says: "Their failure upon so slight a pretext to carry out an agreement deliberately and solemnly entered into and which was manifestly in the common interest, is to me inexplicable and entirely without justification." The attorney general in his letter to Mr. Hustis points out that "it must be remembered that ever since 1909 the commonwealth has had the right to buy the New Haven holding company stock [Boston Railroad Holding Company] at a valuation to be fixed in substantially the same way as is now provided in respect to the Boston & Maine, and that therefore the New Haven's interest in the Boston & Maine is not subjected by the recent statute to any restrictions more burdensome than those imposed upon it when the New Haven was authorized to acquire it." While not in any way passing upon the wisdom or lack of it shown in the New Haven directors' decision, it is fair to point out that whereas the New Haven itself might have been willing to accept certain conditions in regard to what was until the Boston Railroad Holding Company law was passed an unlawful acquisition, it might well be that now no investor or banker could be found who would be willing to buy Boston & Maine stock with a string attached to it. The New Haven directors have no power of coercion over a possible purchaser such as the Massachusetts legislature had over the New Haven management in 1909.

The Failure of the Rock Island Plan

The syndicate which had undertaken to underwrite the sale of $30,000,000 new preferred 7 per cent. stock to Chicago, Rock Island & Pacific Railroad collateral 4 per cent. bondholders and Rock Island Company stockholders has decided to abandon the plan because the present rate of earnings of the company does not make a good showing on the proposed new preferred, and the surplus shown on the last balance sheet of the railway company that was made public is not a real surplus. The collateral bondholders' committee, of which James N. Wallace is chairman and of which the other members are James Brown, of Brown Brothers & Co., New York; Bernard M. Baruch, who is a member of the governing committee of the New York Stock Ex-

change; Henry Evans, president of the Continental Insurance Company, and Frederick Strauss, of the firm of J. & W. Seligman & Co., New York, is asking the further deposit of bonds with the expectation of submitting a reorganization plan "based on the principle of giving the collateral trust bondholders the opportunity, or imposing on them the necessity, of themselves providing the money required." It will be recalled that the plan which has failed, commented on at some length in these columns in the issue of July 3, page 2, called on the collateral bondholders to sacrifice more than a third of their collateral—the Railway company stock—but did not compel them to submit to a cash assessment. The protective committee points out that during the year ending June 30, 1915, over $9,250,000 and during the year ending June 30, 1916, over $11,850,000 of capital obligations of the Railway company and its subsidiaries mature. There is furthermore an ominous suggestion in the last sentence of the committee's announcement:

> Had it not been for the tentative plan arrived at in June this situation [a possible receivership of the Railway company] might have arisen on July 1. That it did not arise was due to the fact that through the effort of the committees, banking interests advanced money to the Railway company in view of the adoption of the tentative plan.

In other words, beside the capital obligations maturing in 1915 and 1916 shown on the last public balance sheet, there is an accumulating floating debt of the Railway company. The fact that James N. Wallace consents to act as chairman of the protective committee is a guarantee that everything possible will be done for the interests of the bondholders. Nevertheless in a situation such as this the revised balance sheet of the Railway company ought to be made immediately available to holders of the collateral trust 4's.

Eliminating Boilermakers as Locomotive Inspectors

The House Committee on Interstate and Foreign Commerce on July 14 ordered reported to the House a bill to eliminate boilermakers as locomotive inspectors for the Interstate Commerce Commission under the boiler inspection act. The bill was introduced in the House on May 12, by Representative Goeke of Ohio, and in the Senate on April 17, by Senator Cummins of Iowa, but its real sponsors are the Brotherhood of Locomotive Engineers and the Brotherhood of Locomotive Firemen and Enginemen. The bill, H. R. 17,894, is an amendment to the present locomotive boiler inspection act, and extends the provisions of that act to apply to and include the entire locomotive and tender and all parts and appurtenances thereof, whereas now it applies only to boilers and their appurtenances. Its real purpose is revealed by its final clause: "That upon the passage of this act all inspectors and applicants for the position of inspector shall be examined touching their qualifications and fitness with respect to the additional duties imposed by this act." There already has been considerable rivalry between the members of the boilermakers' and the other unions for positions in the boiler inspection service, with the result that of 49 inspectors only 14 have had experience in boiler work only, while 16 are former engineers and firemen, without any knowledge of boilermaking. The proposed amendment seems well designed to get rid entirely of those who have no general knowledge of locomotives except such as pertains to boilermaking, and to keep them out of the service. What the boilermakers will have to say to this remains to be seen. Several of the mechanical officers of the railways were given a hearing before the House committee on July 1 and pointed out the lack of need for the bill and the lack of flexibility there would be in its operation. While locomotive boiler inspection undoubtedly has had some good results in requiring the railways to maintain their power in better condition, it is one thing to make rules for boilers and their appurtenances, and quite another thing to deal with all of the hundreds of parts of the complicated locomotive machinery about which there may be as many differences of opinion as there are parts. The bill would require the making by the Interstate Commerce Commission and its inspectors of rigid rules governing the construction and maintenance of all parts of the locomotive, to be enforced by inspectors, most of whom are sure to be incompetent for such important duties.

RAILROAD LABOR LEGISLATION IN MASSACHUSETTS

MASSACHUSETTS legislatures used to be looked upon as possessing a good deal more sanity and conservatism than the average American "deliberative" body, but that favorable view can be no longer entertained. Within the last year or two the labor union demagog has ruled in the Bay State about as recklessly as elsewhere. Two laws have just been passed which may be cited as examples. One is to the effect that Massachusetts station employees (not the agent himself) shall not be employed over 9 hours in any 10 hours; and the other that every person employed in signal towers or at interlocking switching machines or in telegraphing or telephoning train orders shall be allowed two days off each month "with regular compensation." Both of these laws have in them elements of fairness; but both bear the earmarks of the labor union specialist who sees to it that the employees themselves shall not be punished for violations of the laws of health. Men who prefer to work without suitable rest so as to get more money, are never touched by labor union law. In a large majority of station jobs 10 hours, or even 12 hours, is not an unhealthful or unsafe period, for the reason that the men can get rest and time to eat while on duty. It is only a question of the reasonableness of the compensation.

Having failed to get what he wants in money—wages rates—the labor specialist gets the weak-kneed legislators to give him an hour's time. This is the best way to annoy the railroad company for it will cost more to supply a relief man for the hour's "lay off" than it would to pay the regular man a proportionate extra sum. In the monthly two-days' deduction scheme, also, the immediate question is a matter of pay—and not religion or social morality. This bill is so illogical that the governor refused to sign it, and it went into effect because of his five days' silence. The very terms of the statute—"with regular compensation"—reveal its purpose. These tower men all work under the Federal law and have easy hours. It would be difficult to prove that eight hours a day is unhealthful, except possibly in a few hard worked positions. Presumably these men have fair rates of pay. If they work two days less they ought to receive pay for two days less. The terms of the act do not forbid the employer to reduce the rate per day; but the promoters of the law can be trusted to see that this is not done. They know how railroad managers always yield, in small matters, to keep the peace. Laws based on alleged considerations of health afford legislators their easiest opportunities to make fools of themselves. When the United States Steel Corporation relieved a lot of men of Sunday work, thousands of them left and went to work for other mills seven days in the week. Others are said to work six days for the big corporations and also on Sunday for some other employer. Making men either healthy or moral, by statute, is a very difficult matter. It is to be hoped that the process will succeed better with the Massachusetts railroad men than with the Pennsylvania steel workers.

GOVERNMENTAL DISREGARD OF THE EXPERT

THE attitude of Chairman Moon of the House Committee on Postoffice and Post Roads, and also of the Postoffice department, toward the report of the Joint Congressional Committee, which was created to investigate the question of the way in which the railways should be compensated for carrying the mails, well illustrates the attitude usually assumed toward expert bodies by politicians and bureaucrats in this country. In Germany, where the administration of public business is a success, it is usually necessary for a man to be an expert before he can

become a high officer in the bureaucracy, and governmental action is habitually taken either on the advice of experts or by officials who are experts. In this country the fact that a man is a recognized expert on any subject is sufficient to make the typical politician or bureaucrat regard him with suspicion and accept with reluctance, or entirely reject his views.

The attitude assumed by the American politician or bureaucrat toward a body of experts which has been created by Congress is similar to his attitude toward any other expert or expert body, if, perchance, the conclusions reached do not harmonize with his preconceived notions or tend to further his political aspirations. The Joint Congressional Committee, of which former Senator Jonathan Bourne, Jr., the author of the parcels post law, is chairman, spent a long time investigating railway mail pay. It found the existing methods of payment crude, antiquated and unscientific, and the amount paid unjustly low. It decided to recommend to Congress legislation providing for a complete change in the basis of compensation. Before the report could be sent to Congress the chairman of the House Committee on Postoffices and Post Roads and the bureaucrats in the Postoffice department, hurriedly collaborated in preparing and introducing a bill which would reduce the compensation of the railways and which Senator Bourne denounces as unjust to them and designed to give the Postoffice department an autocratic power which would be contrary to the spirit of American institutions.

The developments regarding legislation for the regulation of the issuance of railway securities have been similar. During the Taft administration Congress created a commission to investigate this subject. It did investigate it thoroughly and made a very able report. The report specifically recommended legislation of a certain nature and having certain definite purposes. At this session of Congress a bill for the regulation of securities has been introduced which utterly disregards the report and recommendations of the Hadley Commission.

President Wilson recently nominated Messrs. Jones of Chicago, and Warburg of New York for members of the Federal Reserve Board. He selected them because of his belief in their expert fitness. Their confirmation is being vigorously opposed in the Senate by members of that body who put political buncombe above efficient administration.

The United States is the worst governed civilized country on earth. Its city, state and national legislatures and administrations are wasteful, inefficient and often corrupt. The chief cause of the waste and inefficiency is the habitual ignoring of the expert by the politician and the bureaucrat. One of the fundamental duties of government is to provide and maintain good roads and streets. While good highways are the rule in Europe, they are altogether exceptional in the United States. The main and primary function of government is to prevent and punish crimes of violence. In no other civilized country are crimes of violence so prevalent as here or their punishment so rare.

We are rapidly extending the interference and control of the government in business affairs. Many are advocating not merely government regulation but government ownership. It is manifest to every reading and thinking man that regulation will be a failure and a calamity if it is not done by experts. And government management would be a still worse failure and a still greater calamity if not carried on by experts. But while there is a great public movement to reform, regulate or acquire business concerns that are efficiently managed, there is no movement to reform and improve the worst managed of all our concerns, namely, the governments which are doing the regulating of business, and which many people want to do the managing. Could anything be more abysmally stupid?

AUTOMATIC TRAIN STOPS—III

WE have said that those who advocate the use of automatic train stops and those who do not—who declare the use of such devices unnecessary, or inexpedient, or impossible—ought to get together and thrash out their differences. This presupposes that on both sides there are interests of importance and respectability. A superficial observer might be disposed to deny this. The radical advocate of automatic stops—who, for convenience, we may call a "progressive"—declares that the railways are so slow and unenterprising, not to say neglectful, that they are scarcely to be classed as respectable; the government should brush aside their excuses, stop their dilatory conduct, and by congressional enactment tell them what to do. Big manufacturers, acting truly in the interest of the public, make extensive experiments on their own initiative; the railroads do not do this (at least not in the direction that Congress wants them to) and so they should be coerced.

On the other hand, many railroad men look upon the "progressives" as a lot of unpractical theorists, with whom serious railroad managers, responsible to the public and to stockholders, can ill afford to spend valuable time.

Both of these views should be laid aside, though each may have in it an element of truth. The railroads cannot stand too coldly on their dignity, for now and then they kill passengers, and the public's insistent questions must be answered. The progressive cannot be kicked out of doors, for occasionally he finds a capitalist, supposedly of sober judgment, to espouse his cause; while numerous congressmen take a more or less intelligent interest in his ideas. Many thousands of dollars have been put into automatic stop experiments, and the press can be depended on to help popularize every scheme that has even a small measure of merit. The public in general has ample reason for demanding a full discussion.

It is true that a full and fair discussion probably would not prove an easy thing to bring about. To show the perfection of our present safeguards, even those on the best roads, so that Congress and state railroad commissioners will understand the matter, will be a slow process. Mr. Elliott, of the New York Central, and other signal engineers have appeared before the House Committee at Washington and have laid before the committee numerous important facts; but, as in other similar hearings, there was hardly a beginning toward a thoroughly good understanding. Mr. Elliott for the railroads, and Congressman Esch for the public, would have to spend a good deal of time on the subject to get fully acquainted with each other's respective points of view, to say nothing of enlightening the public. That the general use of automatic stops would introduce new dangers and that at best the protection given would be very costly, can be shown to the lay mind only by a tedious course of instruction.

The railroads, as a body, cannot be said as yet to have formulated the case, even for themselves, in any satisfactory way. This ought to be done even if it be a work requiring some time and money. That A. R. A. report will have to be amplified very greatly before any impression will be made on the public generally. The public says, in effect, that railroad travel can be made safer, and proposes a way to do it. It is the duty of the railroads, if they respect their master, the public, to enlighten that public.

How can the public form a correct idea of the railroads' position? It cannot intelligently differentiate between the Chicago & Eastern Illinois, with ninety engines equipped with the Miller apparatus, and the Pennsylvania, which says, in effect, that an investment like that on the Chicago & Eastern Illinois is wasteful. Electric roads, those out-of-doors as well as those in tunnels, use the stops regularly and are reported as finding their use satisfactory. The reason why the Pennsylvania uses automatic stops in and near New York City and not elsewhere is not well understood; it ought to be made clear.

Experiments with automatic stops, more or less desultory, were begun over twenty years ago—in 1893. For five years, now, experiments more or less sincere have been going on in a number of places. Should the public be expected to reject these schemes as worthless unless and until some recognized authority declares them worthless?

We forget the simple maxim, "in time of peace prepare for war." Unless there shall be an unheard of freedom from disastrous collisions, this question will come up again, in an acute

form. When it does come up the same issues that have been discussed on former occasions will be discussed again. Railroad officers, recalling their experiences before congressional committees, and elsewhere, in the past—as, for instance, in the matter of freight car safety, and boiler inspection—must conclude that the railroads, both in their own interest and in the public interest, should present constructive proposals rather than mere obstructive arguments.

The American Railway Association committee thus far has simply set forth the highest possible ideal, which demands so much that most readers interpret the report as a negative declaration—a statement of what cannot be done. This is looked upon by many as only one move in a policy of delay, which leaves the way open for any and all parties or interests, reliable or not reliable, to exploit whatever schemes they choose—as, for instance, the bill introduced in Congress a year or two ago by Mr. Mann, of Illinois, designed to make the use of a certain type of automatic stop compulsory everywhere!

A committee cannot present constructive proposals in any satisfactory way except on the basis of actual experiments; but if it is wise for the railroads unitedly to go before Congress or the public with definite proposals, this duty of making experiments must be faced. Surely there is not much hope of presenting a united front, with any chance of convincing objectors, so long as it is left to individual roads to follow each its own ideas. The New Haven road's ten-thousand-dollar offer does not seem to have resulted in much progress, as yet. If extended experiments are desirable, the railroad interest as a whole should consider the question of carrying them out. If any road were unwilling to bear a fair share of the cost of such experiments, it would have to consider the possibility that Congress may compel all roads to bear an unfair share—that is, require them to make unwise experiments. To congressmen this matter appeals as a small detail, and they will take no great pains to adjust financial burdens with extreme nicety.

In speaking of experiments we mean, of course, not one of those short-lived installations designed to dazzle investors or congressmen, of which we have had far too many, but a course of experiments which shall bring out the full truth. As is well known to every railroad officer who has studied the subject, the real need is not for a device to stop a train—we have a dozen of those already—but a reliable *system;* which includes not only machines and their operation, but men and administration and innumerable operating details. The New Haven road's $10,000 offer, by its terms, can at best only get to the starting point of the essential study.

And not only are the railroads better fitted than the government to do whatever testing is necessary—they only are competent to do it. An experiment extending over two years' time and perhaps a hundred miles of territory, can be fully successful only under the direction of a manager who is clothed with very full powers and who can have at all times a sympathetic official atmosphere.

It is to be remembered, finally, that the real issue is not the accomplishment of perfection, but the accomplishment of a decided improvement. As we understand it, the conclusion reached by the officers of the Interborough as to the lesson of their ten years' experience is that duty to the public requires the adoption of the best available arrangement; that to defer action in the hope of getting something better would be a mistake. The action of the French government must be taken to indicate the same lesson; that with very dense traffic the best available is well worth having. If automatic stops are not desirable, and if the next best thing is a cab signal or an audible roadside signal, Congress will quickly turn its attention in that other direction. The railroads should forestall Congress.

Always it must be remembered that there are two problems: One is that of safety and the other that of economy. By the use of "speed control" to do away with some of the objections to automatic stops, or by the adoption of cab signals or audible roadside signals, the question of safety may be put on the road to settlement; but having settled that, the question of cost will still remain. We do not minimize this feature. But suppose this item—safety from collision—should prove as costly as that of the steel passenger car: Can it be evaded? And, as in the case of the steel car, it may be that it is not desirable to evade it. However this may be, the first question should be settled first.

There is an element of sober truth in the well-known observation of a certain railroad president that it would be possible to preserve passengers' lives at too great a cost per passenger. But the question of the ultimate cost is a vital one. The public, if we may judge by its attitude in the matter of freight rates and other things, will not accept an unfavorable answer concerning the question of cost until the whole subject has been clarified by further demonstrations in the mechanical field.

NEW BOOKS

Proceedings of the American Railway Engineering Association. Size, 6 in. by 9 in., 1,563 pages, illustrated, bound in half morocco, cloth or paper. Published by the American Railway Engineering Association, Karpen Building, Chicago. Price, half morocco, $7; cloth, $6.50; paper, $6.

Following the practice established two years ago, this volume is printed on India paper, enabling the 1,563 pages to be printed in one volume. It contains the complete proceedings of the fifteenth annual convention held in Chicago, March 17-19, 1914, with 21 committee reports and discussions, and eleven monographs which have been published previously in the bulletins of the association during the past year. Following the practice of last year, all the reports have been presented together, followed by the discussions on the various reports grouped together, with the monographs last. The work of this association is so commonly recognized as representing the best accepted practice in the country that detailed comment is unnecessary. This volume is printed in the same high class manner characterizing the Proceedings of earlier years. The Proceedings of this association are coming more and more to be recognized as necessary for frequent reference by all railway officers concerned directly with the maintenance of track and structures.

Engineering Geology. By Heinrich Ries, professor of economic geology, Cornell University, and Thomas L. Watson, professor of economic geology, University of Virginia. Size 6 in. by 9 in., 672 pages, 400 illustrations, cloth binding. Published by John Wiley & Sons, Inc., New York City. Price $4.

The authors of "Engineering Geology" have given students in civil engineering in their respective universities, special courses in geology as applied to engineering for some years, and in the belief that there is a need for a similar course in other technical schools they have undertaken to prepare a suitable text book.

The authors believe that many civil engineering courses are deficient in the attention given to geology and their belief will no doubt be shared by many engineers who in their early practice encountered problems in tunneling, dam or reservoir construction, the handling of land slides, the securing of a proper water supply, the disposal of sewage or the purification of water, etc. The authors have attempted to illustrate all geological principles by actual cases in engineering work, as it is felt that this method appeals more strongly to practical engineers as well as students and is more successful from the pedagogic standpoint.

The following chapter headings indicate the scope of the work: the rock forming minerals; rocks, their general character, mode of appearance and origin; structural features and metamorphism of rock; rock weathering and soil; surface water; underground water; land slides and their effect; wave action and shore currents, their relation to coasts and harbors; lakes, their origin and relation to engineering work; glacial deposits, their origin, structure and economic bearing; building stone; limes, cement and plaster; clay and clay products; coal series; petroleum, natural gas and other hydrocarbons; road foundations and road materials; and ore deposits. Two appendices are included, the first giving a geologic column, and the second treating of geological surveys.

The Division of Freight and Passenger Expenses

New and Old Formulas Contrasted and the Newest Formula Applied to the 1914 Classification of Expenses

The Interstate Commerce Commission in its tentative form of annual report for the fiscal year beginning July 1, 1914, has included blank columns which at the option of the railroad company may be used to show a division between expenses incurred in passenger service and expenses incurred in freight service. The Pennsylvania Railroad was the first important American railroad company to divide its expenses as between freight and passenger service, and its formula for this division has been revised from time to time. The latest and most comprehensive attempt to divide freight and passenger expenses has been made by the roads running through Oklahoma. The accounting officers of these roads have worked in conjunction with the Oklahoma Commission to draw up an experimental set of formula for dividing all expenses as between states, as between state and interstate, as between line and terminal, and as between freight and passenger service. The divisions as between states and as between line and terminal were described in these columns in the issue of July 3.

The Oklahoma scheme is far more comprehensive and less arbitrary than the Pennsylvania's, but, on the other hand, of course, is purely an experiment, while the Pennsylvania's has been used in practice for a great number of years and has been found to be valuable for comparative purposes.

Maintenance of way presents the most difficulties of any of the general classes of expenses, since so many of the primary accounts under this heading must necessarily be divided on some more or less arbitrary basis. Both the Pennsylvania scheme and the Oklahoma scheme are based on the old system of Interstate Commerce Commission accounts, which was discontinued July 1, 1914, but it is possible to apply the same principles to the new system of accounts which went into effect at the beginning of this fiscal year.

The Pennsylvania divides all of the maintenance of way and structure primary accounts as between freight and passenger service on a revenue train mileage basis with the exception of electric power transmission and docks and wharves. There would, therefore, be no change, presumably, in the Pennsylvania's system with the new classification. The Oklahoma scheme does not attempt to divide freight and passenger expenses until expenses have been divided as between line and terminal (see July 3 issue of the *Railway Age Gazette*).

The theory which underlies the Oklahoma division of maintenance of way and structure expenses is that a considerable proportion of these expenses may be divided directly, and fairly accurately, through careful observation of the facts. Thus the expenses of superintendence for both line and terminal maintenance of way accounts are to be divided directly wherever possible, and this presumably means that an actual study of the time spent by officers whose salaries are charged to superintendence shall be made with the expectation of being able to assign at least a part of their salaries, office expenses, etc., directly to one service or the other. The remainder of the superintendence expenses, that is, the expenses common to both services, are, under the Oklahoma scheme, to be divided in the same proportion as are the expenses for line and for terminal, respectively of ballast, ties, rails, other track material, roadway and track, removal of snow, sand and ice, tunnels, bridges, trestles and culverts, over and under grade crossings, grade crossings, fences, cattle guards and signs, snow and sand fences and snow sheds, signals and interlocking plants, telegraph and telephone lines, electric power transmission, buildings, fixtures and grounds, and docks and wharves.

In the first draft of the Oklahoma scheme the line expenses of the first nine of these accounts were to be divided experimentally on four different bases. (1) On a revenue train mileage basis; (2) on a train speed ton mile basis; this is the gross ton miles of revenue freight and passenger trains, including the weight of the locomotive and cars as well as loading, multiplied by the average speed between stations for such trains. (3) On an engine ton mileage basis the weight of the engine including the tender with coal and water; and (4) on the basis of the assigned line expenses—that is, the directly assignable expenses of the cost of the repairs of steam locomotives; cost of repairs of passenger train cars; cost of repairs of freight train cars; road enginemen's wages; road engine house expenses; fuel for road locomotives; water for road locomotives; lubricants for road locomotives, and other supplis for road locomotives; road trainmen and train supplies and expenses, and clearing wrecks.

The line expenses under these twelve accounts are divided as follows: The repairs of steam locomotives on a mileage run basis with the switching mileage subdivided according to time spent in each class of service. Passenger and freight train car repairs are, of course, assigned to passenger and freight service respectively, as are also the wages of road enginemen, engine house expenses and fuel, water, lubricants and other supplies for road locomotives, the engine house expenses being apportioned on the basis of locomotives handled, and locomotives in mixed service being apportioned on the basis of freight and passenger car ton miles in mixed trains, the fuel, etc., involving common expenses being apportioned on the basis of fuel issued to the locomotives involved, with the mixed engine mileage divided on the basis of respective freight and passenger car ton miles; road trainmen and train supplies being apportioned the same as road enginemen, and clearing wrecks being apportioned to the service in which the wreck takes place; common expenses, such as a wreck involving both freight and passenger trains being apportioned on the basis of the charges for clearing wrecks, assignable exclusively to each one of the two services.

The Oklahoma scheme calls this fourth method of dividing the roadway and track (labor and materials) expenses, the Cost Accounting Method. From one point of view this is true since upkeep of roadway is not an object in itself, but simply a means to the desired end of producing transportation and is, therefore, incidental to the cost of producing transportation and as an incidental expense it may properly be divided upon the proportion of determinable expenses. Moreover, the inclusion of maintenance of equipment expenses which vary in part with the weight of equipment and certain expenses which are divided on a car ton mileage basis, as well as the expenses of clearing wrecks, is a highly ingenious attempt to weight the average used in the arbitrary division of maintenance of way expenses.

The second method goes into less theoretical refinement, and for this reason may not be so strictly in accordance with cost accounting principles, but it appears to be more practically useful. In this method speed and weight of trains are given a relationship, arbitrary, of course, but one in which practice alone can show glaring defects. Rails, ballast and other track material do wear out directly both with the tonnage passing over them and the speed of the trains. Ties, of course, rot on most roads from weather conditions rather than because of pounding either from weight or speed of trains, but the standard of ties and the frequency with which they are renewed does depend quite directly both on weight of trains and on the speed of trains. No instructions are given for estimating the weight of passengers, but this is not a difficult thing to do with a fair degree of accuracy, and

when passenger equipment, is once weighed, it is not difficult to keep a record of the weight of trains.

The objection to the second method comes when we consider removal of snow, maintenance of tunnels, and over and under grade crossings. It is fanciful to say that these expenses vary with speed and weight of trains. It would seem that these accounts ought to be divided according to the fourth method.

The final revised Oklahoma scheme uses no one of these four methods and divides the above accounts for common tracks as between freight and passenger on the basis of engine ton miles based on weight of engines in working order. Presumably it was felt that keeping a record of total weights of passenger trains was hardly worth the expense involved and presumably the same consideration led to the elimination of speed as one of the factors. Since, however, this factor of speed varies so widely and, moreover, is of so much importance in determining the standard of maintenance, it seems a pity that for experimental purposes at least the engine ton mile was not multiplied by average speed between terminals.

Terminal expenses of the nine primary accounts are, of course, in many cases on a directly assignable basis. Common tracks, such as shop, store house and repair tracks, are apportioned on the basis of the assigned charges of terminal expenses, of repairs of steam locomotives, repairs of passenger train cars and repairs of freight train cars. Common expenses, such as engine house, turntable, wye, fuel and water tracks, are apportioned on the basis of the assigned charges for engine house expenses.

The maintenance of grade crossings, fences, cattle guards and signs, and snow and sand fences, and snow sheds for line facilities, are apportioned on the basis of revenue train miles as between freight and passenger service, the terminal facilities upkeep charges of grade crossings, etc., being charged to freight, and the snow and sand fences not being charged to terminal at all.

The maintenance of signals and interlocking plants being entirely a line charge, are apportioned between passenger and freight service—for the interlockers on the basis of respective number of freight and passenger trains passing over them, and for signals on the basis of respective train miles.

The maintenance cost of telegraph and telephone lines used in line service are allocated direct to passenger or freight where possible and the common expenses on the basis of revenue train miles, while the maintenance charges of these facilities used in terminal service are apportioned on the basis of the charges for station employees, which charges are assigned on the basis of a time study of each employee.

The maintenance of electric power transmission can, of course, be allocated direct to one class of service or the other for both line expense and terminal expense on the basis of power used.

The maintenance of buildings, fixtures and grounds used in both line and terminal service are allocated direct to freight or passenger, according to use and facilities that are used in common by both services, such as common depot and station buildings on the basis of the estimated portion of repairs incurred by each class of service, considering each building on its merits. Engine house repairs are divided in proportion to the charges made to each service for engine house expenses, both yard and road. Shops on the basis of assigned locomotive and car repairs, fuel and water stations, proportionate to the charges for fuel and water transportation expenses—yard and road; and section and tool houses on the basis of the division of roadway and track expenses.

Maintenance of docks and wharves both line and terminal are allocated direct where possible and common expenses on a basis of use. Roadway tools and supplies (line) are allocated on a basis of revenue train mileage and terminal are all charged to freight.

Injuries to persons, stationery and printing and other expenses both line and terminal are allocated direct to freight or passenger where possible, and common expenses on the basis of previously mentioned maintenance of way and structure accounts, excepting superintendence and roadway tools and supplies. Maintenance of joint tracks, yards and other facilities (line) are apportioned direct where possible, and common expenses on a basis of revenue train miles of each district, and common terminal expenses on a basis of the cars of each class of service handled at the terminals.

MAINTENANCE OF EQUIPMENT

Maintenance of equipment with certain exceptions lends itself comparatively easily to accurate division as between freight and passenger service. The Pennsylvania divides its expenses as follows: Superintendence on the basis of the other maintenance of equipment items, steam locomotive repairs, renewals and depreciation on a revenue train mileage basis; and repairs, renewals and depreciation of electric locomotives, passenger train cars, freight train cars, electric equipment of cars and floating equipment according to the facts; power plant equipment also according to the facts. The repairs, renewals and depreciation of work, equipment and insurance are divided on the basis of revenue train mileage, while shop machinery and tools, injuries to persons, stationery and printing, and maintaining joint equipment at terminals, are divided on the basis of other maintenance of equipment accounts.

The Oklahoma scheme is almost as simple, but expenses that are not directly assignable are divided on what appears to be a more scientific basis. Superintendence, both line and terminal, is apportioned on the basis of assigned charges for respective locomotive, passenger car, freight car, and work equipment repairs. Both line and terminal expenses of repairs of steam locomotives are divided as between freight and passenger, switch and work on a basis of miles run by individual locomotives in each service, and the switch mileage is further subdivided on the basis of the time spent in freight and passenger switching, and the work on the proportion of the basis of assigned charges of maintenance of way and structure expenses, excepting superintendence and roadway tools and supplies, injuries to persons, stationery and printing, and maintaining joint tracks. Renewals and depreciation are divided on the same basis as repairs, as are also the repairs, renewals and depreciation of electric locomotives. The repairs, renewals and depreciation of passenger train cars are, of course, assigned to passenger service, and freight cars to freight service, and all electric equipment of cars on the basis of freight and passenger cars, all floating equipment according to the service in which used, and all work equipment on the basis of the maintenance of way charges mentioned above. Shop machinery and tools are apportioned on the basis of assigned charges for the respective locomotive, passenger car, freight car and work equipment repairs, as are also injuries to persons, stationery and printing and other expenses, power plant equipment being apportioned on a basis of power used.

Maintaining joint equipment at terminals being entirely a terminal charge is divided as between passenger and freight direct where possible and common expenses on the basis of respective cars handled at terminals.

TRAFFIC EXPENSES

There is an interesting difference in the Pennsylvania and Oklahoma methods of dividing traffic expenses. The Pennsylvania assumes that all of these expenses can be accurately divided according to the facts, even to superintendence, which, under each of the other general classes of expenses, is divided in the Pennsylvania scheme on an arbitrary basis.

The Oklahoma scheme considers all traffic expenses as terminal, but does not assume that all of them can be divided accurately as between freight and passenger and of the common expenses apportions 50 per cent. each to freight and passenger. The reason that the Pennsylvania's traffic expenses can all be divided is because the Pennsylvania has a distinct organization of freight and passenger traffic men, all the way up to the vice-president, who, however, is in charge of the entire traffic department.

TRANSPORTATION EXPENSES

The primary transportation accounts which the Pennsylvania apportions between freight and passenger on a basis of "facts" are station employees, weighing and car service associations, coal and ore docks, motormen, enginemen (when in mixed passenger and freight service, their wages are divided between these accounts on the basis of mileage of cars in mixed trains); fuel for road locomotives (for mixed trains divided on car mileage basis); operating power, purchased power, road trainmen, train supplies and expenses (pay of employees and material used in connection with mixed passenger and freight trains apportioned between these accounts on relative work performed or use made of material); operating floating equipment, express, loss and damage to freight and baggage. The primary accounts that are apportioned on revenue train mileage are superintendence, despatching trains, station supplies and expenses, yardmasters, yard conductors, yard switch and signal tenders, yard supplies, crossing flagman, drawbridge operation, clearing wrecks, telegraph and telephone operation, stationery and printing, insurance, damage to property, damage to stock, injuries to persons, operating joint yards and terminals.

Yard enginemen, engine house expenses (yard), fuel for yard locomotives, water and lubricants for yard locomotives and other supplies, are divided on a yard locomotive mileage basis and operation of fuel stations, water for road locomotives, lubricants and other supplies, are divided on a road locomotive mileage basis.

The Oklahoma scheme divides superintendence, both line and terminal, by directly assigning expenses where possible and apportioning common expenses on the basis of assigned charges of all other transportation expenses, except telegraph and telephone operation and express service, stationery and printing, other expenses, loss and damage to property and stock, injuries to persons, and joint tracks and facilities. Despatching trains is apportioned for line service—there being no terminal service—on the sum of total train mileage of freight and passenger trains in the same territorial units as are used for dividing these expenses between the different states.

Station employees are the subject of time studies and their wages are divided in proportion to the duties performed by them in each class of service.

Weighing and car service associations, and coal and ore docks expenses are assigned to freight exclusively. Station supplies and expenses are allocated direct where possible and common expenses are apportioned on the basis of the assigned charges for station employees.

All yard expenses are to be divided on a time basis, the expenses of each yard to be treated separately and all passenger switching to be considered line service.

Motormen, road enginemen, fuel and water for road locomotives, and lubricants and other supplies for road locomotives, road trainmen, train supplies and expenses are all allocated direct with mixed service apportioned on the basis of freight and passenger car ton miles in mixed trains. Engine house expenses are apportioned on the basis of the number of locomotives handled, locomotives in mixed service being apportioned on the basis of freight and passenger car ton miles in mixed trains.

Operating power plants and purchased power are apportioned as between freight and passenger on a basis of mileage of equipment used employing such power, while interlockers and block signal operation, crossing flagmen and gatemen, and drawbridge operation which are line services are apportioned on the basis of freight and passenger trains passing such facilities. Crossing flagmen and gatemen and drawbridge operation, which are terminal service, however, are apportioned on a basis of assigned charges of yard operation.

Clearing wrecks is charged to the service in which the wreck occurs and common expenses apportioned on the basis of located charges. Telegraph and telephone operation is apportioned on the basis of all maintenance of way, maintenance of equipment, traffic and transportation expenses. The cost of operation of floating equipment is, of course, assigned according to the service performed. Stationery and printing and other expenses are assigned directly where possible and apportioned where common on the same basis as superintendence. Loss and damage to freight is, of course, assigned to freight service and baggage to passenger service, and damage to property, to stock on right of way, and injuries to persons directly where possible, and common expenses are apportioned on the basis of directly assignable charges of this account. Operating joint tracks and facilities are assigned directly where possible and common expenses are apportioned on the revenue train mileage by divisions in each service.

GENERAL EXPENSES

The Pennsylvania divides all general expenses on a revenue train mileage basis.

The Oklahoma scheme assigns salaries of general officers, their clerks, expenses and general office supplies, directly where possible, apportions the remainder on the basis of the assigned charges on all expenses other than general expenses. Law expenses are allocated in the same way, while insurance, directly where possible, is apportioned when common on the basis of "appropriate units of property or persons insured." Relief department expenses, pensions, stationery and printing, and other expenses are apportioned on the basis of assigned charges to all expenses except general expenses.

General administration of joint tracks, yards and terminals, where common, is apportioned on the basis of assigned charges on all other joint facility accounts. Valuation expenses are apportioned on the basis of all assigned charges except general expenses.

THE NEW CLASSIFICATION

Both the Pennsylvania and Oklahoma methods of dividing expenses use the old form of primary accounts, but it is possible to apply the theory apparently underlying the Oklahoma scheme to the classification which went into effect July 1, 1914. The following table is an attempt to carry out the Oklahoma theories for the new classification. It is understood that the division of expenses as shown in this table is in all cases direct where possible, and the column headed direct, contains the accounts which may be charged in whole to one service or the other. The other columns give instructions for dividing common expenses of such accounts as are not assignable in their entirety direct to one or the other service. Thus the expense of superintendence under maintenance of way and structures is to be allocated directly where possible to freight and passenger service, and it is only the balance which is not directly allocatable that is to be divided on the same basis as the assigned charges in accounts 202 to 220, excluding 204 and 205, and adding 272. In the same way a part of the charge for roadway maintenance may represent the cost of roadway maintenance of tracks used exclusively in freight service, and another part the cost of roadway maintenance of tracks used exclusively in passenger service. These directly assignable charges are to be made to the proper service and it is only the remainder which is to be allocated on a basis of engine ton miles.

The table will be clearer by following through a hypothetical example. The accompanying table shows an expense account for a road of 800 miles. Superintendence under maintenance of way on this road cost $70,000, and no part of this sum could be assigned directly to either freight or passenger service. According, therefore, to the Oklahoma scheme this $70,000 is to be divided between freight and passenger service on the same basis as the charges to accounts 202 to 220, excluding 204 and 205, and adding 272. It will be seen that these accounts are to be divided direct where possible, and where this is not possible, on an engine ton mile basis. According to our table, the total of these accounts that are common to both passenger and freight amounts to $1,186,500, and there is $24,600 directly assignable to freight and $3,400 directly assignable to passengers. The $1,186,500 is now to be divided on a basis of engine ton miles. Let us suppose

that our road uses Mikados in through freight service and Pacific type locomotives in through passenger service, and that the total engine ton mileage in passenger service was 126,240,000, and in freight service 873,640,000. If X, therefore, represents the proportion of the total $1,186,500 assignable to passenger service, we have 126,240,000 : 873,640,000 :: X : $1,186,500. Thus X =

Maintenance of Way and Structures

On the basis of assigned charges in accounts 202, 220, omitting 204-5 and including 272	Engine ton miles	Revenue train miles	Direct	Repairs incurred by each class of service	Assigned charges accounts 388 and 400	Assigned charges locomotive and car repairs	Assigned charges account 202-203 and 220	Basis of use by trains in each class of service	On a basis of power used in each class of service	Basis of accounts 382 and 394
Superintendence; injuries to persons; assessments for public improvements; insurance; stationery and printing; other expenses.	Roadway maintenance; ties; rails; other track material; ballast; track laying and surfacing; paving; removing snow, ice and sand; tunnels and subways; bridges, trestles and culverts; elevated structures.	Right of way fences; snow and sand fences, and snow sheds; crossings and signs; telegraph and telephone lines; signals; roadway machines, small tools and supplies; maintaining joint tracks.	Grain elevators; storage warehouses; wharves and docks; coal and ore wharves; gas producing plants; miscellaneous structures.	Station and office buildings.	Engine houses.	Shops	Roadway buildings.	Interlockers.	Power distribution systems; underground power tubes; power line poles and fixtures; underground conduits; power plant dams; power plant buildings; power substation buildings; power transmission systems.	Fuel stations. Basis accounts 385 and 397 Water stations.

Note.—The above table shows only the division of line expenses. In general the terminal expenses are to be divided in the same way as the line expenses, or rather in an analogous way. Thus the maintenance charge for wharves and docks, where a line charge, is assigned on the use for either freight or passenger service, where a terminal charge is likewise assigned on the basis of use for either freight or passenger service. There are certain exceptions, however, noted below. Accounts 202 to 220, omitting 204 and 205, but adding 272, where a terminal facility, are divided not on the engine ton mile basis but in accordance with the following instructions: (a) "Common tracks, such as shop, storehouse and repair tracks, to be apportioned on the basis of assigned charges in accounts 308, 314 and 317; engine house, turntable, wye, fuel and water tracks to be apportioned on the basis of assigned charges in accounts 388 and 400." (b) Telegraph and telephone lines, where a terminal charge, are apportioned on the basis of assigned charges in account 373. (c) Maintaining joint tracks, yards and other facilities, where a terminal charge, is apportioned on the basis of respective cars handled at such terminals. "In each case depreciation is on the basis of repairs.

Maintenance of Equipment

Basis of assigned charges for repairs	Basis of miles run by individual locomotives in each class of service	Basis assigned charges 202-220, omitting 204-5 and including 272	Direct	Basis of power used	Basis of cars handled at terminals
Superintendence; shop machinery; injuries to persons; insurance; stationery and printing; other expenses.	Repairs of steam locomotives; repairs of other locomotives.*	Working equipment repairs.	Freight train cars; passenger train cars; motor equipment of cars; floating equipment repairs; miscellaneous equipment repairs.	Power plant machinery; power sub-station apparatus.	Maintaining joint equipment at terminals.

*Where the locomotives are used in switching, locomotives' repairs are on the basis of time in freight and passenger switching.

Note.—The formulas for dividing maintenance of equipment expenses (terminal) are analogous to those for dividing maintenance of equipment expenses (line). In each case, of course, depreciation and retirements are divided on the same basis as repairs.

Traffic

Direct	50 per cent. of freight and passenger respectively
Outside agencies; advertising; traffic associations; fast freight lines; industry and immigration bureaus.	Superintendents; insurance; stationery and printing; other expenses.

Note.—Terminal expenses are divided in the same way as line expenses.

Transportation—Water Line

Operation of vessels.—The salaries of officers and the cost of fuel for vessels transporting both passengers and freight should be apportioned on a basis of the relative space assigned to passengers and to freight on such vessels.

Operation of terminals—As above.

Incidentals.—As above.

Transportation Expenses

Assigned charges 372-406, 408, 415	Basis of total train mileage of freight and passenger trains in territorial units	Direct	Time basis	Basis of freight and passenger gross ton miles in mixed trains	Basis of mileage of equipment used employing power
Superintendence. Stationery and printing. Other expenses.	Despatching trains.	Station employees. Station supplies and expenses. Weighing, inspection and demurrage bureaus. Coal and ore wharves. Operating sleeping cars. Loss and damage to freight. Loss and damage to baggage.	Yardmasters and yard clerks. Yard conductors and brakemen. Yard switch and signal tenders. Yard enginemen. Yard motormen. Fuel for yard locomotives. Yard switching power produced. Yard switching power purchased. Water for yard locomotives. Lubricants for yard locomotives. Other supplies for yard locomotives. Engine house expenses—yard. Yard supplies and expenses. Operating joint yards and terminals—Dr. and Cr.	Train enginemen.* Train motormen. Trainmen. Train supplies and expenses.	Train power produced. Train power purchased.

Basis of freight and passenger trains passing facilities	Basis of located charges of the same account	Basis of assigned charges of all accounts for maintenance traffic and transportation—rail	Basis of service performed	Basis of locomotives handled	Revenue train mileage	Basis of appropriated units of property or persons insured
Signals and interlocker operation. Crossing protection. Drawbridge operation.	Fuel for train locomotives.* Water for train locomotives. Lubricants for train locomotives. Other supplies for train locomotives. Clearing wrecks. Damage to property. Damage to livestock on right-of-way. Injuries to persons.	Telegraph and telephone operation.	Operating floating equipment.	Engine house expenses—road.	Operating joint tracks and facilities — Dr. and Cr.	Insurance.

Note.—Transportation expenses, where terminal, are divided in the same way as transportation expenses—line, with the following exceptions: Crossing protection and drawbridge operation, where the expense is terminal, is divided on the basis of accounts 377 to 391 inclusive; operation of joint tracks and facilities, where terminal, is apportioned on the basis of cars handled.

*This is, of course, only for mixed train service. In freight or passenger service these expenses are charged direct.

GENERAL EXPENSES

On the basis of all accounts other than general	On the basis of all other joint facility accounts.	On the basis of appropriate units of property or persons insured
Salaries and expenses of general officers	General joint facilities.	Insurance
Salaries and expenses of clerks and attendants.		
General office supplies and expenses.		
Law expenses		
Relief department expenses.		
Pensions		
Stationery and printing.		
Valuation expenses.		
Other expenses.		

MISCELLANEOUS OPERATIONS

Direct	No charge
Dining and buffet service.	Produced power sold
Hotels and restaurants.	
Grain elevators.	
Stock yards.	
Other miscellaneous operations.	

about $171,000. This leaves $1,015,000 of the total of these charges to be assigned to freight service.

Adding the directly assignable amounts to each of the derived figures we have $174,400 total charges against passenger service, and $1,040,100 against freight service. We are now in the position to divide our $70,000 superintendence charges and have $174,400 : $1,214,500 :: X : $70,000, where X represents the amount of superintendence chargeable to passenger service. X equals, therefore, $9,970 and the total superintendence charges is divided $9,970 to passenger and $60,030 to freight service.

This, of course, is only for line expenses. Superintendence charges for terminal maintenance of way are to be divided as the *terminal* proportion of the same 202 to 220, etc., accounts are to be divided. The instructions for dividing these terminal accounts are to locate direct where the facilities are used exclusively in either service and to divide the expenses of common tracks, such as shop, storehouse and repair tracks, on the assigned charges for the repairs of steam locomotives, the repairs of passenger cars and the repairs of freight cars, and such other common tracks as engine house, turntable, wye, fuel and water tracks on the assigned charges for engine house expenses, both yard and road—are apportioned on the basis of locomotives handled.

In our example above we have assumed that there were no superintendence maintenance of way charges for terminal expenses.

The complications that arise under the Oklahoma scheme are at once apparent from our example. It consists of wheels within wheels and complications within complications, but so does the operation of a railroad. If a cost accounting system is to be devised for a very complicated set of transactions a minute analysis is necessary and it would be quite surprising if the accounting could be accurately done by means of some simple formula.

New Classification of Expenses

MAINTENANCE OF WAY AND STRUCTURES

	Freight	Passenger	Common
201—Superintendence	...	...	$70,000
202—Roadway maintenance	...	...	340,000
203—Roadway—depreciation	...	...	60,000
204—Underground power tubes	...	...	2,000
205—Underground power tubes—depreciation	...	...	100
206—Tunnels and subways	...	...	1,000
207—Tunnels and subways—depreciation	...	...	...
208—Bridges, trestles and culverts	...	...	142,000
209—Bridges, trestles and culverts—depreciation	...	...	40,000
210—Elevated structures	...	...	10,000
211—Elevated structures—depreciation	...	...	800
212—Ties	$15,000	...	140,000
213—Ties—depreciation	600	...	17,000
214—Rails	6,000	$3,000	104,000
215—Rails—depreciation	200	100	2,700
216—Other track material	...	...	46,000
217—Other track material—depreciation	...	...	3,000
218—Ballast	2,000	...	58,000
219—Ballast—depreciation	...	...	5,000
220—Track laying and surfacing	800	300	190,000
221—Right of way fences	...	...	5,000
222—Right of way fences—depreciation	...	...	600
223—Snow and sand fences and snow sheds	...	...	700
224—Snow and sand fences and snow sheds—depreciation	...	...	100
225—Crossings and signs	...	...	12,000
226—Crossings and signs—depreciation	...	...	1,000
227—Station and office buildings	22,000	10,000	...
228—Station and office buildings—depreciation	2,200	1,000	...
229—Roadway buildings	...	...	...
230—Roadway buildings—depreciation	...	...	7,000
231—Water stations	...	...	900
232—Water stations—depreciation	...	...	1,000
233—Fuel stations	...	...	200
234—Fuel stations—depreciation	...	...	700
235—Shops and engine houses	...	...	15
236—Shops and engine houses—depreciation	...	...	22,100
237—Grain elevators	...	...	3,000
238—Grain elevators—depreciation	700	...	...
239—Storage warehouses	100	...	...
240—Storage warehouses—depreciation	500	...	...
241—Wharves and docks	50	...	...
242—Wharves and docks—depreciation	9,000	...	...
243—Coal and ore wharves	900	...	...
244—Coal and ore wharves—depreciation	3,000	...	...
245—Gas producing plants	300	...	...
246—Gas producing plants—depreciation	...	...	...
247—Telegraph and telephone lines	...	...	...
248—Telegraph and telephone lines—depreciation	500	1,500	10,000
249—Signals and interlockers	...	...	1,200
250—Signals and interlockers—depreciation	...	...	10,000
251—Power plant dams, canals and pipe lines	...	...	1,000
252—Power plant dams, canals and pipe lines—depreciation	...	...	...
253—Power plant buildings	...	...	3,500
254—Power plant buildings—depreciation	...	...	500
255—Power sub-station buildings	...	...	2,000
256—Power sub-station buildings—depreciation	...	...	200
257—Power transmission system	...	...	900
258—Power transmission system—depreciation	...	...	90
259—Power distribution system	...	...	700
260—Power distribution system—depreciation	...	...	70
261—Power line poles and fixtures	...	...	200
262—Power line poles and fixtures—depreciation	...	...	...
263—Underground conduits	...	...	...
264—Underground conduits—depreciation	...	...	...
265—Miscellaneous structures	...	...	300
266—Miscellaneous structures—depreciation	...	...	...
267—Paving	...	...	200
268—Paving—depreciation	...	...	50
269—Roadway machines	...	...	85
270—Roadway machines—depreciation	...	...	...
271—Small tools and supplies	...	...	24,000
272—Removing snow, ice and sand	...	...	27,000
273—Assessments for public improvements	...	...	150
274—Injuries to persons	19,000	12,000	8,000
275—Insurance	...	...	1,600
276—Stationery and printing	2,600	1,000	...
277—Other expenses	...	...	...
278—Maintaining joint tracks, yards and other facilities—Dr.	...	...	46,600
279—Maintaining joint tracks, yards and other facilities—Cr.	...	...	83,000

MAINTENANCE OF EQUIPMENT

	Freight	Passenger	Common
301—Superintendence	...	...	$58,000
302—Shop machinery	...	...	27,000
303—Shop machinery—depreciation	...	...	16,000
304—Power plant machinery	...	...	3,000
305—Power plant machinery—depreciation	...	...	800
306—Power sub-station apparatus	...	...	600
307—Power sub-station apparatus—depreciation	...	...	100
308—Steam locomotives—repairs	$394,000	$87,000	15,000
309—Steam locomotives—depreciation	54,000	17,000	...
310—Steam locomotives—retirements	41,000	13,000	...
311—Other locomotives—repairs	...	...	...
312—Other locomotives—depreciation	...	...	...
313—Other locomotives—retirements	...	...	...
314—Freight train cars—repairs	...	...	659,000
315—Freight train cars—depreciation	...	...	250,000
316—Freight train cars—retirements	...	...	78,000
317—Passenger train cars—repairs	...	...	51,000
318—Passenger train cars—depreciation	...	...	13,000
319—Passenger train cars—retirements	...	...	...
320—Motor equipment of cars—repairs	...	...	14,000
321—Motor equipment of cars—depreciation	...	...	6,000
322—Motor equipment of cars—retirements	...	...	...
323—Floating equipment—repairs	...	2,000	...
324—Floating equipment—depreciation	...	700	...
325—Floating equipment—retirements	...	300	...
326—Work equipment—repairs	...	...	21,000
327—Work equipment—depreciation	...	...	9,000
328—Work equipment—retirements	...	...	400
329—Miscellaneous equipment—repairs	...	...	...
330—Miscellaneous equipment—depreciation	...	...	...
331—Miscellaneous equipment—retirements	...	...	...
332—Injuries to persons	...	...	4,000
333—Insurance	1,100	500	...
334—Stationery and printing	...	...	5,000
335—Other expenses	...	...	...
336—Maintaining joint equipment at terminals—Dr.	...	1,000	...
337—Maintaining joint equipment at terminals—Cr.	...	...	...

TRANSPORTATION EXPENSES

	Freight	Passenger	Common
351—Superintendence	...	...	$80,000
352—Outside agencies	$6,900	$4,800	...
353—Advertising	600	10,000	...
354—Traffic associations	3,000	600	...
355—Fast freight lines	...	...	...
356—Industrial and immigration bureaus	300	300	...
357—Insurance	...	...	...
358—Stationery and printing	9,700	2,200	...

TRANSPORTATION—RAIL

	Freight	Passenger	Common
371—Superintendence	...	...	$76,000
372—Despatching trains	...	...	104,000
373—Station employees	$239,000	$61,000	...
374—Weighing, inspection and demurrage bureaus	35	...	...
375—Coal and ore wharves	12,000	...	...
376—Station supplies and expenses	12,000	8,000	...
377—Yardmasters and yard clerks	...	...	59,000
378—Yard conductors and brakemen	186,000	3,000	...
379—Yard switch and signal tenders	2,000	...	...
380—Yard enginemen	114,000	300	...
381—Yard motormen	...	...	...
382—Fuel for yard locomotives	99,000	...	...
383—Yard switching power produced	...	...	...
384—Yard switching power purchased	...	...	...
385—Water for yard locomotives	2,400	300	...
386—Lubricants for yard locomotives	1,900	...	...
387—Other supplies for yard locomotives	4,000	...	...
388—Engine house expenses—yard	41,000	...	...
389—Yard supplies and expenses	6,000	3,000	...
390—Operating joint yards and terminals—Dr.	9,000	17,000	...
391—Operating joint yards and terminals—Cr.	600	...	...
392—Train enginemen	384,000	91,000	6,000
393—Train motormen	3,000	10,000	...
394—Fuel for train locomotives	597,000	114,000	17,000
395—Train power produced	...	7,000	...
396—Train power purchased	...	...	...
397—Water for train locomotives	21,000	10,000	1,000
398—Lubricants for train locomotives	10,000	3,000	700
399—Other supplies for train locomotives	16,000	4,000	500
400—Engine house expenses—train	96,000	40,000	...
401—Trainmen	360,000	90,000	14,000
402—Train supplies and expenses	42,000	40,000	1,000
403—Operating sleeping cars	...	...	...
404—Signal and interlocker operation	...	...	6,000
405—Crossing protection	...	...	14,000
406—Drawbridge operation	...	...	...
407—Telegraph and telephone operation	...	...	50
408—Operating floating equipment	1,600	...	...
409—Express service	...	...	...
410—Stationery and printing	26,000	8,000	1,000
411—Other expenses	300	1,400	...
412—Operating joint tracks and facilities—Dr.	27,000	18,000	800
413—Operating joint tracks and facilities—Cr.	20,000	6,000	...
414—Insurance	6,000	4,000	...
415—Clearing wrecks	17,000	200	...
416—Damage to property	3,000	1,000	500
417—Damage to livestock on right-of-way	1,800	900	...
418—Lost and damaged freight	16,000	...	...
419—Lost and damaged baggage	...	2,000	...
420—Injuries to persons	23,000	7,000	1,700

TRANSPORTATION—WATER LINE

	Freight	Passenger	Common
431—Operation of vessels	$60,000	$35,000	...
432—Operation of terminals	3,000	7,000	...
433—Incidental	...	...	$300

MISCELLANEOUS OPERATIONS

	Freight	Passenger	Common
441—Dining and buffet service	...	$15,000	...
442—Hotels and restaurants	...	1,600	...
443—Grain elevators	$4,000	...	...
444—Stock yards	16,000	...	...
445—Produced power sold	...	...	...
446—Other miscellaneous operations	...	...	...

GENERAL

	Freight	Passenger	Common
451—Salaries and expenses of general officers	...	...	$90,000
452—Salaries and expenses of clerks and attendants	...	...	135,000
453—General office supplies and expenses	...	...	9,000
454—Law expenses	...	...	36,000
455—Insurance	...	...	2,000
456—Relief department expenses	...	...	600
457—Pensions	...	...	36,000
458—Stationery and printing	...	...	14,000
459—Valuation expenses	...	...	12,000
460—Other expenses	...	...	400
461—General joint facilities—Dr.	...	...	200
462—General joint facilities—Cr.	...	...	170
Transportation for Investment—Cr.			

FOLK'S NEW HAVEN REPORT

[From an article by The Onlooker in *The Annalist*.]

During Charles S. Mellen's exciting career as a witness immune before the Interstate Commerce Commission in the recent New York, New Haven & Hartford investigation at Washington the commission's counsel, Joseph W. Folk, was a frequent caller at Mr. Mellen's rooms in the Shoreham Hotel. He was, in fact, the only caller outside of a few personal friends, and his repeated visits aroused curiosity. At last one of Mr. Mellen's acquaintances asked him what it was all about—what Folk came to talk over with him. He smiled cynically. It was almost incredible. The counsel of the Interstate Commerce Commission, whose knowledge of New Haven affairs was less than that of the Park Row journalist who openly coached him, came evenings to his chief witness, not to learn anything about the case, not to get light on obscure episodes, such as the Billard transaction, and not even to fish for clues, but to solicit the former president of the New York, New Haven & Hartford to employ vivid and picturesque language in his testimony on the morrow, for purposes of newspaper headlines.

On leaving the stand the last day Mr. Mellen could not restrain the remark to an acquaintance that he was going back home with about two-thirds of his information intact. The commission's counsel had not known how to get it.

Mr. Folk had no understanding of accounting himself, and had neither the industry to master its perplexities nor the wit to provide himself with experts big enough for the job. For instance, there was the notorious Billard transaction. Several days after Billard himself had been on the stand, and had succeeded in leaving the subject as bedimmed as it was before, a New York journalist arrived to hear the Mellen testimony first hand. He spent his leisure time going over the Billard testimony. In the official stenographer's record he found references to certain financial exhibits marked, "Billard A, B, C, D, E, and F," which had not been copied into the record. He first applied for them to Billard's personal counsel, who was staying over, but his only copy of the exhibits was in New England. Next the journalist applied to Mr. Folk, who stared at him blankly; he did not know anything about them. His attention was called to the reference in the record at the place where the exhibits were offered in evidence and marked, "Billard Exhibits A, B, C, D, E, and F." He shook his head. Possibly the accountants knew. Ask them. The accountants, too, had forgotten them. By the record it was clear that such exhibits did exist, but nobody knew where to look for them. A search was insisted upon, and after half an hour the exhibits were found in the bottom of a clothes basket full of other papers and documents. The journalist copied them off and then tried to analyze them. They did not analyze, that is, the figures did not balance, as any capable accountant must have been able to see upon five minutes' study, but Billard had been allowed to stand on them, as they were, and to leave a hopeless record of the transactions carried on in his name by the New Haven Railroad. A competent accountant ought to have been able to take those figures, start at the beginning and force either Mr. Billard or Mr. Mellen step by step into a corner out of which either the truth or the bald refusal of it had been bound to come.

"What would you have done," the journalist asked Mr. Mellen, "if a man who knew accounting had forced you through those figures to the point of the ultimate question?"

"I would have been obliged to tell things I did not tell," he said. "I was not there to volunteer information they did not know how to get."

And so it stands in the record and in the conclusions of the Interstate Commerce Commission that John L. Billard retained more than $2,700,000 in a transaction in which he represented the New Haven Railroad, and in which he invested not a dollar of his own. That is not true. That was the apparent difference in the par value of securities, but the actual value of what Mr. Billard came off with, clear and free, was probably under $1,500,000. It was after Mr. Mellen retired, and through a trade with the new management, that he got a final profit at all. The investigators did not go into that; they probably did not know how. It may be said that $1,500,000 was as preposterous as $2,700,000; but the point is that the Interstate Commerce Commission failed to get the truth, and, failing, let it go at that.

THE RAILWAYS OF NIGERIA.—It is said that Nigeria is so swampy that horses and mules do not thrive in it and that, therefore, transportation is dependent entirely upon roads for foot traffic, railways and the waterways. Besides a seacoast of about 500 miles, the country has more than 1,000 miles of navigable inland waterways and over 900 miles of railway, a little over 700 of which is of 3 ft. 6 in. gage and 200 miles of 2 ft. 6 in. gage. There are also about 500 miles of new railway line under construction.

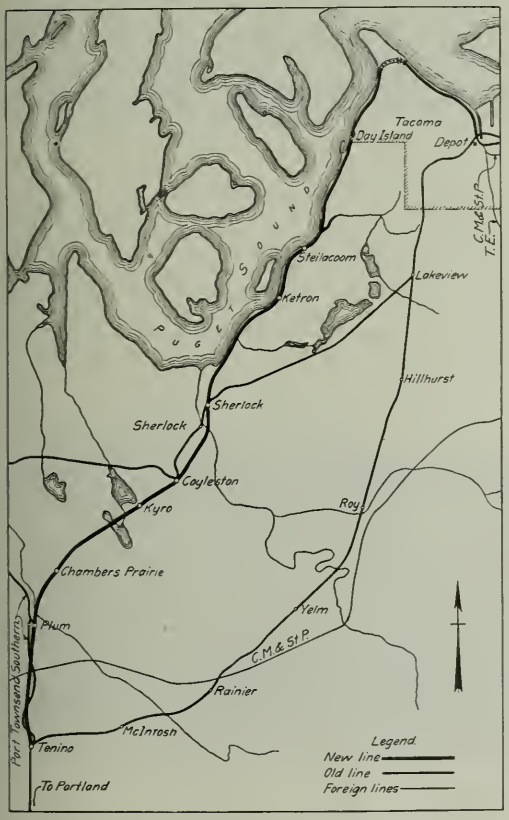
New Low Grade Line from Tacoma, Wash., to Tenino

This 44-Mile Section Completes Northern Pacific Double Track Road Between Seattle and Portland

The Northern Pacific is now completing a double track low grade line from Tacoma, Wash., south 43.7 miles to Tenino, to replace the existing single track line between those points. The new line is on an entirely new location removed several miles from the present one and involves some very heavy construction work under unusual conditions. The building of this line completes the reconstruction and double tracking of the entire line from Tacoma, south to Portland, thus providing double track from Portland to Seattle.

TRAFFIC

In addition to the traffic of the Northern Pacific, the Great Northern also operates over the tracks of the Northern Pacific from Seattle to Portland, and the Oregon-Washington Railroad & Navigation Co. from Tacoma to Portland. Thus, although this line is the only one from Portland north to Puget Sound points, it is used by all three of these trunk lines on an equal basis; it carries 22 regular scheduled passenger trains daily in addition to an average of about 18 freight trains.



Map Showing Location of New and Old Lines Between Tacoma and Tenino

The O. W. R. & N. started operation over this line on January 1, 1910, and the Great Northern on June 19, following, at which time work had already been begun on the reconstruction of the line and building a second track from Tenino south to Portland. With the inauguration of this additional train movement the demand for increased facilities became more urgent and the work was prosecuted vigorously until the second track south of Tenino was placed in operation late in 1911. In rebuilding this portion of the line, numerous changes in grade and alinement were made so that the ruling grade south of Tenino is now 0.3 per cent. in each direction with the exception of five miles of one per cent. grade ascending both ways to Napavine, 25 miles south of Tenino.

CHARACTERISTICS OF OLD AND NEW LINES

North of Tenino the grade on the old line is very broken and consists largely of one per cent. grades in both directions, with 2.2 miles of 2.2 per cent. grade ascending directly from the station at Tacoma. The maximum curve on the old line is 10 deg. The tonnage rating southbound is now 2,000 tons with helper service up the hill from Tacoma; switch engines from the yard are used for helper service, three such locomotives being required as helpers on a tonnage train.

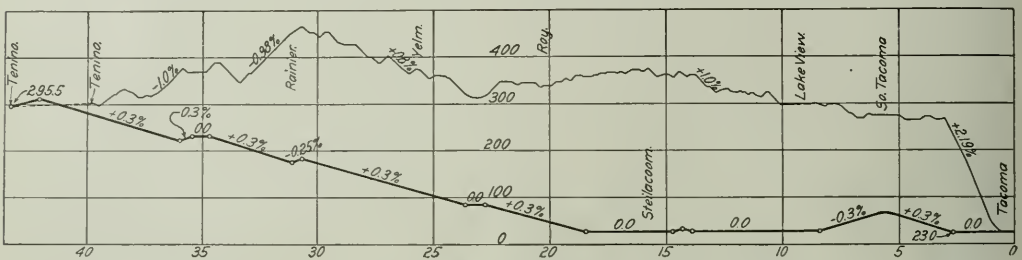
The heavy through traffic of all three roads between Portland and Tacoma is materially increased by local traffic of the Northern Pacific coming onto this line from the Moclips branch at Centralia, from the South Bend branch at Chehalis, and from the Olympia branch at Lake View. This traffic, combined with the physical characteristics of the old line, made necessary the inauguration of radical improvements north of Tenino. The topography along the old line made the construction of a low grade line on this location impractical and an entirely independent line was located.

Starting from Tenino the new line follows in a general way the location of the Port Townsend Southern, a subsidiary of the Northern Pacific, for six miles to Plum, and then continues northeast 16 miles across Patterson Lake to the east shore of Puget Sound. The line then follows the east shore of Puget Sound for 16 miles to Point Defiance, Tacoma, passing through the point in a tunnel 4,391 ft. long to the south shore of Commencement Bay, which it follows for five miles to a connection with the old line at the entrance to Tacoma station.

The distance by way of the new line, as compared with the old, is increased from 39.18 miles to 43.71 miles and the curvature from 824 deg. to 1,347 deg. However, the ruling grade southbound is reduced from the 2.2 per cent. out of Tacoma and one per cent. elsewhere to a maximum of 0.3 per cent., compensated in both directions. With the exception of the 0.3 per cent. grade in the Point Defiance tunnel, provided for drainage, there is practically no adverse grade against northbound trains. The total rise and fall on the new line is 421 ft. as compared with 1,244 ft. on the existing line. The maximum curve is also reduced from 10 deg. on the old line to three deg. on the new. With the locomotives now in use on this division, the new grade will permit an increase in the tonnage to 3,000 tons southbound, limited by the Napavine hill, and will increase this rating still more as far south as Centralia and Chehalis by filling out with cars for these branches, in this way decreasing the mileage of these branch line trains between Tacoma and Chehalis. Because of the rapidly increasing traffic on this, the only north and south line along this portion of the coast, the new line was located as a four track line, of which the two westerly tracks are now being built.

The situation at Tacoma station will also be materially

improved. At present a reverse movement at the foot of the 2.2 per cent. grade is necessary for all trains either in entering or leaving the passenger station, while the freight tracks cross the passenger line at grade at the throat of the station. The present station was built two years ago with the present work in view so that upon the completion of the new line, passenger trains will be pulled directly into and out of the station without any reverse movement and freight and passenger traffic will be entirely separated at the station. From the station north almost to the Point Defiance tunnel, the new line lies on the present location of several important industrial tracks, necessitating a considerable rearrangement of large steam shovels on this line in addition to two Model 40 shovels for miscellaneous light work.



Profile of Old and New Lines

yards and industrial connections to afford main tracks independent of the switching leads.

GRADING

The construction of this line was authorized early in 1912 and work was immediately started on the grading. The yardage is estimated at 7,500,000 yd. consisting almost entirely of earth. The contract provided for only two classifications, earth and solid rock. The largest fill on the line, which was at the crossing of the Nisqually river, was 72 ft. high and about a half mile long, requiring 1,500,000 yd. of material.

The grading south of Puget Sound involved no particular difficulties. The only slide of any importance was about two miles north of Tenino where the line crosses a low divide in a cut originally estimated to contain 195,000 yd., in addition to 200,000 yd. of borrow material which was to be taken out beyond the regular slopes. As the work progressed the material on one side for a horizontal distance of 700 ft. back and to a height of 300 ft. above grade started to move into the cut. A photograph shows the condition of this cut after the shovel had been hurriedly pulled back following a rise in the bottom of the cut and a further side movement during one night. At the time of this slide a total of 600,000 yd. of material had been removed. The contractor placed seven large steam shovels on this line in addition to two Model 40 shovels for miscellaneous light work.

THE SECTION ALONG PUGET SOUND

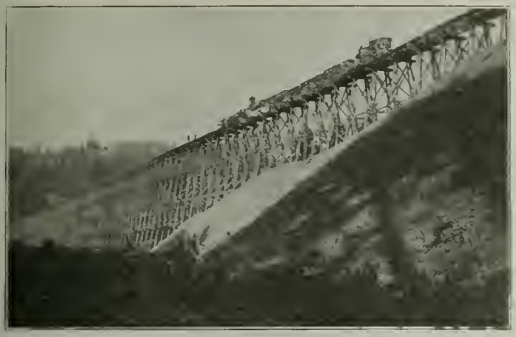
The most interesting problem is in the construction of that portion of the line lying along Puget Sound. For 16 miles this location lies almost entirely in the Sound, supported only on occasional points of land which it crosses. Coming south out of the tunnel at Point Defiance the grade descends until the elevation of subgrade is five feet above high tide and then continues level for 10 miles, after which it rises to turn inland. The average variation in tide in this vicinity is 17 ft. and a maximum variation of 21 ft. has been observed. To protect the embankment on such a location from storms and heavy wave wash it was necessary to construct 12 miles of seawall. To provide this seawall and also a means for the construction of the embankment, a trestle was built consisting of three-pile bents spaced 15 ft. apart for heights exceeding 9 ft. above the bottom of the Sound and two-pile bents below that height with an intermediate braced pile between each two bents. These piles varied in length from 16 to 44 ft., depending on the depth of the water and were driven to a minimum penetration of 12 ft.

The bottom consisted mainly of sand and gravel with some clay and some cemented gravel. In the latter material, holes were sprung with light charges of powder and the piles driven in the holes thus started. The piles were capped by 12 in. by 12 in. timbers and properly cross-braced. The grade of the top of the caps was established at three feet above high tide. The outside piles were driven on a batter of three inches to one foot, this inclination making necessary the use of a pendulum driver pivoted at the upper end. The contractor built three such drivers for this work. The intermediate braces consisted of one pile driven on this same batter with two 4 in. by 8 in. timbers braced to a 16 ft. anchor pile, as shown in the drawing. The inside faces of these main piles

A Heavy Slide North of Tenino

were planked solidly with six inch planks to the elevation of mean high tide.

As this timber seawall was completed, the contractor placed a deck on it and used it as the construction trestle on which he brought out his material to construct the embankment. This material was for the most part loaded by steam shovels working in cuts where the line crossed points extending into the Sound or in borrow pits, although in some instances material was sluiced directly from high banks into the fills. As



Constructing Heavy Fill at Approach to Patterson Lake

the fill was widened out sufficiently behind the wall, the contractor threw his track onto it and raised it to subgrade two feet above the top of the caps. The center of the nearest track was 15 ft. 6 in. inside of the center line of the seawall trestle.

The waters in Puget Sound are seriously infested with teredo which attack the piling up to about 10 ft. above low tide. Although timber given a heavy penetration of creosote is practically immune to the attacks of the teredo for some time, untreated piles were used for this wall as it was not considered necessary to go to the increased expense of using

Making Fill Across a Sink Hole at Patterson Lake from a Trestle Carried on a Raft

treated piles when in any event it would be necessary to protect the bank ultimately with riprap. Accordingly, as fast as a portion of the embankment was completed it was protected with a heavy facing of stone, although in several instances piles were entirely cut off by the teredo and rose to the surface before this riprap could be applied; the life of this timber, in some instances, not exceeding three months.

About 250,000 yd. of rock were required for the protection of this embankment and the specifications required that 90 per cent. of it must be one cubic foot in volume or larger, allowing up to 10 per cent. of spalls. This material was brought in by scows from Waterman and was placed by contract by means of one floating derrick, one derrick working from the seawall and one outfit of scows dumping directly at high tide. The lower portion of the wall was made by these scows and it was completed by the derricks. The finished wall stands on a 1:1 slope up to the top of the timber sheeting and is then inclined on a flatter slope to the shoulder of the embankment as shown in the sketch. Approximately 522,000 lineal feet of fir piling were required for this seawall, all of which was specified to have a minimum of nine inches of heart wood. In addition, 7,220,000 ft. B.M. of timber other than piles was required and over 1,368,000 lb. of iron.

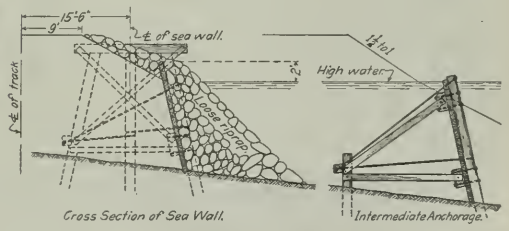
POINT DEFIANCE TUNNEL

Next to the seawall the most interesting problem was the construction of the Point Defiance tunnel through the projection between Commencement Bay and Puget Sound proper, just outside the city limits of Tacoma. This tunnel is 4,391 ft. long and is built for two tracks on a 0.3 per cent. grade each way from the center to provide drainage. It is on tangent with curves at each end. The material through which it

Completed Portion of Sea Wall and Embankment

was driven is very fine sand. Work on this tunnel was pushed from both ends with shields. Wall plate drifts were first driven, followed closely by the shields supported on these wall plates. These shields were driven forward with twelve 80-ton hydraulic jacks with a limit of movement of one foot. The timbering followed immediately behind these shields.

Motor driven belt conveyors carried the material excavated from the wall plate drifts out onto the bench. Similar conveyors carried the muck out from the center drift. At the east end a bottom center drift was then driven at grade sufficiently large to permit a dump car to enter and the remainder of the material was trapped into cars. At the opposite end the bench was taken out with a Marion 40 air



Sea Wall Along Puget Sound

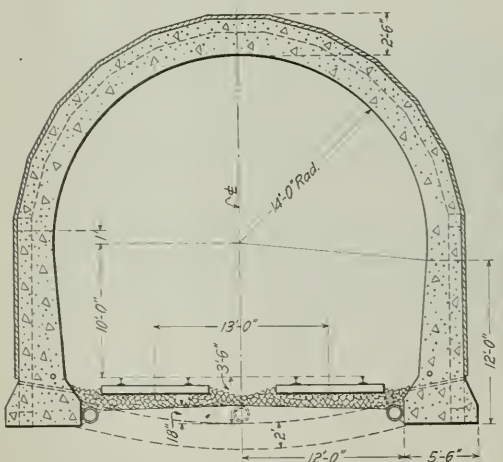
operated shovel loading into small cars which were handled by an electric locomotive. Work on this tunnel was started late in April, 1912. It was holed through on June 11, 1913, and the last of the bench material was removed on June 21. The maximum distance driven in one month was 731 ft. in May, 1913.

In lining the tunnel with concrete, alternate ribs only were

removed and the remaining timbers were concreted in place. The concrete mixing plant at the east portal is shown in one of the photographs. Stone and sand were elevated into storage hoppers above the mixer with a belt conveyor and cement was stored in the adjoining shed. The concrete was dumped into cars which were hauled into the tunnel with a small

Interior of Point Defiance Tunnel Showing Timbering

electric locomotive. The cars were then hoisted and dumped onto an elevated platform which was mounted on four trucks running on two tracks and moved forward as the work progressed. The concrete was shoveled into the sidewalls or arch ring by hand. About 120 yd. of concrete was deposited by each plant at each shift. The cross section of the



Cross-Section of Double Track Tunnel at Point Defiance

wall required 7½ cu. yd. of concrete per lineal foot, enabling a 16 ft. section of the arch to be keyed up daily. This lining required 39,000 cu. yd. of concrete in addition to 3,710,000 ft. B.M. of timber. Power for operating the locomotives, for lighting the tunnel while this work was in progress and for running the mixers was generated by a plant at the west portal.

Another tunnel 300 ft. long was built through heavy blue clay a short distance east of the long one. Side drifts were first driven on the elevation of the wall plates and were then widened until the entire arch section was excavated. Wall benches were then driven, the sidewalls were built and the arch rings put in, after which the center bench was removed. This tunnel was also driven from both ends. Construction

Concrete Mixing Plant at Entrance to Point Defiance Tunnel

was complicated somewhat by an agreement with the town of Rustin in which it was located, providing that a roadway tunnel which the city desired to construct alongside the railroad, be driven first and the intermediate wall be used in common. Delay in completing the city's portion of the work held up the railway for some time but not sufficiently long to delay the opening of the line.

OTHER CONSTRUCTION FEATURES

Three steel bridges are required. The Des Chutes river is crossed seven miles north of Tenino on one 150 ft. deck truss and two 50 ft. deck girder approaches. The Nisqually river is crossed 11 miles farther north on three 150 ft. deck trusses and two 100 ft. approach spans. At Steilacoom an 80 ft.

The Substructure of the Nisqually River Bridge

Strauss direct lift bridge was built with a creosoted timber approach. Creosoted pile structures were also built at Wilton Waterway, Bay Island and two other points along the Sound, care being taken to secure a heavy penetration of creosote to render this timber immune from the attacks of the teredo.

Smaller openings were provided for with concrete pipe made by the railway company at a plant built especially for

this work at Auburn, Wash., 18 miles north of Tacoma, and described in the *Railway Age Gazette* of February 20, 1914. This pipe was made in 24 in. and 36 in. sizes, over 10,000 lineal feet of each size of pipe being required. About 200 concrete piles were also cast in this yard for use under the ends of the girder approaches to the longer spans.

This new line is laid with 90-lb. open hearth rail on untreated ties. After the completion of the line, all through traffic will be routed over it, but the old line will continue to be operated for local traffic.

This road is being built under the direction of W. L. Darling, chief engineer, Northern Pacific; J. C. Breedlove, assistant engineer, is in direct charge of the work to the city limits of Tacoma, while that work within the city is being handled under the direction of A. R. Cook, principal assistant engineer. All bridge work was designed under the direction of H. E. Stevens, engineer of bridges. Porter Brothers, Grant, Smith & Co., Portland, had the contract to build the foundations for all bridges and to do all grading, track laying and ballasting on this line south of the tunnel and the Keasal Construction Co. had the contract north of the tunnel for the grading and masonry work. Nelson Bennett, of Tacoma, had the contract for the tunnels.

GENERAL FOREMEN'S CONVENTION*

At the Thursday morning session A. P. Prendergast, superintendent of machinery of the Texas & Pacific, addressed the association. Mr. Prendergast emphasized the need of good treatment of employees and urged that provision be made for their comfort, and also that good tools be provided for them or they cannot do good work. A large percentage of employees will follow the example of their leaders, and it is therefore necessary that supervising officers use care in conducting themselves. He urged foremen to study the personality of the individual workmen so that they may be assigned to work for which they are best fitted. He also placed considerable stress on the help which can be obtained by carefully reading railway technical papers. The address was replied to by Dr. Angus Sinclair.

VALVES, CYLINDERS AND PISTONS

J. T. Mullin presented a paper from which the following is taken:

Piston valves on superheater locomotives should be examined once every 30 days, as a great deal of carbonization accumulates on them. Piston valves with the Stephenson valve gear should be set with negative lead to obtain the greatest efficiency from superheater locomotives. Piston valves and valve chambers when worn 1/32 in. should be rebored, and new valve rings should be a perfect fit in the valve chamber and should be 3/32 in. larger than the chamber. Old rings reapplied in the shop or engine house should be at least 1/16 in. larger than the valve chamber.

It has been found on locomotives converted from saturated to superheated steam that the cylinders have a tendency to crack leading from the valve chamber to the receiving ports of the cylinder. In order to overcome this we are applying a cross-brace from front to back between the valve chamber and the cylinder, shrinking it and drawing the metal together in order to hold it when under the high temperature. This has overcome the cracking of this part of the cylinder.

Pistons should be examined every shopping as in some cases they are apparently in good condition until examined, when they are found to be worn flat.

Discussion.—With the Stephenson valve gear a number of roads follow the practice of keying the eccentrics to the main axle before the wheels are under the engine. A record is kept of the position of the eccentrics so that the practice may be uniform on different engines of the same class. The Lackawanna has found trouble on superheater locomotives with the graphite lubricator because of carbonization, causing the piston rings to tilt, and blows resulting. It was stated that much trouble with valves may be eliminated by removing the relief valves and instructing the men to work steam to a stop. The practice of examining valves and piston rings periodically, generally every thirty days, seems to be quite general, but one member did not think it was necessary. He claimed that this method was too expensive and that satisfactory results could be obtained by the enginemen reporting trouble after it starts. Several members expressed the opinion that lack of lubrication was the cause of much cylinder and valve trouble where a little more oil would save much repair expense on rings and bushings. Two roads have done away with piston rod oil cups on superheater locomotives and use swabs with valve oil. This has been found to reduce carbonization, as the enginemen, it was claimed, will use low grade oil in the oil cups and this carbonizes very easily.

AUTOGENOUS WELDING

C. L. Dickert (Central of Georgia) presented a committee report of which the following is an abstract:

Literally speaking, the methods mentioned in these papers would not come under the head of autogenous welding, but as we know and speak of them as such we have included them.

Each method has its advantages; the electric, for welding flues to the back flue sheet, I believe, has the field to itself. However, the oxy-acetylene advocates claim great progress along this line. For cutting, the oxy-acetylene process is in a class by itself; there is a difference of opinion as to which is best on a general run of boiler work. Economy and efficiency are the two main points to consider.

We have the electric and oxy-acetylene plants installed at Macon shops, and have done quite a lot of welding with both, but I am not in a position to give a comparative cost or the efficiency of the two methods. We at first installed the oxy-acetylene plant and used this method altogether, and about two years later we installed the electric. Shortly after the electric outfit was going, we had an accident occur to the acetylene plant. We then had to resort to the electric for all classes of welding. We have just about completed our new acetylene plant and have made a few tests on side sheets with the electric and oxy-acetylene. One of our greatest troubles is breaking in operators and holding them after they have learned to handle the torch successfully. Each craft does the welding of metals that originates in its respective department; blacksmiths handle all wrought iron, steel and cast steel; boilermakers all boiler plates and flues; machinists, cast iron; and coppersmiths do all the brass and pipe work.

One great defect is that its use appears too easy, and it is applied in all sorts of ways. The operators, as a rule, give it but little study, which is responsible for practically all failures, as the average mechanic, these days, devotes but little time to study on the things pertaining to his trade. A blacksmith of the right caliber would, in my opinion, be the right man to handle the welding, as he has more knowledge of heating metals, taking care of expansion and contraction, etc., than mechanics from other departments. At any rate, whoever is put on the job should have a competent instructor, and should be furnished with all the reading matter that is published from time to time on the subject, so as to familiarize himself with the work.

Autogenous welding has enabled the railroads to reduce the cost of repairs, increase mileage of flues, prolong the life of fireboxes, reclaim worn parts of locomotives, repair broken parts of machinery, and numbers of other savings. All large shops, to have a complete arrangement, should have all the systems.

Electric Welding.—A field in which electric welding has proved very successful and profitable, is that of welding flues to back flue sheets. We have in service today over 90 locomotives with flues welded to the back flue sheet, making a total of about 27,000 flues. Out of this number of locomotives in service with

*See *Railway Age Gazette*, July 17, 1914, page 105, for report of the first two days' proceedings.

flues welded, we have our first engine to fail on the road from flues. We have, however, had some few flues leak after being in service a short while, which was due to bad beads when they were welded in. If part of the bead is off, exposing the copper, it is very difficult to get a good weld.

When new flues are to be welded, we apply them in the usual manner, with copper ferrules, rolling the bead and prossering. A heavy bead is built up in welding to the flue sheet. This leaves a rough finish. Some roads shape up the beads with a cutter, while others go over them with a beading tool to smooth them over. We find this is not necessary.

Where flues that have been welded in are to be removed, it only requires a few hours longer to cut off the beads, and we find that the flue sheet is in better condition than before welding in flues, as welding builds up the sheet around the flue holes to about the original thickness. We have a tool for facing off the rough surface after the flues are removed, making a good clean sheet for applying new flues.

Welding in half side sheets and patches, repairing mud rings, etc., has proved very successful with the electric process.

Electric welding has proved valuable in filling up worn links, link blocks, blade jaws, saddle pockets and cellar bolt holes in driving boxes; welding new notches in quadrants, worn places in frames caused by spring rigging wearing; building up piston fits to crossheads, rod ends and straps; in fact everything that is worn or broken that it is possible to reclaim at a profit. There is no limit to its usefulness, as we always find something new to be done.

Oxy-Acetylene Welding.—The oxy-acetylene process of welding and cutting has passed the experimental stage, and has made a more rapid growth in the past few years in railroad work than in all the preceding years combined. For cutting it has the field to itself.

Oil Welding.—Oil welding of locomotive frames has been the practice at Macon shops for the past two years. Quite a number of welds have been made during this time which have proved very successful. The success of oil welding, like all other methods of frame welding, depends largely on allowances made for expansion and contraction.

There is but little expense attached to this method of welding. The outfit consists of a small oil burner, an oil tank and two small battering rams. The entire outfit is mounted on a four-wheel truck which is easily handled around the shop. The material used is crude oil, fire brick and fire clay, which amounts to about $2; the balance of expense is for labor, which amounts to about $6; making a total cost for preparing and welding frames on an average of $8.

The Chicago & North Western is using three methods of welding with very good results in each case: oil welding, thermit and oxy-acetylene welding. If there are any light frames broken, say through the pedestal jaw or lower rail, or back braces, they resort to oil welding as it is considered much cheaper and quicker than any other process. For broken frames on heavy power thermit is used almost entirely, and with very great success. They have had one or two cases where the frames have broken again at the weld, but it is not believed that the thermit was to blame so much as the men doing the job, in not allowing enough for contraction in the cooling process, and thereby putting an undue strain upon that part of the frame.

The Delaware & Hudson uses both the electric and oxy-acetylene welding processes. On boiler work they weld in flues, small cracks, seams, mud rings, etc. With boiler work this has not proved entirely successful, due to leaks that develop later and have to be corrected. However, they are making progress along this line, and are continuing its use.

The oxy-acetylene system they have had going about one year, starting with portable oxygen and acetylene tanks. The class of work done includes the welding of various castings when defective, building up of the worn surfaces on the heavier castings, as this is a surer process than the electrical welding of engine frames, which is not always successful, welding engine truck frames and cradles, all frame braces and brackets, plugging holes in heavy motion work parts, reclaiming nearly all tender bolsters, guides and pedestals, cracked locomotive bells, etc. On boiler work they weld in all firebox door sheets when they join in the fire door hole, and apply patches to boilers, which is not always successful, due to the tendency to crack on cooling. They also apply sections to flue sheets and weld broken bridges. These also have to be frequently gone over the second or third time on account of cracks due to contraction.

In repairs to fire door cracks, experience strongly indicates, for back shop practice at least, that better results are obtained by cutting out the cracks, replacing by patches the sizes of which are governed by the nature and size of the crack. Merely welding up old fire door cracks usually leads to future trouble, since the crack starts from the inside and can be only partially seen from the outside with the result that all of the crack is not completely welded up, and possibly cracks existing on the water side and not visible from outside may be increased by the strain of contraction from the heat of welding a closely adjoining crack. By cutting out cracks which are visible from outside and welding in patches of new material this trouble is eliminated The Atlantic Coast Line has experienced excellent success with boiler repairs made by the oxy-acetylene process at the Waycross, Ga., shops, including some radical departures over the old method of repairs.

The report is signed by C. L. Dickert, chairman; R. B. Van Wormer, A. C. L.; C. M. Newman, A. C. L.; A. A. Masters, D. & H.; F. P. Miller, C. M. & St. P., and Wm. Hall, C. & N. W.

Discussion.—The discussion of this paper was entered into with a great deal of interest, and on the subject of oxy-acetylene welding, Mr. Byers, of the St. Louis & San Francisco, presented considerable information on the work done at the new Springfield shops of that road. The shops are piped for acetylene gas and 20 welders are kept busy performing various classes of work. From July 1, 1913, to June 30, 1914, that shop consumed 856,700 cu. ft. of oxygen and 108,800 lb. of carbide, and it was estimated that a saving of $83,191.60 was obtained by the use of this process, the following table giving a list of the amount and kind of work during this time:

Parts	Pieces	Parts	Pieces
Ashpans	637	Shop machines	692
Brackets	391	Main rod brasses	8
Braces	661	Miscellaneous repairs	473
Bolsters	13	Main rods	146
Crossheads and pistons	254	Miscellaneous parts	4,914
Center castings	26	Oil boxes	531
Center plates	2	Pedestals	626
Cylinders	23	Reverse lever strips	368
Driving boxes	240	Rocker arms	100
Drawbars	12	Running boards	374
Driving wheels	3	Steam chests	5
Door collars and sheets	400	Steam pumps	10
Deck castings	1	Side sheets	495
Equalizers	236	Steam pipes	62
Engine frames	567	Truck boxes	113
Front end ring	45	Truck frames	14
Firebox work, misc.	3,017	Triple valves	2
Lubricators	3	Water columns	4
Flue sheets	261		

Mr. Byers stated that all firebox side sheets are welded in and that good success has been obtained with welding frames, there being only two failures out of 77 frame welds made. It has, however, been found difficult to get a satisfactory weld with cast iron, only one man having been found who could do this so that it could be machined. It is necessary to have expert men to perform oxy-acetylene welding, and it has been found that blacksmiths make the most apt students. In welding tubes in the tube sheets, Mr. Byers stated that it is not necessary to use the copper ferrules.

Other members could not report as all-round good success as did Mr. Byers, and attributed their trouble to inexperienced help.

Those roads using electrical welding have found it very successful, being able to weld more difficult jobs than they could with the oxy-acetylene process. C. L. Dickert, of the Central Railway of Georgia, claimed that an electrical welding outfit would pay for itself by its success in welding tubes, and the results have shown that 22 tubes could be welded per hour by one man. With this process he has been able to fill up wrist-

pin and knuckle-pin holes and flat spots on tires very satisfactorily. Thermit welding has proved generally successful. On the Chicago & North Western at Clinton, Iowa, out of 154 thermit welds, there were only five failures, three of these being man failures. Other roads reported equally good results.

AIR BRAKE REPAIRS

The following is an abstract of a paper by Chas. M. Newman (Atlantic Coast Line):

The maintenance of the air brake depends largely on five principles: Accessible location of parts which require frequent attention; proper installation; methods of inspection; to what extent terminal repairs are made; methods of making repairs to the principal parts.

Accessible Location.—As an assistance to maintenance, this is very important. When time is short and many repairs are to be made, the parts most accessible will receive the attention and those inaccessible will be neglected. This results in lowering the efficiency of the brakes, in neglect of equipment and in increase in the cost of maintenance. I have seen air pumps located so close to the running board that it was next to impossible to remove the bottom head or a valve cap without removing the pump or the board.

Proper Installation.—A good air brake equipment improperly installed is an expensive device from which efficient service cannot be obtained. The heart of the equipment, the air pump, should be made perfectly secure in its location, and so located that the intake will not be in a position to get the dirt and grit from the running boards or ashes from the pans when fires are being cleaned or dumped. Reservoirs and other parts which have several pipes connected should be fastened to some place as free from vibration as possible and the fastening made securely, as improper installation and location of such parts are responsible for a great many leaks and broken pipes. When a distributing valve is used, it should be applied to substantial brackets and these to a place free from vibration. As little drop as possible for the brackets will prevent some vibration. Brake valves and signal valves should not be located too close to the boiler, as excessive heat interferes with their efficient operation.

Gages should never be fastened directly to iron brackets, but small blocks of soft wood, of a uniform thickness, should be used between the gage and the bracket. Too much cannot be said on the proper installation of piping. Many failures to engines and cars on account of defects in the air brake equipment can be traced to badly clamped and crooked pipes, or pipes with an insufficient number of clamps, or clamped or bent in such a manner as to form pockets. All piping should be put up with as few elbows as possible, using easy bends instead.

Methods of Inspection.—Before any engine leaves the engine house its entire air apparatus should be given a thorough inspection and test by competent men, and all perceptible defects corrected. The air pump should be given an efficiency test to make sure that it is capable of supplying the necessary quantity of air under ordinary conditions.

Something which is very frequently overlooked by inspectors, especially on locomotives, is the matter of the brake levers, beams and hangers being the correct ones for the type of engine. Frequently, a repair man, at an outside point, will replace one of these with one the nearest to the correct one that he has. This lever may increase the braking power and under unfavorable conditions would cause wheels to slide; or he may have decreased the braking power by applying a light beam or the wrong hanger, which reduces the efficiency of the brakes.

The proper time to inspect a train is on its arrival. To do this, the incoming engineer should add to the reduction required to stop, enough to fully set the brakes on the train. The inspectors should be present and make an immediate examination and bad order all defective brakes. In seeking accessible places to make brake tests and inspection without loss of time, extra switching or danger to workmen, the freight house and transfer tracks should be considered. Here, the number of cars handled per day is considerable, and these tracks should be supplied with compressed air and full advantage taken of this excellent opportunity of locating and remedying defects.

Terminal Repairs.—Good brakes depend on the attention they receive at the terminal. You cannot depend on the repair tracks in shops keeping up the air brake equipment. All defects noted by the inspectors should be corrected. At the very best, the regular terminal test of brakes on engines or cars misses many of the defects, and for that reason it is important that as few defects as possible be allowed to escape repair. However, it does not follow that the repairing of defective brakes cannot be done without delay to cars which should go forward promptly.

Such repairs as ordinary brake pipe leaks, defective hose gaskets, wrong piston travel, etc., which require little time should be made on the service tracks; but cars requiring heavy brake repairs should be marked for the repair tracks. Here is where good judgment must be exercised, as perishable or other very important loads or empties needed for such lading must not be delayed. By assigning a certain track in important terminal yards for air brake repairs, which require more time than the ordinary repairs made on the service tracks, and a few men with the necessary repair materials, such cars are often repaired and go forward in the first train out, and very few are allowed to go forward without repairs being made. All cars in shops or on repair tracks with cleaning dates over nine months old, should have their brakes cleaned and lubricated. Not only will the condition of brake cylinders and triples fully warrant this, but it is improbable that these cars will be so favorably located again for months, without causing delay and switching.

When triples need cleaning, it is not a good policy to do it on the repair or service tracks, but they should be removed and sent to the shops, or some place fitted with a test plant, so that, after the operation of cleaning and lubricating, they can be placed on the test rack and given the required test; then they are ready to be replaced on the car or engine, and efficient operation is assured.

Another apparently small defect will be found on almost every train which is carefully inspected is air leaks. A large railroad, which operates long trains successfully, has an allowable maximum train line leakage as follows: For trains of from 25 to 50 cars, 7 lb. per min.; for trains of from 50 to 75 cars, 6 lb. per min.; for trains of 75 cars or over, 5 lb. per min.

Methods of Making Repairs.—Practically all of our air brake parts are removed and applied to the locomotive by handy men and helpers. When carried to the air brake department for overhauling, the work is done by specialists; that is, handy men or mechanics who have been trained in each line. By using men in this manner, we get the highest efficiency from the man on each part.

Discussion.—The chief point brought out was that the different parts of the air brake apparatus should be placed in more accessible places, giving an opportunity to repair and inspect them readily. A change in the design of the air pump piston rods from the shoulder to the tapered fit of the piston was believed to be needed; where it has been done a reduction in broken piston rods has been experienced.

THE TAYLOR SYSTEM

A subsidiary paper on this subject was presented by W. W. Scott (D., L. & W.) in which he said, in part:

After a careful analysis of the scientific principles of either the Taylor or Emerson school, we may find in many of the details, nothing entirely new in doing work. The shop manager may have a much better way in handling some detail; but the new principles should not be confused with methods. If you have the principles of scientific management and a purpose to carry them out, any man may get results, though his methods of applying the principles may vary.

The history of the development of scientific management calls for a word of warning. The mechanism of management must not be mistaken for its essence or underlying philosophy. Pre-

cisely the same mechanism will in one case produce disastrous results and in another the most beneficial. The same mechanism which will produce the finest results when made to serve the underlying principles of scientific management will lead to failure if accompanied by the wrong spirit in those who are using it.

ELECTION OF OFFICERS

The following officers were elected for the ensuing year: President, W. W. Scott, general foreman, D., L. & W., Buffalo, N. Y.; first vice-president, L. A. North, superintendent of shops, Illinois Central, Chicago; second vice-president, Walter Smith, Chicago & North Western, Chicago; third vice-president, W. T. Gale, machine foreman, Chicago & North Western, Chicago; fourth vice-president, W. G. Reyer, general foreman, Nashville, Chattanooga & St. Louis, Nashville, Tenn.; secretary-treasurer, Wm. Hall, Chicago & North Western, Winona, Minn.

CLOSING EXERCISES

J. Hannahan, formerly chief of the Firemen's Brotherhood and now a representative of the Locomotive Stoker Company, addressed the association, pointing out to the members the necessity of all railroad men working together to prevent so much adverse legislation that has proved to be merely political ammunition. Every railroad man should exert what influence he can to impress his representatives in either the state or federal legislatures, that they should treat the railroads fairly. He also spoke of the vast opportunities ahead of general foremen, mentioning a number of prominent men who have worked up through this position.

PASSENGER TERMINAL IMPROVEMENTS AT BUFFALO

The Delaware, Lackawanna & Western began construction work about the first of the year on its new passenger station and the rearrangement of its terminals in Buffalo, N. Y., in accordance with its agreement with the city's Terminal Station Commission. This commission was created by special act of the state legislature about four years ago, with power to negotiate with the railways entering the city to secure freight and passenger terminal improvements that have been desired both by the railways and the city. The membership of the commission, as fixed by the act of the legislature, consists of ten prominent citizens of Buffalo serving without pay, the commission having authority to act in this matter for the New York Public Service Commission. The constitutionality of the act was contested in the courts and was upheld by a decision rendered in March, 1913. The commission has done little toward the consideration of the problem of improving the city freight terminals, as some immediate relief for the passenger terminal situation was urgently needed.

There are at present four principal passenger stations at Buffalo; first: the so-called union station owned by the New York Central & Hudson River and used also by the Buffalo, Rochester & Pittsburgh; the Lake Shore & Michigan Southern; the Michigan Central; the Pennsylvania, and the West Shore; second: the Lehigh Valley station, used also by the Grand Trunk; third: the Erie station, used also by the New York, Chicago & St. Louis, and the Wabash; and fourth: the Delaware, Lackawanna & Western station. All of these stations are old and inadequate properly to handle the traffic. Also, in a number of instances the approaches cross streets at grade, endangering street traffic and causing delays in entering the station. Following extended negotiations with the Terminal Commission, the Lackawanna reached an agreement last year for the improvement of its entrance and the construction of a new station. The New York Central and the Lehigh Valley are still conducting negotiations for similar improvements and it is possible that in the rearrangement the roads now using the Erie station may become tenants of the New York Central. It has been tentatively decided to locate the New York Central station on the Terrace just west of the present union station near the location of a small station on the Niagara Falls branch of that road. It is expected that the Lehigh Valley will use its present entrance with some improvements in street crossings, but the location of its new station east and west has not yet been fixed.

The Lackawanna enters the downtown district of Buffalo from the southeast, approaching the Buffalo river near Michigan street and paralleling the river from that point to the passenger station and beyond to the coal docks. The double track line crosses Michigan street overhead and then drops down to the street level, the tracks being laid in Ohio street for the remaining distance to the station. The old passenger station is located on the west side of Main street with the lake freight house just across the tracks on the river front. The coal docks are located about one-half mile west of the station and the local freight house north of the main tracks near Columbia street. The advantages of this river front location for the freight traffic are evident, and as the passenger station is only a few blocks from the hotel and office district of the city and the other railway stations, its location was also satisfactory. The old building was entirely inadequate, however, having been remodeled from the structure used by the street railway company as a car barn in the days of horse car operation. It was also very desirable from the standpoint both of the railway and the city to remove the tracks from the public streets along the river front.

Perspective Sketch of Proposed D. L. & W. Passenger Station at Buffalo, N. Y., from the River Side

The traffic to be considered in designing the new passenger

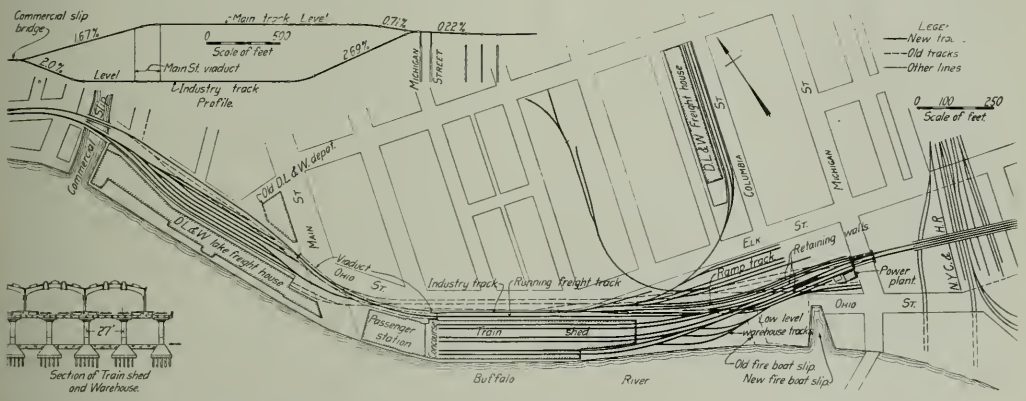
station and terminal approaches consists of eight passenger trains each way per day, five of which in each direction are through trains to and from New York; a heavy movement of Pennsylvania coal, particularly in the summer, which is hauled to the coal dock for loading lake boats; and a considerable package freight traffic for transfer to and from lake steamers at the lake freight house, in addition to the local freight business handled at the separate house mentioned above. The passenger terminal is of the stub-end type, all through cars for western connections being handled at East Buffalo or other junction points east of the station. All locomotives and cars are handled at the East Buffalo terminal, about five miles from the station.

The new passenger station will be located just east of Main street adjacent to the river. By moving Ohio street about 40 ft. to the north and acquiring all property between Ohio street and the river this allows all tracks to be placed south of the street, leaving it unobstructed. The track level is raised about 22 ft. above the street and the single track lead to the coal dock is carried on this elevation across Main street on a steel viaduct encased in concrete. The only grade crossing involved in the new layout is the single track lead to the lake freight house just west of Main street. This lead is carried alongside the train shed and station building and under the Main street viaduct, shed, will be available for future warehouse development. It will be necessary to construct a new fire boat slip in order to remove the old one which interfered with the location of the station leads.

The new station will be a steel frame structure, 110 ft. by 250 ft. in size, with a granite base course, brick facing above the waiting room floor level, and a tile roof. It will be four stories high with a mezzanine floor between the dock level and the train shed floor. The upper portion of the building will be devoted to offices. The new dock will have a concrete dock wall supported on timber piles, all of the timber construction being kept below the water line. About 10,700 piles are being driven under the station and train shed. About 30 ft. of quicksand has been encountered; under part of the work and under this condition the piles are jetted. Elsewhere they are driven. The piles are being driven to rock which is about 40 ft. below street grade.

An electro-pneumatic interlocking tower, controlling the entrance to the station, will be located on top of the power plant which will furnish heat to the new station. This is located just west of Michigan street, this somewhat remote location being chosen in order to leave the more valuable space along the river front free for development.

This improvement work is being carried out under the direc-



Track Plan Showing the Lackawanna Improvements along the River Front in Buffalo, N. Y.

connecting with the small yard adjacent to the freight house. The lead to the local freight house just west of Columbia street is unchanged, connecting with the low level tracks just north of the train shed. The two main tracks will remain unchanged across Michigan street, but just west of that point they will swing to the south diverging to six station tracks, two of which are about 475 ft. long and four 675 ft. long.

Advantage has been taken of the location of the station on the river front in a number of ways. Arrangements have been made to dock the passenger boats of the Detroit & Cleveland and the Cleveland & Buffalo boat lines alongside the station building and passengers of these steamers will use all of the station facilities in common with the railway company's patrons. A Bush type train shed will be used and the station tracks and platforms, as well as the shed, will be supported on a continuous deck structure of reinforced concrete, over the tops of the supporting columns, which will be spaced 27 ft. center to center in both directions. This type of construction will make available all of the space under the train shed for warehouse purposes. This storage space will be accessible to boats docking alongside and it can also be served by three spur tracks connecting by a switchback, shown in the accompanying plan, under the station approach tracks to the low level track along the north side of the station. The new development will involve the construction of about 1,800 ft. of dock, a portion of which, just east of the train

tion of G. J. Ray, chief engineer, Delaware, Lackawanna & Western; A. E. Deal, bridge engineer; G. E. Boyd, division engineer, and O. H. Kellogg, assistant engineer. Kenneth M. Murchison, New York, is the architect for the station building. The contract for all foundation and dock work was let to the Buffalo Dredging Company, Buffalo, N. Y., and that for the station to the Hedden Construction Company, New York City.

SUMMARY OF RAILWAY PROGRESS IN CHILI.—The government of Chili now has under construction 208 miles of railroad estimated to cost about $8,634,000, of which it is expected to complete 63 miles by the close of 1914 at a cost of $1,848,000. On completion of these lines, the Chilian government will own and control 2,270 miles, of which 150 miles is double track. The private railroads of the country cover 1,860 miles with 878 miles under consideration. The 1,860 miles are valued at $93,066,583, and the receipts for 1913 were $14,460,425, with expenses at $11,521,156, showing a net gain of $6,051,378; while the state railways showed a loss of $2,732,596. As has been noted before, the Chilian government is at present outlining a scheme of equipping the government railways with rolling stock sufficient in quantity to handle the growing business of the country, three-fourths of the total number of cars and locomotives required will have to be purchased abroad, and it is said that American material will have the preference at the same price.

AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION

The sixth annual convention of the American Railway Tool Foremen's Association was held at the Hotel Sherman, Chicago, July 20-22, inclusive. The meeting was called to order by A. M. Roberts of the Bessemer & Lake Erie, president of the association. After a prayer by the Rev. Howard A. Lepper, rector of Christ Church, Englewood, the association was welcomed by J. F. De Voy, assistant superintendent motive power and machinery, Chicago, Milwaukee & St. Paul. Mr. De Voy spoke very highly of the work done by mechanical department associations, stating that the members in attendance at the Atlantic City conventions this year seemed to pay more official attention to what the junior organizations were doing. Many of the superintendents of motive power in attendance when questioned stated that the time had come when the older associations were becoming more dependent on the junior associations for help in developing the mechanical departments of railways. Money spent by the railroads in sending men to conventions of this kind is not wasted in the least, and if the members will give up their ideas to their fellow workers the railroads will be greatly benefited.

Mr. De Voy paid special tribute to the integrity and sincerity of purpose of the men in the motive power department. Conventions of this sort will do a great deal to promote the general efficiency of that department. He referred to the tool foremen as efficiency engineers of the highest type and pointed out that their special field lay in establishing standards that would facilitate the work and reduce the cost of production, referring to the work that had been done in the automobile industry as an illuminating example.

A special field for the tool foremen is the devising of safety appliances to be placed on machines. By their ingenuity they can devise efficient and inexpensive safeguards that will be of vast benefit to the railroads they serve. He called on the tool foremen to shoulder part of the responsibility the state and federal laws have placed on the railroads and do all they can to perfect the safety appliances. Mr. De Voy closed his remarks with some very encouraging words as to the business conditions. Within the past month the Milwaukee has increased its force ten per cent. He laid particular stress on the benefits the railroads would derive from the abundance of grain that is being shipped.

PRESIDENT'S ADDRESS

President Roberts spoke of the opportunities the tool foremen have in increasing the efficiency of the mechanical department. The higher officers are looking to the tool foremen more and more each year, calling on their ingenuity and skill to increase the output of the shops and at the same time improve the quality of the work. A special field for the tool foremen is to standardize the tools so that a much less number will be required to perform the necessary work. Mr. Roberts also spoke of the benefit he has personally received by attending the conventions. Many new ideas obtained from other members through the discussions on the floor have been successfully applied by him.

STANDARDIZING REAMERS

Several members presented papers on standardizing reamers for locomotive repairs. C. A. Schaffer, general tool inspector, Illinois Central, spoke in part as follows: To any one who has had practical experience in a locomotive repair shop the economy resulting from standardized reamers is obvious, and to those who have gone into the matter systematically no argument is necessary to show wherein a saving may be effected. If conditions will not permit of going into the matter in a general way, possibly on account of not wishing to replace all of the large stock of tools of various descriptions at one time, it may be possible to select one or more sets from the following list of reamers to start with, any one of which when completed and put into practical use should show a good saving, as compared with the old method: Crossheads and piston reamers; knuckle pin reamers; ball joint reamers; and rod and frame bolt reamers. A saving in time from one to eight or ten hours may be effected on jobs when compared with the old practice of putting the work into a machine and boring it for a fit. Then, too, the life of the job will be much greater if it is done with the proper tools.

The commercially manufactured locomotive tapered reamers, which are cataloged by all the leading small tool manufacturers, for use on rods and frame work, come far from being suitable for use on the heavy power of today. A revision in standards along this line would, no doubt, result in increased business for the manufacturer and economy for the roads who buy the greater proportion of such tools instead of making them themselves.

E. J. McKernan, Atchison, Topeka & Santa Fe, stated that on the Santa Fe lines all the frame reamers for locomotives have 1/16 in. taper in 12 in. All sizes of reamers 1 in. in diameter and under are purchased from manufacturers and all those over that are made in the tool room at Topeka. Nine reamers have been adopted as standard for crosshead and piston work. These reamers are tapered ½ in. in 12 in., and are made with a left hand spiral. Four reamers are used for the knuckle pin work on side rods. They have a 9-in. flute and a 1½-in. taper in 12 in., with a left hand spiral of 68.57 pitch. A standard tapered reamer of a straight flute 12 in. long is used for the link blade pin. This one reamer takes care of all the jaws on Stephenson link motion as well. The standard reamers for cylinder saddle flange work are used in all holes on cylinder splices as well as on the flanges for truing up the holes after the cylinder has been bolted together. These reamers are tapered to 1/16 in. in 12 in. For general motion work two reamers are used, one 17½ in., and the other 19½ in. over-all. They have a taper of ½ in. in 10 in., measure 1¼ in. on the point and have a left hand spiral. The dimensions of reamers in use on the Philadelphia & Reading, Southern and the Chicago, Rock Island & Pacific were submitted by J. P. Manger, J. E. Dosser and W. J. Eddy, respectively.

Discussion.—From the discussion it was clearly brought out that the square shank was more desirable than the tapered shank for all reamers. These square shanks should be made in four different sizes so that it will not be necessary to have too many wrenches with which to drive them. The high point of the discussion was, however, the success with which the spiral reamer had met wherever it had been used and carefully made. Some reported that it was impossible to use carbon steel reamers and that high speed steel was necessary. Other roads, however, reported that with the fluted reamers carbon steel could be used exactly as well and that there was very little difference in the life. The process of the manufacture of the spiral reamer is a little more difficult than the straight reamer, although devices have been used whereby the machine work is pretty nearly the same. It is more difficult, however, in tempering and grinding as the reamers are more liable to become warped.

The Atlantic Coast Line makes reamers so that they may be ground four times, each time taking off 1/32 in. in diameter. When they have been used up to this limit they are reclaimed by being made into smaller reamers, or small tools. The discussion was closed with a recommendation that the secretary be instructed to gather information from the members of the association concerning the sizes and the degree of taper, together with other information, with a view of establishing standards for reamers at the next convention.

The remaining sessions of the convention will be reported in next week's issue.

Rolling Stock on a Chinese Railway.—At the end of 1913 the rolling stock of Tientsin-Pukow Railway of China consisted of 32 locomotives; 66 passenger and inspection cars and 490 freight cars. The freight and passenger receipts for the year were $900,600.

THE RAILROADS' MOST GIGANTIC TASK

By JOHN FINDLEY WALLACE

[From Leslie's Illustrated Weekly Newspaper, July 16, 1914]

Chicago, which conquers in the sign "we will," now contemplates picking up a river which is in her way and carrying it out west where she wants it; not very far west—only a few city blocks—but the job will cost about $6,000,000, and that is only one item in the complicated and costly undertaking by which 1-764 of the city's area, where more than twenty railroads handle every day 112,000 tons of freight and 200,000 passengers, must be unmanacled from congestion.

At New York the national government, the city and state of New Jersey are endeavoring to work out colossal projects for handling the natural growth of freight at a port doing an annual business of more than $2,000,000,000, plus that which is expected from the three great new ditches, the New York state barge canal, the Cape Cod and Panama canals. For the railroads this situation presents expensive problems. On the west side of Manhattan there is great congestion of incoming food, raw materials and manufactures and outgoing factory products and distributers' merchandise. Yards are to be constructed between Sixtieth and Seventy-second streets taking some of the costliest land in the world; it is desired to have surface operation below Sixtieth street eliminated by boring a subway to the Battery which will serve business on the land side, connect with the New Jersey ferries and link up the steamship piers with the island and with one another. Freight tunnels under the Hudson are contemplated to the New Jersey terminals. Dock development in Brooklyn with a marginal railway adjacent thereto will call for further expenditures by the rail lines for effective and convenient connections.

Boston lies between roads south and roads north, subjecting business to a high cartage cost and demanding some form of belt line, probably involving a tunnel from South Boston to East Boston under the harbor, to say nothing of electrification for both passenger and freight service.

Philadelphia must rearrange and electrify her passenger terminals so as to care for an immense number of commuters directly on the line of a very extensive through service to the south and west; while our old friend, the cartage charge, demands that freight consumed and disgorged by 8,000 or 9,000 manufacturing establishments be laid down and taken up more nearly at every man's door—and every man's door is located where it is going to cost money to plow a railroad track through to it.

Baltimore is opening an entire new section to the southeast by means of the so-called "Key Highway" with a network of tracks connecting manufacturing and jobbing sites with the railroads and piers; and the Calvert freight houses and yard spaces are to be doubled in capacity.

At Buffalo a state commission has been working out for two years the disentanglement of the Buffalo situation, which has been tying itself up tighter and tighter. Fast through passenger trains roll as serenely past this lakeport of nearly half a million people as if it were a country village; there is no quick way of getting a train in and out again. A score of railways are scattered here, there and everywhere over the city with their unrelated passenger and freight facilities which must be systematized. The New York Central alone must spend $9,000,000 for a passenger and freight terminal recently sanctioned by the commission.

St. Louis is served by ten eastern lines whose rails terminate at East St. Louis on the Illinois side of the river and by seven lines running into the city. The intermediate service is performed by practically one switching line over the two bridges except a small portion which is ferried. This arrangement requires extensive terminal accommodations. On the St. Louis side the situation is serious. Additional team track service and freight house facilities can be provided upon land already acquired for that purpose, if an ordinance can be agreed upon with the city authorities. Cleveland, Columbus and Cincinnati have all outgrown their facilities. The list might be prolonged.

Terminal betterments are made in order to reduce the time that freight cars and packages are in the hands of the railroads and not traveling. L. F. Loree some months ago told the story of a freight car trip. The car was in the hands of the railroads 63.7 per cent. of the time and in the hands of the shippers 36.3 per cent. of the time. On the average, shifting and interchange movements consume 10.1 hours out of 24, or two-thirds of the time that the car is in the possession of the railroads. "Here," says Mr. Loree, "center the largest opportunities of reducing the delays that are wasteful of time and money alike."

Each of the great cities is beset by the gravest anxiety, because its people know history. They have read the legend, which scientific excavators credit, that a cat could walk from wall to wall and house-top to house-top through the Syr-Darian river valley from Kashgar in Eastern Turkestan to the Sea of Aral; that the remains of ancient Bactra (Balkh) cover a circuit of twenty miles after 600 years of abandonment, and that Jenghiz Khan is said to have slain 800,000 people in Bagdad alone. Life was fine and fair in Bagdad and in many a metropolis of old created at the convergence of camel routes between Europe and China and India. When shipbuilders began to use iron nails instead of wooden pegs and to navigate the Red sea with loss from shipwreck so diminished that freight rates were lower by ship than by caravan, the inland center with a population running into the millions could shrivel and evaporate, and become the tomb of busy commerce, muck for the antiquarian's rake.

Through routes today in the United States are assailed by competition on every hand. Freight shipped at New York, jobbed at Chicago and rejobbed at Spokane can go, if induced, by way of Tehuantepec or Panama; San Francisco or Seattle will do the jobbing. If transshipment at Chicago came to involve sufficient delay, freight from New York might even travel coastwise to Newport News or Baltimore and beat the Chicago route into Spokane in point of time as well as of cost. This is especially true when industry is booming, terminal facilities strained and everyone eager to cash in while the going is good. One such period might almost create a new major center of transshipment for the country. Men in middle life can remember when St. Louis ridiculed the prediction that Chicago would outstrip her in business and in population. There is another kind of competition. If merchandise manufactured on the Atlantic seaboard is delayed long enough in going through inland terminal cities on its way across the Mississippi, manufacturing plants will be established at points from which product can be laid down in the trans-Mississippi territory without going through those centers of transshipment.

It is not only the residents of terminal cities who suffer if transportation through those cities is defective. The point at which the shipper comes in contact with a terminal defect may be a thousand miles away from the defective terminal. He wants a car which he cannot get or he is waiting for a load that does not come. He thinks and says that he is suffering from a car shortage. The fact may be that too many cars have clogged a terminal somewhere. The real shortage is a terminal shortage.

To some extent his sufferings may be ameliorated by the addition of more rolling stock and to a large extent in the recent past the railways, turning in the direction of least resistance, have increased their rolling stock as a stop gap while postponing the city terminal improvements which involve such enormous land costs.

More cars under some circumstances will enable the shipper to start his shipment sooner, but delivery will be no more prompt if a clogged terminal stands in the way. Ultimately what interests the shipper is the time consumed from the moment when his shipment is ready to load to the moment of delivery to the consignee.

A group of railroads in reply to an inquiry have furnished a detailed computation showing that they would spend in terminal development in the next five years if they could obtain the necessary capital an average of $3,312 per mile of track. At this rate the total for all roads would be $1,316,924,064. To borrow

this sum at 5 per cent. would impose an annual interest charge of $65,846,203. In 1911, the latest year for which statistics are complete, the roads had available for resuming or increasing dividends but used instead for improvements or surplus $161,825,740. Taking from this amount the interest on the investment estimated as desirable for terminals, $65,846,203, and another interest charge of $19,635,000, estimated for substituting steel cars for wooden, and the roads would have had available in 1911 for improvements and surplus $76,344,537—an amount which would be completely wiped out merely by an average advance of 7 per cent. in the compensation of railway employees. There is also to be provided a huge additional sum annually, of which well-based estimates are practically impossible, for safety appliances on cars and locomotives, for block signals, for automatic trainstops, and for the elimination of grade crossings, none of which enlarge earning power.

The United States must choose. Either we must give up in some degree our pre-eminence as having by far the lowest railway capitalization in the world, and permit our lines to earn such revenues as will attract enormous investment for terminal and other improvements; or we must on the other hand renounce the American rapidity of national development and content ourselves with the slow growth which is typical of older countries.

ACCIDENT BULLETIN No. 50

The Interstate Commerce Commission has issued quarterly Accident Bulletin No. 50 containing the record of railway accidents in the United States during October, November and December, 1913. The number of persons killed in train accidents was 191 and of injured 3,726.

The total number of casualties of all classes reported, including industrial accidents, was 2,792 killed and 50,776 injured. The accidents are summarized as follows:

TABLE No. 1.—*Casualties to persons—Steam railways*

Causes	Passengers		Employees (including employees not on duty)		Other persons (trespassers and non-trespassers)		Total persons	
	Killed	Inj'd	Killed	Inj'd	Killed	Inj'd	Killed	Inj'd
Train accidents.								
Collisions	3	1,004	77	734	9	42	89	1,780
Derailments	31	1,198	55	520	9	34	95	1,752
Miscellaneous, including boiler explosions	..	7	6	183	1	4	7	194
Total	34	2,209	138	1,437	19	80	191	3,726
Other than train accidents.								
Accidents (113) to roadway or bridges not causing derailment	..	...	...	...	3	...	3	...
Other accidents (classes C3 to C12, inclusive)	51	1,927	688	13,139	1,742	2,977	2,481	18,043
Total	85	4,136	826	14,576	1,764	3,057	2,675	21,769
Industrial accidents to employees.								
While working on tracks or bridges	..	...	40	6,470	...	...	40	6,470
At stations, freight houses, enginehouses, etc.	..	...	24	6,678	...	...	24	6,678
In and around shops	..	...	31	13,989	...	...	31	13,989
On boats and wharves	..	...	7	508	...	...	7	508
At other places	..	...	15	1,362	...	...	15	1,362
Total	..	...	117	29,007	...	...	117	29,007
Grand total	85	4,136	943	43,583	1,764	3,057	2,792	50,776

Table No. 1A, following, presents comparisons with the record in the bulletin next preceding and the bulletin covering the corresponding quarter of the previous year.*

TABLE No. 1A.—*Condensed summary of fatalities.*

No.	Item	Bulletin No. 50	Bulletin No. 49	Bulletin No. 46
1	Passengers killed in train accidents	34	33	57
2	Passengers killed, all causes	85	96	114
3	Employees (on duty) killed in train accidents	137	141	170
4	Employees (on duty) killed in coupling	49	42	54
5	Employees (on duty) killed, total	730	759	861
6	Total passengers and employees (items 2 and 5, above)	815	855	975
7	Other persons killed (including trespassers, nontrespassers and employees not on duty), all causes	1,860	2,186	1,886
8	Employees killed in industrial accidents	117	132	106
	Grand total (items 6, 7 and 8)	2,792	3,173	2,967

The total number of collisions and derailments reported was 3,757 (1,450 collisions and 2,307 derailments), of which 182 collisions and 217 derailments affected passenger trains. These are classified as follows:

TABLE No. 2.—*Collisions and derailments*

No.	Classes	Number	Killed	Inj'd	Damage to road and equipment
	Collisions—				
1	Rear	250	22	477	$311,063
2	Butting	141	37	644	*307,444
3	Train separating	98	2	26	35,401
4	Miscellaneous	961	28	633	556,482
	Total	1,450	89	1,780	$1,210,390
	Derailments due to—				
5	Defects of roadway	576	25	855	$433,395
6	Defects of equipment	1,091	4	236	840,948
7	Negligence	126	3	83	97,774
8	Unforeseen obstruction	76	14	108	73,670
9	Malicious obstruction	16	5	54	31,661
10	Miscellaneous	422	44	416	402,522
	Total	2,307	95	1,752	$1,879,970
	Total collisions and derailments	3,757	184	3,532	$3,090,360
	Total for same quarter of—				
	1912	3,994	227	4,010	$3,408,953
	1911	3,346	230	4,132	2,893,948
	1910	3,366	219	3,175	2,831,469

The usual tables are given classifying certain kinds of accidents in detail.

Thirteen accidents occurring during this quarter were investigated by the inspectors of the commission and the reports of these investigations fill 27 pages of the bulletin. The accidents occurred as follows:

Southern	Oyama, N. C.	Mar. 31, Derailment
St. Louis Southwestern	Stephens, Ark.	Oct. 2, Butting collision
N. Y., Chic. & St. Louis	Fairview, Pa.	Oct. 3, Butting collision
Mobile & Ohio	Buckatunna, Miss.	Oct. 19, Derailment
Pennsylvania	Portville, N. Y.	Oct. 20, Side collision
Southern	Easley, S. C.	Oct. 27, Derailment
St. Louis & S. F.	Chelsea, Okla.	Oct. 29, Derailment
Phil., Balt. & Washington	Washington, D. C.	Oct. 31, Derailment
Great Northern	Rexford, Mont.	Oct. 31, Butting collision
Lake Shore & Mich. So.	Mount Union, Ohio.	Nov. 6, Butting collision
Central of Georgia	Clayton, Ala.	Nov. 13, Derailment
Central Vermont	Georgia, Vt.	Nov. 16, Butting collision
Virginian	Keever, Va.	Nov. 29, Butting collision

Electric Railways reporting to the commission (not included in the foregoing statistics) had 124 persons killed during the quarter and 1,445 injured; and there were 57 collisions and 15 derailments. Train accidents are charged with seven fatalities. The total number of passengers killed from all causes was 9 and of employees 25 (13 in industrial accidents). The number of trespassers struck or run over by cars was 65; 37 killed and 28 injured.

COMPARATIVE SUMMARY OF FREIGHT CARS IN SERVICE

The tables on the two pages immediately following show the number of freight cars in service on all of the important railroads of the country in 1912 and 1913, and in 1900 and 1913. It will be noted that narrow-gage cars are excluded, as well as non-revenue cars, but that cars used to carry company freight are included. The railways are grouped under the heads of New England roads, trunk line roads, Southern classification roads, Central classification roads and Western classification roads.

The tables show the number of cars in service, the number of cars per mile of road, average length of haul, freight cars per thousand freight car miles and per thousand ton miles, the average rate per ton per mile, and the freight cars in service per thousand dollars of freight earnings.

The table does not show the capacity of cars and, of course, roads which show a decrease in the number of cars may have cars with a larger total capacity despite the smaller number.

*Preceding bulletins have been noticed in the *Railway Age Gazette* as follows: No. 49, May 15, 1914, page 1072; No. 48, March 6, 1914, page 468; No. 47, October 24, 1913, page 759; No. 46, August 29, 1913, page 383.

COMPARATIVE SUMMARY OF FREIGHT CARS IN SERVICE ON RAILROADS OF THE UNITED STATES—1912 AND 1913

Note.—Narrow gage cars excluded. Non-revenue cars excluded. Company freight included.

	Miles.		Frt. equipment.				Frt. cars per mile of road.		Average length of haul.		Freight Cars—Per 1,000 frt. car miles,		Freight Cars—Per 1,000 rev. ton miles.		Rate per ton mile. (Dollars)		Freight cars per $1,000 frt. earnings.	
	1912.	1913.	1912.	1913.	In-crease.	De-crease.	Per cent. of change.	1912.	1913.	1912.	1913.	1912.	1913.	1912.	1913.	1912.	1913.	1912.	1913.
NEW ENGLAND ROADS:																			
Boston & Maine	2,291	2,302	25,410	24,155	.....	1,255	4.94	11.1	10.5	103.86	106.82	.115	.106	.0103	.0089	.01089	.01054	0.95	0.84
Bangor & Aroostook	625	568	5,335	5,279	.....	56	1.05	8.6	9.3	125.51	132.05	.272	.296	.0237	.0247	.01121	.01146	2.11	2.15
Central Vermont	536	536	3,451	3,310	.....	141	4.09	6.4	6.2	76.73	73.96	.110	.112	.0111	.0104	.00930	.00930	1.20	1.12
Maine Central	1,192	1,205	9,110	9,347	237	.....	2.60	7.6	7.7	90.16	90.13	.163	.160	.0149	.0142	.01088	.01086	1.37	1.31
New York, New Haven & Hartford	2,092	2,114	38,053	36,185	.....	1,868	4.91	18.2	17.1	94.95	96.43	.178	.163	.0162	.1043	.01371	.01345	1.18	1.06
Total	6,736	6,725	81,359	78,276	.....	3,083	3.79	12.1	11.6	98.24	99.88	.168	.167	.0152	.0145	.01120	.01112	1.36	1.29
TRUNK LINE ROADS:																			
Baltimore & Ohio	4,455	4,456	87,002	88,619	1,617	.....	1.86	19.5	19.9	193.04	197.53	.106	.103	.0070	.0062	.00580	.00560	1.20	1.10
Buffalo, Rochester & Pittsburgh	570	576	16,625	17,181	556	.....	3.34	29.2	29.8	159.30	163.40	.191	.179	.0098	.0084	.00480	.00461	2.03	1.83
Central of New Jersey	669	676	22,015	23,912	1,897	.....	8.62	32.9	35.4	70.87	72.56	.168	.162	.0100	.0096	.00861	.00882	1.16	1.09
Chesapeake & Ohio	2,263	2,319	43,740	42,691	.....	1,049	2.39	19.3	18.4	256.00	266.00	.125	.123	.0065	.0064	.01043	.00412	1.60	1.55
Delaware & Hudson	878	904	19,712	19,028	.....	684	3.47	22.4	21.0	144.11	146.80	.121	.109	.0066	.0058	.00620	.00663	1.05	0.94
Delaware, Lackawanna & Western	985	985	28,720	28,384	.....	336	1.17	29.2	28.8	170.50	171.82	.112	.105	.0076	.0070	.00731	.00727	1.05	0.96
Erie	2,258	2,258	49,465	49,119	.....	346	0.70	21.9	21.7	184.61	188.61	.104	.101	.0072	.0064	.00583	.00574	1.24	1.11
Lehigh Valley	1,441	1,451	43,352	43,409	57	.....	0.13	30.1	29.9	160.42	168.76	.142	.126	.0087	.0070	.00646	.00632	1.40	1.18
New York Central & Hudson River	3,791	3,753	71,603	78,748	7,055	.....	9.84	18.9	21.0	194.62	198.39	.084	.085	.0061	.0061	.00626	.00609	1.10	1.14
New York, Ontario & Western	566	566	6,409	6,568	159	.....	0.92	11.3	11.6	145.29	145.58	.110	.106	.0074	.0070	.00758	.00783	0.98	0.90
Pennsylvania Railroad	4,092	4,111	139,346	148,073	8,727	.....	6.26	34.1	36.0	153.42	152.72	.123	.115	.0060	.0060	.00583	.00583	1.08	1.09
Reading	1,015	1,020	40,210	42,651	2,441	.....	6.07	39.6	41.8	93.82	93.92	.135	.132	.0079	.0074	.00704	.00714	1.13	1.04
Western Maryland	543	543	6,635	7,944	1,309	.....	1.97	12.2	14.6	94.55	100.09	.116	.135	.0066	.0073	.00596	.00579	1.11	1.27
Total	23,526	23,618	574,924	596,327	21,403	.....	3.73	24.4	25.2	155.43	158.94	.125	.122	.0075	.0070	.00677	.00629	1.24	1.17
SOUTHERN CLASSIFICATION:																			
Atlantic Coast Line	4,568	4,617	27,233	28,920	1,687	.....	6.19	5.9	6.3	153.60	156.27	.131	.131	.0148	.0142	.01230	.01203	1.21	1.18
Central of Georgia	1,915	1,924	10,302	10,112	.....	190	1.84	5.4	5.3	147.70	146.97	.135	.132	.0101	.0096	.01120	.01049	1.16	1.15
Florida East Coast	642	642	1,267	1,370	103	.....	8.13	2.0	2.1	162.89	161.65	.057	.049	.0107	.0096	.01772	.01712	0.60	0.54
Louisville & Nashville	4,740	4,923	44,727	45,269	542	.....	1.21	9.4	9.2	170.00	171.00	.116	.116	.0086	.0082	.00786	.00779	1.10	1.05
Mobile & Ohio	1,114	1,119	10,305	10,606	301	.....	2.92	9.2	9.5	223.70	220.10	.097	.094	.0070	.0062	.00679	.00656	1.13	1.04
Nashville, Chattanooga & St. Louis	1,230	1,231	9,943	10,078	135	.....	1.36	8.1	8.2	146.00	150.00	.124	.118	.0121	.0108	.01030	.00995	1.18	1.08
Norfolk & Western	2,018	2,035	42,065	42,699	634	.....	1.51	20.8	21.0	273.74	270.81	.096	.092	.0052	.0048	.00424	.00424	1.22	1.12
Norfolk Southern	608	569	3,019	2,896	.....	123	4.07	5.0	5.1	80.81	87.50	.249	.225	.0226	.0202	.01643	.01584	1.38	1.28
Seaboard Air Line	3,059	3,074	15,846	16,845	999	.....	6.25	5.2	5.5	147.87	147.80	.115	.111	.0100	.0097	.01110	.01091	1.03	1.00
Southern Railway	7,088	7,036	50,919	48,746	.....	2,173	4.27	7.2	6.9	154.58	155.43	.127	.117	.0098	.0086	.00987	.00982	1.23	1.08
Virginian Railway	475	503	6,374	7,023	649	.....	10.18	13.4	14.0	347.63	353.47	.121	.107	.0050	.0045	.00351	.00343	1.44	1.31
Total	27,457	27,673	222,000	224,564	2,564	.....	1.15	8.5	8.1	182.59	184.64	.124	.117	.0105	.0097	.01012	.00983	1.15	1.08
CENTRAL CLASSIFICATION:																			
Chicago, Indianapolis & Louisville	617	617	6,769	6,922	153	.....	2.26	11.0	11.2	133.60	138.29	.178	.162	.0117	.0099	.00826	.00745	1.59	1.48
Cincinnati, Hamilton & Dayton	1,015	1,015	11,281	9,602	.....	1,679	14.88	11.1	9.5	122.63	121.31	.144	.130	.0082	.0067	.00535	.00529	1.57	1.30
C. C. C. & St. Louis	2,012	2,014	24,490	24,224	.....	266	1.08	12.1	12.0	152.30	154.50	.087	.083	.0057	.0050	.00543	.00547	1.10	1.07
Grand Rapids & Indiana	578	576	3,207	3,207	.....	.....	0.00	5.6	5.6	96.73	96.32	.099	.098	.0063	.0063	.00707	.00705	0.98	0.98
Lake Erie & Western	906	906	3,150	2,796	.....	354	11.24	3.5	3.1	123.98	123.49	.061	.052	.0042	.0037	.00656	.00648	0.68	0.59
Lake Shore & Michigan Southern	1,872	1,853	54,861	57,693	2,832	.....	5.16	29.3	31.1	159.50	155.50	.123	.119	.0076	.0077	.00529	.00545	1.51	1.56
Michigan Central	1,817	1,800	26,227	25,681	.....	546	2.08	14.4	14.3	145.00	148.00	.099	.087	.0078	.0069	.00664	.00652	1.23	1.11
New York, Chicago & St. Louis	523	523	12,622	11,957	.....	665	5.11	24.1	22.9	196.00	197.00	.082	.078	.0060	.0058	.00502	.00514	1.23	1.16
Pennsylvania Company	1,751	1,750	59,328	62,073	2,745	.....	4.63	33.9	35.5	79.85	77.75	.137	.138	.0068	.0071	.00572	.00569	1.25	1.25
P. C. C. & St. Louis	1,472	1,472	27,350	30,210	2,614	.....	9.47	18.7	20.5	125.82	119.97	.079	.088	.0048	.0056	.00380	.00509	0.89	0.99
Pere Marquette	2,330	2,330	17,943	17,727	.....	216	1.20	7.7	7.6	167.86	173.63	.132	.135	.0094	.0083	.00643	.00603	1.59	1.48
Vandalia	827	876	8,832	8,821	.....	11	0.12	10.7	10.1	107.40	105.48	.118	.108	.0076	.0072	.00648	.00658	1.22	1.14
Total	15,720	15,732	256,306	260,913	4,607	.....	1.79	16.3	16.6	134.22	134.27	.112	.106	.0072	.0067	.00617	.00610	1.24	1.17
WESTERN CLASSIFICATION:																			
Atchison, Topeka & Santa Fe	10,733	10,771	62,241	66,213	3,972	.....	6.38	5.8	6.1	329.59	311.33	.092	.094	.0070	.0068	.01026	.01002	0.87	0.85
Chicago & Alton	1,026	1,026	11,756	11,667	.....	89	0.77	11.5	12.3	152.72	165.51	.100	.099	.0068	.0062	.00576	.00537	1.26	1.18
Chicago & Eastern Illinois	12,075	12,075	25,516	26,210	694	.....	2.72	20.0	20.6	146.21	159.73	.209	.202	.0115	.0107	.00530	.00520	2.29	2.19
Chicago & North Western	7,960	7,976	59,098	60,429	1,331	.....	2.25	7.4	7.6	138.11	140.12	.194	.177	.0115	.0096	.00910	.00870	1.27	1.11
Chicago, Burlington & Quincy	9,074	9,129	55,726	55,735	9	.....	0.02	5.1	6.1	254.92	263.30	.092	.085	.0073	.0063	.00752	.00729	0.97	0.87
Chicago Great Western	1,496	1,496	11,294	10,891	.....	403	3.57	7.5	7.3	222.66	224.42	.115	.107	.0084	.0075	.00725	.00732	1.37	1.11
*Chicago, Milwaukee & St. Paul	7,296	9,613	45,778	62,216	16,438	.....	35.91	6.3	6.5	192.12	246.23	.096	.090	.0077	.0062	.00839	.00793	1.07	1.11
*Chicago, Milwaukee & Puget Sound	2,059	.....	11,959	.....	.....	11,959	100.00	5.8	.....	542.51	.....	.109	.....	.0074	.....	.00883	.....	0.92	.....
Chicago, Rock Island & Pacific	8,036	8,048	41,798	44,064	2,266	.....	5.42	5.2	5.5	215.69	224.76	.098	.097	.0075	.0070	.00890	.00890	1.01	0.95
Chicago, St. Paul, Minn. & Omaha	1,745	1,747	11,438	12,569	1,131	.....	9.89	6.6	7.2	157.22	153.91	.185	.189	.0105	.0099	.00868	.00860	1.21	1.16
Colorado & Southern	1,813	1,871	10,869	10,714	.....	155	1.43	6.0	5.7	148.02	154.06	.145	.137	.0104	.0093	.00931	.00944	1.10	0.99
Denver & Rio Grande	2,551	2,555	14,578	18,370	3,792	.....	26.01	5.7	7.2	116.44	128.45	.132	.170	.0090	.0107	.01210	.01194	0.84	1.02
Duluth, S. S. & Atlantic	623	628	2,923	3,309	386	.....	13.20	4.7	5.3	67.47	75.37	.168	.184	.0127	.0127	.00895	.00865	1.42	1.47
Great Northern	7,482	7,750	47,640	53,595	5,954	.....	12.50	6.4	6.9	236.11	227.02	.127	.114	.0066	.0061	.00768	.00765	0.99	0.92
Illinois Central	4,763	4,763	55,108	56,326	1,218	.....	2.21	11.6	11.8	235.79	247.56	.113	.104	.0074	.0064	.00610	.00577	1.45	1.32
Kansas City Southern	827	827	5,479	5,847	368	.....	3.07	6.6	7.1	227.01	240.87	.091	.089	.0058	.0054	.00798	.00788	0.82	0.73
Minneapolis & St. Louis	1,586	1,586	7,596	7,396	.....	200	2.63	4.8	4.7	156.70	161.67	.131	.115	.0089	.0072	.00758	.00804	1.33	1.02
Minn., St. Paul & Sault Ste. Marie	3,773	3,976	22,586	25,064	2,478	.....	10.97	6.0	6.3	225.39	229.12	.118	.112	.0083	.0075	.00702	.00704	1.19	1.07
Missouri Pacific	7,231	7,257	43,343	42,773	.....	570	1.32	6.0	5.9	218.00	227.83	.112	.103	.0075	.0064	.00824	.00807	1.10	0.93
Missouri, Kansas & Texas	3,398	3,677	24,804	25,650	846	.....	3.41	7.3	7.0	192.10	206.27	.138	.132	.0148	.0141	.01080	.01140	1.37	1.23
Northern Pacific	6,025	6,230	43,220	46,988	3,768	.....	8.72	7.2	7.5	289.40	292.80	.126	.110	.0074	.0075	.00867	.00867	0.96	1.07
St. Louis & San Francisco	5,241	5,255	29,646	32,071	2,425	.....	8.18	5.7	6.1	153.62	154.37	.127	.125	.0093	.0089	.01010	.01000	1.08	1.03
St. Louis Southwestern	1,548	1,609	11,512	11,430	.....	82	0.71	7.4	7.1	245.22	234.01	.152	.149	.0137	.0131	.01070	.01130	1.38	1.16
San Antonio & Aransas Pass	724	724	1,850	2,745	895	.....	48.38	2.6	3.8	151.09	143.10	.074	.113	.0095	.0130	.01625	.01639	0.58	0.78
Southern Pacific	9,970	10,311	47,448	50,049	2,601	.....	5.48	4.8	4.9	228.03	222.30	.094	.091	.0065	.0060	.01168	.01123	0.65	0.63
Texas & Pacific	1,885	1,885	11,096	11,201	105	.....	0.94	5.9	5.9	183.00	181.51	.092	.095	.0094	.0076	.01000	.00969	0.94	0.90
Union Pacific	7,150	7,349	29,255	30,683	1,427	.....	4.88	4.1	4.2	381.18	381.80	.067	.062	.0040	.0037	.00989	.00971	0.51	0.48
Wabash	2,515	2,515	20,350	23,127	2,777	.....	13.64	8.1	9.2	210.58	214.63	.080	.083	.0061	.0056	.00609	.00584	1.07	1.06
Total	119,805	121,849	765,908	807,331	41,423	.....	5.41	6.4	6.6	214.53	208.41	.120	.119	.0087	.0082	.00890	.00848	1.10	1.05
TOTAL ALL ROADS	193,244	195,597	1,900,497	1,967,411	66,914	.....	3.52	9.8	10.1	173.39	174.04	.128	.121	.0090	.0087	.00846	.00805	1.17	1.12

*1913 operations of Chicago, Milwaukee & Puget Sound Ry. Co. included in Chicago, Milwaukee & St. Paul R. R. Co.

COMPARATIVE SUMMARY OF FREIGHT CARS IN SERVICE ON RAILROADS OF THE UNITED STATES—1900 AND 1913.

Note.—Narrow gage cars excluded. Non-revenue cars excluded. Company freight included.

	Miles.		Frt. equipment.				Frt. cars per mile of road.		Average length of haul.		Freight Cars— Per 1,000 frt. car miles.		Per 1,000 rev. ton miles.		Rate per ton mile. (Dollars)		Freight cars per $1,000 frt. earnings.	
	1900.	1913.	1900.	1913.	Increase.	Decrease.	Per cent. of change.	1900.	1913.	1900.	1913.	1900.	1913.	1900.	1913.	1900.	1913.	1900.	1913.
NEW ENGLAND ROADS:																			
Boston & Maine	1,787	2,302	12,230	24,155	11,925	.....	97.50	6.8	10.5	66.99	106.82	.126	.106	.0146	.0089	.01440	.01054	1.02	0.84
Bangor & Aroostook	354	568	3,091	5,279	2,188	.....	70.78	8.7	9.3	89.62	132.05	....	.296	.0539	.0247	.01420	.01146	3.79	2.15
Central Vermont	513	536	2,006	3,310	1,304	.....	64.95	3.9	6.2	94.97	73.96	.063	.112	.0079	.0104	.00880	.00930	0.90	1.12
Maine Central	816	1,205	3,586	9,347	5,761	.....	160.65	4.4	7.7	81.11	90.13	.163	.160	.0123	.0142	.01130	.01086	1.09	1.31
New York, New Haven & Hartford	2,008	2,114	13,116	36,185	23,069	.....	175.88	6.5	17.1	85.36	96.43	.076	.163	.0097	.0143	.01451	.01345	0.67	1.06
Total	5,478	6,725	34,029	78,276	44,247	.....	130.03	6.5	11.6	83.61	99.88	.107	.167	.0197	.0145	.01264	.01112	1.49	1.29
TRUNK LINE ROADS:																			
Baltimore & Ohio	3,179	4,456	61,708	88,619	26,911	.....	43.61	19.3	19.9	194.81	197.53	.128	.103	.0068	.0062	.00412	.00560	1.96	1.10
Buffalo, Rochester & Pittsburgh	472	576	8,858	17,181	8,323	.....	93.96	18.7	29.8	136.16	163.40	.139	.179	.0097	.0084	.00470	.00461	1.99	1.83
Central of New Jersey	639	676	15,002	23,912	8,910	.....	59.39	23.4	35.4	77.88	72.56	.153	.162	.0118	.0096	.00871	.00882	1.36	1.09
Chesapeake & Ohio	1,476	2,319	17,270	42,691	25,421	.....	147.19	21.6	18.4	302.00	266.00	.082	.123	.0058	.0064	.00343	.00412	1.71	1.55
Delaware & Hudson	665	904	13,030	19,028	5,998	.....	46.03	19.6	21.0	94.46	146.80	.147	.109	.0113	.0058	.00789	.00663	1.54	0.94
Delaware, Lackawanna & Western	947	985	27,287	28,394	1,097	.....	4.02	28.8	28.8	151.00	171.82	....	.105	.0144	.0070	.00808	.00727	1.79	0.96
Erie	2,104	2,258	46,225	49,119	2,894	.....	6.26	21.9	21.7	194.40	188.61	.101	.101	.0089	.0064	.00559	.00574	1.60	1.11
Lehigh Valley	1,382	1,451	34,954	43,409	8,455	.....	24.19	25.3	29.9	188.08	168.76	.135	.126	.0106	.0070	.00542	.00632	1.97	1.18
New York Central & Hudson River	2,817	3,753	59,180	78,748	19,568	.....	33.06	21.1	21.0	163.00	198.39	....	.085	.0088	.0061	.00560	.00609	1.72	1.14
New York, Ontario & Western	480	566	5,899	6,568	669	.....	11.34	12.3	11.6	142.38	145.58	.144	.106	.0121	.0070	.00816	.00783	1.49	0.90
Pennsylvania Railroad	3,716	4,111	80,385	148,073	67,688	.....	84.20	21.6	36.0	109.54	152.72	.091	.115	.0067	.0060	.00540	.00583	1.25	1.09
Reading	1,000	1,020	31,824	42,651	10,827	.....	34.02	31.8	41.8	89.42	93.92	.139	.132	.0114	.0074	.00831	.00714	1.50	1.04
Western Maryland	279	543	691	7,944	7,253	.....	1049.63	2.5	14.6	51.02	100.09	....	.135	.0038	.0073	.00734	.00579	0.53	1.27
Total	19,176	23,618	402,313	596,327	194,014	.....	48.22	21.0	25.2	153.16	158.94	.098	.122	.0093	.0070	.00637	.00629	1.55	1.17
SOUTHERN CLASSIFICATION:																			
Atlantic Coast Line	1,759	4,617	5,378	28,920	23,542	.....	437.74	3.6	6.3	121.90	156.27	....	.131	.0143	.0142	.01401	.01203	1.02	1.18
Central of Georgia	1,196	1,924	5,041	10,112	5,071	.....	100.59	4.2	5.3	148.86	146.97	.107	.132	.0183	.0096	.01096	.01049	1.26	1.15
Florida East Coast	.....	642	.....	1,370	1,370	.....	.....	...	2.1	.....	161.65	....	.049	.....	.0096	.....	.01712	....	0.54
Louisville & Nashville	3,007	4,923	23,402	45,269	21,867	.....	93.44	7.7	9.2	163.00	171.00	.096	.116	.0090	.0082	.00758	.00779	1.13	1.05
Mobile & Ohio	876	1,119	5,389	10,606	5,217	.....	96.81	6.2	9.5	195.63	230.10	....	.094	.0076	.0062	.00590	.00656	1.33	1.04
Nashville, Chattanooga & St. Louis	1,189	1,231	5,328	10,078	4,750	.....	89.15	4.4	8.2	151.00	150.00	.113	.118	.0096	.0108	.00880	.00995	1.10	1.08
Norfolk & Western	1,551	2,035	18,656	42,699	24,043	.....	128.87	12.0	21.0	253.41	270.81	.085	.092	.0068	.0048	.00430	.00424	1.58	1.12
Norfolk Southern	147	569	409	2,896	2,487	.....	608.07	2.8	5.1	57.42	87.50	....	.225	.0161	.0202	.01770	.01584	0.91	1.28
Seaboard Air Line	(1901) 2,604	3,074	8,335	16,845	8,510	.....	102.09	3.2	5.5	153.32	147.80	.119	.111	.0136	.0097	.01180	.01091	1.14	1.00
Southern Railway	6,306	7,036	26,814	48,746	21,932	.....	81.79	4.2	6.9	168.82	155.43	.107	.117	.0116	.0086	.00916	.00982	1.27	1.08
Virginian Railway	.....	503	.....	7,023	7,023	.....	.....	...	14.0	.....	353.47	....	.107	.....	.0045	.....	.00343	....	1.31
Total	18,635	27,673	98,752	224,564	125,812	.....	127.40	5.3	8.1	157.04	184.64	.105	.117	.0119	.0097	.01002	.00983	1.19	1.08
CENTRAL CLASSIFICATION:																			
Chicago, Indianapolis & Louisville	546	617	5,440	6,922	1,482	.....	27.24	9.9	11.2	153.00	138.29	.155	.162	.0141	.0099	.00757	.00745	1.86	1.48
Cincinnati, Hamilton & Dayton	652	1,015	7,838	9,602	1,764	.....	22.51	12.0	9.5	108.96	121.31	....	.130	.0122	.0067	.00610	.00529	2.00	1.30
C. C. C. & St. Louis	1,891	2,014	15,484	24,224	8,740	.....	56.40	8.2	12.0	169.30	154.50	.094	.083	.0083	.0050	.00583	.00547	1.42	1.07
Grand Rapids & Indiana	582	576	3,015	3,207	192	.....	6.37	5.2	5.6	90.12	96.32	.140	.108	.0156	.0063	.00870	.00705	1.88	0.98
Lake Erie & Western	725	906	5,549	2,796	.....	2,753	49.61	7.6	3.1	153.51	123.49	.137	.052	.0110	.0037	.00614	.00648	1.89	0.59
Lake Shore & Michigan Southern	1,411	1,853	19,958	57,693	37,735	.....	189.07	14.1	31.1	178.00	155.50	.067	.119	.0055	.0077	.00505	.00545	1.09	1.50
Michigan Central	1,635	1,800	14,219	25,681	11,462	.....	80.61	8.6	14.3	193.50	148.00	....	.087	.0070	.0069	.00592	.00652	1.19	1.11
New York, Chicago & St. Louis	513	523	6,743	11,957	5,214	.....	77.32	13.1	22.9	297.00	197.00	.059	.078	.0055	.0058	.00478	.00514	1.16	1.16
Pennsylvania Company	1,396	1,750	43,967	62,073	18,106	.....	41.18	31.5	35.5	77.95	77.75	.177	.138	.0135	.0071	.00590	.00569	2.30	1.25
P. C. C. & St. Louis	1,407	1,472	12,884	30,210	17,326	.....	134.48	9.1	20.5	111.14	119.97	.056	.088	.0052	.0056	.00620	.00599	0.84	0.99
Pere Marquette	1,821	2,330	7,944	17,727	9,783	.....	123.15	4.3	7.6	112.64	173.63	....	.125	.0124	.0083	.00802	.00603	1.55	1.48
Vandalia	727	876	5,922	8,821	2,899	.....	48.95	8.1	10.1	74.46	105.48	.121	.108	.0139	.0072	.00718	.00658	1.66	1.14
Total	13,306	15,732	148,963	260,913	111,950	.....	75.15	11.2	16.6	143.63	134.27	.112	.106	.0102	.0067	.00645	.00610	1.57	1.17
WESTERN CLASSIFICATION:																			
Atchison, Topeka & Santa Fe	7,426	10,771	27,486	66,213	38,727	.....	140.89	3.7	6.1	349.19	311.33	.073	.094	.0079	.0068	.00976	.01002	0.81	0.85
Chicago & Alton	855	1,026	9,386	11,667	2,281	.....	24.30	10.9	12.3	176.16	165.51	.135	.099	.0148	.0062	.00794	.00537	1.87	1.18
Chicago & Eastern Illinois	711	12,075	8,206	26,210	18,004	.....	219.40	11.5	20.6	144.70	159.73	.132	.202	.0096	.0107	.00483	.00520	1.99	2.19
Chicago & North Western	5,219	7,976	40,846	60,429	19,583	.....	47.94	7.8	7.6	151.30	140.12	.108	.177	.0106	.0096	.00830	.00870	1.28	1.11
Chicago, Burlington & Quincy	7,546	9,129	42,287	55,735	13,448	.....	31.81	5.6	6.1	254.87	263.30	....	.085	.0111	.0063	.00851	.00729	1.29	0.87
Chicago Great Western	930	1,496	5,782	10,891	5,109	.....	88.36	6.2	7.3	301.68	224.42	.087	.107	.0081	.0075	.00720	.00732	1.13	1.11
Chicago, Milwaukee & St. Paul	6,423	9,613	35,740	62,216	26,476	.....	74.08	5.6	6.5	189.07	246.23	.093	.090	.0106	.0062	.00929	.00793	1.14	1.11
Chicago, Rock Island & Pacific	3,647	8,048	17,150	44,064	26,914	.....	156.74	4.7	5.5	213.00	224.76	.094	.097	.0096	.0070	.00990	.00890	1.08	0.95
Chicago, St. Paul, Minn. & Omaha	1,557	1,747	10,253	12,569	2,316	.....	22.59	6.6	7.2	160.55	153.51	.149	.189	.0135	.0090	.00971	.00860	1.39	1.16
Colorado & Southern	762	1,871	2,979	10,714	7,735	.....	259.65	3.9	5.7	101.00	154.06	.108	.132	.0115	.0093	.01242	.00944	0.93	0.99
Denver & Rio Grande	1,674	2,555	8,359	18,370	10,011	.....	119.76	4.9	7.2	.....	128.45	.118	.170	.....	.0107	.....	.01194	1.09	1.02
Duluth, S. S. & Atlantic	585	628	2,697	3,309	612	.....	22.69	4.6	5.3	49.07	75.37	....	.184	.0209	.0127	.01221	.00865	1.70	1.47
Great Northern	5,418	7,750	21,484	53,595	32,111	.....	149.46	3.9	6.9	192.00	227.02	.104	.114	.0085	.0061	.00899	.00765	0.93	0.92
Illinois Central	3,996	4,763	32,439	56,326	23,887	.....	73.64	8.1	11.8	213.83	242.56	.092	.104	.0094	.0064	.00651	.00577	1.45	1.32
*Iowa Central	510	.....	2,238	.....	.....	2,238	100.00	4.4	...	152.30	.....	.099	....	.0084	.....	.00696	.....	1.21	....
Kansas City Southern	833	827	5,118	5,847	729	.....	14.24	6.1	7.1	304.41	240.87	.118	.089	.0091	.0054	.00613	.00788	1.49	0.73
*Minneapolis & St. Louis	597	1,586	3,066	7,396	4,330	.....	141.22	5.1	4.7	108.79	161.67	.096	.115	.0155	.0072	.01212	.00804	1.45	1.02
Minn., St. Paul & Sault Ste. Marie	1,255	3,976	6,631	25,064	18,433	.....	277.98	5.3	6.3	194.65	229.12	.179	.112	.0109	.0075	.00658	.00704	1.67	1.07
Missouri Pacific	4,938	7,257	25,186	42,773	17,587	.....	69.82	5.1	5.9	236.24	227.83	.102	.103	.0095	.0064	.00834	.00807	1.15	0.93
Missouri, Kansas & Texas	2,218	3,677	9,669	25,650	15,981	.....	165.28	4.4	7.0	298.93	206.27	.073	.132	.0082	.0141	.00840	.01140	0.98	1.23
Northern Pacific	5,006	6,230	23,138	46,988	23,850	.....	103.07	4.6	7.5	309.60	292.80	.105	.110	.0104	.0075	.00987	.00867	1.04	1.07
St. Louis & San Francisco	†1,659	5,255	5,974	32,071	26,097	.....	436.84	3.6	6.1	182.05	154.37	.093	.175	.0114	.0089	.01058	.01000	1.08	1.03
St. Louis Southwestern	1,258	1,609	5,386	11,430	6,044	.....	112.21	4.3	7.1	196.28	234.01	.127	.149	.0130	.0131	.01110	.01130	1.17	1.16
San Antonio & Aransas Pass	687	724	1,553	2,745	1,192	.....	76.75	2.3	3.8	162.26	143.10	.113	.113	.0142	.0130	.01861	.01639	0.95	0.78
Southern Pacific	7,576	10,311	29,413	50,049	20,636	.....	70.15	3.9	4.9	307.31	272.30	.096	.091	.0062	.0060	.00957	.01123	0.73	0.63
Texas & Pacific	1,570	1,885	6,263	11,201	4,938	.....	78.84	3.9	5.9	231.77	181.51	.079	.095	.0093	.0076	.01030	.00969	0.91	0.90
Union Pacific	5,428	7,349	21,826	30,682	8,856	.....	40.57	4.0	4.2	305.68	381.80	.080	.062	.0082	.0037	.01046	.00971	0.78	0.48
Wabash	2,340	2,515	13,087	23,127	10,040	.....	76.71	5.6	9.2	216.70	214.63	.071	.083	.0068	.0056	.00558	.00584	1.23	1.06
Total	82,624	121,849	423,642	807,331	383,689	.....	90.57	5.0	6.6	211.25	208.41	.104	.119	.0106	.0082	.00926	.00848	1.21	1.05
TOTAL ALL ROADS	139,219	195,597	1,107,699	1,967,411	859,712	.....	77.61	8.0	10.1	184.09	174.04	.105	.121	.0112	.0087	.00854	.00805	1.36	1.12

*1913 operations of Iowa Central R. R. Co. included in Minneapolis & St. Louis R. R. Co. †Before consolidation with other companies.

The Operation of Large Classification Yards*

The Second Series of Papers Received in Contest, Bringing Out Practical Ideas Gained by Experience

ESSENTIALS IN SUCCESSFUL YARD OPERATION

By E. C. Tucker

General Yardmaster, Norfolk & Western, Portsmouth, O.

The most economical method of breaking-up and classifying trains is secured in the hump yard, which not only reduces the yard-switching movement and the operation cost to the minimum, but materially decreases the switching causes of damage to equipment. Gravity yards should be located at such points on the system as the character and the volume of traffic may require, and especially at those divisional points where terminal or junctional classification of the outgoing movement is demanded. This junctional classification is highly important, permitting the traffic to be delivered promptly and with the minimum switching expense at the junction point.

One Mallet locomotive with 30 car-riders will weigh and classify more cars in an 11-hour working day in a gravity yard than 10 switch engines and crews working in flat yards, and with fully one-half less damage to the equipment. A gravity yard is very necessary for the classification of empty cars, as such cars may be handled and classified in this manner with the least amount of delay and expense. This is an important consideration, as it is necessary to get the cars in revenue haul with the smallest loss of time, in order that the railway may secure the full value of its equipment. Every day a car is held unnecessarily when equipment is in demand means a loss of freight revenue.

Time freight trains should be classified as far as possible at the originating point. The cars traveling under refrigeration should be placed next to the engine and kept in that position to destination so that there will be no delays to time freight trains in transit due to re-icing the cars at icing stations. The despatcher should keep the yardmaster fully advised as to the expected time of arrival of these trains, and crews at terminal yards should be called in advance to avoid any loss of time on the schedule. The handling of time freight trains by the despatcher, the yardmaster and his assistant should be given the same consideration as a passenger train—careful handling, proper classification and "on time"! If this measure of service is not secured in the divisional yards the railway stands to lose rather than to increase its freight business of this character.

A very considerable and often a very unnecessary expense is attached to overcrowding and blocking of yards. This can only be controlled by the yardmaster keeping in close touch with the power and crews available, by regulating the movement according to the clear trackage, and, if necessary, by deadheading additional crews from other terminals and moving light power to the crowded yard.

The regulating or proper balancing of power and crews by the chief despatcher should prevent yard congestion, provided the yardmaster has kept up with his classification and yard work as the traffic has reached him. A blocked yard with classified cars therein is really a question only of power and crews, and additional trains should not be forced into the yard which will block the leads and take up what little reserve classification space may have been held open by the yardmaster.

As a means of preventing delays to cars in yards, the yardmaster should define the duties of each employee and educate him to the extent that his work may assist in every proper measure toward the regular movement of the traffic through the yard. Care should be taken to avoid as far as possible any causes for special movements by making the regular movements with such promptness and so systematically that special movements will not be necessary.

Frequently cars of coal, coke or similar bulk commodities may be found to be too heavily loaded when they arrive at the scales in the gravity yard, requiring that a portion of the lading must be removed from the car before forwarding. The most economical manner of removing this excess is to set aside two short tracks in the vicinity of the scales, and place an air whistle at the scales so that a signal may be given by the weighmaster to the switch-tenders when cars are found to contain an excess of lading. The cars may then be run direct from the hump tracks into the over-load track, where a crane should be located, provided with a dipper holding about 2,000 lb. The excess can then be readily removed and placed in an empty car in front of the crane, the original car being then reweighed and allowed to go forward to destination without any unnecessary delay. Short tracks are more desirable for this purpose, as they will require the cars to be removed promptly and thus avoid congestion in the classification yard, as well as preventing delay to the shipments.

All time freight bills should be kept separate from the slow freight bills in the yard office. The system outlined below, which requires two separate racks or bill cases, has proved to be highly satisfactory. One case consists of 10 apartments for the card bills, the filing of bills in the rack being governed by the last figure in the car number. Each apartment is numbered, the numbers running from 0 to 9. Thus the bill for car number 23,646 would be filed in apartment numbered 6. This case is used for time freight only. The second case contains 100 apartments; it is square, with 10 apartments across and 10 high. The filing of the bills in this rack is governed by the last two figures in the car number. Beginning at the upper left-hand corner of the case and running horizontally across it, the apartments are numbered 00, 01, 02, 03, 04, 05, 06, 07, 08, and 09; and starting at the same corner and running vertically from the top to the bottom of the case the apartments are numbered 00, 10, 20, 30, 40, 50, 60, 70, 80, and 90. Thus, if a car number is 44,599 the bill would be filed in the extreme lower right-hand corner of the case. This case is used exclusively for bills covering everything other than the time, or preference freight. In using this described system, the bills should be filed as soon as they arrive at the yard office, so that when the train-checker brings in a list of the track from which a train is to be run the bills are readily accessible and the time consumed in picking them out is reduced to a minimum. When a car is cut out of a time freight train for any reason, the bill should immediately be stamped "Delayed car—Rush," to insure its being handled to destination in preference movement, and the car should be forwarded from the yard in the next section of the time freight schedule.

A careful check should be made daily of all bills in the yardmaster's office. The yardmaster or his assistant should personally go through the bill cases and note the date on each card bill, and if any bill has remained in the box for 24 hours or more, and the car is yet in the yard, it should be located and movement secured without further delay.

Another feature in the handling of the bills at a large terminal is that all bills remaining in the case for a period of six days should be removed therefrom until the car is located, to avoid any cars moving out on the wrong bill or an erroneous or duplicate bill. A great many claims have been presented against railroads on account of improper movements of carload shipments from this cause. Unless the greatest care is used in securing duplicate bills and in checking the bill case, the delayed car may move from the yard on either the misplaced original or a duplicate bill, and in a second movement through the yard be improperly forwarded on one or the other of these

*The first series of papers received in this contest was published in the *Railway Age Gazette* of July 3, page 5.

bills which had been allowed to remain in the case an undue length of time.

The handling of shop cars in a large break-up yard where every car length of room is always in demand, is of large importance. Every car in bad order is not only a car out of service, but is occupying track space which could be used for cars moving under revenue load. Cars in bad order will continue to take up track room until they are repaired, and therefore the yard is serving itself best when it seeks to aid the repair department in reducing the amount of time consumed in the handling and repairing of bad order cars to the minimum.

Car repair forces can best handle shopped cars if they are given to them on the repair tracks in a classified order; that is, with reference to the heavy repair or light repair cars. Since the repairmen must handle the repair material from the supply wharves to the cars being repaired, the heavy repair cars should be placed as near as possible to the wharf carrying heavy repair material, and the light repair cars should be placed as near as possible to the wharf carrying light repair material. This will not only decrease the amount of time consumed in carrying material from wharves to cars, but will make it possible for the forces to repair the maximum number of cars daily and thereby decrease the total number of bad order cars being held each day on the yard tracks. It is also the better practice to have separate shop yards for loaded and empty shopped cars, to prevent delay to loaded cars.

Another saving in time, secured by classification of the shopped cars when placed on the repair tracks according to the amount of repairs necessary, is through the fact that each track will contain cars the repairs for which can be made in practically the same amount of time for each car, this track being ready to pull when any one of the cars is ready; no one of the cars will be delayed waiting for the other cars.

Since the repair work is usually performed out of doors, the weather plays an important part in the amount of time consumed, and if a large terminal yard should have a heavy movement of traffic with a number of days of rough weather, the accumulation of shop cars would consume badly needed track room in the yard. In districts where the weather may be inclement for long periods at a time, good results are to be secured by having 40 to 50 car-lengths of track space, in both the loaded shop yard and the empty shop yard, covered with protecting sheds so that a sufficient number of repairmen may work each day regardless of the weather.

The shop track foreman should keep the yardmaster advised as to probable time certain repair tracks will be ready to pull. Such an arrangement permits the yardmaster to include the repair track switching in laying out his work through the day, and to do this switching to the best advantage. The repair forces should endeavor to complete the repairing "by tracks," as in this way the switching work in the repair yard is kept to a minimum, the repair work is interrupted less frequently, and the entire service is carried forward in a more regular and systematic manner.

The transfer tracks should be switched at stated times each day, and by one certain yard crew if possible, in order to secure the best and quickest service. If a certain yard crew performs this service every day, it will be thoroughly familiar with the work and will know just what should be done; what kind and class of cars to spot to each shipment in bad order, and just where to place the cars to best advantage for work to be done. The periods at which the transfer tracks should be switched should be governed by the number of cars awaiting transfer of ladings, the number of cars completed, etc., but the best time for such switching and spotting is at night, inasmuch as the transfer men work during the day, and at night there will be nothing to hinder the switching crew in their work and no possibility of injuring the men of the transfer force while switch work is being done.

The yardmaster's assistants should advise the foreman of the transfer force regarding such cars as are to be given preference movement. The assistants should also make note of any loss or damage to shipments, either before or after transfer, and also note whether the work is being carried on in the quickest and most economical way possible. Instructions require that the empty car which is to receive the lading from the crippled car shall be light-weighed before transferring is commenced. The carrying out of these instructions may require both time and expense if cars are to be specially light-weighed for this purpose, but much of this loss of time may be successfully avoided by utilizing cars which have been light-weighed after receiving heavy repairs.

The comparative expense of terminal yard operation is daily indicated in the statements of total switch engine mileage and terminal overtime. Engines employed in yard switching service are given an arbitrary mileage allowance per hour of service. This total mileage in its relation to the volume of cars handled into and out of the yard reflects the cost of yard operation, and the comparative showing from day to day, or month to month, serves as a barometer to indicate proper and economical yard management. It is therefore necessary for the yardmaster to give close attention to the number of engines employed in switching service from day to day to see that engines are not used except when absolutely required, and that the work is so systematized and given such close and constant supervision that the full maximum service be secured from each engine or switching crew.

It is primarily important, of course, that the traffic should receive good and prompt movement through the yard, but it is also of the greatest importance that the expense of yard operation shall be maintained at the lowest limit with reference to the service to be performed. In a well-regulated and economically-operated yard the methods of work will be such as to decrease the switching movement per car through the yard to the exact needs. This can largely be secured by proper grouping of cars in breaking-up incoming trains with reference to the outbound movement of such cars, so as not to handle a car repeatedly in the switching work when a fewer number of switch handlings can be made to answer the purpose.

Any condition of the yard making it impossible to take in trains promptly from the road results in the crews of such trains making terminal overtime. The expense of this road crew overtime is charged against the yard showing, and very properly so, although more frequently than otherwise the yard condition resulting in this overtime being made has been due primarily to road conditions such as derailments, power failures, etc., causing bunching of trains into the terminal and a congested condition of the yard. Not only is the expense of this overtime an absolute loss, but the effect of trains held out of the yard is far-reaching and operates to further cripple both the road and the yard movement.

HUMP OR FLAT YARDS

By W. B. Hendricks

Superintendent of Terminals, Chicago, Milwaukee & St. Paul, Milwaukee, Wis.

The relative merits of hump and flat yards for the make-up and break-up of trains in transit have been a disputed question for a number of years. Considering this question, and eliminating entirely industrial and local switching, let me present some data compiled from actual performance on the Chicago, Milwaukee & St. Paul, in Milwaukee, Wis., where the break-up and make-up of east-bound trains is done by hump switching and all west-bound trains are made up in a flat switching yard.

The hump is located in the middle of three yards. Two receiving yards are west of the hump and contain 17 long tracks with a capacity of 957 cars, and 5 short tracks with a capacity of 150 cars. The long tracks will receive trains containing from 50 to 75 cars, while the short tracks are used by way freights and patrols. Five divisions entering Milwaukee from the west discharge their trains into these receiving yards, and during the busy season bring in from 2,000 to 2,500 cars a day.

The classification yard is located east of the hump. This yard

has 25 tracks for classification purposes and 8 tracks for receiving trains from the west, the latter to assist the two receiving yards, so there will be no delay in the prompt receiving of trains. It will be readily understood that when a train arrives on one of these tracks, it must necessarily pass the hump on its way in, and when switched the train must be pulled westward past the hump, but not over it, and then shoved eastward over the hump. The 25 classifying and the 8 receiving tracks east of the hump have a capacity of 2,700 cars, the longer tracks holding 70 cars.

A trimmer engine was employed both night and day, when the hump was first put in service in the fall of 1912, but this was dispensed with later on, when it was found that the work could be performed with very little delay by the engine working on the hump, after it had completed shoving the string of cars over the hump into the different classifying tracks.

The riders walk back to the hump. While this, at times, causes a slight delay, the number of riders is increased or decreased according to the volume of business. The first three cars placed on any track in the classifying yard are anchored by setting the hand brakes. During the night a green lantern is placed on the ground on each of the 25 classification tracks, to indicate the position of the last car, the rider moving the lantern to the proper position after each cut is made. Green lanterns are preferred for this purpose, as they are not as readily carried away as the red and white lanterns would be.

The pin puller on the hump announces by signal (a hand signal during the day and a lamp signal at night) to the switchtender at the junction switch, which is located about 300 ft. east of the summit of the hump, the number of the track the car is to go on, and he in turn conveys the information to the switchtender having charge of the track, who repeats the signal back to the junction switchtender. The track reference of the second cut to come over the hump is marked in chalk on the rear end of the last car on the first cut, etc.

Track No. 25 in the classification yard is an outside track used exclusively for bad order cars. It leads directly to the repair yard and is switched several times every day.

It has been demonstrated by experience that one hump rider is capable of taking care of three cars, either loads or empties, with the exception, of course, that when the loads are extremely heavy it is advisable to have two riders. Two riders can handle from three to six cars and three riders from six to nine cars, and so on. The pin lifter at the summit has charge of the riders and regulates the number required to handle the different cuts. The three yard men working on the hump engine take their turn as riders in disposing of their drag when shoving cars over.

The men are not permitted to work during the noon hour, nor is overtime allowed to be made except when absolutely necessary to handle stock and time freight. This is controlled entirely by the yardmaster.

It has been demonstrated that the maximum capacity for a 24-hour period is about 1,800 cars, our high mark being 1,836. It is only possible to reach this figure under the most favorable conditions, where most of the cuts are large, consisting of from 5 to 10 cars and upwards. The average number of cars actually moved over the hump will amount to about 1,200 for a 24-hour period. To do this work at present we are using one engine during day time and two during night time. At this writing eight hump riders are employed days and the same number nights. With the assistance of three yard men on the hump engine this increases the day riders to eleven men, and the six yard men on the two engines nights make the total number of night riders fourteen.

At each of the 25 switches located in the classification yard two skates are placed to be used in case the riders find that they cannot control the cars by the hand brakes. When this occurs the rider signals the switchtender of the track upon which the car is to go, and he places a skate upon the rails. This is done to reduce the speed of the car and prevent the destruction of equipment, particularly where the run may be short and the rider has not the time to get the cars under control after leaving the hump. This is mostly occasioned by the hand brake failing to hold as it should or by some other defect in the braking apparatus.

The brakes on all cars are tested by the riders before the cars are cut off at the hump, and if a brake is found to be defective an additional car or cars is sent down with the cut to furnish sufficient hand braking power. It frequently happens, after brakes have been found to be apparent'y satisfactory at the hump, that they become inoperative when the cars are under way, and it is upon these occasions that a skate is called for by the rider.

The type of engine used at the hump is what is known as the C-2, handling trains of from 2,000 to 2,200 tons with ease. These locomotives have a weight on drivers of 189,200 lb., a tractive power of 42,800 lb., a boiler pressure of 200 lb., 63 in. driving wheels, and 23 in. x 30 in. cylinders. During the winter months a Mallet locomotive is used on the hump in place of one of the C-2's for the entire 24-hour period, being double crewed. The weight on the drivers of this engine is 323,500 lb., the tractive power 76,200 lb., boiler pressure 200 lb., and the diameter of driving wheels 57 in. These engines average from 36 to 40 miles per 10-hour period.

In making up trains in the flat switching yards we use two engines days and two nights. One of these engines—day and night—is of the same type as those used on the hump, viz., C-2. The second engine is a regular switch engine of the I-5 type, with a weight on drivers of 125,550 lb., a tractive effort of 28,158 lb., a boiler pressure of 180 lb., and driving wheels 51 in. in diameter. The average mileage made by these switch engines is about 25 or 30 miles per ten-hour day.

During the month of October, 1913, the total number of cars handled on trains in and out of Milwaukee, amounted to 133,000, or an average of nearly 4,500 a day, including Sundays. This large number of cars was about evenly divided east and westbound. Of the 67,000 eastbound cars, 55,000 were switched in the hump yard, and the balance were taken care of in what is known as the stock yards, a flat switching yard, where beer, merchandise and stock trains are made up every night, owing to the fact that the hump cannot take care of all of the business between the hours of 7 p. m., and 12 midnight. The 67,000 cars westbound are made up in trains in two different yards, on a flat switching proposition entirely.

The following statements will show a comparison of the actual expense of handling cars in hump and flat switching for October 23, 24 and 25, 1913.

Total number of cars handled by hump engines	5,223
Cars actually passed over the hump	3,437

The balance of the cars which were received at the hump yard were taken care of by the hump engines without any additional expense, but were not switched over the hump, owing to the fact that they were either stock trains or trains arriving in such condition that "humping" was not required, the engines simply making an exchange of caboose, or adding or deducting tonnage to fill the requirements of the connecting division.

Following is a table showing the expense incurred in the operation of the hump yard for the three days mentioned:

3	engineers	90 hr. at	4.25	$38.25
3	firemen	90 hr. at	2.55	22.95
14	riders, night	420 hr. at	3.70	155.40
12	riders, day	360 hr. at	3.50	126.00
2	foremen, night	60 hr. at	4.00	24.00
2	foremen, day	60 hr. at	3.80	22.80
10	switch tenders	300 hr. at	1.92	57.60
3	car clerks	90 hr. at	60.00	18.00
2	car clerks	60 hr. at	65.00	13.00
2	car clerks	60 hr. at	55.00	11.00
2	yardmasters	60 hr. at	4.50	27.00
				$516.00
	10 per cent. added for accounting and supervision			51.60
				$567.60
3	engines, use of	90 hr. at	8.00	72.00
3	engines, roundhouse expense	90 hr. at	2.50	22.50
24	tons coal	at	3.00	72.00
12	tanks water	at	.50	6.00
	Oil and waste			2.25
	Total			$742.35

This would make the cost of cars actually switched over the

hump 21.6 cents each, but as the total number of cars handled by the same employees and with the same equipment, without any additional expense whatever, amounted to 5,223, it will reduce the average cost of switching in the hump yard to 14.2 cents per car.

The total number of cars handled in the flat yards, for the same period, was 4,444. Following is a statement showing the cost of operating these yards for October 23, 24 and 25, 1913:

4 engineers	120 hr. at	4.25	$51.00
4 firemen	120 hr. at	2.55	30.60
4 helpers, nights	120 hr. at	3.70	44.40
4 helpers, days	120 hr. at	3.50	42.00
2 foremen, nights	60 hr. at	4.00	24.00
2 foremen, days	60 hr. at	3.80	22.80
1 switch tender	30 hr. at	1.92	5.76
2 yardmasters	60 hr. at	4.50	27.00
1 yard clerk	30 hr. at	65.00	6.50
1 yard clerk	30 hr. at	60.00	6.00
Proportion of expense of other yard clerks carding cars			10.00
			$270.06
10 per cent. added for supervision, etc.			27.00
			$297.06
4 engines, use of	120 hr. at	8.00	96.00
4 engines, roundhouse expense	120 hr. at	2.50	30.00
36 tons coal	at	3.00	108.00
12 tanks water	at	.50	6.00
Oil and waste			3.00
Total			$540.06

This will make the average cost of flat switching during this period 12.1 cents per car.

While these statements show that hump switching costs 2.1 cents per car more than the flat switching, it does not tell the entire story. When the hump yard was first inaugurated at Milwaukee, I was decidedly prejudiced against its use, because of the fact that a large number of cars were damaged by striking or colliding with cars standing on tracks. However, it was proved that this was mostly caused by the inexperience of the riders. At the opening of the hump yard the average number of cars damaged in a 24-hour period amounted to 35 or 40. After the riders became more experienced and knew how to handle the cars, the damage to equipment greatly decreased, and it is now a very frequent occurrence that we do not have a single car damaged in a 24-hour period. I feel safe to say that as many as ten days in every month go by without any equipment being damaged in this yard. Of course, it occurs occasionally that three or four cars will be damaged at one time, which is invariably due to the inefficiency of the brakes after the cars have left the hump. All cases of damage to equipment are thoroughly investigated for the purpose of ascertaining how the damage was brought about.

On the other hand, flat switching cars thrown down on the different tracks, and the abrupt stops required when cutting off cars, results in much damage to equipment as well as to commodities loaded in the cars. It is safe to estimate that the damage done in flat switching to equipment and freight is at least five times as great as that done in hump switching. I am therefore convinced that switching cars over the hump is more economical than flat switching, when the matter of damage to equipment and freight is considered.

THE PROPER SELECTION OF MEN

By I. T. Tyson

Assistant Trainmaster, Philadelphia & Reading, Philadelphia, Pa.

In handling any terminal, large or small, eternal vigilance and loyal employees, all working in perfect harmony, are required to bring most efficient service and economic results. The man in charge can never feel for a moment that there is nothing to do but to take life easy, look wise, and draw his salary, for that feeling spreads surprisingly fast and within a very short time everything begins to drag and irregularities and congestions appear.

I have always felt that the most important duty is the selection of men for employment. After the most careful examination has been made and the man has been accepted and put to work, his development must be watched and if it is found that a mistake has been made, and that he is not going to make good, the only thing to do after a fair trial is to drop him from the service. On the other hand if he develops any special points keep him headed that way so that he will take more interest in his work and the results obtained will far exceed what they would had the man been kept at something for which he was not fitted.

I find it necessary to watch closely for the fellow who becomes careless, lazy or indifferent. This class of men should be eliminated immediately, before they contaminate the entire force. I have known by actual experiment where one lazy, drunken man who was permitted to remain too long in the service destroyed the efficiency of the entire force with which he came in contact because he neglected every duty possible, which naturally threw everything out of bearing and caused friction. We know how easy it is for friction to crop out among men who are being forced under high pressure all the time in a busy terminal. This friction must be stamped out immediately. I have always made it a point where there are two or more yardmasters and each begins to feel that the other fellow is rubbing it in and begins to balk, to get on the ground just as quickly as possible to show all concerned the conditions in their true light. Then all can get back into the one long steady pull.

The man who is able to keep his entire force working in absolute harmony, from the general yardmaster to the newly appointed messenger boy, has the opportunity to put his mind to new problems which may arise or which may be of benefit to some part of the service, if properly worked out and put into effect. We have always found that from the moment a man is employed he should be made to feel he is an important cog in the wheel of a great organization. The assistant yardmaster, whose duties are about the same as those of his immediate superior, must depend upon his efficiency and loyal service for advancement. The switchman who squanders a lot of money in an hour in wrong moves will correct his method if he is shown what one minute lost on each move amounts to in a day. If the car checker who marks the cars on arrival is slow he should be made to see what slowness means in dollars and cents, and if the proper material is in him there will be no more trouble.

The engine despatcher is the next to the most important man in the whole organization. He must insist upon the engine being ready for service on the minute. The men must understand that there are 600 minutes in a day of 10 hours, which the company pays them for and which it does not get if they come out late.

Even in the selection of the messenger boy the greatest care should be used. In this young man we plant the seed for the future practical railroad man. From the very start he must understand the importance of his position and be made to feel that it is his duty not only to take care of this position, but also to fit himself for the next in line as soon as the opportunity may offer for advancement. The boy that fails in this is dead timber.

After such a careful selection and training of men there should be no reason why the handling of any terminal should not be successful. The secret is eternal vigilance, with every man constantly pushing the work. We have always trained our men to understand that just so soon as the work begins to push us, it requires double the effort to get even small results.

SOME DEFECTS IN YARD OPERATION

By A. B. C.

The subject of the operation of classification yards is one of minute detail requiring continuous ability; live, personal interest and smooth-running team work on the part of all concerned. No one, I think, has yet come forward with the knowledge, the courage and the backing to increase the cost of yard operation to the point where delays to freight will be avoided. Yards generally are run too cheaply. Too often a dollar is made saving yard engine service, and lost in per diem. There is

too much judging efficiency by comparing present with past figures.

In the same yard there is little sameness in the work for the same seasons of different years. The car movement and not the expense should be, and is not, the standard. Larger yards are not needed as badly as better road movement with present facilities. Except to handle certain equipment at certain periods storage yards are a mistake. Better car movement will obviate for some time the necessity of either. Larger yards will permit ready trains to wait on power, while storage yards will tend to lose cars and lessen the per-car per-day necessary mileage. Better car distribution will avoid storing many cars.

Yard operation does not appear to have been given close enough supervision by the higher officers. Too many decisions are based on information and detail from sources lacking experience or knowledge. We have many expert traffic minds promoted from clerkships, many good managers from mechanics or operators, but few promoted yardmasters. There are not many officers with a detailed knowledge of yard work. At many points on all roads conductors are running yards who don't want the job, but who have to be used for their switching knowledge, and who, in trouble, go back to their turns.

The interchange yard, where per diem is the much discussed item; the delivery yards at termini, where cars go to floats or piers or to industries, where the biggest kicker gets the best attention; the producing yard, where freight is collected from big industries, quarries and mines, and built into trains; and the classification yard at a divisional point, where sufficient room and facilities are supposed to be furnished for the properly classified handling of goods to or towards destination; all are different, but they are all alike in that they mean car movement.

Excessive continued yard crew overtime shows an unhealthy condition. There are too few yard engines, the schedule of work is wrong, there is no system in handling the work, or team work and personal interest are lacking. If the proper number of engines is worked, and they are rightly handled, the excessive overtime will disappear, though there will always be some overtime, as no two days are alike in the detail of the work they present, and it is impossible all the time to produce results in a given ten hours. Reasonable overtime should not be objected to as we get value received for the money spent.

Our modern hump and gravity classification yards seem to have proved that despatch in handling cars in yards is preferred above the risk of damage to freight by rough handling. In many places the number of brakemen riders is too small to properly protect and handle the business; and the damage done by bad brakes, etc., is too great, particularly in handling explosives, which under our present I. C. C. regulations make many an extra car.

The general yardmaster has not a free enough hand. By reason of his duties, probably pursued, he should be in line for the position of trainmaster. Perhaps, if his jurisdiction extended over the car and roundhouse foremen, and the transfer agent, much better team work might result, provided the train despatcher took the proper interest in team work. Under present actual conditions of work surrounding a general yardmaster's duties there is too much friction. The work of a general yardmaster should be purely of a supervisory nature, and his executive ability and power to handle men should be the criterion, rather than his ability to "rawhide" night and day.

On coming into a yard the first element to be considered is the classification required, for, regardless of the physical aspect of the yard, the men, or the power supplied, particular assigned work must be done at different points.

The second item for consideration is the organization—the human element and the system of work. The kind of men and the working plan mean much, as different men produce vastly different results with a given problem of yard operation.

Next to the general yardmaster his chief clerk should be experienced and capable of handling the correspondence, as well as smaller matters of the yard extra list, and the placing of clerks. He should see that every man is at his post at the beginning of his trick. He should have the assistance of an index or inventory clerk to handle car records and the many yard reports required. Car records by booking inbound and outbound trains, or filing by conductors trace reports, should be kept in the yard office. Such additional clerks as the work requires should be supplied.

The assistant yardmaster should be educated, trained and young. He is frequently not any of these. His education should be provided before he comes to the road, quite possibly in these days, and, if properly handled, his experience can be had from the bottom up in yard service in a very few years. He should appreciate the relative importance of all freight by a glance at the card manifest accompanying the cars; he should have a working knowledge of the freight agent's work, particularly billing; and he should be able to direct and work in harmony with his yard and road crews and subordinates. The clerk, weigher, checker, switch-tender and caller should be his men, trained and handled by him. His particular duties vary, but the proper conduct of the yard is his responsibility during his hours of service. The minute duties of his force should be considered separately with reference to requirements and circumstance in each instance.

To my mind the most important feature of yard operation is the handling of bad-order and stray or "no bill" cars. The "no-bills" should have a particular place in the yard, and the effort to locate bills should be constant and unremitting. The shop cars should have a sufficient space of their own. They should be placed and repaired promptly, and regularly taken off the repair tracks—once or twice in 24 hours, as may be demanded. There should be a positive unvaried schedule in handling this work. "Working Book" rules were made to be observed, and a yardmaster should understand the importance of strict compliance with instructions, and have cars forwarded on the time required. But if failure to carry out instructions were investigated with a view to understanding why certain things could not be or were not done, and if more consideration were extended, better results would obtain. If properly trained no yardmaster will ever disobey instructions. He will carry them out if his yard ties up provided he knows he will get the credit due obedience and good faith.

ORGANIZATION OF THE HUMP RIDERS

By E. W. Brown
Assistant Superintendent, Lake Shore & Michigan Southern, Chicago, Ill.

Riders should be required to get on cars and have their brakes tested before the cars are cut from the train. When defective brakes are found, which cannot be adjusted with little delay, another car should be added to the "cut" and the cars allowed to drop in on some track which is not in use, where they will not be overlooked, but will be picked up later by the "roustabout" engine, or by the "hump" engine after the train is switched.

During the daylight hours riders should be instructed to get off their cuts when the speed has been reduced to a slow rate and not to kill time riding until the cars stop. Whenever a rider is given more than one car the conductor should call to him the number he has in the "cut," and if the rider feels he cannot hold these cars he should call for another rider. When taking down long cuts, or when conditions are out of the ordinary, and more than one rider is used these men should be required to get off the "cut" when the speed has been checked so that one man can handle the cars. With an arrangement of this kind in effect very few cars will be damaged in switching. When cars are damaged a brake inspection should be made by the car inspectors and a report rendered to the general yardmaster who will investigate all cases and discipline careless riders.

Good switchtenders are of the greatest importance in avoiding sending cuts onto wrong tracks. They should also keep the "hump" conductor posted when the tracks are filling up and when cuts do go wrong they will advise the conductor so that the cars may be taken out before the train is ready to leave the yard. It has been my pleasure to have switchtenders who

took as much interest in a successful day's work as I, and to whom I owe much. Switchtenders should be promoted as soon as they are qualified, thereby encouraging new switchtenders.

Where classification tracks are long, or when they are clear, the conductor should instruct the riders as to just what distance he desires the cars to go and not allow the riders to ride the cars the entire length of the track, which consumes a great amount of time for these and the following riders. To enable the general yardmaster to have proper knowledge of the amount of work done in his yard, each rider should be required to turn in to his conductor or yardmaster, at the end of each day's work, a report showing the number of "cuts" he has taken down the hill and the hours and minutes used in other work. The reports, properly checked, will show just what is being done by each set of men and one can readily locate any slow work.

The noon hour should be watched very closely and riders should not be allowed to work unless absolutely necessary. The yardmaster should have cars on the hill if possible so as to start work promptly at the expiration of the noon hour. This can be done by working two or three men during noon hour, requiring all others to take the full hour for lunch.

A SUFFICIENT NUMBER OF CLASSIFICATION TRACKS

By G. O. Sarvis
Assistant Trainmaster, Philadelphia & Reading, Harrisburg, Pa.

One of the debatable questions in the design of yards is the number and length of classification tracks. It is the writer's opinion that the best interest will be served with a larger number of classifying tracks of sufficient length to accommodate the maximum train handled on the road, rather than fewer tracks of greater length. With sufficient tracks only to provide one for each classification, even if of considerable length, circumstances will arise preventing the prompt movement of one or more classifications. These tracks will fill up and it is then possible to keep working only by combining two or more classifications on one track, which is very undesirable and ultimately results in loss of time. With tracks for each classification, and a number of auxiliary tracks, each of sufficient length to hold a maximum train, it is possible under all ordinary circumstances, to avoid delay, and to keep the traffic properly classified.

Also with a classification yard consisting of one track only for each classification, the handling of preferred freight is a difficult proposition and cannot be accomplished expeditiously, without serious and costly delay to slow freight movement. With a yard having a number of auxiliary classification tracks, it is fair to assume that there will be a few tracks unoccupied and on which the preferred freight may be classified, and while this will greatly reduce the delay, it cannot be entirely eliminated. The ideal condition is a separate yard for the classification of all preferred freight, accessible without interfering with the slow freight movement.

THE NEW HAVEN'S ANSWER TO PRESIDENT WILSON

The following is the statement given out by President Hustis of the New Haven:

"The directors of the New York, New Haven & Hartford Railroad Company desire to make their position entirely clear. They have never refused, but on the contrary have always been willing and anxious to carry out the agreement with the Attorney-General made on March 21, 1914, approved by the stockholders on April 21, and sanctioned by the Governor of Massachusetts.

"That agreement was framed to accomplish two objects, first, the sale of certain properties owned by the company which the Attorney-General demanded, and second, the sale to take place at such times and on such terms as would insure a return at a fair price. This last object, in the judgment of the directors, will be defeated if the sale of the Boston & Maine stock is made subject to the condition imposed by the legislature of Massachusetts, and therefore they have declined to accept it and have stated fully the reasons for their decision.

"They have not refused to carry out any agreement which they have made, but they have refused to change that agreement, as the change would entail on the company a very large pecuniary loss and at the same time increase enormously the difficulty of reorganizing the Boston & Maine Railroad.

"As evidence of the good faith of the directors a representative committee consisting of President Hustis, Mr. Cuyler and Dr. Hadley, accompanied by Mr. Moorfield Storey, counsel in these proceedings, waited on the Attorney-General on July 20 and offered to carry through the settlement in all respects according to the agreement, and further in order to meet the difficulty which had been created by the Massachusetts legislature the committee offered to place the control of the Boston Holding Company in the hands of the trustees who had been selected by the Attorney-General and the Governor of Massachusetts, with full power to absolutely control the Boston & Maine Railroad until either the Massachusetts legislature passed the necessary legislation or the rights of the parties interested were decided by the Federal court in proceedings which the company offered to expedite in every way possible.

"In making this offer the committee did everything possible to avoid hostile proceedings without at the same time sacrificing the interests of their shareholders, and the directors only regret that an offer which seems to them eminently fair should not have been accepted.

"The following authorized statement will be issued to the stockholders:

"'You authorized your directors to compromise the questions pending between the United States and the company upon the basis set forth in the statement by the Attoreny-General on March 21 and submitted to you and approved by you at a special meeting of the stockholders held on April 21 last.

"'You have been advised through the statement adopted by the directors on July 8 that the legislature of Massachusetts has attached a condition to the sale of the Boston & Maine stock held for this company by the Boston Holding Company to which the directors cannot assent, and in that statement the directors have given the reasons for their decision.

"'Since that time a committee of the directors has conferred with the Attorney-General and has explained to him that the company cannot modify the agreement made with him by making the sale of the Boston & Maine shares subject to the terms imposed by the legislature of Massachusetts. The committee pointed out that the amount involved is very large, that in the judgment of the directors the condition would seriously depreciate the value of the stock and that it practically prevents the sale of these shares except at a great sacrifice and hampers very seriously all efforts to reorganize the Boston & Maine Railroad.

"'The committee called attention also to the fact that the right which the legislature seeks to acquire by the recent act is very different from the power reserved in the acts incorporating the Boston Holding Company, since these gave Massachusetts the power not to buy the Boston & Maine shares but only the shares, "bonds, notes and other evidences of indebtedness" issued by the Boston Holding Company, and this upon condition that it took them all and at the same time relieved the New Haven company from all its obligations as guarantor of those securities.

"'The New Haven company has guaranteed the principal and dividends on 272,939 shares of preferred stock issued by the holding company, of which 28,000, worth at par $2,800,000, are outstanding in the hands of the public. These shares are all secured by a lien on the Boston & Maine shares and the proposed act gives the right to take this security without assuming the New Haven company's liabilities as guarantor.

"'The Attorney-General has decided that it is his duty to bring his suit for a dissolution of the system and there is now no existing agreement between him and the representatives of the company, but the directors hope that a way will be found after the suit is brought through negotiation and action of the court to carry out the compromise agreement and thus achieve a result which all parties earnestly desire.'"

General News Department

The Chicago, Milwaukee & St. Paul has increased the working time of 2,000 men employed in its Milwaukee shops, from 8 to 8½ hours.

The new car shops of the Philadelphia & Reading at the coal shipping yard at Pottsville, Pa., have been turned over by the contractors to the railroad company.

The Public Service Commission of Pennsylvania and the Department of Labor and Industry of that state are holding conferences with railroad officers and with managers of industrial plants looking toward the formulation of a simpler report for state purposes, and especially for the reporting of accidents by corporations.

A joint committee of the New York City Club, the Citizens Union, the Independent Club of the West Side, the West End Association, the Twenty-third Street Improvement Association, the Washington Heights Tax Payers Association, the West Side Tax Payers Association, the Greenwich Village Improvement Association, the Woman's Municipal League, the League to End Death Avenue and the Merchants' Association has made an appeal to the Board of Estimate of the city of New York to cut short the negotiations with the New York Central looking toward some compromise on the question of the elimination of surface operation on Eleventh avenue and on the west side of New York, and to proceed immediately either through the courts or the legislature to forbid operation on Eleventh avenue unless the New York Central shall at once come to the terms asked by the city for the elimination of these tracks.

The Senate Committee on Interstate Commerce which had come to a tentative agreement on the draft of the Railroad Securities Bill, and was understood to be ready to report it to the Senate has, after a conference with Louis Brandeis and George Rubelee, decided to reconsider the bill. The objection found to the bill by Mr. Brendeis and by Senator Lippitt and Senator Brandegee was that in the form in which it was to be reported the Interstate Commerce Commission's approval of a security issue would amount to an implied guarantee by the government of the propriety of such an issue. As first agreed on the bill would have given the Interstate Commerce Commission power to investigate proposed improvements for which funds were sought, to approve issues if deemed necessary or advantageous, or to reject them if regarded as extravagant or unnecessary. The commission also would have been given power to go into court to enjoin a bond issue if made in violation of its order. Electric railways were to be exempt.

Controversy with Western Engineers and Firemen

The United States Board of Mediation and Conciliation arrived in Chicago on Monday, July 20, and offered its friendly offices in bringing about a settlement of the controversy between the Western railways and the engineers and firemen who have taken a strike vote. The request for mediation was made by the conference committee of managers, of which A. W. Trenholm, general manager of the Chicago, St. Paul, Minneapolis & Omaha, is chairman, after the representatives of the engineers and firemen had declined to join in the request on the ground that to do so would place a moral obligation on them to accept arbitration as provided for in the Newlands act. They had previously announced that they would not accept arbitration because of their claim that in past arbitrations the railroads had refused to place the awards in effect.

As briefly noted in last week's issue, the representatives of the engineers and firemen who had broken off negotiations on June 1, met with the committee of managers in Chicago on July 14, headed by W. S. Stone, president of the Brotherhood of Locomotive Engineers and W. S. Carter, president of the Brotherhood of Locomotive Firemen and Enginemen, and presented the results of a strike vote, claiming that 99.2 per cent. of the engineers' brotherhood had voted for a strike unless their demands were granted and 97.2 per cent. of the Brotherhood of Locomotive Firemen and Enginemen. The managers then requested that they submit in writing the results of the strike vote in detail by roads, which request was declined, in a letter stating that if the managers' committee had nothing further to offer, negotiations would be immediately discontinued and they would be notified of the time when the men would leave their service. The managers then asked for a statement of the final demands on which the men proposed to strike and were told that the men intended to stand by the final demands presented at the previous conference which were fully described in the statement issued by Mr. Trenholm on June 1, which was published in the *Railway Age Gazette* of June 5, page 1240. On July 16, Mr. Trenholm addressed a letter to Messrs. Stone and Carter, stating that as it was apparent that further negotiations between the committees would in all probability result only in reaffirmation of their relative positions without progress toward a settlement, the managers' committee requested the engineers and firemen's committee to join them in a request for the services of the federal board of mediation and conciliation. To this Messrs. Carter and Stone replied as follows:

"Your request has been referred to the joint committee representing the engineers, firemen and hostlers in the Western territory, and has been declined for the reason that should they join with you in the request to the United States Board of Mediation and Conciliation, it would place a moral obligation upon them to accept arbitration as provided for in the Newlands act. As we have stated to you on several occasions they will not accept arbitration because in our past arbitrations, the railroads have refused to place the awards in effect."

The managers then requested the services of the board and William L. Chambers, chairman, offered its services to the engineers and firemen, who accepted, but stated in the telegram "that it is unfair to ask us to wait four days before mediation begins in view of the present strained relations."

The managers' committee also issued a statement on July 17, in the form of a letter to the engineers and firemen, denying that the Western railroads had ever refused to abide by arbitration awards, and requesting that specific instances be cited in support of the charge.

The board of mediation and conciliation on its arrival in Chicago on Monday immediately went into conference with the managers' committee and the brotherhood's committee, separately, and announced its intention of holding a meeting with each committee daily.

American Railway Safety Association

A meeting of the American Railway Safety Association, which was organized in Chicago on June 9, 1913, was held on July 16, at the Hotel Bismarck, Chicago. This was the fifth meeting since the organization. At the previous meeting the election of permanent officers was postponed, pending possible action by the American Railway Association toward organizing a bureau of safety or a committee on safety within its organization. As the American Railway Association had taken no action on these plans it was decided to proceed with the permanent organization, and the following officers were elected: President, A. W. Smallen, chairman general safety committee, Chicago, Milwaukee & St. Paul, Chicago; vice-president, Isaiah Hale, safety agent, Atchison, Topeka & Santa Fe, Topeka; secretary-treasurer, L. F. Shedd, safety supervisor, Rock Island Lines, Chicago. It was decided to hold the next regular meeting of the association at Chicago in November.

On recommendation of a committee appointed at the previous meeting it was decided that the association should become an associate member of the National Council for Industrial Safety. A committee was appointed with N. D. Ballantine, assistant to second vice-president, Rock Island Lines, as chairman, to investigate and report at the next meeting on a uniform plan of

reporting accident statistics. It appeared that the safety departments of various roads were using different methods in compiling their reports of injuries, some following the rules of the Interstate Commerce Commission regarding the reporting of injuries to that body, which requires the report of an injury only where the injury causes the employee to lose three days' time, while some roads include in their reports all injuries, regardless of whether time is lost, and others only report injuries that cause the loss of time, thus making it difficult to make comparisons between the safety records presented by different roads. A committee was also appointed to compile statistics of automobile accidents at crossings, with a view to conducting a campaign of education among automobile owners and manufacturers.

Following the completion of the routine business of the meeting, the meeting was thrown open to general discussion of safety methods. E. R. Scoville, of the general safety committee of the Baltimore & Ohio, gave an outline of the work on that road, which was reorganized on January 1, with a general safety committee of seven members to give all their time to the work. J. G. Pangborn, formerly special representative of the president, is chairman, and the other members of the committee include a superintendent of motive power, a division engineer, a division superintendent, a medical examiner, a supervisor of safety service, and a former inspector of the Interstate Commerce Commission. The General Safety Committee usually attends meetings of all of the division safety committees, 20 in all, each month, and have a car assigned to their use. The committee reports to the third vice-president, and obtains special authority for expenditures recommended by the division committees, which are of such a nature that they cannot be taken care of out of the funds allotted to the divisions. The general committee recently spent one month in visiting large terminals on the road other than the division headquarters where the regular division meetings are held. A large number of separate meetings were also held with various classes of employees, the men being paid for the time spent at such meetings. For the month of July one member of the committee is attending the division meetings and the others are traveling over other parts of the system, inspecting conditions. A. A. Krause, commissioner of safety, Missouri, Kansas & Texas, also spoke briefly regarding the safety work on his road. M. A. Dow, general safety agent, New York Central Lines, described some of the features of the safety work on the New York Central Lines, and distributed samples of some of the literature used. He said the most important feature of the work was the education of employees along safety lines. During the past year 100,000 men have attended the meetings held in the safety exhibit car. Special shop meetings were held which were attended by every man working in the shop. His department has issued a leaflet of 40 special safety rules, which are supplemental to the regular operating rules, which the men are required to keep in the rule books, and on which they are required to pass an examination. He also described the use of a safety work card, which is filled out when special work is recommended for certain divisions, one copy being left with the division superintendent and the other mailed to his office. When the work is completed the superintendent fills out the card mailed to him stating that the work has been completed. If the work is not done within 30 days, it is taken up by his office from the card records. He also outlined plans which are now being worked out for the use of moving pictures in the campaign during the next winter. J. D. M. Hamilton, claims attorney of the Atchison, Topeka & Santa Fe, spoke of the importance to the railroads of exercising more care in the inspection of men before they are hired, to see that they are qualified for their work, and the education of these men after they are in service. He said that railroads must seek to obtain a higher degree of perfection in the employees, and to eradicate habits of carelessness which have been acquired through long practice, and because the men have never been taught any better. He also dwelled on the necessity of teaching the men habits of concentration on their work. Several other members spoke along the same lines. L. F. Shedd, of the Rock Island Lines, said that under the present workmen compensation laws the railroads are running insurance companies without knowing what risks they are taking, unless the men are examined thoroughly before they are hired. J. M. Guild, of the Union Pacific, told of the plan recently adopted by the Union Pacific for keeping in touch with good men that apply for jobs, but who cannot be put to work at once. Waiting lists have been established, so that when men are needed the road has an opportunity to make better selection. Mr. Hamilton was appointed chairman of the executive committee; Mr. Guild of the committee on publicity and entertainment; and C. T. Banks, of the Northern Pacific, of the committee on membership.

Crossing Accident on the Virginian

An electric train of two cars on the Virginia Passenger & Power Company's line from Ocean View, Va., to Norfolk ran into a train of 71 empty cars on the Virginian on the night of July 16, killing four people and injuring a considerable number of others. From unofficial accounts it would appear that the train of empty coal cars was in considerable part past the crossing when the electric cars, fairly well crowded with people returning from Ocean View, either disregarding the regulations to stop before the crossing or for some season unable to do so, crashed into the train almost at right angles, breaking it in two, overturning the electric cars and derailing two or more of the gondola cars.

American Railway Tool Foremen's Association

The following is a list of the exhibitors at the convention of the American Railway Tool Foremen's Association, held at the Hotel Sherman, Chicago, on July 20 to 22:

American Specialty Company, Chicago.—Drill sockets. Represented by H. S. Mills and C. N. Weakes.

Brown & Sharpe Company, Providence, R. I.—Machinists' tools. Represented by R. C. Brown and R. E. Doras.

Carborundum Company, Niagara Falls, N. Y.—Carborundum and aloxite wheels, and aloxite and carborundum cloths, and valve grinding compounds. Represented by C. C. Schumaker, H. P. Frost and E. P. Ritzina.

Chicago Pneumatic Tool Company, Chicago.—Air and electric drills, pneumatic hammers, speed recorders. Represented by C. E. Walker, P. F. Flaven, J. C. Campbell, J. L. Camby, C. B. Coates and Chas. H. Schumasken.

Cleveland Twist Drill Company, Cleveland Ohio.—Twist drill reamers. Represented by Herbert S. White and A. L. Beardsley.

Colonial Steel Company, Pittsburgh, Pa.—High speed saws, drill rods, 11/16 in. punch shown through 1⅛ in. steel, examples of steel fractures, photographs. Represented by T. W. McManus and M. P. Spencer.

Crerar-Adams & Co., Chicago.—Jacks, die starters, pipe benders, wrenches. Represented by Russel Wallace and W. I. Clock.

Crucible Steel Company of America, Pittsburgh, Pa. Represented by Mr. Baskerfield.

Detroit Twist Drill Company, Detroit, Mich.—Drills, reamers, milling cutters, sleeves, sockets, chucks. Represented by M. P. Crawmer.

Faessler Manufacturing Company, The, Moberly, Mo.—Catalogs, Represented by G. R. Maupin.

Grip Nut Company, Chicago.—Testing machines, deflecting machines, samples grip nuts. Represented by B. C. Hooper.

Halcomb Steel Company, Syracuse, N. Y. Represented by Garson Myers.

Independent Pneumatic Tool Co., Chicago.—New electric tools, new air turbines, small S. S. compound drills. Represented by Robert T. Scott, Geo. Wilson, Harold Henricks and Wm. Gummere.

Ingersoll Rand Company, New York, N. Y.—Pneumatic tools. Represented by N. O'Connor.

Lutz-Webster Engineering Company, Philadelphia, Pa.—Lutz no-set screw lathe dog, Lutz no-handle ratchet, Lutz one-piece drill ratchet, Lutz adjustable self-feed drilling post, solid and swivel arm; Lutz compression wrench for all finished or rough surface stud driving. Represented by Wm. H. Lutz.

Manning, Maxwell & Moore, Inc.; Ashcroft Manufacturing Company; Consolidated Safety Valve Company; The Hancock Inspirator Company, New York.—Hancock inspirators, boiler checks, Consolidated safety valves, Ashcroft pressure gages, prismatic water glasses and other locomotive appliances. Represented by C. L. Brown.

Midvale Steel Company, Philadelphia, Pa.—Catalogs. Represented by F. W. Sager.

National Machinery Company, Tiffin, Ohio.—Single motor driven bolt cutter and die sharpener. Represented by Chas. Harmon, Jr., and K. L. Ernst.

Norton Company, The, Worcester, Mass.—Two 2¼ in. Model C grinders, equipped with Model P protection hoods; one stand showing wheel broken in its hood; one stand showing exhaust system-line of tool-room wheels; booklets on Safety First grinding. Represented by J. W. Horne.

Racine Tool & Machine Company, Racine, Wis.—High speed metal cutting machines. Represented by J. M. Jones and Wm. Richards.

Rich Tool Company, Chicago.—High speed tool. Represented by O. F. Schubert.

Ryerson, Joseph T., & Son, Chicago.—Model of a punch and boiler tools. Represented by L. H. Bryan, C. R. Gregg, H. C. Williamson and H. G. Merriell.

Strong-Carlisle & Hammond Company, Cleveland, Ohio.—Randall graphite sheet lubricator, Mac-it set screws. Represented by B. E. Carpenter.

Weaver Manufacturing Company, Springfield, Ohio.—Weaver roller jaw chucks. Represented by C. F. Hodgson.

Western Tool & Manufacturing Company, Springfield, Ohio.—Tool holders, expanding mandrels, lathe dogs. Represented by J. Z. Wells.

Whitman Barnes Company, Akron, Ohio.—Drills, reamers, wrenches. Represented by A. O. Wange and M. E. Towner.

Williamson, H. C., Chicago.—Metal band saw. Represented by H. C. Williamson.

American Boiler Manufacturers' Association

The American Boiler Manufacturers' Association will hold its twenty-sixth annual convention at the Waldorf-Astoria, in New York, from September 1 to 4. An invitation to attend has been extended to all boiler, tank and stack manufacturers, fabricators of steel plate and representatives of supply companies.

MEETINGS AND CONVENTIONS

The following list gives names of secretaries, dates of next or regular meetings, and places of meeting.

AIR BRAKE ASSOCIATION.—F. M. Nellis, 53 State St., Boston, Mass. Next convention, May 4-7, 1915, Hotel Sherman, Chicago.

AMERICAN ASSOCIATION OF DEMURRAGE OFFICERS.—A. G. Thomason, Boston, Mass.

AMERICAN ASSOCIATION OF DINING CAR SUPERINTENDENTS.—H. C. Boardman, D. L. & W., Hoboken, N. J. Next convention, October, Washington.

AMERICAN ASSOCIATION OF GENERAL PASSENGER AND TICKET AGENTS.—W. C. Hope, 143 Liberty St., New York.

AMERICAN ASSOCIATION OF FREIGHT AGENTS.—R. O. Wells, I. C. R. R., East St. Louis, Ill.

AMERICAN ASSOCIATION OF RAILROAD SUPERINTENDENTS.—E. H. Harman, Room 101, Union Station, St. Louis, Mo. Next convention, August 20 and 21, New York.

AMERICAN ELECTRIC RAILWAY ASSOCIATION.—E. B. Burritt, 29 W. 39th St., New York. Annual convention, October 12-16, Atlantic City, N. J.

AMERICAN ELECTRIC RAILWAY MANUFACTURERS' ASSOCIATION.—H. G. McConnaughy, 165 Broadway, New York. Meetings with American Electric Railway Association.

AMERICAN RAILWAY ASSOCIATION.—W. F. Allen, 75 Church St., New York.

AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—C. A. Lichty, C. & N. W., Chicago. Next convention, October 20-22, 1914, Los Angeles, Cal.

AMERICAN RAILWAY ENGINEERING ASSOCIATION.—E. H. Fritch, 900 S. Michigan Ave., Chicago. Next convention, March 16-18, 1915.

AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION.—J. W. Taylor, Karpen Bldg., Chicago.

AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—A. R. Davis, Central of Georgia, Macon, Ga.

AMERICAN SOCIETY FOR TESTING MATERIALS.—Prof. E. Marburg, University of Pennsylvania, Philadelphia, Pa.

AMERICAN SOCIETY OF CIVIL ENGINEERS.—Chas. W. Hunt, 220 West 57th St., New York; 1st and 3d Wednesday, except June, July and August, New York.

AMERICAN SOCIETY OF ENGINEERING CONTRACTORS.—J. R. Wemlinger, 11 Broadway, New York; 2d Thursday of each month, at 2 P. M., 11 Broadway, New York.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 39th St., New York.

AMERICAN WOOD PRESERVERS' ASSOCIATION.—F. J. Angier, B. & O., Baltimore, Md. Next convention, January 19-21, 1915, Chicago.

ASSOCIATION OF AMERICAN RAILWAY ACCOUNTING OFFICERS.—E. R. Woodson, 1300 Pennsylvania Ave., Washington, D. C. Annual convention, April 28, 1915, Atlanta, Ga.

ASSOCIATION OF RAILWAY CLAIM AGENTS.—C. W. Egan, B. & O., Baltimore, Md.

ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.—Jos. A. Andreucetti, C. & N. W. Ry., Chicago. Annual convention, October 19-23, Chicago.

ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—P. W. Drew, 112 West Adams St., Chicago.

ASSOCIATION OF TRANSPORTATION AND CAR ACCOUNTING OFFICERS.—G. P. Conard, 75 Church St., New York.

ASSOCIATION OF WATER LINE ACCOUNTING OFFICERS.—W. R. Evans, Chamber of Commerce, Buffalo, N. Y.

BRIDGE AND BUILDING SUPPLY MEN'S ASSOCIATION.—L. D. Mitchell, Detroit Graphite Co., Chicago, Ill. Meeting with American Railway Bridge and Building Association.

CANADIAN RAILWAY CLUB.—James Powell, Grand Trunk Ry., Montreal, Que.; 2d Tuesday in month, except June, July and August, Windsor Hotel, Montreal.

CANADIAN SOCIETY OF CIVIL ENGINEERS.—Clement H. McLeod, 176 Mansfield St., Montreal, Que.; 1st Thursday, October, November, December, February, March and April, Montreal.

CAR FOREMEN'S ASSOCIATION OF CHICAGO.—Aaron Kline, 841 Lawler Ave., Chicago; 2d Monday in month, except July and August, Lytton Bldg., Chicago.

CENTRAL RAILWAY CLUB.—H. D. Vought, 95 Liberty St., New York; 2d Friday in January, May, September and November and 2d Thursday in March, Hotel Statler, Buffalo, N. Y.

CIVIL ENGINEERS' SOCIETY OF ST. PAUL.—Edw. J. Dugan, P. O. Box 654, St. Paul, Minn.; 2d Monday, except June, July, August and September, Old State Capitol Bldg., St. Paul.

ENGINEERS' SOCIETY OF PENNSYLVANIA.—Edw. R. Dasher, Box 75, Harrisburg, Pa.; 1st Friday after 10th of each month, except July and August, 31 So. Front St., Harrisburg, Pa.

ENGINEERS' SOCIETY OF WESTERN PENNSYLVANIA.—Elmer K. Hiles, Oliver Bldg., Pittsburgh; 1st and 3d Tuesday, Pittsburgh, Pa.

FREIGHT CLAIM ASSOCIATION.—Warren P. Taylor, Richmond, Va.

GENERAL SUPERINTENDENTS' ASSOCIATION OF CHICAGO.—A. M. Hunter, 605 Grand Central Station, Chicago; Wednesday preceding 3d Thursday, Transportation Bldg., Chicago.

INTERNATIONAL RAILWAY CONGRESS.—Executive Committee, 11, rue de Louvain, Brussels, Belgium. Convention, 1915, Berlin.

INTERNATIONAL RAILWAY FUEL ASSOCIATION.—C. G. Hall, 922 McCormick Bldg., Chicago.

INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—Wm. Hall, 829 West Broadway, Winona, Minn.

INTERNATIONAL RAILROAD MASTER BLACKSMITHS' ASSOCIATION.—A. L. Woodworth, Lima, Ohio. Next convention, August 18-20, Hotel Wisconsin, Milwaukee, Wis.

MAINTENANCE OF WAY & MASTER PAINTERS' ASSOCIATION OF THE UNITED STATES AND CANADA.—T. I. Goodwin, C. R. I. & P., Eldon, Mo. Next convention, November 17-19, 1914, Detroit, Mich.

MASTER BOILER MAKERS' ASSOCIATION.—Harry D. Vought, 95 Liberty St., New York.

MASTER CAR BUILDERS' ASSOCIATION.—J. W. Taylor, Karpen Bldg., Chicago.

MASTER CAR & LOCOMOTIVE PAINTERS' ASSOCIATION OF THE UNITED STATES AND CANADA.—A. P. Dane, B. & M., Reading, Mass. Next convention, September 8-11, Nashville, Tenn.

NATIONAL RAILWAY APPLIANCES ASSOCIATION.—Bruce V. Crandall, 537 So. Dearborn St., Chicago. Next convention, March 15 to 19, 1915, Chicago.

NEW ENGLAND RAILROAD CLUB.—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass.; 2d Tuesday in month, except June, July, August and September, Boston.

NEW YORK RAILROAD CLUB.—H. D. Vought, 95 Liberty St., New York; 3d Friday in month, except June, July and August, New York.

NIAGARA FRONTIER CAR MEN'S ASSOCIATION.—E. Frakenberger, 623 Brisbane Bldg., Buffalo, N. Y. Meetings monthly.

PEORIA ASSOCIATION OF RAILROAD OFFICERS.—M. W. Rotchford, Union Station, Peoria, Ill.; 2d Thursday in month, Jefferson Hotel, Peoria.

RAILROAD CLUB OF KANSAS CITY.—C. Manlove, 1008 Walnut St., Kansas City, Mo.; 3d Friday in month, Kansas City.

RAILROAD MASTER TINNERS, COPPERSMITHS & PIPEFITTERS' ASSOCIATION.—U. G. Thompson, C. & E. I. Danville, Ill.

RAILWAY BUSINESS ASSOCIATION.—Frank W. Noxon, 30 Church St., New York.

RAILWAY CLUB OF PITTSBURGH.—J. B. Anderson, Penna. R. R., Pittsburgh, Pa.; 4th Friday in month, except June, July and August, Pittsburgh.

RAILWAY DEVELOPMENT ASSOCIATION.—W. Nicholson, Kansas City Southern, Kansas City, Mo.

RAILWAY ELECTRICAL SUPPLY MANUFACTURERS' ASSOCIATION.—J. Scribner, 1021 Monadnock Block, Chicago. Meetings with Association of Railway Electrical Engineers.

RAILWAY FIRE PROTECTION ASSOCIATION.—C. B. Edwards, Mobile & Ohio, Mobile, Ala. Annual meeting, October 6, Washington, D. C.

RAILWAY GARDENING ASSOCIATION.—J. S. Butterfield, Lee's Summit, Mo.

RAILWAY SIGNAL ASSOCIATION.—C. C. Rosenberg, Bethlehem, Pa. Annual meeting, Bluff Point, N. Y., September 22-24.

RAILWAY STOREKEEPERS' ASSOCIATION.—J. P. Murphy, Box C, Collinwood, Ohio.

RAILWAY SUPPLY MANUFACTURERS' ASSOCIATION.—J. D. Conway, 2136 Oliver Bldg., Pittsburgh, Pa. Meetings with M. C. B. and M. M. Associations.

RAILWAY TELEGRAPH & TELEPHONE APPLIANCE ASSOCIATION.—G. A. Nelson, 50 Church St., New York. Meetings with Association of Railway Telegraph Superintendents.

RICHMOND RAILROAD CLUB.—F. O. Robinson, C. & O., Richmond, Va.; 2d Monday in month, except June, July and August.

ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.—L. C. Ryan, C. & N. W., Sterling, Ill. Next convention, September 8-10, 1914, Chicago.

ST. LOUIS RAILWAY CLUB.—B. W. Frauenthal, Union Station, St. Louis, Mo.; 2d Friday in month, except June, July and August, St. Louis.

SALT LAKE CITY TRANSPORTATION CLUB.—R. E. Rowland, Hotel Utah Bldg., Salt Lake City, Utah; 1st Saturday of each month, Salt Lake City.

SIGNAL APPLIANCE ASSOCIATION.—F. W. Edmunds, 3868 Park Ave., New York. Meeting with annual convention Railway Signal Association.

SOCIETY OF RAILWAY FINANCIAL OFFICERS.—Carl Nyquist, La Salle St. Station, Chicago. Annual meeting, September 15-17, Hotel Aspinwall, Lenox, Mass.

SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—E. W. Sandwich, A. & W. P. Ry., Atlanta, Ga.

SOUTHERN & SOUTHWESTERN RAILWAY CLUB.—A. J. Merrill, Grant Bldg., Atlanta, Ga.; 3d Thursday, January, March, May, July, September, November, 10 A. M., Candler Bldg., Atlanta.

TOLEDO TRANSPORTATION CLUB.—J. S. Marks, Agent, Interstate Despatch, Toledo, Ohio; 1st Saturday in month, Boody House, Toledo.

TRACK SUPPLY ASSOCIATION.—W. C. Kidd, Ramapo Iron Works, Hillsburn, N. Y. Meetings with Roadmasters' and Maintenance of Way Association.

TRAFFIC CLUB OF CHICAGO.—W. H. Wharton, La Salle Hotel, Chicago.

TRAFFIC CLUB OF NEW YORK.—C. A. Swope, 291 Broadway, New York; last Tuesday in month, except June, July and August, Waldorf-Astoria, New York.

TRAFFIC CLUB OF PITTSBURGH.—D. L. Wells, Erie R. R., Pittsburgh, Pa.; meetings bimonthly, Pittsburgh. Annual meeting, 2d Monday in June.

TRAFFIC CLUB OF ST. LOUIS.—A. F. Versen, Mercantile Library Bldg., St. Louis, Mo. Annual meeting in November. Noonday meetings October to May.

TRAIN DESPATCHERS' ASSOCIATION OF AMERICA.—J. F. Mackie, 7122 Stewart Ave., Chicago.

TRANSPORTATION CLUB OF BUFFALO.—J. M. Sells, Buffalo; first Saturday after first Wednesday.

TRANSPORTATION CLUB OF DETROIT.—W. R. Hurley, Superintendent's office, L. S. & M. S., Detroit, Mich.; meetings monthly, Normandie Hotel, Detroit.

TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, N. Y. C. & H. R., East Buffalo, N. Y. Next meeting, September 15-18, Hotel Sherman, Chicago.

UTAH SOCIETY OF ENGINEERS.—Frank W. Moore, Newhouse Bldg., Salt Lake City, Utah; 3d Friday of each month, except July and August, Consolidated Music Hall, Salt Lake City.

WESTERN CANADA RAILWAY CLUB.—W. H. Rosevear, P. O. Box 1707, Winnipeg, Man.; 2d Monday, except June, July and August, Winnipeg.

WESTERN RAILWAY CLUB.—J. W. Taylor, 1112 Karpen Bldg., Chicago; 3d Tuesday of each month, except June, July and August, Karpen Bldg., Chicago.

WESTERN SOCIETY OF ENGINEERS.—J. H. Warder, 1735 Monadnock Block, Chicago; regular meeting 1st Monday in month, except January, July and August, Chicago. Extra meetings, except in July and August, generally on other Monday evenings.

Traffic News

During the month of May, the Atchison, Topeka & Santa Fe "California Limited" train arrived on time in Los Angeles and Chicago terminals 59 out of a possible 62 times.

Returns made to the committee on relations between railroads of the American Railway Association show that on July 15 the total freight car surplus was 228,384 cars, an increase of 7,509 as compared to July 1. The total shortage on the same date was 1,843 cars, an increase of 508.

The Lumbermen's Association of Chicago has addressed a letter to all its members, urging them to co-operate with the railways by loading cars to full capacity, thereby reducing the number of cars required to handle its products and releasing them for use in the grain traffic, and to appeal to the consumer to co-operate by unloading cars as promptly as possible. With the letter is sent a letter to be sent out by individual firms to be sent to other mills.

The City Club of Chicago has published a book of 89 pages, by George E. Hooker, civic secretary of the club, on Through Routes for Chicago's Steam Railroads, which discusses the Chicago terminal and local transportation system in detail, with many maps and charts, and advocates the plan of through-routing the suburban trains of the steam railroads by means of subways through the central portion of the city, to give passengers on one road direct access to other portions of the city now served by the other roads.

Agreement Reached on Intermountain Rate Case

Following a recent conference between traffic officers of the western transcontinental railways and the Interstate Commerce Commission at Washington, an agreement has been reached providing for the final disposition of the entire intermountain rate cases by January 1, 1915, and for putting into effect most of the rates involved by October 1 of this year. As the order of the commission, which was recently sustained by the Supreme Court, dates from June 22, 1911, a new effective date had to be set on which the order should become effective. On July 9, the carriers submitted to the Interstate Commerce Commission a petition which has now been granted by the commission to extend the effective date of the order from June 22, 1911, to October 1, this year, in order to enable the carriers to compile and publish rates to conform to the order, with the exception of 107 commodities on which they ask further consideration. The roads submitted to the commission with the petition three schedules of rates.

Schedule A is a list of commodities on which the rates to Pacific coast terminals will apply as maxima to intermediate points, and on which no relief is requested. These include rates on such commodities as fruit, grain, flour, vegetables, products of the soil, agricultural implements, building material, etc., particularly those rates in which the individual is much interested as a consumer, upon some of which the carriers consider the rates low, but on which they will continue to apply the coast rates as maxima.

Schedule B consists of commodities subject to water competition at the Pacific coast terminals, but on which the rates from the Missouri river to the Pacific coast by rail are generally not less than $2 for less than carload lots, and $1 for carload lots, and as to which the carriers will observe the fourth section rule of the commission, applying only such percentages over the through rates at the intermediate points as were designated for the respective zones in the original order of the commission.

Schedule C is a list of 107 commodities covering generally manufactured articles subject to the most severe water competition, and on which the rates to the coast are less than $1 in carloads, and $2 in less than carloads, which rates the carriers consider subnormal to a marked degree, measured by any recognized standard that has been fixed by the commission as reasonable, but which are necessary to move a share of this water-competitive traffic by rail; also to enable manufacturers and shippers at points of production not located directly on the Atlantic seaboard to share in the trade of the Pacific coast. These rates are so low that the carriers consider they should not be used as a basis for rates to interior points. Schedule C embraces such articles as sulphate of ammonia, chloride of calcium, carbide of calcium, canned fruit, fish, corn, meat, mincemeat, tomatoes, etc., green coffee, cotton piece goods, hardware and tools, pig iron, structural iron, iron fence, iron posts, iron pipes, wire fencing, paint, paper, rice, radiators, sectional boilers, etc., pig and slab tin, and insulated copper wire.

The rates on commodities named in schedules A and B will become effective on October 1, therefore, when the carriers will have in effect new schedules conforming either literally to the fourth section of the Interstate Commerce act or taking only such percentages over the through rates as were designated for the respective zones. As to the rates in schedule C, the carriers asked sufficient time to present to the commission such evidence as, in their opinion, will completely justify a greater degree of relief from the provisions of the fourth section than was granted in the order. The carriers now feel that they can present convincing facts and arguments in support of such modifications of the order as to these rates. As to these rates the commission agreed to grant a hearing beginning in Chicago on October 6, to afford the carriers opportunity to present their evidence. Of the 107 items, 67 are carload and 40 less than carload rates. By stipulation of the carriers they agree that after this hearing, or after the commission has given consideration to the data there presented, they will, on January 1, without delay, comply with the order of the commission in toto.

The commission also determined slightly to modify zone boundary lines fixed in the original order so as to make the zones upon diagonal traffic from Lake Superior regions to the south Pacific coast, and from Galveston to the north Pacific coast to conform to the zones already fixed in the tariffs applicable to class rates.

It will thus come about that by October 1, on 372 commodities in carloads, and 41 commodities in less than carloads, the fourth section order will be fully operative. Since the issuance of the original order, by agreement with the intermountain shippers, commodity rates from all eastern points to intermountain points have been established on all commodities involved that move in sufficient volume to justify commodity rates. This made a very considerable reduction in previous rates. The commission had previously reduced all class rates from eastern points to all intermountain territory and the roads have established class rates to the coast based on a scale of $3.70 New York to the coast.

Shippers Asked to Co-operate for Car Efficiency

W. S. Tinsman, chairman of the Association of Western Railways, has issued the following circular letter addressed to shippers and receivers of freight, industrial traffic managers and commercial organizations, asking their co-operation in promoting the most efficient use of freight car movement during the crop-moving season to avoid the possibility of car shortage:

"Two years ago in anticipation of the large tonnage which the railroads would be required to move as a result of the heavy crops of that year, this association appealed to the shippers and receivers of freight for co-operation in obtaining the maximum use of freight equipment. The results of that appeal, and the interest manifested by the shippers throughout the country, were very gratifying.

"The present prospect of exceptionally heavy crops, as evidenced by the tables attached hereto, warrants an appeal of the same nature at this time.

"In spite of the fact that a great surplus of cars has existed for some time, the surplus of box cars is not so great as to warrant any feeling of security, and unless the co-operation suggested below can be had, the prospects are for a difficulty in moving these crops which may affect disadvantageously the interests of the shippers and receivers alike.

"The railroads are making every effort which their resources will permit to put cars in condition for service and in other directions to prepare themselves to handle the traffic with promptness.

"Shippers and receivers, commercial organizations and others

having to do with the commerce of the country, are earnestly urged to lend their efforts and influence in every way possible to bring about the most economical use of equipment, and the following suggestions are made for which the widest publicity is solicited:

"First.—Move all the coal, lumber, cement and other supplies that you can before the heavy crop movement starts.

"Second.—Load and unload all cars as quickly as possible. (If, without additional cost, the use of greater force will get the load ready for movement or the car released more quickly, do it.)

"Third.—Load all cars to the full capacity. (A leeway of 10 per cent. above the marked capacity is permitted before reduction of load is required. All cars should so far as possible be loaded to a weight between the marked capacity and 10 per cent. above.)

"Fourth.—Anticipate the disposition of freight before its arrival.

"Fifth.—Only order such cars as can be loaded promptly. (Orders for cars should state the number required for that day's loading, the kind of cars, the final destination of the shipment, and the routing via which it will move.)

"Sixth.—Reduce to the minimum the practice of billing cars to intermediate points to be held for reconsignment."

The circular also includes tables of the crop reports for previous years, with the estimates for this year, as an indication of the probable demand upon the carriers for equipment during the coming season, and says: "The greatly increased crops here indicated cannot but be reflected in the movement of other freight, or fail to impress upon the minds of every one interested in the subject, the necessity for the most hearty co-operation on the part of all if a serious car shortage and its accompanying damage to all lines of trade is to be avoided."

Another table gives information as to the general situation with respect to cars available, with comparisons for previous years. These figures indicate an increase in the number of available cars in the western territory, as well as in the whole country, and taking into consideration the increase in the average capacity of all freight cars the improvement is substantial. For 1913, for the western states, the number of freight cars owned was 6.41 per mile of road, as compared with an average from 1907 to 1913 of 6.04. The percentage of cars in shop was 6.7. For the entire United States the number of freight cars owned was 2,127,314, as compared with an average of 2,019,681, or 10.03 per mile, as compared with an average of 9.79, and the percentage in shop was 7.30, as compared with an average of 6.85. Exclusive of cars in shop the number of cars per mile of road was 9.30, as compared with an average of 9.12. About 40,000 copies of the circular have been sent out, including a large number to newspapers.

James E. Quan, chairman of the Illinois Public Utilities Commission, has issued a statement saying the Illinois roads have informed the commission that 20,650 new cars will be available on seven lines, in addition to the old equipment, for handling the grain movement this season, and that the roads are exerting every effort to have their equipment in proper condition. The cars are to be delivered by August 1, and 120 new locomotives are to be delivered to the roads in the state by that time. "We expect few or no complaints of car shortage this year," says the commission, "notwithstanding the fact that the crops are the largest ever known. All that is necessary is that shippers and receivers of grain co-operate with the railroads by prompt action in loading and unloading cars in order that they may be promptly available for other service."

The office of markets of the United States Department of Agriculture has made inquiries in Texas, Oklahoma, Kansas, Missouri, Nebraska, Iowa and Illinois as to the possibilities of a car shortage for movement of grain this fall. The report of this investigation says in part:

"The sentiment is by no means universal among the country elevators that there will be a car shortage. The belief that there will be a shortage is most prevalent among the country elevators of Kansas. Expressions from terminal elevator points indicate that there will be a shortage in all states.

"On the part of the roads statements from officials through the press are given to the public and growers, and elevator men are personally advised by local agents, traveling freight agents and other representatives, of all steps taken to minimize shortages."

Commission and Court News

INTERSTATE COMMERCE COMMISSION

Molasses Rates to Knoxville, Tenn.

Opinion by Commissioner Hall:

The commission finds that the carriers are justified in canceling a special rate of 25 cents on "blackstrap" molasses in carloads from New Orleans to Knoxville and restoring in its place the domestic rate of 33 cents on all other molasses, except in so far as the 33 cent rate may violate the long and short haul clause in comparison with a rate of 32 cents to Bristol, Tenn. (30 I. C. C., 613.)

Cotton Rates to Augusta, Ga.

Augusta Cotton Exchange & Board of Trade v. Southern Railway. Opinion by the commission:

The commission finds that the rates on cotton to Augusta, Ga., from stations in South Carolina on the Southern Railway are unreasonable to the extent that they exceed rates from the same point which were in effect prior to September 23, 1909, the rates then in effect being on the basis of the South Carolina scale as are the present class rates. (30 I. C. C., 704.)

Lumber Rates from Batesville, Miss.

Southern Hardwood Traffic Bureau, for the benefit of R. J. Darnell, Inc, v. Illinois Central et al. Opinion by the commission:

The commission finds that the rates on lumber, other than cottonwood and gum from Batesville, Miss., to points in central freight association, western trunk line and trunk line territories are not unreasonable, but they are discriminatory to the extent that they exceed the rates to the same destinations from Sardis, Miss., a point nine miles north of Batesville. (31 I. C. C., 6.)

Increases in Rates on Fencing Allowed

In re rates on fencing and fencing material from Anderson and other points in Indiana to Texarkana, and other points Opinion by Commissioner Harlan:

The commission finds that the carriers are justified in increasing from 37 cents to 40 cents per 100 lb. the present rate on fencing and fencing materials from Anderson, Crawfordsville, Kokomo, Muncie and Richmond, all in Indiana, to Texarkana. No substantial reason is given for the charging of a lower rate for shipments of fencing materials from the five Indiana points named, than is charged on similar shipments from other points in Chicago-Cincinnati territory. (30 I. C. C., 650.)

Switching Charges on Ice in the Chicago District

Peoples Fuel & Supply Company v. Grand Trunk Western et al. Opinion by the commission:

The Minneapolis, St. Paul & Sault Ste. Marie, and the Grand Trunk Western, in compliance with an order of the commission, established a joint rate on ice from Silver Lake, Wis., to a point of delivery on the tracks of the Grand Trunk Western in Chicago. There having been a dispute as to divisions, the commission finds that the Soo line should allow the Grand Trunk Western the regular reciprocal switching charges applicable under the provisions of the Lowrey tariff to reciprocal switching in the Chicago district. (30 I. C. C., 657.)

Lumber Rates from Thebes, Ill.

Opinion by Commissioner Meyer:

The commission finds a proposed cancellation of proportional rates on lumber and forest products from Thebes, Ill., to points in southwestern Illinois on the Chicago, Burlington & Quincy via the St. Louis, Iron Mountain & Southern to Herrin and the Chicago, Burlington & Quincy beyond to be justified because of the discontinuance of the physical connection at the interchange point. It is ordered, however, that the rates via the route over

the Chicago & Eastern Illinois, or over the latter to Goreville and the Chicago, Burlington & Quincy beyond should be maintained upon the same relative basis as the rates charged to competitors located on the St. Louis & San Francisco. (31 I. C. C., 15.)

Grain Transit Privileges at St. Louis

Merchants Exchange of St. Louis, Mo., v. Baltimore & Ohio et al. Opinion by Commissioner Meyer:

The commission deems that the record in the case is not sufficient to enable it to determine the reasonableness of the regulations requiring shippers to surrender their expense bills covering inbound shipments in order to obtain the benefit of reshipping rates from St. Louis, Mo., and East St. Louis, Ill., to central freight association and trunk line territories, which rates apply regardless of the point of origin of the original shipment. The case is therefore reopened and set to be heard with *Southwestern Missouri Millers' Club v. Chicago & Alton* at an early date to be announced later. (30 I. C. C., 700.)

Increased Rates from Maine Refused

In re class and commodity rates from stations in the state of Maine. Opinion by Commissioner Meyer:

The commission finds that the Maine Central has not justified charges in its tariffs whereby it will eliminate stations east of Lewiston and Brunswick in the Ellsworth group from the list of stations taking the Boston rates and apply to the eliminated territory differentials over the Boston rates on traffic destined to central freight association territory. The carrier has not sufficiently shown the necessity of such an increase in rates by the presentation of statements of earnings per ton mile and proof of increased general operating expenses, nor has it shown that the rates heretofore maintained yield less than a fair return. That the average length of the haul is slightly in excess of the haul from points from which it is proposed to continue the Boston rates does not prove that the rates under suspension are just and reasonable, no evidence having been offered as to the reasonableness of the Boston rates. (31 I. C. C., 18.)

Kelly's Creek Colliery Case

Hughes Creek Coal Company et al. v. Kanawha & Michigan et al. Opinion by Commissioner Meyer:

In the original case of *Kelly's Creek Colliery Company v. Kanawha & Michigan*, reported in the *Railway Age Gazette* of April 10, page 850, the commission held that the defendants should establish through routes and joint rates on coal between stations on the Kanawha & Michigan and its branches and various eastern and southeastern territory on the lines of the Chesapeake & Ohio and its connections and that as reasonable rates for these routes defendants should apply rates not in excess of those applying to those destinations for shipments from the mines on the Chesapeake & Ohio. Upon reconsideration of the case the commission now holds that there may properly be a slight difference between the rates applicable to the through routes ordered and those applicable to the single movement over the Chesapeake & Ohio. The difference, however, must not exceed five cents per ton.

Intermediate and Joint Rates

Humphreys-Godwin Company v. Yazoo & Mississippi Valley et al. Opinion by the commission:

The complainant made carload shipments of cottonseed meal from Helena, Ark., to certain New England points. The shipments were consigned in the first instance to itself at Louisville, Ky., but while en route, defendants at Louisville were furnished with instructions to forward the shipments to the respective New England destinations. The joint through rate was 33 cents; the sum of the intermediate rates via Louisville was 30½ cents. Upon complaint alleging that the shipments to and from Louisville were separate and distinct transactions and that the shipments should have been charged at the intermediate rates, the commission finds that the shipments were not handled under such circumstances as to have constituted separate and distinct shipments to and from Louisville, and that although the fact that a joint rate exceeds the sum of the intermediate rates over the same through route raises a strong presumption that the joint through rate is unreasonable to the extent that it exceeds the sum of such intermediate rates, the presumption is not conclusive and may be rebutted by evidence to the contrary. Under the circumstances of the instant case the presumption of unreasonableness inhering in the 33-cent rate is held to be satisfactorily rebutted by the evidence. Complaint dismissed. (31 I. C. C., 25.)

Rates from the Twin Cities to Dakota Points

Minneapolis Civic and Commerce Association v. Chicago, Milwaukee & St. Paul. Opinion by Commissioner Meyer:

Complaint is made that the class rates from Minneapolis and St. Paul to South Dakota and North Dakota points on the Hastings & Dakota division, the James River Division (now consolidated with the Hastings & Dakota division) and the trans-Missouri division of the Chicago, Milwaukee & St. Paul, are unreasonable per se, and discriminatory. The three operating divisions referred to constitute that part of the transcontinental line of the Chicago, Milwaukee & St. Paul which crosses the northern part of South Dakota, and the southwestern corner of North Dakota, and the branch lines running northward and southward from the main line. Comparisons are made between the rates from the Twin Cities to the points of destination involved and the distance tariffs of Minnesota and Iowa for intrastate traffic; the rates from Minneapolis to Iowa points on defendant's line; the rates to South Dakota points on defendant's line to Rapid City, S. D.; the rates for equal distances from Chicago and Milwaukee to points in Minnesota, Iowa and South Dakota and the rates from the twin cities and from Duluth to points in North Dakota on the lines of the Great Northern and Northern Pacific, which, it is argued, bear out complainants' contentions. The commission finds, however, that the existence of undue discrimination is not proven in the rates from the twin cities to South Dakota points, as compared with those to the same points from competing markets, and that to a certain extent carriers are justified in placing competitive markets on an equal basis. It is also held, however, that in many instances the rates involved are unreasonable in that they increase in the movement westward greatly out of proportion with the increase in distance. A new table of rates is prescribed, therefore, for distances varying from 200 to 600 miles, which, it is believed, will remove this discrepancy. (30 I. C. C., 663.)

Switching Charges at Seattle

Transportation Bureau of the New Seattle Chamber of Commerce et al. v. Great Northern. Opinion by Commissioner Meyer:

The commission finds that defendant's class E rate of 3 cents per 100 lb. applicable to shingles and lumber moving in carloads from Ballard to Seattle for interchange at the latter place with other roads is not unreasonable in so far as it results in charges not greater than $10.50 per car. At one time defendant moved cars from industries on its Sobey Spur at Ballard to the Chicago, Milwaukee & St. Paul's car barge slip at Ballard from which the cars were carried on floats to Seattle and charged for the service at a switching rate of $3 per car. The construction of the Lake Washington Canal necessitated the abandoning of the barge slip and for a time cars were taken by the defendant to Seattle at a charge of $4.50 per car, which it is proposed to supersede by the new rate. Complaint is made that the three cent rate is excessive, particularly since it prohibits the former absorption of switching charges that were in force for traffic destined to competitive points. As has been noted above, the commission finds that the increased charge is not unreasonable. The Chicago, Milwaukee & St. Paul no longer maintains terminals at Ballard. The Great Northern, on the other hand, contends that it is entitled to the long haul and that it is not proper that the St. Paul should be allowed to compete for this traffic originating on the Great Northern's terminals at a charge which does not compensate the latter for so affording the use of its terminals to its competitor. The commission believes that the arrangement suggested by the Great Northern for joint rates between it and the St. Paul on the flat Seattle basis, applicable to traffic from complainants' mills to non-competitive local points on the latter road is a proper one and should be adopted even though the St. Paul may lose all of the traffic to competitive points. Apart from the possible consequences flowing from the nature of the service or the form of the charge, defendant's contention that the com-

mission should prohibit the absorption by competitive roads of its established charges applicable to the movement over its terminal between Ballard and Seattle, is held not to be sustained. The commission's duty is to pass upon the reasonableness of the established charges, and the act does not require that in so doing it shall take into its calculations the consideration of the possibility of the absorption of the charge by competitive roads. (30 I. C. C., 683.)

Rates on Fresh Fruits from Grand Rapids and Other Points to Milwaukee

Milwaukee Produce & Fruit Exchange v. Crosby Transportation Company et al. Opinion by Commissioner Hall:

The Crosby line is a water carrier operating its own steamers for a year round service across Lake Michigan between Milwaukee and Grand Haven. During that time of year when Muskegon is open a side trip service is also maintained between that port and Grand Haven. Boats are also operated in the fruit picking season on the Grand River to Grand Rapids and Grand Haven. By virtue of a contract by which the Crosby Line began in 1906 to perform the Grand Trunk's break-bulk service across Lake Michigan, certain joint rates and through routes were canceled which had been in effect between the steamship line, the Grand Rapids, Grand Haven and Muskegon and electric line, which operates a service from Grand Rapids to Grand Haven, with a branch from Grand Haven Junction north to Muskegon, nearly the whole service in direct competition with that of the Grand Trunk. The commission finds that the former through route and joint rates between the electric company and the steamship company, from points on the former line to Milwaukee except Grand Rapids, Grand Haven and Muskegon, where the service of the Grand Trunk, alone, is sufficient, should be re-established insofar as is necessary to provide for the transportation of fresh fruits, it having been found that a very large portion of the fresh fruit business from the region on the electric line west of Grand Rapids had been diverted from Milwaukee. (30 I. C. C., 653.)

Railroads and Private Business

The commission has submitted a report to Congress in response to a resolution passed about six years ago concerning the relations of railroads to coal and oil properties. The report deals chiefly with certain large purchases of coal lands in Illinois by the Cleveland, Cincinnati, Chicago & St. Louis for the purpose of protecting the future coal supply of the New York Central Lines. In it the commission criticizes the management of the latter and makes the following recommendation:

"From the facts related herein, particularly those discovering the industrial railways around St. Louis and those describing the relations of the New York Central Lines to coal properties in Illinois, the commission believes it important that the public business of transportation should be clearly separated from private business; that railroads should be prohibited from furnishing directly or indirectly capital or loans to private enterprises; that railroads should be prohibited from extending the use of their credit for the benefit of private individuals or companies, and that the commodities clause should be enforced and extended to all traffic."

The commission finds that the New York Central Lines through the Big Four in 1905 began to acquire coal lands in Saline and Williamson counties, Illinois, and purchased altogether 23,000 acres. The plan, the report says, originated with W. C. Brown and was carried out by him through S. W. McCune and Charles P. Hewitt, Mr. Brown's brother-in-law.

"Many irregularities took place in connection with the purchase of these properties and both McCune and Hewitt profited substantially. The irregularities were accomplished by the use, apparently, of one or more of the following devices: (1) by preparing vouchers for amounts in excess of those actually received by the grantors of the properties sold to the Big Four; (2) by taking lands in Hewitt's name and turning them over to the Big Four at advanced prices; and (3) by secreting the legitimate commissions in the purchase prices and then passing additional vouchers in favor of Hewitt as his alleged commission on the same land. Hewitt definitely asserted that he was not aware of these acts.

"Funds so pilfered from the Big Four were handled in the same manner as were legitimate commissions, i. e., deposited in McCune's bank account and then divided with Hewitt, the latter's share passing through Mr. Brown's hands to the bank at Clarinda. Mr. Brown asserts that he had no way of verifying the amounts sent to him by McCune and they were merely passed through his hands for Hewitt's convenience. Traveling auditors of the Big Four in 1909 checked over the vouchers and other papers in connection with these coal land purchases, but failed to report the irregularities mentioned.

"The record does not show that Mr. Brown had any knowledge of irregularity in the purchase of the properties. The only charges that can be made against him in connection with the pilfering of the funds of the company of which he was an executive are these (1) he placed McCune, without bond, in a responsible position, involving the expenditure of over $1,000,000, to which trust, the record shows, that person was unfaithful, and (2) he assigned to a lucrative position netting nearly $25,000 in a little over a year, a relative, who was not competent even to handle his own money affairs, was inexperienced in the work itself and was lacking in the most ordinary business ability."

W. C. Brown and other officers of the New York Central took an active part in the promotion of the Saline County Coal Company and the O'Gara Coal Company. The report charges that the latter company has been granted a great many unusual concessions, and from the time it began shipping coal to within the last year it has been a preferred institution of the New York Central Lines, and that the carriers have practically supported the company for years. In September, 1913, the O'Gara Coal Company went into the hands of friendly receivers, the investigations of the commission having caused the New York Central to restrict its support.

"Many of the concessions described were skillfully concealed and some were discovered almost by accident. The attempts of Mr. Brown and others to explain the concessions leave much to be desired. In short, they amount to ignorance of the rebates mentioned, while as to loans, advances and extensions of credit, Mr. Brown and his associates admit knowledge of the practices, but claim to have been actuated by a desire to protect the fuel supply and the traffic of their lines by protecting a patron from the financial disaster that would otherwise occur. It is significant, in this connection, that among the hundreds of industries along the 13,000 miles of the New York Central Lines, the carriers should have overlooked all moribund concerns except one of those in which the carriers' officers were interested."

Speaking of a tentative plan of consolidation which contemplated that the Chicago & Harrisburg Coal Company, owned by the Big Four, would issue bonds guaranteed by the latter, and purchase its coal lands and the mines and lands of the companies mentioned above, whereupon there was to be formed an operating company to which the mines and part of the land would be leased for operation, the report says:

"W. C. Brown and other officers testified that the plan never received serious consideration and in all probability would never be effected. It is worthy of mention, on the other hand, that in the latter part of 1913 the capital stock of the Chicago & Harrisburg Coal Company was increased from $55,000 to $150,000 and that the company began taking over the coal and coal lands owned by its parent company, the Big Four. Whether this is the beginning of a gigantic coal proposition involving the purchase of the Saline and O'Gara properties and based on the credit of the New York Central Lines, the record does not disclose. Such a use of railroad credit for the private ends of favored individuals should obviously receive, if carried out, the severest condemnation of law."

STATE COMMISSIONS

Illinois Public Utilities Commission has issued an order on complaint of the Springfield Commercial Association, ordering the steam roads to switch cars for the Illinois Traction System at Springfield and to allow the traction system the use of their tracks for switching at that point.

The Illinois railroads, through the Illinois Freight Committee, asked the Illinois Public Utilities Commission last week for permission to increase certain rates within the state, within the maxima fixed by the commission. The commission announced that the petition would be considered within 30 days.

The Railroad and Public Service Commission of Montana announces that a general reduction in freight rates, averaging 20 per cent., is to go into effect in Montana, on July 29, as the result of a conference between the commission and representatives of the principal railroads. It appears that the railroads voluntarily proposed tariffs prepared on the same basis as those in effect in the state of Washington. The new tariffs do not affect so-called distributing rates from the jobbing centers.

According to press reports, the members of the Texas Railroad Commission have given informal consideration to a plan to appeal to Congress for legislation clearly defining the powers and duties of the Interstate Commerce Commission, so that it cannot interfere in any way with state commissions in the fixing of rates between points within the states, in order to obtain for the Texas Commission relief from the decision of the United States Supreme Court and the Interstate Commerce Commission in the Shreveport rate case.

The Michigan Railroad Commission has issued an order against the Pere Marquette, Lake Shore & Michigan Southern, Michigan Central and Detroit, Grand Haven & Milwaukee railways, requiring them to issue, and make effective by September 1, a tariff which shall provide that on the tender by shippers at any one time during cold weather, of 10,000 lb. of any perishable commodity for shipment to stations on the main line of the road serving the shipping point, or on the payment of the charges on 10,000 lb., a refrigerator car must be furnished.

The California Railroad Commission has recently been holding a hearing on complaint by residents of the San Francisco peninsula, against the passenger fares in effect on ferry and electric lines of the Southern Pacific between San Francisco and Oakland. Some of the trans-bay fares were lowered in October, 1913, after a hearing by the commission, from 15 cents to 10 cents one way. In answer to the present complaint the company has requested the commission to advance these fares from 10 cents to 12½ cents. After a hearing in June the case was adjourned for 60 days, to allow attorneys for the complainants to consider the data submitted by the company. This included a valuation of the property involved, and figures to show that the revenue from the ferries and the electric service is not sufficient to meet the cost of operation, plus interest and taxes.

PERSONNEL OF COMMISSIONS

S. N. Mills has been appointed an inspector for the Interstate Commerce Commission and has been assigned to the work of investigating and testing signal and train control systems and other safety devices. Mr. Mills received his early education in the public schools of Minnesota and later completed a course in electrical engineering. He entered the service of the Interstate Commerce Commission in September, 1906, and was chief clerk of the Block Signal and Train Control Board throughout the five-year period of its existence. When that board was abolished in June, 1912, Mr. Mills was assigned to the commission's accident-investigation work. In December, 1913, the work of investigating and testing devices was again taken up by the commission under the act of October 22, 1913, and Mr. Mills was one of the first men assigned to this service. On May 1, 1914, he was appointed an inspector and assigned to field work.

COURT NEWS

The Mississippi supreme court has dismissed a suit brought by the state railroad commission against the Louisville & Nashville to compel the company to stop certain through passenger trains at Bay St. Louis, Miss. A fine of $402,000 had previously been imposed on the company by the lower court because of its refusal to obey the order of the commission.

Judge Landis, of the United States district court at Chicago on July 17 issued a decision ordering F. W. Ellis, vice-president of the Armour Car Lines, to answer questions asked of him by the Interstate Commerce Commission in connection with its investigation of private car lines. At the time of the commission's hearings in Chicago in January, Mr. Ellis declined, on advice of counsel, to answer questions regarding the private business of the company.

Railway Officers

Executive, Financial, Legal and Accounting

George H. Winsor has been appointed auditor and traffic manager of the San Benito & Rio Grande, with headquarters at San Benito, Tex., to succeed C. T. Davis, resigned.

W. R. Campbell, at present assistant to president of the Susquehanna & New York, the Tionesta Valley and the Leetonia Railway, has been appointed vice-president of the Susquehanna & New York, with office at New York, effective August 1, succeeding E. C. Hoyt, resigned, and the title of assistant to president has been abolished.

Operating

E. E. Cain, superintendent of the Toledo-Ludington division of the Pere Marquette, has been appointed superintendent of the Chicago-Petoskey division, with headquarters at Grand Rapids, Mich., succeeding J. W. Mulhern, resigned.

James Patrick Houston, whose appointment as superintendent of the Eastern division of the Minneapolis & St. Louis, with headquarters at Oskaloosa, Iowa, has already been announced in these columns, was born April 5, 1865, at Durand, Ill. He received a common school education and began railway work in 1875 with the Chicago, Burlington & Quincy, with which road he remained until 1886, being employed consecutively as water boy, flagman, brakeman and operator and agent. The following two years he was with the Western Union Telegraph Company as operator, and from 1888 to 1899 he was despatcher and chief despatcher for the Chicago Great Western. He was then with the Great Northern for three years as chief despatcher and trainmaster, going to the Chicago Great Western in 1902 as chief despatcher. Subsequently until 1909 he was trainmaster, and in the latter year he became trainmaster of the Minneapolis & St. Louis. Later he was made assistant superintendent, which position he held at the time of his recent appointment as division superintendent, as above noted.

Traffic

A. J. Blaisdell has been appointed general agent of the passenger department of the Canadian Pacific at St. Louis, Mo.

J. S. Henney, traveling freight agent of the Toledo, St. Louis & Western at Cleveland, Ohio, has been appointed commercial agent at Kansas City, Mo.

F. R. Hanlon has resigned as district freight agent of the Oregon-Washington Railroad & Navigation Company at Seattle, Wash., to become traffic manager of the port of Seattle.

W. R. Busenback has been appointed general agent, freight department, of the Erie at Akron, Ohio. The headquarters of J. H. Hackett have been removed from Akron to Marion.

J. S. Brown, general freight agent of the Illinois Central, has been appointed manager of the transportation department of the Board of Trade of Chicago, succeeding E. B. Boyd, resigned.

The territory of H. C. Dinkins, general agent of the Gould Lines for Mexico, has been extended over West Indies, Central America and South America, with offices at New Orleans, La., and Galveston, Tex.

C. A. Torrence, foreign freight agent of the Missouri Pacific, the St. Louis, Iron Mountain & Southern, and Denver & Rio Grande, with headquarters at Chicago, will also have jurisdiction over the Western Pacific, effective July 15.

M. T. Dean, at present assistant to general manager of the Tionesta Valley and the Leetonia Railway, has been appointed general freight and passenger agent of the Susquehanna & New York, the Tionesta Valley and the Leetonia Railway, with office at New York, effective August 1, and the position of assistant to general manager has been abolished.

Engineering and Rolling Stock

F. L. Beal has been appointed valuation engineer of the Louisiana & Arkansas, with headquarters at Stamps, Ark., reporting to F. W. Green, general manager.

E. A. Sweeley, who recently resigned as supervisor of car repairs of the Atlantic Coast Line, has been appointed master car builder of the Seaboard Air Line, with headquarters at Portsmouth, Va. He will have jurisdiction over the entire car department.

John L. Mohun, formerly in the motive power department of the Pennsylvania Railroad, has been appointed assistant to consulting engineer of the Union Pacific, the Oregon Short Line and the Oregon-Washington Railroad & Navigation Company, with headquarters at New York. Mr. Mohun began railway work as an apprentice at the Altoona shops of the Pennsylvania Railroad, and was successively assistant master mechanic of the Juniata shops, master mechanic and assistant engineer of motive power of the New Jersey division, with office at Jersey City, N. J.

OBITUARY

P. J. Halloran, chairman of the executive board of the Brotherhood of Railroad Conductors, died suddenly of heart disease in Boston on July 16.

Eugene E. Osborn, formerly vice-president of the Chicago & North Western, died at Frederick, Md., July 20, aged 60 years. Mr. Osborn was born at Norwalk, Conn., May 1, 1854, and was a graduate of the Sheffield Scientific School of Yale University. He entered railway service in 1894 as general attorney for the Chicago & North Western. In June, 1901, Mr. Osborn was elected vice-president and secretary of the North Western and assistant secretary of the Chicago, St. Paul, Minneapolis & Omaha, which positions he held until his retirement from active service in 1911.

RAILWAY CONSTRUCTION IN KYUSHU, JAPAN.—The length and estimated cost of the lines projected at present by the government railways on the Japanese island of Kyushu are as follows: Yatsushiro-Sendai line, 67 miles, $6,500,000; Kumamoto-Oita line, 83 miles, $8,250,000; and Saheki-Miyazaki line, 88 miles, $8,500,000.

THE HEDJAZ RAILWAY TO ARABIA.—It is enjoined upon Moslem pilgrims without fail to visit Medina and Mecca at least once in their lives. At one time, the trip from Damascus to Medina was a journey by caravan of 35 to 40 days' duration. With the construction of the railway, the journey has been reduced to but 58 hours. Most of the pilgrims use the railroad in order to get to Medina and then return the same way and embark at Haifa or Beirut for Jedda, the nearest port to Mecca on the Red Sea. Arrangements have been made whereby there are steamers in waiting at Beirut and Haifa for the trains from Mecca so that immediate embarkation is possible. The Turkish government has for some time worked to extend the railway to Mecca and thus entirely eliminate the route by sea. At present, the distance from Medina to Mecca takes 12 days by camel through an arid desert so pilgrims prefer to return north and reach Mecca by the sea route. Until last year, only first and third class cars were in use, but lately second class cars have been introduced and commodious sleeping cars have been added for the benefit of first class passengers. For this accommodation an additional charge of about $4.40 is added to the price of a first class ticket. The trains make five stops daily for a sufficient length of time to enable the Moslems to make their required devotions. There are comfortable dining rooms at Derra and Maan and native buffets at some of the smaller stations, such as Tebouk, Aman and Medam-Salih. The fares are as follows: From Haifa to Medina and return—first class, $52.10; second class, $39.07; third class, $26.05; from Damascus to Medina and return, first class $50.95; second-class, $38.24 and third-class, $25.08. The rates from Damascus are slightly less. From the first of Chaaban (June 24) to the end of Zelcaade (October 18) a special reduction of 50 per cent. is allowed on the above prices. Non-Moslems are allowed to travel only a part of the way because their entrance into Medina and Mecca is rigidly prohibited.

Equipment and Supplies

LOCOMOTIVE BUILDING

THE CENTRAL OF GEORGIA is in the market for 4 Pacific type locomotives.

THE EL PASO BELT has ordered 2 locomotives from the Baldwin Locomotive Works.

THE COLORADO, WYOMING & EASTERN is in the market for 2 Mikado type locomotives.

THE SKANEATELES RAILWAY is in the market for one six-wheel switching locomotive.

THE RUSSIAN GOVERNMENT is asking prices on a large number of locomotives of various types.

THE ATLANTIC COAST LINE is in the market for a number of Mountain and Pacific type locomotives.

WINSTON BROTHERS COMPANY, Minneapolis, Minn., are in the market for 8 or 10 six-wheel switching locomotives.

THE INTERCOLONIAL RAILWAY OF CANADA has ordered 3 switching locomotives from the Montreal Locomotive Works.

THE CHICAGO, BURLINGTON & QUINCY has ordered 15 Santa Fe type locomotives from the Baldwin Locomotive Works.

THE STANDARD OIL COMPANY OF NEW JERSEY has ordered one switching locomotive from the Baldwin Locomotive Works.

THE NORTHWESTERN PACIFIC is in the market for 4 ten-wheel passenger, 2 ten-wheel freight and 3 six-wheel switching locomotives.

THE CHILEAN STATE RAILWAYS are proposing the purchase of 125 locomotives as part of a plan for the rehabilitation of the railways of Chile.

THE CAROLINA SPRUCE COMPANY, Philadelphia, Pa., has ordered one 70-ton Shay geared locomotive from the Lima Locomotive Corporation.

THE ILLINOIS CENTRAL is in the market for 50 Mikado type and a number of Pacific type locomotives, and for a number of locomotives for hump-yard service.

THE INTERNATIONAL RAILWAYS OF CENTRAL AMERICA, reported in the *Railway Age Gazette* of last week as having ordered 5 locomotives from the Baldwin Locomotive Works, have ordered 5 Consolidation locomotives of that company.

THE BANGOR & AROOSTOOK has ordered 5 superheater Consolidation locomotives from the American Locomotive Company. These locomotives will have 23 by 30 in. cylinders, 56 in. driving wheels, a total weight in working order of 213,000 lb., and a steam pressure of 175 lb.

THE DULUTH & NORTHEASTERN has ordered 2 consolidation and 2 70-ton Shay geared locomotives from Lima Locomotive Corporation. The former will have 20 by 24 in. cylinders, 50 in. diameter driving wheels, a weight on the driving wheels of 128,000 lb. and a total weight in working order of 144,000 lb.

THE SOUTHERN PACIFIC has ordered 20 superheater Mikado type passenger and 10 superheater switching locomotives from Lima Locomotive Corporation. The Mikado locomotives will have 26 by 28 in. cylinders, 63 in. diameter driving wheels, a weight on the driving wheels of 218,000 lb. and a total weight in working order of 305,000 lb. The switching locomotives will have 19 by 26 in. cylinders, 51 in. diameter driving wheels and a total weight in working order of 155,000 lb. Both the Mikado and switching locomotives will be equipped for oil burning.

CAR BUILDING

THE CHILEAN STATE RAILWAYS are preparing plans for the purchase of about 400 freight cars.

THE CHICAGO GREAT WESTERN has ordered 500 40-ton box cars from the American Car & Foundry Company.

The Baltimore & Ohio has awarded a contract to the Ryan Car Company, Chicago, for the repairing of 2,000 box cars.

The Intercolonial Railway of Canada is in the market for 8 all-steel sleeping cars and one all-steel compartment observation car.

The Delaware, Lackawanna & Western, reported in the *Railway Age Gazette* of June 26 as being in the market for 55 all-steel suburban coaches has increased its inquiry to 110.

The New York Central Lines have ordered, 1,250 gondola cars each from the Ralston Steel Car Company and the Haskell & Barker Car Company. These cars will be put in service on the Toledo & Ohio Central.

The Union Pacific order for 107 passenger cars from the Pullman company, as reported in the *Railway Age Gazette* of May 29, is divided as follows: 15 69-ft. baggage, 2 75-ft. baggage and buffet, 10 60-ft. postal, 5 60-ft. baggage, 4 69-ft. baggage and postal, 21 72-ft. 6-in. dining, 8 72-ft. 6-in. observation, 2 70-ft. parlor cars, 5 60-ft. coaches, 5 70-ft. coaches, 10 60-ft. chair, and 20 70-ft. chair cars.

IRON AND STEEL

The Chicago & Western Indiana has ordered 1,200 tons of rails from the Illinois Steel Company.

The Intermountain has ordered 1,200 tons of rails for immediate shipment from the Illinois Steel Company.

The Atchison, Topeka & Santa Fe has ordered 115 tons of steel for a 100-ft. through plate-girder turntable, from the American Bridge Company.

The Chicago, Indianapolis & Louisville has ordered 276 tons of material for deck girder spans at Bedford, Ind., from the Wisconsin Bridge Company.

The Arthur Iron Mining Company has ordered 131 tons of steel from the American Bridge Company, Chicago, for a locomotive repair shop for the Dunwoody mine, Chisholm, Minn.

The Boston & Maine, which recently ordered 5,000 tons of rails from the Pennsylvania Steel Company, has placed an additional order of 5,000 tons, divided equally between the Bethlehem Steel Company and the Lackawanna Steel Company.

Chicago, Rock Island & Pacific.—The item in the *Railway Age Gazette* of last week to the effect that this company had ordered 17,000 tons of rails from the Colorado Fuel & Iron Company was incorrect. The company has, however, ordered 10,500 tons from the Illinois Steel Company.

SIGNALING

The Southern Railway is preparing to install a telephone block system to take the place of the telegraph system now in use on the Atlanta division between Macon, Ga., and Ooltewah, Tenn., a distance of 225 miles and part of the route for the Southern Railway's through trains between the west and Florida.

The telephone is now being used for despatching trains and handling messages over the entire line of the Alabama Great Southern between Chattanooga and Meridian, the circuits between Chattanooga and Birmingham having just been completed and put in service. The line from Birmingham to Meridian has been in service since June 1. With the completion of the circuits on the Alabama Great Southern the telephone is now being used for despatching over the entire line of the Queen & Crescent route between Cincinnati and Meridian, a distance of 630 miles.

Transportation Facilities in South Manchuria.—South Manchuria railway runs daily and thrice weekly express trains from Dairen connecting with the Trans-Siberian Railway, the Peking-Mukden and the Kirin-Changchung lines of the Chinese government railway, the Korean government railway and the Dairen-Shanghai direct mail steamers. Steamships leave weekly (in some cases twice a week) for ports in Korea, Japan and China. It is said that the Korean government railways are attempting to secure the bulk of the freight transportation between Japan and Manchuria.

Supply Trade News

Announcement is made that J. M. Oden has severed his connection with B. E. Tilden & Company of New York and Chicago.

The Pennsylvania Equipment Company, Philadelphia, Pa., has moved its office from the West End Trust building to 503 Coleman building, 15th and South Penn square.

John W. Dix has been appointed assistant general sales manager and structural engineer of the Carnegie Steel Company, Pittsburgh, Pa., effective July 15, succeeding John C. Neale, who has resigned to become president and general manager of the Central Steel Company, Massillon, Ohio.

Edward N. Lake, Chicago representative of the Stone & Webster Engineering Corporation, sailed on the *Lusitania* on July 14 with the party accompanying the Chicago Railway Terminal Commission, which is making a six weeks' study of European railway practices with special reference to terminals.

W. D. Jenkins, who has for several years been private secretary to Judge Freeman, general counsel of the Texas & Pacific, and who is well known in southern railroad circles, has been appointed southern representative of the Union Railway Equipment Company, Chicago, with office in the Whitney Central building, New Orleans, La.

John H. Wynne, who since May 1, 1914, has been manager of sales of the Montreal Locomotive Works, Montreal, Que., graduated from the regular course at Cornell University in 1898, and from the special post graduate course in 1899. He immediately entered railway service as a special apprentice on the Illinois Central. Three years later he went to the Procter & Gamble Company, Ivorydale, O., in the capacity of shop engineer, but in the following year returned to the Illinois Central as a gang foreman. After working in that position for a short while he became a general foreman on the Pennsylvania Lines at West Richmond, Md. In 1904 he again returned to the Illinois Central, however, and served as mechanical engineer at Chicago. In April, 1906, he entered the supply field, taking the position of manager of the Chicago office of the Atlantic Equipment Company, and in September, 1910, went to New York as general sales manager. On February 1, 1912, he entered the service of the American Locomotive Company as manager of its Rogers & Cooke plants, and retained that position until, on May 1, he reached his present position as manager of sales at Montreal. Mr. Wynne in addition is also in charge of the design of small locomotives for industrial service.

J. H. Wynne

Joseph T. Ryerson & Son, Chicago, have taken over the plant, merchandise, equipment and good will of the W. G. Hagar Iron Company, St. Louis, Mo. It is the intention of the company to supplement the plant of the latter with complete modern warehouses and equipment for the handling and cutting of shapes, reinforcing bars and similar heavy material. Ryerson & Son will thus be able to render immediate service in their lines of finished steel to customers in the territory tributary to St. Louis.

C. W. Cross has been appointed Chicago representative of the Equipment Improvement Company, with headquarters at 30 Church street, New York. Mr. Cross began his railroad experi-

ence with the Pennsylvania Lines West and left that system when assistant master mechanic at Fort Wayne to become master mechanic of the Lake Shore & Michigan Southern, with headquarters at Elkhart, Ind. He was made superintendent of apprentices of the New York Central Lines in 1906 when that system revised and centralized its apprenticeship department to meet modern conditions. Mr. Cross' work in the development of this department requires no comment, as it is widely known and understood.

Colonel H. G. Prout has resigned as president of the Union Switch & Signal Company. W. D. Uptegraff, formerly vice-president, has been appointed president pro tempore. Sydney G. Johnson, vice-president in charge of sales, has also resigned, no successor being appointed. T. W. Siemon, treasurer and assistant secretary of the Westinghouse Electric & Manufacturing Company, has been made secretary-treasurer of the Union Switch & Signal Company, succeeding James H. Johnson, resigned.

TRADE PUBLICATIONS

ELECTRIC INDUSTRIAL LOCOMOTIVES.—The Westinghouse Electric & Manufacturing Company has recently issued a four-page folder illustrating a number of Baldwin-Westinghouse electric industrial locomotives.

CONCRETE REINFORCING.—Joseph T. Ryerson & Son have issued a second edition of Technical Library No. 8, entitled "Concrete Reinforcing." The same company has also issued bulletins Nos. 9,071 and 13,071, descriptive respectively of the Ryerson high-speed friction saw and the Lennox serpentine shear.

AIR BRAKES.—The Simplex Air Brake & Manufacturing Company, Pittsburgh, Pa., has issued a 14-page booklet descriptive of the construction and operation of its locomotive air brake equipment. This circular contains a colored diagram showing the arrangement of parts and the action of the valves and controlling device.

LIGHTING OF MACHINE SHOPS.—The General Electric Company of Schenectady, N. Y., has just published a very well illustrated bulletin describing the lighting systems which can be applied to machine shops and metal working plants. As a supplement to this bulletin there is published a table showing the characteristics of Edison Mazda lamps used for standard lighting service.

TELEPHONE CABLE.—The Western Electric Company has recently issued a 15-page booklet entitled "The Making of the Voice Highways," descriptive of the manufacture of lead covered telephone cable. The booklet goes into a brief consideration of the several steps involved in the making of the product and contains a large number of views taken in the shops where it is made.

HYDRAULIC PRESSES.—The Hydraulic Press Manufacturing Company, Mount Gilead, Ohio, has recently issued catalog No. 40 containing 128 pages, 8 by 11 in. in size, showing representative views of the company's line of hydraulic presses. Specifications and descriptions are given of each press illustrated, and a brief statement of the work of which it is capable. The book also contains a number of interesting views of the company's plant.

CEMENT GUN.—The Cement Gun Company, New York, has issued an elaborate 107-page catalog devoted to the description of the cement gun apparatus, its principle and mechanical construction; the cement gun product, "Gunite," and its applications and adaptability. This book contains many illustrations showing the method of application and also the finished work. Many letters of engineers and construction men commenting on the use of "Gunite" are also reproduced in this catalog.

LIFTING THE QUEBEC BRIDGE.—The Electric Controller & Manufacturing Company, Cleveland, Ohio, has issued an interesting 16-page pamphlet, devoted to the general description, and the method of erection of the new Quebec bridge over the St. Lawrence river. The general description of the bridge and conditions to be contended against are taken from a paper by H. F. Stratton, which appeared in the December, 1913, issue of the *Engineering Magazine*. The Electric Controller & Manufacturing Company, which is furnishing all the electrical equipment, gives an interesting account of the electrical control of the apparatus used in the erection work.

Railway Construction

CALGARY & FERNIE.—The Railway Commissioner of Canada has approved the application of this company to build a 174-mile line from Fernie, B. C., through Kananaskis pass and Elbow pass, thence along the south branch of the Sheep river, through the oil fields and through the Sarcee reserve into Calgary, Alta. J. R. Lawreyn, S. S. Manahan, Victoria, B. C., and A. Mutz, Fernie, are interested. (January 2, p. 50.)

DENVER & RIO GRANDE.—An officer writes that a contract has been awarded to C. Wells, Denver, Colo., for the grading for a 16-mile narrow gage line from Caliente, Taos county, N. Mex., to La Madera, to connect with the lumber line of the Hallack & Howard Lumber Company of Denver, Colo. The line will have a maximum grade of 2½ per cent., and a 16 deg. maximum curve. Other work than the grading will be done by the company forces. J. G. Gwyn, Denver, Colo., is chief engineer.

DENVER & RIO GRANDE.—According to press reports, work has been started on a 16-mile branch from Caliente, N. M., southwest. This line is to connect with a line to be built by the Hallack & Howard Lumber Company, of Denver, Colo., which is also to be 16 miles long.

EXPORT PHOSPHATE RAILWAY & TERMINAL COMPANY.—Under this name a line is being built, it is said, for the Export Phosphate Company, of Mulberry, Fla., to a phosphate drying plant near Tampa, also a number of branch lines, in all about 50 miles. E. L. Blood, president; H. E. C. Capewell, vice-president, and E. A. Pierce, secretary and treasurer.

FAIRMOUNT & VEBLEN.—The Greenville & Southeastern has asked for incorporation in South Dakota with a capital of $50,000 to build a 10-mile line from Roslyn, S. Dak. This is a section of the Fairmount & Veblen extension building from Veblen, southwest to Webster, 40 miles.

GREAT NORTHERN.—An officer writes that the Montana Eastern, which started work some time ago on a line from New Rockford, N. Dak., west to Lewistown, Mont., has track laid from Fairview, Mont., east to Arnegard, 30.4 mile. A north and south line has also been completed from Sidney, Mont., north via Fairview to a connection with the main line at Snowden, 25 miles. A. Guthrie & Co., St. Paul, Minn., had the contract for this work. It has not yet been definitely decided when other sections of the line will be built.

GREENVILLE & SOUTHEASTERN.—See Fairmount & Veblen.

MISSOURI ROADS.—According to press reports, capital has been secured and surveys are being made for a line to be built from Springfield, Mo., southeast to a connection with the St. Louis, Iron Mountain & Southern at a point south of Mountain Home, Ark., about 100 miles. E. C. MacAfee, Springfield, Mo.; K. V. Loba and H. S. Wickersham, North Yakima, Wash., are interested.

MOBILE & OHIO.—It is reported that this company is preparing to double-track its line between Corinth, Miss., and Jackson, Tenn. B. A. Wood, chief engineer, Mobile, Ala.

MONTANA EASTERN.—See Great Northern.

NEW YORK SUBWAYS.—The New York Public Service Commission, First district, has awarded six contracts for as many sections of the subway system, aggregating $21,035,185. The most important is that for the construction of the East River tunnels from downtown Manhattan to Brooklyn awarded to the Flinn-O'Rourke Company, newly formed by the O'Rourke Engineering Company and Booth & Flinn, Ltd., who submitted a joint bid of $12,444,726; $6,469,916 being for the Interborough tunnel from Old Slip, Manhattan, to Clark street, Brooklyn, and $5,974,810 for the New York Municipal Railway tunnel from Whitehall street, Manhattan, to Montague street, Brooklyn. Contracts were also awarded for the construction of section No. 1 of route No. 12, a part of Eastern Parkway subway in Brooklyn, to the Cranford Company, for $2,195,296; section No. 2 of route No. 20, the Canal street railway in Manhattan, to the Underpinning & Foundation

Company, for $1,822,994; section No. 7 of route No. 5, the portion of the Lexington avenue subway from Forty-third to Fifty-third streets, to Rapid Transit Subway Construction Company for $1,915,165, and section No. 2 of routes Nos. 4 and 36, the portion of the Broadway subway from Twenty-sixth to Thirty-eighth streets, to the United States Realty & Improvement Company for $2,657,005.

Northern Pacific.—This company, it is said, is planning to construct a branch line from Beach, N. D., southeast 25 miles in Golden Valley. W. L. Darling, chief engineer, St. Paul, Minn.

Seattle, Port Angeles & Lake Crescent.—A perpetual franchise for the use of the streets for railroad purposes in Port Townsend, Wash., has been granted to C. J. Erickson, president of this company, which is building from a point near Oak Bay, Wash., west via Irondale, Chimacum valley, Sequim Dungeness valley and Port Angeles to the Lyre river, thence west past Lake Crescent into the Olympic timber district. Work has been finished on 25 miles. The franchise gives the company control of much of the water frontage and provides a route for an extension to a tidewater terminal in Port Townsend. (July 3, p. 40.)

Southern Railway.—A contract has been given to Robert Russell, Danville, Va., for building a new double track cut-off between Danville and Dry Fork, 12.95 miles, to eliminate a heavy grade, and reduce the curvature between these two places which are on the existing line. The work will include a double track bridge over the Dan river.

Tampa & Gulf Coast.—A contract is reported let to Morrisey, Bouly & Company, for work on the extension building from Belleair, Fla., south, thence east to St. Petersburg. (May 15, p. 1119.)

RAILWAY STRUCTURES

Butte, Mont.—The Chicago, Milwaukee & St. Paul has awarded a contract for the grading work for its new passenger station at Butte, Mont., to Guthrie, McDougall & Company, Spokane, Wash.

Mount Airy, N. C.—The Southern Railway has given a contract to Porter & Boyd, Charlotte, N. C., for building a new granite passenger station at Mount Airy.

New York.—The New York Central & Hudson River has given a contract to R. P. Johnson, New York, for erecting the superstructures, including timber work, concrete work, paving and all incidental work, for 12 overhead bridges and one railroad bridge on the Hudson River division.

New York.—The Lehigh Valley has awarded contracts for dredging and other preliminary work for a large ore pier in the Constable Hook section of Bayonne, N. J., fronting on New York Bay, which will be the northern terminus of a line of ore-carrying steamers to be used by the Bethlehem Steel Company to bring iron ore from its deposits in Chile via the Panama Canal. It is said that the steel company plans to import at least 750,000 tons of ore annually. The pier will be 1,150 ft. long and 67 ft. wide. There will be a basin 200 ft. wide, and a channel will be dredged that will have a depth of 35 ft. at low tide. The pier will be equipped with modern unloading machines, two of which will be able to work in one vessel at the same time with a maximum capacity each of 500 tons an hour. The site is known as the old French oil yard and adjoins the plant of the Standard Oil Company. It is directly on the line of the Lehigh Valley, which is intending to establish yards at this point with a capacity at first of 350 cars.

Texas City, Tex.—Work has been started on improvements at the Texas City ocean terminal of the Texas City Transportation Company. The work includes building a steel and sheet metal warehouse along the north side of pier A to cover an area of 880 ft. by 163 ft. Dredging work is also to be carried out in the slip alongside the new structure. The work will cost about $110,000.

Siberian Railway Concession.—St. Petersburg advices state that a Frenchman has secured a concession for a South Siberian trunk line of about 1,300 miles, which will require an outlay of about $80,000,000.

Railway Financial News

Atchison, Topeka & Santa Fe.—This company has leased the Oklahoma Central, which for a number of years has been in the hands of a receiver.

Lancaster, Oxford & Southern.—This company ceased operation of train service on July 1. The reasons given for this are that the operation of the road did not pay, although it might at some time be taken over by some other railroad.

Las Vegas & Tonopah.—This road, it is understood, is to take over the Bullfrog & Goldfield, which runs from Rhyolite and Betatey to Goldfield and parallels in part the Las Vegas & Tonopah. The plan is said to have been approved by the Nevada State Railroad Commission, and provides for the abandonment of parts of the parallel lines and the reconstruction of the remainder so as to make available for one line the best parts of the two existing lines.

Lewisburg & Northern.—See Louisville & Nashville.

Louisville & Nashville.—The Lewisburg & Northern, a subsidiary of the Louisville & Nashville, began operation on Wednesday, July 15. This road runs from Brentwood, Tenn., to Athens, Ala.

Missouri Pacific.—A committee has been formed for the protection of holders of 5 per cent. notes of the Missouri Pacific which were extended to June 1, 1915. This committee consists of Edwin G. Merrill, president of the Union Trust Company, New York; Stephen Barker, president of the Bank of the Manhattan Company; Howard Bayne, vice-president of the Columbia-Knickerbocker Trust Company, New York; Louis V. Bright, president of the Lawyers' Title Insurance and Trust Company; A. B. Hepburn, chairman of the Board of the Chase National Bank, and Henry Ruhlender, of Speyer & Company, New York.

New York Central & Hudson River.—Stockholders by an almost unanimous vote on July 20 approved the consolidation of the New York Central & Hudson River and the Lake Shore & Michigan Southern, and it now remains for the court to pass upon protest of certain minority stockholders of the Lake Shore & Michigan Southern and for some of the state commissions that have jurisdiction to give their approval. The majority of the state commissions have already approved the plan.

New York, New Haven & Hartford.—In addition to the suit which the Attorney General is to bring under the Sherman Anti-Trust Law, a suit by Sherman Whipple on behalf of the estate of Ole Bull and all stockholders of the corporations who may desire to join therein has been brought. The appointment of a receiver to prosecute claims for $306,000,000 alleged to be due under the Sherman law is sought. See also editorial and abstract of New Haven's reply to President Wilson.

Oklahoma Central.—See Atchison, Topeka & Santa Fe.

Toledo, St. Louis & Western.—It is reported that on August 1 the interest on the $11,527,000 collateral, 4 per cent. bonds which are secured by the deposit of Chicago & Alton stock will be defaulted.

Union Pacific.—The extra dividend, consisting of $12 par value Baltimore & Ohio common, $22.50 par value Baltimore & Ohio preferred, and $3 in cash, the total of which had a market value of $30.50, was distributed to stockholders on July 20.

Progress of Railway Construction in Argentina.—According to data published by the Argentine ministry of public works relative to progress of different government railway lines under construction, the number of miles of track laid up to the latter part of April, 1914, was as follows: On the line from San Antonio to Nahuel Huapi, 251 miles; Comodoro Rivadavia to Colonia Sarmiento, 122 miles; Puerto Deseado to Lago, Buenos Aires, 170 miles; Formosa to Embarcacion, 153 miles; Barranqueras al Oeste, 127 miles; Barranqueras to Quimili, 55 miles; Diamante to Crespo, 22 miles; Hasenkamp al Norte, 61 miles; Nare to San Javier, 43 miles.

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WE GUARANTEE, that of this issue 9,000 copies were printed; that of these 9,000 copies, 7,470 were mailed to regular paid subscribers to the weekly edition, 250 were provided for counter and news companies' sales, 1,179 were mailed to advertisers, exchanges and correspondents, and 101 were provided for samples and office use; that the total copies printed this year to date were 290,700, an average of 9,377 copies a week.

VOLUME 57 JULY 31, 1914 NUMBER 5

Contents

*Illustrated.

Barring Ability from Public Service

The withdrawal of the nomination of Mr. Jones for the Federal Reserve Board after the failure of his confirmation by the Senate became certain, has profound significance, not merely for those interested in banking and currency, but for all who are interested in the relations between government and business. The government has been within late years rapidly extending its regulating authority over various classes of business concerns. It is essential, if regulation is to be fair, intelligent and beneficial, that the regulatory laws shall be administered by men having expert fitness for their duties. Numerous proposals are being made for government ownership of various facilities, such as the telephone, the telegraph, railways, coal mines, and so on. The need for expert administrators would be still greater under government ownership than under government regulation. Large enterprises cannot be managed by any other kind of men. The advocates of public regulation and public ownership say that the government could and would secure such men. Yet every time that Congress has a chance to, it furnishes evidence tending to refute this contention. The test of business ability is achievement in the field of business, and men who achieve in that field necessarily become identified with large concerns; but almost every time a man who has been identified with a large concern is suggested for a public office requiring business ability, the leather-lunged and wooden-headed demagogues begin to split the ears of the groundlings with their bellowings against him. Neither government regulation nor government management can ever be a success in this country so long as it is as easy as it is now for yelping demagogues to get into Congress, and as hard as it is now for men of ability and experience to get into any branch of the public service.

Division of Freight and Passenger Accounts

The Interstate Commerce Commission has apparently definitely decided to require a form of accounts which will show freight and passenger expenses separately. It is now at work with a committee of the Association of Railway Accounting Officers looking to the formulation of a set of rules for dividing expenses that are not directly assignable between these two classes of service. The commission announces that if sufficient progress can be made, carriers will be asked to file a special report for the year ending June 30, 1915, in which no operating expenses are to be left unapportioned. With the question of whether or not such a separation is wise and feasible decided probably beyond appeal by the commission, it is of the utmost importance that the very best system for making an arbitrary division of expenses should be adopted. Such a system ought to combine two seemingly irreconcilable characteristics. It ought to be flexible enough to be adaptable to widely different conditions, and it ought to be stricty enough defined so as to provide uniformity. Since it is to be an important step in the development of cost accounting for railroads, it should be based on a careful, painstaking analysis of the facts and not on a theoretical or arbitrary basis of reasoning.

A Formula Now Being Tested

The attempt to make a comprehensive formula for the apportionment of expenses between freight and passenger service, a description of which was published in our last issue, is, so far as we know, the most comprehensive and scientific attempt that has ever been made to lay down the principles of cost accounting for railroads. This scheme was worked out by a committee of which James Peabody, statistician of the Atchison, Topeka & Santa Fe, was chairman. Most fair-minded, unprejudiced railroad officers will probably acknowledge that if this scheme could be applied to the operations of a railroad by a corps of unusually intelligent accountants it would show with at least a working degree of accuracy a division of expenses as between freight and passenger service. The difficulty lies in the fact that in practice if such a scheme as this were to be prescribed by the Interstate Commerce Commission it would not be and could not be applied by an unusually intelligent and competent corps of accountants to the operations of every railroad company in the country. The scheme depends for the accuracy of its results both on a keen analysis of conditions and on a sympathetic and painstaking application. Its application to different railroads would undoubtedly be most uneven. No one who has had anything to do with the returns which are now made to the Interstate Commerce Commission can doubt that on some roads the commission's instructions would be most unsatisfactorily carried out. There are infinite oppor-

tunities for bias or bad judgment to warp the results that would be obtained by the application of such a scheme as this by the Interstate Commerce Commission. This is not, however, saying that it would be without value to the roads themselves, or would not in time be found to yield information of real importance and usefulness.

Government Statistical Report for 1912

The total length of railroad in the United States on June 30, 1912, was 246,816 miles, or 2,837 miles more than the total one year prior to that date. Railroads in Hawaii and Alaska (655 miles) are not included. This total appears in the final statistical report of the Interstate Commerce Commission for 1912, the first 65 pages of which were issued this month and were noticed in these columns two weeks ago, page 87. As was suggested in that notice the value of most of the two-years-old facts here given out by the commission is impaired by the great delay, and by readers' confusion due to preliminary partial publications; but this item of total mileage, which will be wanted in all future comparisons, should be classed as real news. The figure for 1911, used in the statement of increase, is 200 miles less than that which was given in the commission's report for that year; and it appears that this discrepancy is the result, not of a single error in adding, but of corrections in a considerable number of items. The table now printed gives the total for each state, with the increase or decrease from the preceding year. *Nine* states show decreases. While this statement of mileage is the only one in the report which is of major importance and which has not been in part anticipated by earlier publications, there are many pages of matter which now appear for the first time and which are useful to the student and investigator—such as details of cars and engines and of data concerning employees and wages, capitalization, interest and dividends. Indeed, for the investigator who keeps his eye on the country as a whole this partial report for 1912 is almost as satisfactory as the full volume; and he gets it a good deal earlier. It contains a three-page analysis of railroad taxes by states, with the three classes of roads—big, medium and small—shown separately; and the full statement of roads in the hands of receivers; and these and all the other statistics are given separately for each of the three grand divisions into which the country is divided—eastern, southern and western.

THE OPERATION OF LARGE TERMINAL YARDS

TWO series of the papers received in the contest on "The Operation of Large Classification Yards" already have been published in these columns (July 3 and July 24), and the third and last will appear at an early date. The interest which this contest has excited has shown that railway men are fully awake to the importance of the problem of yard operation. An equally important problem is presented by the operation of large terminal yards where freight is received and delivered. To secure a full discussion of this subject we announce a contest on "The Operation of Terminal Yards," including the switching of cars to and from freight houses, team tracks, docks, industry tracks, etc., the delivery of cars to, and their receipt from connecting lines—in fact, all the problems presented to the terminal superintendent or yardmaster in the handling of freight cars between the classification yards and the various points of receipt or delivery.

The terminal superintendent, or yardmaster, is in direct contact with the shipper, and the problem of giving him satisfactory service, while at the same time operating the entire terminal economically and efficiently is a complicated one. There is a great chance for cars to be delayed or lost, while it is most difficult to exercise close supervision over a large number of switching crews widely scattered and frequently working for a large portion of the day on the track of other roads. These and numerous other problems call for the exercise of a high degree of executive ability.

Every practical operating officer has considerable knowledge of this subject. But it can best be discussed in its many ramifications by those who are now, or who have been, in actual charge of this work; they are in the best position to offer valuable suggestions for improvements in this branch of the service. We especially desire to secure a thorough discussion of this subject, and will pay $50 and $35 for the two best papers received, and our space rates for all others accepted and published. The award will be based upon the practicability and value of the ideas presented, and on the completeness with which the subject is covered.

All contributions should be sent to the Editor of the *Railway Age Gazette*, 608 South Dearborn street, Chicago, and must be received not later than September 15 to be considered by the judges.

DANGER IN THE CAR SITUATION

THE statistics of the American Railway Association show that, in the aggregate, there is a large surplus of freight cars in the country. But the situation which already has developed at Galveston illustrates strikingly the danger of traffic congestion and car shortage with which the railways, the shippers and the consignees are confronted. As usual, the country elevators and farmers have been rushing the wheat crop to Galveston almost as fast as it has been threshed. The railways were at first able to move it as rapidly as it was offered to them. But there have not been enough boats at Galveston to take away the grain delivered there. The facilities of the consignees for unloading the cars, and the storage capacity of their elevators, mills and warehouses, have proved inadequate. Consequently, after getting their terminals crowded with cars, the principal carriers to Galveston, have had to put an embargo on the movement of grain to that port. The Santa Fe alone, at latest reports, had 1,800 cars on the island, and 1,900 waiting outside that could not be moved to it.

There is danger that a like situation will develop at other large grain markets, unless the railways, the shippers and the consignees heartily co-operate to prevent it. There will be a great effort on the part of the farmers and country elevators generally to ship the grain as fast as cars can be obtained. Statistics of car supply published from time to time by the American Railway Association show that the number of cars owned by the railways operating in the territory west of Lake Michigan and the Mississippi river was 658,151 on January 1, 1910, and 766,275 on January 1, 1914, an increase in four years of 108,124, or 16.4 per cent. Owing to the large capacity of the cars constructed during this period, the actual increase in the aggregate car capacity has been not less than 20 per cent. Besides there has been recently a substantial increase in the number of surplus box cars available in this territory, they having been moved there to be ready for handling the crop. There has been a corresponding increase in the number and power of locomotives; and additional track, signals and yard facilities have been provided. As a result, the numerous lines leading from the grain fields to the great markets, which are largely double track, can move grain in practically unlimited quantities. But can it be promptly handled at the elevators, mills and warehouses, to which it is ordered on arrival?

The increase in the capacity of these facilities of the consignees has not, it is feared, kept pace, except in rare cases, with railroad development. In few cases have the increases in the capacity for the storage of grain been accompanied by increases in facilities for unloading it. This is believed to be the condition at Chicago, Milwaukee, Minneapolis, Duluth and the Atlantic and gulf ports. The most serious troubles in transportation arise from difficulties encountered in disposing of the loads. So long as the facilities of the consignees permit cars to be unloaded promptly and started back to the grain-producing districts for

more loads, it is probable there will be no serious congestion at the terminals and no car shortages in the grain-producing districts. But when the consignees begin to fail to unload promptly, cars will begin to accumulate at other terminals as they have at Galveston. The terminals will become congested, as at Galveston, hindering prompt movement and causing shortages of equipment in the grain-producing districts. The only recourse of the carriers must then be to decline to furnish cars for loading to markets where they cannot be promptly unloaded.

Needless to say, it is to the interest of all concerned that this situation shall be avoided, and that the grain shall be moved with the greatest possible facility and the least possible friction.

REGULATION OF RAILROAD SECURITIES

THE *Railway Age Gazette* long has advocated some form of federal regulation of the issuance of railway securities. It has regarded some such regulation as inevitable, and has felt that if it were reasonable, and recognized business conditions and sound economic principles, it would do good. The bill pending in the Senate ignores business conditions and is not based on sound economic principles.

Doubtless legislation should specify, as the bill in the Senate does, the purposes for which securities may be issued. It should contain provisions, as this bill does, which would give publicity to the purposes for which securities are to be issued, the amounts received for them, how they are marketed, the disposition made of the funds raised, and so on. Ample authority should be vested in the Interstate Commerce Commission or some other agency for ascertaining whether the reports made by railway directors and officers concerning these matters are correct, and for securing swift and exemplary punishment of those guilty of wrongdoing either in connection with the issuance of securities or with the disposition of the receipts.

The bill before the Senate goes much farther than this. It prohibits the issuance of any securities without the approval of the Interstate Commerce Commission, and authorizes the commission "to fix a minimum price below which said securities shall not be sold or disposed of or said obligations entered into and to make such other rules and regulations relating to the sale or distribution of said securities" as in its judgment may be for the best interest of the carrier and the public.

The objections to such legislation were clearly and conclusively stated in the report of the United States Railroad Securities Commission three years ago. One of the present members of the Interstate Commerce Commission, B. H. Meyer, was a member of the Railroad Securities Commission. If Congress will not heed spokesmen for the railroads, will it not give ear to a public official so well fitted to advise it as is Mr. Meyer?

Among the principal objections to the proposed legislation are the following:

First, there are numerous railway companies, and it is essential to the proper management of their business that, in the aggregate, they make many issues of securities each year. In order that they may place their stocks and bonds to the best advantage it is often necessary for their directors to decide and act quickly. The Interstate Commerce Commission is very busy, and, because of the increased duties Congress constantly is giving it, will grow busier. It would be impossible for a single body of men, even though it had no other duties to perform, to pass on all the securities issued by all the railways with anything like the facility that commercial conditions demand. As the Railroad Securities Commission said, "A growing railroad has constant need of money, and its officers and directors are the best judges of the amount of its annual requirements. It is manifestly to the interest of the company and of the public that a road should get its money as cheaply as it can. The policy of allowing a floating debt to accumulate with a view to its extinction by the sale of permanent securities upon the completion of its improvements is not a good one and should be avoided wherever possible. An administrative body, whose approval was required in advance for the sale of securities, would have great difficulty in always acting promptly enough to enable the roads to avail themselves of favorable money markets and avoid the creation of floating debts."

Second, for the commission to attempt to fix the minimum price at which securities should be sold would result disastrously directly to the railways, and indirectly to the public. No board of directors can foresee with an approach to certainty at what price an issue of securities will sell. Banking houses which make a business of underwriting securities often err, and in consequence have to pocket losses. If directors and bankers with a good working knowledge of individual properties, and familiar with the attitude of investors toward them, often cannot estimate accurately what their securities can be placed for, how can it be thought that the Interstate Commerce Commission would be able to determine what prices the securities of all of the railways of the country would bring? In many cases the commission would fix minimum prices that were too high, thereby disabling the roads from selling them and rendering impossible the making of contemplated improvements.

The experiment of having regulating bodies fix the prices at which railway securities shall be sold has been tried and has failed. As the Railroad Securities Commission said in its report, "The experience of Massachusetts has shown that the attempt to prohibit the issue of stock below ts market value has hampered the investment of capital and has distinctly interferred with the development of facilities. If this has been the experience of Massachusetts, where capital was abundant, we can hardly expect better results in states where capital is more scarce." That the attempts of the Massachusett's Railroad Commission to regulate the prices at which securities should be sold were failures was confessed in 1908 in the most conclusive manner—namely, by the repeal of the law under which the commission had acted for 15 years.

Third, such legislation as is proposed is objectionable because it would tend to deceive investors, and thereby to injure instead of benefit them. If the Interstate Commerce Commission should fix a minimum price for an issue of stocks or bonds it would thereby say that it believed that the stocks or bonds were worth that much. No doubt, at first, many investors would buy securities because of faith in the commission's judgment. But it would soon develop that the commission made mistakes. There would be many cases where securities would not yield the returns the commission expected or long command the price in the market that it had caused to be paid for them. In numerous cases investors in the securities of Massachusetts railways paid for them prices fixed by the Massachusetts commission, only to suffer losses because of subsequent heavy declines in their values. If the government through the Interstate Commerce Commission is going to say to innocent investors that a railway share or bond is worth a given amount, and encourage them to buy it at that price, than it ought to be prepared to make its guarantee good by a suitable system of taxation or of rate regulation. Either of these alternatives is objectionable. Louis D. Brandeis is a Massachusetts man who knows how the law in that state worked, as well as a public-spirited citizen, and, therefore, his drastic criticisms of the proposed federal legislation should carry great weight.

Legislation for the regulation of the issuance of railway securities should, first, prescribe the purposes for which securities may be issued; second, cause such publicity to be given to the facts regarding the business of the railway issuing them that the investor will be able to determine for himself what they are worth, and third, prevent the money derived from securities from being recklessly or dishonestly misapplied. Any legislation which tries to do more than this will cause more harm than good.

Letters to the Editor

PLACING HUMP RIDERS ON A PIECE WORK BASIS

Chicago, Ill., July 7, 1914.

To the Editor of the Railway Age Gazette:

Noting the discussions regarding the operation of large classification yards in your issue of July 3, I offer a suggestion that where the volume of business will warrant, the car riders in gravity yards be placed on a piece work basis, paying these men for the number of cuts they ride, instead of by the day or hour. It is an established fact that we are not securing over 75 per cent. efficiency with our present system of riding these cuts. The only objection to this would seem to be that the men will take chances, and thereby create additional damage. I feel, however, that this can be readily overcome by proper supervision.

E. W. Brown,
Assistant Superintendent, Lake Shore & Michigan Southern.

A RETRENCHMENT THAT MIGHT STRIKE NEAR HOME

New York, June 1, 1914.

To the Editor of the Railway Age Gazette:

I have been for many years a reader of your paper and have read discussions of many items of expenses connected with the operation of railways, some of them forming but a fraction of 1 per cent. of the gross earnings. There is one item, however, which amounts to a great deal more in many cases, to which I have seen no reference. I refer to legal expenses. Some of the large roads may be able to carry this burden with ease, but to some of the smaller ones it seems almost crushing.

I have a case in mind of a small railroad which has been earning about $100,000 a year gross, which has been paying to its very efficient and active counsel $900 a year. The company has recently extended its line and its gross earnings are now about double, but the company has had the misfortune to lose the services of the above mentioned general counsel by death and no other law firm of standing in the particular town adjacent to the road seems to be willing to accept its business for less than $2,400 a year, and this does not cover all the legal expenses by any means. I have talked with the officers of other lines who all join in complaining about the exorbitant demand made for legal services.

There is another subject bearing on this point. The item of expenditures on part of the railroads is supervised by the Interstate Commerce Commission, but when the company gets into trouble there are lawyers for the receivers, lawyers for the company, lawyers for the bondholders and lawyers for the stockholders, as well as for secured creditors and unsecured creditors, and they all expect to be, and generally are paid out of the corpus of the property. Frequently the legal expenses run up to large figures and the result obtained for this large sum is generally quite disproportionate.

Possibly legislative bodies being largely composed of lawyers do not care to legislate against these exorbitant legal charges, but with hard times pressing the railroads, this matter should certainly be fully discussed.

Kicker.

EARLY RAILROAD BUILDING

Albany, N. Y., June 10, 1914.

To the Editor of the Railway Age Gazette:

Among the many broad generalizations made by Professor Ripley in his instructive articles on "Railroad Construction Finance," there is the statement:

> The first railroads laid down in America were built as in England, to last forever. On the Boston & Lowell and Baltimore & Ohio, iron rails were laid upon granite cross ties in order to give permanence.

Although we can have no definite proof as to what was in the minds of the early railroad builders, there is, however, considerable doubt whether the Baltimore & Ohio was originally laid upon granite "cross ties" so as to be built to last forever. In a report signed by three eminent engineers, dated March 14, 1835, to the Canal Commissioners of the State of New York,* it is stated regarding the Baltimore & Ohio (then 67½ miles):

> Over ⅗ of the superstructure is timber sills and rails capped with an iron plate; ¼ or (26/100) is stone rails capped with iron plates; and 1/17 is timber rails on light stone blocks.

Thus, nothing is said regarding granite cross ties. If they existed, they were laid at the ends of stringers for the purpose of preventing tracks from spreading, and not for durability.

Professor Ripley also gives as evidence of the "permanent character" of the early construction of American railroads the fact that the original New York & Erie elevated 200 miles of track on piles for the purpose of eliminating grades. It seems, however, that building on piles in the early days was less expensive than excavations and embankments. Thus the South Carolina Railroad is described in the report of the New York Canal Commissioners as "having been placed on piles, excavation having been avoided as much as possible, and embankments omitted altogether, by which the expense of grading has been very little."

A. M. Sakolski,
Lecturer on Railroad Economics, New York University.

NEW BOOKS

Foundations of Bridges and Buildings. By Henry S. Jacoby, professor of bridge engineering, Cornell University, and Roland T. Davis, professor of structural and hydraulic engineering, West Virginia University. Size 6 in. by 9 in., 603 pages, illustrated, cloth binding. Published by McGraw-Hill Book Company, New York. Price $5.

This book can readily be divided into four parts, the first consisting of five chapters with a total of 197 pages devoted to timber, concrete and sheet piles; second, seven chapters with a total of 210 pages covering cofferdams and caissons; third, three chapters with 76 pages, devoted to piers and abutments, and fourth, four chapters treating of spread foundations, underpinning buildings, explorations and unit loads, and a chapter giving very complete references to engineering literature, classified as to the subjects treated in the previous chapters.

The large amount of space devoted to piles is justified by the authors on the ground that the primary field for the book is for class room instruction and young engineers are more likely to come in contact with pile foundation work than any other class of foundation construction early in their experience. It is also felt that the recent introduction of concrete piles will do much to keep that type of construction in the lead of other classes of foundations. The treatment covers equipment, methods of driving, bearing power, the various types of concrete piles and metal and sheet piles. The discussion of cofferdams and caissons includes one chapter on cofferdams, one on box and open caissons, two on pneumatic caissons for bridges, one on pneumatic caissons for buildings, one on pier foundations in open wells, and one on pneumatic caisson practice, which was written by T. Kennard Thomson, a consulting engineer who has specialized in foundation construction. The three chapters on piers and abutments are included to meet the demand for a concise treatment of this subject in engineering schools which combine the study of masonry construction with that of foundations.

The authors have recognized the impossibility of covering so large and varied a subject exhaustively within the limits of such a book, and have met this difficulty by the very liberal use of references to engineering literature, both in the bibliography in the last chapter and in notes scattered through the discussion.

Telegraphic Communication in Nigeria.—In 1911 Nigeria owned and operated 1,704 miles of telegraph line and 3,286 miles of wire. There have been several important extensions since that time, so that now the lines connect all of the principal office headquarters and trade centers.

*This is reprinted in the "Annual Report of the State Engineer on the Canals of New York," 1862, pp. 145-178.

The Federal Valuation of the S. P., L. A. & S. L.

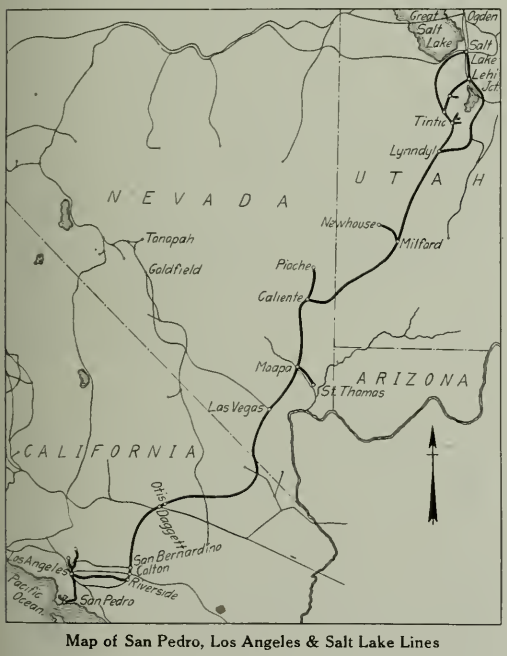
A Description of the Organization Employed and the Methods Followed in Collecting the Required Data

By E. G. Tilton

Formerly, Chief Engineer, San Pedro, Los Angeles & Salt Lake.

As its name indicates, the San Pedro, Los Angeles & Salt Lake extends from San Pedro, on the southern coast of California, to Salt Lake City, a distance of 810.7 miles, passing through Los Angeles 27 miles inland from San Pedro. This line is known locally as the Salt Lake route and the owning company is referred to as the Salt Lake Company.

Of the 1,129.24 miles composing Salt Lake system, of which 783.58 miles are main line and 345.66 miles are branch lines and industrial spurs, the Salt Lake Company owns 681.14 miles of main line and 329.13 miles of branches and spurs. Only that portion of the road between Los Angeles and Salt Lake is designated as main line; the portion from Los Angeles to San Pedro being included with the branches. The main line is not owned continuously by the Salt Lake Company. Between Riverside, Cal., and Daggett, 100 miles, and for the last two miles entering Salt Lake City, trains are operated over the lines of foreign companies under trackage agreements, while the terminals in Salt Lake City are also used under such an agreement. Also on the Provo subdivision, formerly the main line, trains operate from Sandy to Salt Lake City, 13 miles, over the rails of another company.



Map of San Pedro, Los Angeles & Salt Lake Lines

With the exception of the branch to Pioche, a ten-mile line change on the Provo sub-division and branch line extensions amounting to about ten miles more, all the lines of the Salt Lake system lying east of Caliente, Nev., and west of Los Angeles, were built by different companies during the 25 years preceding 1900 and were purchased by the Salt Lake Company in 1901. The line between Los Angeles and Caliente has been constructed since 1900, since which date all the main lines purchased have been rebuilt to the adopted standards and the branches have been very much improved.

Some of the purchased lines had passed through several ownerships with the result that many of the original records of construction were mislaid, lost or destroyed. For this reason it will be impractical in all cases for the federal valuation engineers to determine the first cost of component parts of this system. Quite complete data covering the construction of the line from Lynndyl via Tintic and Garfield to Salt Lake City is in existence as this section had just been completed when it was taken over by the present company and its construction records are well preserved. Complete data are likewise available covering that portion of the lines west of Caliente, and but little difficulty will arise in determining the original cost of those lines. An exhaustive valuation of the company's lines in California has recently been compiled by the engineers on the road for the California State Railroad Commission. Therefore, it may be stated that the engineering and accounting records of about 40 per cent. of the mileage of the system are very complete, while they are only partially so for the remainder.

Characteristics of the Road

West of Riverside the lines of this system traverse thickly populated valleys, while of the 300 miles of practically unsettled desert country between Daggett and Caliente about two-thirds are sandy plains and the remainder mountainous. In this last section the atmosphere is very dry and the summer temperature is high. For some 90 miles in this section the main line traverses a series of attenuated valleys, connected with each other by ravines and canyons, down which Meadow and Clover creeks, the main drainage streams, flow merging together at Caliente. These streams are usually dry or nearly so, but when in freshet from melting snows or heavy protracted rains they become violent torrents and run at high velocity down sandy beds having gradients averaging one per cent. Floods in these creeks so frequently and seriously damaged the road and interrupted its operation, that after the destruction of most of it in the winter of 1909-10, a new line was built in a safer location and of a more substantial design.* Between Caliente and Salt Lake City, with the exception of about 60 miles of mountainous and broken country, the main line traverses a high plateau which was once the bed of a prehistoric lake of which body of water the existing Great Salt Lake is but a shrunken remnant. Most of the mileage of branch lines in this division lies in the valleys.

The main freight and passenger terminal is located at Los Angeles, where an extensive yard and other facilities, including division shops for light repairs, are provided. Repair shops and freight yards are also located at four other terminals on the line. The main shops are at Las Vegas, Nev.

The material encountered when grading the valley and plateau sections of the road was principally earth with which loose rock and cement were occasionally combined. In a few instances rock and conglomerate were encountered. Classification of material on these portions of the line during construction was not difficult, and it is quite possible to determine it even now with a fair degree of accuracy by examination and measurement. In the mountainous sections, however, the formation included several kinds of rock, massive conglomerate, loose rock, cemented material and earth, the latter generally lying as an overburden

*In an address recently delivered, a prominent person stated that the line in this place had been twice rebuilt on new locations after being destroyed by flood. This is incorrect. After washouts, previous to the one referred to, the line was always restored on its original location.

upon the other materials. In many of the cuts these materials were so mixed that classification for the contractor's estimates was a perplexing task. To determine accurately the component classification and yardages of such cuts now, 10 or 12 years after they have been excavated, is quite impracticable. At best an engineer can only make an approximate estimate based chiefly upon his visual examination and his judgment derived from experience gained on work where analogous geological conditions prevailed, unless he uses the railroad company's records as a guide in his determination. It is also impracticable now to ascertain accurately by measurement the vast yardage of riprap protection which has been placed along the slopes of embankments exposed to the wash of streams.

THE VALUATION WORK

The work of making a valuation of the Salt Lake Company's property in accordance with the congressional enactment of March 1, 1913, is now being done. The Pacific valuation district embraces the states lying west of the Rocky mountains, and the Salt Lake line was the first on which work was undertaken in this district. The factors which contributed to the choice of this line were: That it contains a smaller mileage than any of the other large railroad systems; that a large proportion of its mileage has been built within the past decade and its records for that part are complete and in available form; that its property includes ocean as well as inland terminals; that the climatic conditions prevailing throughout the year over the entire line are such that work could be started at any time and carried on without interruption, and because on this road a long section of main line had been destroyed by floods and a new section had been built on another location in its stead, which factor brings up for decision by the commission the question of what proportion of the sums expended in the construction of the destroyed line can be included in the company's capital account and what proportion in its operating account. The ruling of the commission on this subject will be of much interest to other roads, especially in the west, where nearly all have been obliged to rebuild portions of their lines on new locations and on more stable ground.

To begin the work, two parties were placed in the field about February 1, which number has since been increased to five. Four parties are termed roadway and track parties and each consists of one instrument man, one recorder, one computer, four rodmen and tapemen, one laborer and one cook, all in charge of an assistant field engineer. The fifth party is a structural party composed of one assistant structural engineer in charge and three assistants. An assistant engineer employed by the railway company is also assigned to each of the five parties.

The roadway and track parties are housed in cars provided for this purpose. Two box cars fitted up by the company were assigned to each of the first two parties, one car being a combined kitchen and dining room and the other a combined office and dormitory. The three parties sent out later were each given an old Pullman tourist car containing all the provisions described above. Double deck metal cot beds were provided in the box cars, although the men will probably find it necessary for comfort at night to remove their beds to the ground outside when on the desert during the summer. The government pays for the rental of the cars, the hire of cooks and transportation and furnishes the cots and bedding. The men pay for the commissary and supplies, each being allowed one dollar a day subsistence money. The freight rate for commissary supplies has not yet been fixed. The men's laundry is carried to and from town by local passenger trains, which also receive and deliver mail for the camps. Ice is delivered by train and water is also likewise provided at dry sidings. Camp is shifted at intervals of about 15 miles by local freight trains.

The interval between the parties is not uniform, each being assigned sufficient territory to keep it employed for a considerable length of time. A hand car and a track velocipede are furnished by the railroad company to each camp for the use of the men going to and returning from work. While motor cars were considered for this purpose, it was decided to use hand cars as safer and in general as expeditious. The men in the parties sign agreements releasing the railway company from liability for injuries sustained while using the hand cars. The length of the working day for these field forces exceeds eight hours, the limit set by the government for most of its civilian employees.

The roadway and track parties carry on the field work as outlined below. A recorder and two chainmen measure the center line, noting the station and plus at each point of switch, structure, etc., measuring the length of all side tracks and spurs and locating and taking measurements of all buildings and structures sufficiently for noting on the maps, with their size and location. Notes regarding the details of the tracks and of small bridges and culverts are also made by the recorder, while the larger bridges are left for the structural party. A party of three men in charge of an instrumentman, follows the chainmen, taking cross-section notes of all grading, ballast and bank protection with a level, rod and tape. This party completes from 2½ to 3 miles of surveys on desert and valley lines and about one mile on mountain lines per day. The assistant field engineer carefully examines cuts containing various formations with the object of determining their proper classification. He also examines the structures, the composition of the track and fittings, the ties and the roadbed and notes their condition. Depreciation rates will probably be determined largely from tables prepared from data gathered by the Commission, due consideration being given in the case of rails and fastenings to the tonnage which has passed over them, and in the case of ties, to their size, the kind of wood, etc. The field engineers' condition notes will be of service, however, and probably will be used. Notes of the cross-section party are turned over to the computer in the field office who plats and computes as many of them as his other duties permit. After examination the platted sheets are forwarded to the district office in San Francisco where the computations of quantities and overhaul are made and compiled.

The assistant field engineer confers with the company's assistant engineer and settles with him, when possible, questions which may arise respecting the classification of grading or similar matters. If the two cannot agree the question is referred by each to officers of higher rank in order that it may be decided promptly, as it is desired by all interested that as few matters as practicable be left for adjustment after the field work is completed.

INFORMATION FURNISHED BY THE COMPANY

To assist the engineers in their investigation, the railroad company furnishes them a typewritten copy of all final construction estimates for grading, bridging and any other work done by contract and paid for upon a quantity basis. It also provides them with statements of force account work, such as for clearing, grubbing or excavation for foundations, and any available data concerning grade changes, ballasting, riprap, ditching, well drilling, pile penetration, etc., which may aid in arriving at a closer determination of the quantities and the facts than could otherwise be attained. In addition to the above the railway furnishes prints of alinement and station maps, profiles and standard and special plans; and also prints of maps and profiles of abandoned portions of the lines and of new lines substituted therefor, with a statement of grading and of other quantities in the abandoned lines and statements of quantities, with maps and sketches when necessary of any other work which has been abandoned or obliterated, as well as abstracts of agreements concerning the ownership of joint property such as crossings, interlockers, tracks and other property in which it possesses an interest, and bills of material for miscellaneous standard structures such as depot shelters, section houses, cattle corals, pump houses, etc.

The assistant engineer representing the railroad company who is attached to each roadway and track party is a man of considerable construction experience and possessing a knowledge of the work executed on this line. He looks after the company's interest generally in the field in connection with the valuation and watches to see that no property is overlooked which should

be included in the inventory. He confers with the assistant field engineer and whenever possible settles with him on the ground classification and other questions which may arise. He furnishes information relative to all disbursements for work, such as for paving of street crossings, construction of drains and the payment conditions under which industry tracks were put in, etc., when such information is not noted on the prints of maps furnished. He takes with him into the field the original notes of cross sections, pile driving records, etc., and is the responsible custodian of such documents.

The structural field party notes the condition and takes measurements of all buildings, docks, wharves, fuel and water-plants and bridges—but not culverts—in sufficient detail to supplement standard and special drawings that bills of material may be prepared referring to them; and it also inventories all fixtures and supplies in depots, noting their condition. It is furnished by the company with prints, statements and other information required to facilitate its investigation. The data secured by this party will be worked up in the district office. The party progresses an average of about five miles a day.

The duties of the company assistant engineer attached to the structural field party are in general much the same as those of his colleagues attached to the roadway and track parties; that is, he is watchful to see that no property properly included is overlooked in making the lists for the inventory and also that the assistant structural engineer is supplied with all data available to help him secure the facts he is seeking.

Under the district member of the accounting board are prepared the organization and financial histories of the common carriers; the analyses of original cost of road and equipment—that is, all expenditures chargeable to capital account; reports of earning and operating expenses and the compilation of cost data required by the engineers in fixing the unit prices for their reproduction estimates. The federal accounting force engaged in the valuation of the Salt Lake Company's property consists of a senior accountant, reporting to the member of the accounting board, and six or seven assistant accountants who carry on their work in the offices of the company's chief engineer. This force examines all books and all supporting papers relative to disbursements for construction insofar as may be necessary to verify charges to capital account and to make proper segregation as to location on the line of road and as between the various accounts, from which data will be produced a statement of original cost of the property. Unit cost data for the use of the engineers will also be deduced by the accountants from their examinations. From their investigations a statement will be produced respecting the sale of capital stock and bonds by the company, which will set forth the sums received therefor, the commissions paid and the discounts allowed; also a statement setting forth the amounts of money and securities paid for those portions of the lines which were purchased.

The valuation force of the company is under the jurisdiction of the chief engineer, whose offices are at the general headquarters of the company at Los Angeles. The chief engineer is aided by an assistant engineer in charge of valuation, who in turn has under him the company field assistant engineers, whose duties have been described, an assistant engineer and three clerks in his office. He is also aided by a chief accountant who at present has an assistant accountant. The assistant engineer in charge of valuation sees to it that all requisitions from the field for prints, statements and other data and construction records are prepared and forwarded promptly. He has frequent conferences with the senior and structural engineers respecting matters that arise, and from time to time visits the field parties and confers there with the federal and company assistant engineers attached to them. He sees that new drawings which have to be made from which to produce prints to be furnished the federal engineers conform with the specifications of the commission. When the valuation has been finished and tabulated and a copy furnished the company, it will be his duty to investigate it closely and in detail respecting matters of construction.

The chief accountant collects from the auditor's office and other sources and supplies to the federal accountants' books, vouchers and any other documents which are required by them. He discusses with the senior accountant any questions of accounting which may arise relative to the documents and together they settle them if possible, otherwise they refer them to their superiors. He and the valuation assistant engineer have frequent conferences concerning matters that are correlative to the branch of each in the valuation.

The inventory of rolling stock, equipment, shop machinery and telegraph, and right of way and real property both operative and non-operative, has not yet been undertaken, but will be later by assistants who will be entrusted with this phase of the work by the member of the engineer board in charge of the district.

From details obtained in the field and from the company's records, quantities will be computed and an estimate made therefrom in the district engineer's office in San Francisco, and the railroad company will probably detail engineers and accountants to that city to look after its interests while that portion of the work is being done.

The valuation sections into which the road has been divided have, as yet, only been tentatively fixed upon, but it is probable the present division will be adhered to. Each branch, the terminal at San Pedro and the terminal at Los Angeles, will probably be treated as a valuation unit or section, and the main line will be broken into sections of from 50 to 150 miles in length corresponding generally with the operating sub-divisions or engine districts.

It is not practicable yet to estimate the length of the time which will be required to perform the task of evaluating the property of this company nor what its cost will be. The federal forces engaged upon it will probably conclude the physical examination and the investigation of accounts by the end of this summer.

TRAIN ACCIDENTS IN JUNE[1]

Following is a list of the most notable train accidents that occurred on railways of the United States in the month of June, 1914:

Collisions.

Date.	Road.	Place.	Kind of Accident.	Kind of train.	Kil'd.	Inj'd.
†12.	Atchison, T. & S. F.	Bagdad, Cal.	bc.	P. & F.	2	9
*12.	Georgia	Robinson.	bc.	F. & F.	1	8
13.	Hocking Valley	Starr, Ohio.	bc.	P. & P.	5	43

Derailments.

Date.	Road.	Place.	Cause of Derailm't.	Kind of train.	Kil'd.	Inj'd.
6.	Georgia	Madison.	unx.	P.	0	10
7.	Central Virginia	Braintree.	b. rail	P.	0	10
11.	Baltimore & Ohio	Clarksburg.	ms.	P.	0	20
13.	St. Louis & S. F.	Moccasin Spgs.	d. wheel	P.	0	31
14.	Southern	Sadler, N. C.	acc. obst.	P.	2	4
14.	Chesapeake & Ohio	Covington.	unx.	P.	1	0
19.	Southern	Whittle's.	d. track	P.	0	16
20.	Cin. H. & Dayton	Wapakoneta.	neg.	F.	0	6
*24.	Southern	Shelbyville.	fire	F.	1	2
28.	C. N. O. & Tex. P.	Richwood.	d. track	P.	0	1
28.	Louisville & N.	Moore's, Ky.	d. track	P.	2	22

The trains in collision at Bagdad, Cal., on the night of the 12th were an eastbound passenger train, No. 4, and a westbound freight. The passenger train ran over a misplaced switch and into the head of the freight. Two passengers were killed and 8 injured, one of them fatally, and the conductor was fatally injured.

The trains in collision near Robinson, Ga., on the 12th were

[1]Abbreviations and marks used in Accident List:
rc, Rear collision——bc, Butting collision——xc, Other collisions——b, Broken——d, Defective——unf, Unforeseen obstruction——unx, Unexplained——derail, Open derailing switch——ms, Misplaced switch——acc. obst., Accidental obstruction——malice, Malicious obstruction of track, etc. ——boiler, Explosion of locomotive on road——fire, Cars burned while running——P. or Pass., Passenger train——F. or Ft., Freight train (including empty engines, work trains, etc.)——Asterisk, Wreck wholly or partly destroyed by fire——Dagger, One or more passengers killed.

westbound freight No. 19, and eastbound freight No. 210. Both engines and many cars were wrecked. One fireman was killed and eight other trainmen were injured. A car of oil took fire, and some of the injured were rescued from the flames with great difficulty. Most of the wreck was burnt up, and a dwelling house nearby was damaged. No. 19 had run past the appointed meeting station.

The trains in collision at Starr, Ohio, on the night of the 13th were northbound and southbound passenger trains. The collision was due to failure of an operator to stop a train for an order. Five trainmen were killed and 39 passengers and 4 trainmen were injured.

The train derailed near Madison, Ga., on the morning of the 6th was westbound passenger No. 1. It was running at low speed. The cause of the derailment was not determined. Eight passengers and two trainmen were injured.

The train derailed at Braintree, Vt., on the 7th was the northbound Montreal express. The first two cars fell down a bank. Six passengers and four trainmen were injured. The cause of the derailment was a broken rail.

The train derailed near Clarksburg, W. Va., on the 11th was an eastbound express passenger. The engine was derailed at a misplaced switch, and fell against some freight cars standing on a side track. Twenty passengers were injured, four of them seriously.

The train derailed near Moccasin Springs, Mo., on the 13th was northbound passenger No. 802, and 31 passengers were injured, none seriously. A dining car and one coach broke through a trestle. The train was crowded, but the passengers in the other cars were not seriously injured. The derailment was due to a loose wheel.

The train derailed at Sadler, N. C., on the 14th of June was southbound passenger No. 29, and three coaches left the track. The engineman and fireman were killed, and one passenger and three trainmen were injured. The cause of the derailment was a loose switch rail, which had been forced out of place by a piece of iron which had fallen from a car in a freight train.

The train derailed near Covington, Ky., on the 14th was a westbound passenger. Its engine struck a westbound freight. One passenger car was overturned. The engineman was killed. The cause of the derailment was not discovered.

The train derailed near Whittle's, Va., on the 19th was northbound passenger No. 36. Two cars ran off the track to the left, and fell against some of the cars in a southbound passenger train, which was passing at the moment. The cars in the southbound train were steel, and it is said that the serious scraping of the sides is about all the damage that they suffered. The northbound cars, however, were considerably broken up. Fourteen passengers and two trainmen were injured, all of the injuries being slight, except that of a ticket collector. The cause of the derailment was buckling of the track.

The train derailed on the afternoon of the 20th of June, near Wapakoneta, Ohio, was a southbound wrecking train, and a derrick car was overturned. Six employees were injured. The cause of the derailment was failure to secure the boom of the derrick in a safe position.

The train derailed near Shelbyville, Ky., on the 24th was westbound freight No. 72. The engine and eight cars fell through a bridge to a ravine 84 feet below the track. One brakeman was killed, and two other trainmen were injured. The wreck, including most of the bridge, was destroyed by fire. The cause of the derailment was the weakening of the trestle by fire which had been started presumably by sparks from a locomotive.

The train derailed near Richwood, Ky., on the 28th was southbound passenger No. 11. The engine and two cars fell down a bank. The engineman was injured. The derailment was due to failure of the roadbed on a bank. This track had been in use seven months, and there had been no rain for two months.

The train derailed at Moore's, Ky., on the 28th was a northbound excursion train. Two trainmen were killed, and one trainman and 21 passengers injured, none of the passengers seriously. The cause was reported as a loose rail.

Canada.—In a butting collision between an eastbound passenger and a westbound freight train on the Canadian Northern, near Kamsack, Sask., on the night of the 5th of June, an express messenger and two mail clerks were killed and four other persons were injured. In a butting collision of freights on the Grand Trunk, near Kinburn, Ont., on the 21st, two firemen were killed.

RAILWAY TAXATION FOR 1913

The Bureau of Railway Economics has compiled the following table showing the taxes accrued on railways of the United States in the aggregate and per mile of line, during the fiscal year ended June 30, 1913.

Railway Taxation, Year Ended June 30, 1913

Railways of Classes I and II (Including leased and proprietary roads)

State	Taxes	Mileage	Taxes per mile of line	Taxes of switching and terminal companies	Total taxes
Alabama	$1,546,694	4,521.83	$342.05	$49,196	$1,595,890
Arizona	884,089	2,360.16	374.59	.....	884,089
Arkansas	1,765,785	4,098.54	430.83	.....	1,765,785
California	4,230,953	7,434.59	569.09	.....	4,230,953
Colorado	1,847,783	5,488.06	336.69	20,432	1,868,215
Connecticut	1,115,007	1,000.87	1,114.04	721	1,115,728
Delaware	148,945	334.97	444.65	.....	148,945
Dist. of Columbia	56,742	34.21	1,658.64	81,411	138,153
Florida	1,053,486	4,032.40	261.26	38,792	1,092,278
Georgia	1,724,971	5,953.63	289.73	40,763	1,765,734
Idaho	1,434,986	2,455.34	584.43	.....	1,434,986
Illinois	6,866,093	12,197.54	562.91	851,967	7,718,060
Indiana	4,535,497	7,429.20	610.50	183,722	4,719,219
Iowa	2,830,762	9,644.61	293.51	101,798	2,932,560
Kansas	3,401,989	8,913.20	381.68	40,465	3,442,454
Kentucky	1,636,135	3,421.94	478.13	230,267	1,866,402
Louisiana	1,486,001	4,448.11	334.07	71,698	1,557,699
Maine	1,112,211	2,249.31	494.47	42,699	1,154,910
Maryland	935,393	1,294.33	722.69	55,878	991,271
Massachusetts	3,542,864	2,085.53	1,698.78	6,396	3,549,260
Michigan	4,002,885	8,589.55	466.02	108,885	4,106,770
Minnesota	4,840,651	8,982.30	538.91	23,447	4,864,098
Mississippi	1,364,658	3,837.82	355.58	5,874	1,370,532
Missouri	2,204,457	8,010.84	275.18	178,958	2,383,415
Montana	1,874,406	4,303.57	435.55	.....	1,874,406
Nebraska	2,324,354	6,142.17	378.43	11,612	2,335,966
Nevada	931,431	2,097.29	444.11	.....	931,431
New Hampshire	862,289	1,206.95	714.44	10	862,299
New Jersey	6,824,108	2,129.49	3,204.57	35,365	6,859,473
New Mexico	970,914	3,072.00	316.05	.....	970,914
New York	10,560,490	7,921.45	1,333.15	106,483	10,666,973
North Carolina	1,327,478	4,520.76	293.64	10	1,327,488
North Dakota	1,728,169	4,954.04	348.84	.....	1,728,169
Ohio	7,800,208	9,015.37	865.21	175,979	7,976,187
Oklahoma	3,117,360	6,346.09	491.23	85	3,117,445
Oregon	1,495,146	2,335.09	640.29	88,659	1,583,805
Pennsylvania	8,497,141	10,540.97	806.11	132,114	8,629,255
Rhode Island	350,960	197.94	1,773.06	.....	350,960
South Carolina	860,854	3,157.51	272.64	23,502	884,356
South Dakota	956,242	4,160.18	229.86	.....	956,242
Tennessee	1,345,195	3,412.09	394.24	47,195	1,392,390
Texas	3,216,714	14,316.05	224.69	213,997	3,430,711
Utah	932,594	1,996.75	467.06	27,820	960,414
Vermont	386,965	924.29	418.66	.....	386,965
Virginia	2,244,539	4,115.65	545.37	13,224	2,257,763
Washington	3,751,589	4,636.20	809.19	.....	3,751,589
West Virginia	1,492,546	3,166.86	471.30	9,443	1,501,989
Wisconsin	3,855,846	7,083.91	544.31	12,074	3,867,920
Wyoming	655,992	1,624.21	403.88	.....	655,992
Total state and local taxes	$122,932,567	232,195.76	$529.44	$3,025,941	$125,958,508
Internal U. S. Revenue Tax	4,902,055	.....	.....	183,474	5,085,529
Miscellaneous	214,303	.....	.....	.....	214,303
Canada	1,529,052	14,594.58	104.77	12,479	1,541,531
Mexico	158	51.67	3.06	.....	158
Total all taxes	$129,578,135	246,842.01	$524.94	$3,221,894	$132,800,029

Taxes paid by switching and terminal companies are not shown per mile because of their great proportion of terminal real estate and also because report of miles of first main track of these roads is not required by the commission.

Railways of Classes I and II include respectively roads having annual operating revenues above $1,000,000 and those having annual operating revenues from $100,000 to $1,000,000. The mileage given for these two classes of roads is miles of line, that is, miles of first main track owned, including branches and spurs. Taxes have not been apportioned per mile of track because the Interstate Commerce Commission does not require reports of miles of track by states.

Class III roads are omitted, because their taxes are only about two-thirds of 1 per cent. of the aggregate.

Total state and local taxes per mile of line amounting to $529.44 in 1913 show an increase over 1912 of $26.49, or 5.27 per cent., and over 1911 of $70.50, or 15.36 per cent.

Making Provision for Emergency Grain Cars

The Rock Island is Fitting Up Stock and Automobile Cars to Meet the Pressing Needs in Its Territory

By W. J. Tollerton
General Mechanical Superintendent, Rock Island Lines, Chicago, Ill.

The heavy grain crop in the West this year has caused not a little anxiety among the railroads extending through the farming sections in connection with proper and prompt handling of the grain to the markets. The majority of our railroads, of course, own and operate rolling equipment for the transportation of all classes of freight; therefore, when it becomes necessary to make extremely heavy shipments of one particular commodity requiring a special class of car, it is often necessary to go to extremes in fitting up cars for the transportation of this freight.

Fig. 1—Stock Car Coopered for Handling Grain

The bulk of the grain is shipped when harvested; therefore, the railroads are called on to furnish an enormous number of cars in a comparatively short period of time. To better meet the demand, all repair shops and yards are required to give box cars preference in order to reduce the bad order cars of this class to a minimum, and all box cars turned out must be in condition for hauling grain. Not only must attention be given to the bad order cars, but all box cars, regardless of their condition, are carefully inspected, repaired and coopered for carrying bulk grain. The car must not only be rendered grain tight, but the construction must be such as to eliminate any possibility of damage to the lading from the elements.

The proper fitting up of a box car for grain shipments is merely the placing of the car in a reasonably perfect condition, which is the regular procedure; but making cars which were not originally designed for hauling grain suitable for this purpose is entirely another proposition. The Chicago, Rock Island & Pacific, in order to take care of extreme necessities of grain shipments, is now fitting up stock and automobile cars for this purpose.

The stock cars are first thoroughly cleaned, removing all odors, and are given any required repairs. They are then ready for proper coopering. Strips of wood of proper width are fitted between the slats of the frame of the car; and the inside, with the exception of the ceiling, is completely covered with an odorless tar felt waterproof paper, this paper being secured by means of laths tacked over it. A heavy lath is used on the floor to protect

Fig. 2—Roof of Stock Car Equipped for Handling Grain

Fig. 3—Interior of Stock Car Equipped for Handling Grain

the paper when a scoop is used in unloading. The side doors are fitted with temporary grain doors and properly coopered. All grain doors except the top one on each side are applied on the repair tracks, and it is only necessary to apply one temporary grain door on each side after the car is loaded. Coopering paper and are covered with roofing paper, as shown in Fig. 2. The strips of paper are applied crosswise of the car and secured by means of laths, the application requiring the removal and replacement of the running board. The small end doors in the stock cars are covered both on the inside and outside with old metal roof sheets.

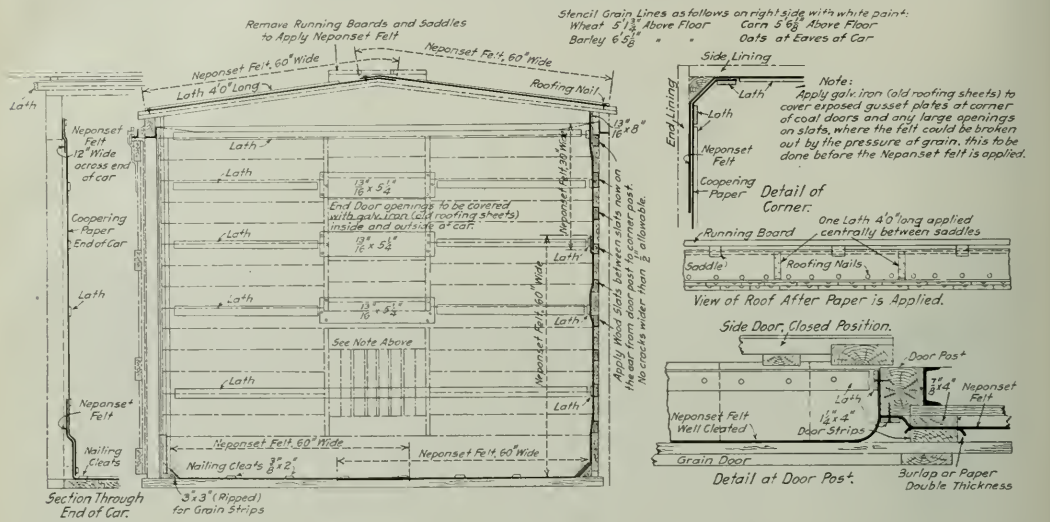


Fig. 4—Coopering of Stock Cars for Emergency Grain Service

is then secured to the top of the side door opening and bent inward and secured to the grain door near the upper edge.

The general appearance of the car after the openings between the slats have been closed and the temporary grain doors have been put in place is shown in Fig. 1. The cars have board roofs It is estimated that from three to five loads can be shipped in these cars before the renewal of the paper lining is required. Fig. 4 shows the general construction with cross sections and Fig. 3 is an interior of the car.

The automobile cars selected for grain shipments are 50-ft.,

Fig. 5—Automobile Car Fitted for Handling Grain

40-ton capacity cars, having large double doors at one end and 12-ft. side doors. One of these cars is shown in Fig. 5. It was necessary to apply a wooden bulkhead up to the end plate at the end door and properly cooper with paper. The bulkhead consists of 1¾ in. decking extending crosswise of the car from the floor to a height of about 5 ft. and then ordinary 13/16 in. lining to the end plate, these boards being secured to the inside of the sheathing, to a center post nailed to the floor and to the end plate. This center post is set against the end door, which greatly assists in taking up the load due to the pressure of the bulk grain. Fig. 6 shows in detail the construction of the bulkhead.

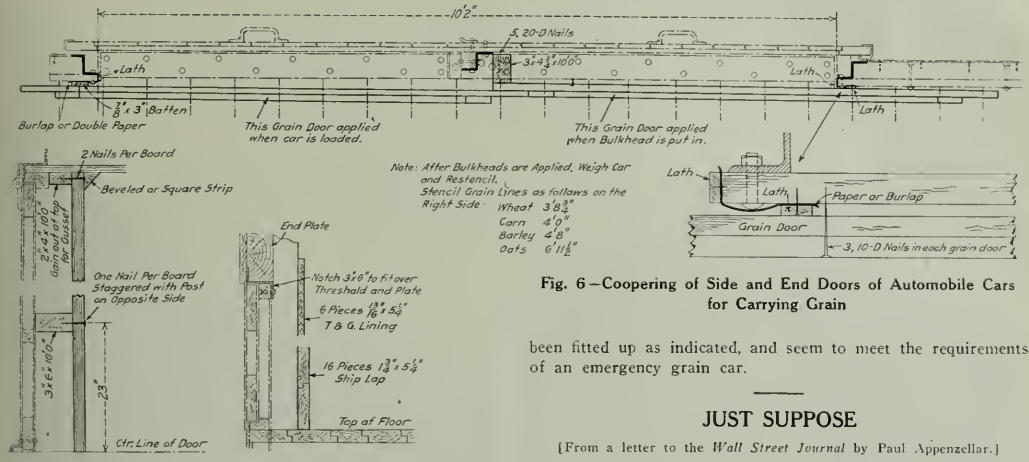


Fig. 6—Coopering of Side and End Doors of Automobile Cars for Carrying Grain

In order to apply the grain door to the side door openings of these cars, it is necessary to apply a temporary post at the center, the doors on one side consisting of two six-foot doors opening in opposite directions; therefore, one door on each side is closed and secured, having the temporary center post at its inner edge.

Fig. 7—Method of Closing Part of Side Door in Automobile Cars

To this center post and door post one set of temporary grain doors is secured. On the other door post is secured a wooden strip the full length of the post and of a thickness equal to the temporary grain doors so that the second set of grain doors, applied when the car is loaded, will be parallel to the side of the car. Fig. 7 shows the temporary grain doors as applied to one-half of the side door.

Both the stock and the automobile cars, after being equipped for grain loading, are properly stenciled, the stock car as an emergency grain car and the automobile car as being equipped for grain loading. It is, of course, necessary to paint grain lines on the inside and to reweigh the cars before placing them in service. A total of 500 automobile and 300 stock cars has been fitted up as indicated, and seem to meet the requirements of an emergency grain car.

JUST SUPPOSE

[From a letter to the *Wall Street Journal* by Paul Appenzellar.]

Suppose that along with other investigations a committee of business men would investigate Congress, bringing out a record of all errors of judgment and instances of inefficiency. Supplied with as large a stock of adjectives and adverbs as the Interstate Commerce Commission what kind of a report could be written?

Suppose that someone asked the President to reconcile the law against unfair business competition (say the New Jersey statute) which he has had enacted, with the government's action in placing the post office in competition with the express companies by naming rates lower than the actual cost of doing the business.

Suppose that when passenger rates on railroads were ordered reduced some one had suggested that a reduction be made in the 20-cent per mile allowance to Congressmen.

Suppose that some one investigated William G. McAdoo's business record—investigator to be an original holder of Hudson & Manhattan securities.

Suppose that the Interstate Commerce Commission were considering a petition from the American Federation of Labor asking for an increase in wages throughout the United States. How long would they take to hand down a decision and what would be the chance of its being unfavorable to the American Federation of Labor?

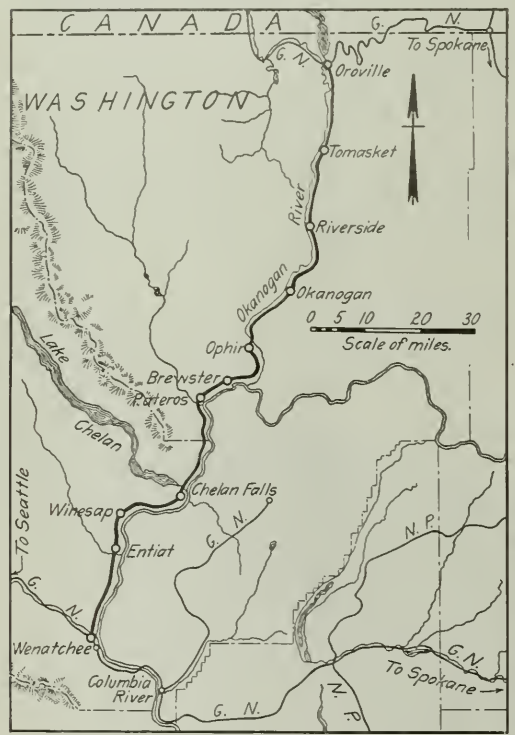
Suppose that instead of Mr. Gompers, a captain of industry had sat in the gallery of the house and checked off the members as they voted on a bill to exempt from the operation of the law a special group of citizens?

LONG DISTANCE TRAVELING ON ENGLISH RAILWAYS.—The story is told of an English gentleman who recently contrived to cover 1,008 miles in 22½ hours of traveling. Leaving the London St. Pancras station by the midnight Scotch express, he reached Leeds (196 miles) at 4:03 a. m., from which he commenced his return to London seven minutes later. He arrived in the metropolis at 8:15 a. m., and at 9:30 was on his way to Carlisle (308½ miles) which was reached at 3:50 p. m. In eight minutes he took the 3:58 train and arrived at London at 10:25 p. m. It might be possible to improve upon this record in America, and perhaps in England. It is to be doubted, however, whether American railroads could produce as remarkable a record of punctuality.

New G. N. Line from Oroville to Wenatchee

Road Serves an Area Previously Without Facilities, Providing Low Grade Line from British Columbia East

The Great Northern has been working for three years on the construction of a line north from Wenatchee, Wash., to Oroville. The main line of the Great Northern crosses the state of Washington from Spokane to Seattle north of the Northern Pacific and St. Paul roads, and about 100 miles south of the Canadian border. A branch line of the Great Northern runs north from Spokane to the international border and then west, generally parallel to this border to the Cascade mountains. A third line runs north from Seattle along Puget Sound to Vancouver, while another line is now building east from Vancouver to a connection with one extending west along the international boundary. With the exception of a few branch lines of the Northern Pacific along the western coast and one adjacent to



Map of Wenatchee-Oroville Line of the Great Northern

the main line of the Great Northern from Spokane west to Adrian and a short branch of the Great Northern east of the Columbia river, this area 200 miles long by 100 miles wide has been without railway facilities. While this area includes the Cascade mountain region, much of it is productive land suitable for wheat and fruit raising.

Early in 1910 the Great Northern undertook the construction of a new line extending through the center of this area north and south. Due to various complications, actual construction work on the southern half of this line was delayed until the spring of 1912, and the grading for the entire line has only recently been completed. This road will provide transportation facilities for a large area, much of which is already set out in orchards, although the only transportation heretofore has been daily packet service on the Columbia river as far north as Brewster, and stage transportation beyond. This new line starts from a connection with the main line at Wenatchee and extends north along the west bank of the Columbia river to Brewster, from which point it follows the Okanogan river to a

One of the Tunnels With Highway Overhead

connection with the east and west line along the border, at Oroville, a total distance of 134 miles.

With the completion of the new line, the Great Northern has two lines from Oroville to Spokane. The older line running east along the boundary has heavy grades and curvature, and is therefore expensive to operate. The new line from Oroville to Wenatchee is built with a maximum grade northbound of 0.4 per cent., and southbound of 0.3 per cent., and with 4 deg. curves the sharpest, except at M. P. 40, where three 5 deg. curves are inserted. As southern British Columbia, through

Typical Point Projecting into River

which the old line passes west of Oroville, originates much fruit and other traffic, it is expected that a large proportion of this will eventually be sent over the new line via Wenatchee to Spokane. Thus, in addition to providing railway facilities for a large area previously undeveloped, this line also gives a low grade outlet for a considerable amount of traffic.

Owing to difficulties in completing negotiations with the state

for certain necessary changes in the state highway near Wenatchee, work was started first at the north end of the line. The grading of that portion of the road between Oroville and Pateros was started in 1910, but due to the delays in completing negotiations further south the work at the north end was not pushed and the bridges and track laying on this section were not completed until early in the spring of 1913. Grading on the portion of the line south of Pateros was started early in 1912, and was completed late in the fall of 1913. All track has now been laid.

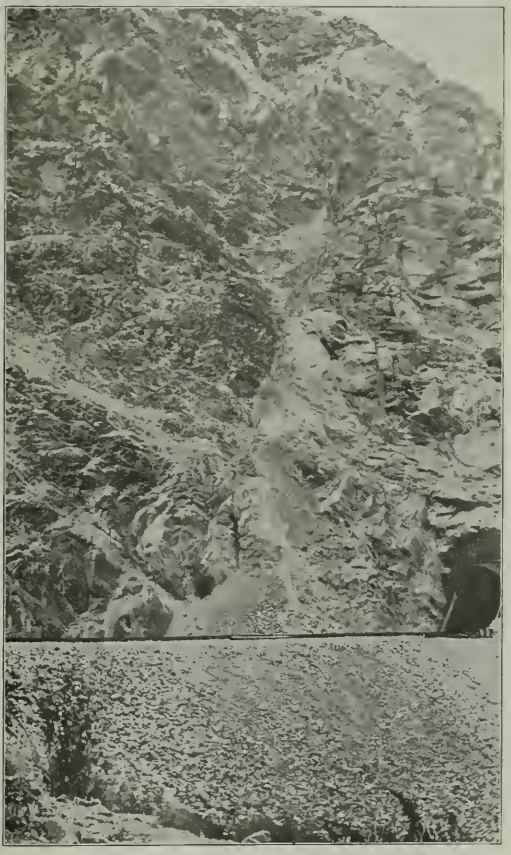
The relocation of Washington State Road No. 10 was the

Bluff Debris Encountered on Mile 23

most complicated problem in the construction of this line of railroad. At frequent intervals throughout the lower 27 miles of the line the railroad location occupied the highway, and necessitated the relocation of the highway. The points where relocation was necessary were usually around steep rock bluffs, and building of the railroad at such points was rendered about doubly expensive and very complicated by providing a roadbed for the highway, as well as for the railroad. In all 13 miles of wagon road was rebuilt in three stretches, at a total cost of over $100,000. The accompanying photographs show the railroad with reference to the reconstructed highway at some of the steepest bluffs. It was necessary to maintain continuous traffic over these highways, so the new roads had to be built before the old ones could be abandoned, which, of course, had to be done before the railroad grade could be built. The specifications under which the new highway was built were furnished by the state engineer, and required a roadbed 10 ft. wide, with frequent turnouts, 100 ft. long where the roadbed is 16 ft. wide, and protected with a substantial fence on the embankment side. The maximum gradient allowed on the wagon road was 7 per cent.

At Destruction Point, a few miles north of Wenatchee, it was necessary to move over 200,000 cu. yd. of rock and one steam shovel worked at this point for nine months. It was necessary to relocate the highway up on the face of the bluff and the location was so confined at this point that after the highway was completed and placed in service it was necessary to lay a narrow gage track in it and plank it over for the use of the contractor in excavating the first cut for the railroad alongside, by loading into cars standing on the highway. In this way, however, the highway was kept in service with the exception of one day when the shovel was moving down the highway to cut in. In that portion of the line north of Knapps Hill the new highway extended across a bay in the river where one fill of 200,000 cu. yd. was made in deep water.

Grading on this line of railroad is light on the northerly 76 miles, which is through the Okanogan valley. The 58 miles south of Pateros is heavier—the grading on this stretch amounting to 3,194,000 cu. yd. of material, 50 per cent. of which was rock. With the exception of relatively heavy work at one point, near Wenatchee, and for a short distance north of Knapps Hill, Mile 27, these quantities were quite evenly distributed over



Typical Rock Formation Encountered at Tunnel Portal

the distance. About 90 per cent. of the material was moved by steam shovels and the remainder by station men. Ten steam shovels in all were employed.

Three tunnels of 442 ft., 755 ft. and 383 ft., respectively, were required. All three were driven from top headings, working from one end only. The southerly tunnel was driven entirely by hand. As the material encountered was solid rock it was only necessary to line the portals with timber. The hard character

of this material is shown in one of the accompanying photographs.

Five rivers are crossed which require truss bridges. The Wenatchee river is crossed about 2½ miles north of Wenatchee, on three 150-ft. Howe truss spans. At Entiat the line crosses the Entiat river on one 150-ft Howe truss, while the crossing of the Chelan river at Chelan Falls is made on three 150-ft. and one 100-ft. Howe truss spans. The Okanogan river is crossed near Wakefield on two 60-ft. and one 190-ft. Howe trusses, the latter being a draw span. The Methow river is crossed at Pateros on one 150-ft. through Howe truss and one 100-ft. through Howe truss. These bridges were all built of

Howe Truss Bridge Across Wenatchee River

dressed timber, creosoted. The timbers were framed in the material yard at Olds, and after framing all exposed surfaces were given a further brush treatment with creosote. Timber trusses are unusual in most parts of the country, but the arid climate here gives these structures a relatively long life, while fir timber is comparatively cheap, and steel high in price on account of the long haul. Several large timber bridges have recently been built in this vicinity, notably that of the O.-W. R. & N. across the Columbia river, near Kennewick. The photograph of the Wenatchee river bridge shows a typical structure on this line, supported on pile foundations and surrounded by cribs filled with rock, which are in turn protected by heavy riprap.

Corrugated iron culvert pipe was used for small openings under all fills up to 15 ft. in height. Above that height, cast iron

Typical Heavy Highway Reconstruction Work

pipe was used for openings up to 36 in. in diameter. A few small concrete culverts were built at points requiring larger openings than these pipes.

The stations were located at intervals of about five miles, at which points the grading was completed for a 2,000 ft. passing track and a house track, although with the exception of Entiat, only the passing tracks were laid. No intermediate yards or fuel stations were built between Oroville and Wenatchee, but water stations were built at intervals of 20 miles. With the exception of one gravity supply, the water was secured from wells as the river was either too far distant or the lift was too great. The track was laid with 68-lb. rail on fir ties and gravel ballast by the contractor, using a Roberts track laying machine.

The line was built under the direction of A. H. Hogeland, chief engineer, of the Great Northern, and Ralph Budd, formerly chief engineer, and now assistant to the president; A. F. Whitcomb was district engineer in immediate charge; Guthrie, McDougall & Company, of Portland, Ore., were contractors for the grading, bridge work and track laying.

AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION

A report of the opening sessions of the Tool Foremen's Association convention was published in the *Railway Age Gazette* of July 24, page 168. Following is a report of the concluding sessions:

TOOL ROOM GRINDING

W. C. Diebert (Chesapeake & Ohio): Considerable difficulty is experienced in grinding tools without automatic machines. At Clifton Forge, Va., we have made a surface grinder, an automatic reamer grinder, a small die grinder and a grinder for the Ingersoll milling machine cutters. This latter machine will cut up to 14 in. in diameter and grind the radius on the cutters used in channeling out driving rods. Wheel lathe tools are given an angle clearance of 7 deg.

J. C. Bevelle (El Paso & Southwestern): The tools issued from the tool room on check are all ground in the tool room. To insure a reasonable life for a drill it should be properly ground at the point. The two cutting edges must be exactly of the same length and should be at an angle of 59 deg. for ordinary purposes. The angle of lip clearance should be about 12 deg. This angle, however, should gradually increase as the center of the drill is approached until the line across the center of the web stands at an angle of 135 deg. with the cutting edges. For heavy cuts in soft material the angle of lip clearance may be increased to 15 deg. The failure to give sufficient angle of lip clearance at the center of the drill is the principal cause of splitting drills up the web. Standard reamers should be kept sharp and properly ground, otherwise a great deal of time will be wasted by the men using them. In the shop at El Paso, Tex., the reamers are not placed in the rack until they have been inspected and put in first-class condition.

Owen D. Kinsey (Illinois Central): Our grinding machinery is placed as far from the precision machinery as possible to avoid trouble from dust and it is in a position to command good light and ventilation. The spindles of all the grinding machines have been made standard so that the grinding wheels may be interchanged. They are also provided with substantial safety hoods and fixtures for every operation. Instructions have been posted on each machine showing the belt position for grinding wheels of different diameters. Success or failure in grinding operations depends directly on the proper selection of wheels for the particular work in hand. We have found that a cool free cutting wheel is the most economical in the long run, even though the wheel life is shorter. The heaviest cutters we handle are 10 in. by 20 in. peg cutters. These are ground on a Bath universal grinder using a radius arm projecting from an arbor upon which the cover is mounted.

Thomas F. Eaton (Baltimore & Ohio): There are 70 grinding wheels in service at the Baltimore shops and it has been found expedient to have one man inspect all the wheels throughout the plant rather than to have each department look after its own. By this means we are kept posted as to the condition of the bearings, the safeguards and the balance of the wheel and are enabled to keep the wheels in safe and efficient running condition. A large number of high speed steel frame reamers and drills have been reclaimed by welding new shanks on by the oxy-acetylene welding process.

Discussion.—Many of the members have experienced considerable difficulty in grinding high speed steel wet, it being found that the tools will split and chip off. For that reason

it was believed to be better practice to do this work dry, being careful not to over-heat the metal. Care should also be taken to see that the right kind of grinding wheel is used. Many of the members favored a soft wheel. Some believed that much better results could be obtained by honing the edges of tools with a soft stone to take off the wire edge. This has been especially successful on slab millers, they having been found to give much better service both in the work done and the maintenance of the cutting edge.

SAFETY FIRST IN GRINDING

R. G. Williams, safety engineer of the Norton Company, Worcester, Mass., gave an illustrated address on safety as applied to grinding wheels. He stated that the manufacturers, immediately before packing grinding wheels, submit them to a speed test in which the wheel is revolved at a speed which subjects it to between three and four times the centrifugal stress it will be subjected to under actual working conditions. Defective wheels break under this test. After completing a test a record is made of the order number and other data connected with the wheel, and each testing sheet is taken before a Justice of the Peace and the man doing the testing work is required to swear that he has made a true record of his work. The manufacturer thus has on record a sworn statement of every test made.

In considering grinding wheel breakages, 15 causes were discussed and a number of illustrations were shown. Among the causes for wheel breakages may be mentioned the wheel receiving a blow on the side, improper adjustment of the work rest, heating of the wheel from forcing the work, the wheel running out of true, and the mounting of the wheel so that the nut works loose. The matter of protection devices was taken up, tests having been conducted to prove the relative value of hoods and flanges as protectors in case of breakage. These tests indicated that protection hoods provide greater safety than do safety flanges.

MACHINE TOOL REPAIRS

J. B. Hasty (Atchison, Topeka & Santa Fe): All machines are taken to the tool room for general repairs, dismantled, and all the serviceable parts used. Small cast iron gears that require renewal are replaced with steel. Light repairs are made throughout the shop by repairmen from the tool room. All repairs and renewals to shop machinery and tools are charged to a separate account, the different departments being designated by letters. The machines have serial numbers and a record is kept as to their location and the work done on them by the repair department. The classes of repairs are designated by numbers 1, 2, 3, 4 and 5, according to the amount of work done.

John Tothill (Buffalo, Rochester & Pittsburgh): Plenty of shop space should be allotted to this work and it should be thoroughly equipped with the necessary tools, appliances, etc. Every machine should be given a shop number when purchased and an accurate record kept by the man in charge of machine repairs as to the amount expended on each machine. A full set of catalogs of all tools in service covering repair parts should be readily accessible to the repairman so that he can order new parts promptly. He should be ready with new parts of tools that are wearing fast, thereby causing a minimum delay to the work.

G. W. Smith (Chesapeake & Ohio): Machine tools require much more repairing at the present than in former years owing, principally, to the introduction of high speed steel and greatly increased speed. In the majority of the cases it does not seem to be the upkeep incident to long service so much as the breakage resulting from overstrain. In order to overcome this we strengthen, wherever it is possible, broken gear wheels, worm wheels, worms and racks by making them of Bessemer steel. It is a serious mistake to operate a machine that is in a very bad condition, but it is often difficult to work on these machines, as they can seldom be spared.

Discussion.—While many of the members replace broken parts by duplicate parts made of stronger material it was pointed out that it was not always advisable to do this. Sometimes a part is purposely made weaker than another so that when any undue strain is placed on the machine it will be the part to fail. If this part was strengthened the next time the machine was subjected to such strain some more intricate part might be damaged which would cost a great deal more to replace. On new machines that were especially designed for the work they are doing it was deemed best to replace any broken parts with exactly the same kind of material as was used in the first place. On the Rock Island at Silvis one man is detailed to constantly inspect all the machinery, pumps, engines, etc., making note of the parts that are becoming worn and that will have to be replaced. By doing this it is possible for the repair gang to anticipate many failures and place a machine in good condition a short time after it fails.

DISTRIBUTION OF SHOP TOOLS

Henry Otto (Atchison, Topeka & Santa Fe): The tool room of a locomotive repair shop is one of the most important, but oftentimes one of the poorest equipped and most neglected departments in the whole shop. In many instances it is located in an out-of-the-way corner, causing the workmen who are in need of tools to waste time going back and forth. In properly planning a tool room it is necessary to consider the distribution and care of the small tools, the special tools, jigs, air motors, hammers, etc. A practical checking system should be installed to keep a record of all tools issued.

W. E. Ross (Baltimore & Ohio): The messenger system for distributing tools, if perfected, will give much better results than having the men call for their tools. The messenger boys are stationed in the tool room and are called to various parts of the shop by means of an annunciator.

John W. Nutt (Chicago Great Western): The tool room counter over which the tools are handed out should run the full length or width of the tool room and should be so arranged as to permit the placing thereon of the tools most frequently called for, such as hand taps, dies, studs, gages, etc., so that they shall at all times be accessible to the tool passer. Various other tools may be placed on revolving racks located immediately behind and parallel to the tool room counter, readily accessible to the tool distributor. Each gang foreman in the erecting shop should have a tool cupboard where tools, such as wrenches, hand punches, a set of die nuts, set nuts, etc., may be kept. No method of handling tools, however good, will operate successfully without the hearty co-operation of department foremen who should be watchful of the care the tools are given while in the hands of the men under their jurisdiction.

Discussion.—All the members were practically agreed that in order to get the best results in the distribution of tools the tool distributor must have the co-operation of all the foremen in the shop in order that the tools may be properly used and returned to the tool room. Various methods of accounting for the tools were mentioned. The tool distributor himself should be very tactful with the workmen coming to the tool room for tools, and should treat them so they will be interested in returning the tool in good condition. The tools should be handy to the distributor, so that he may fill the requests as quickly as possible. Also the tool room should be so located that the men will not waste much time in getting the tools they desire.

COLD PUNCHING DIES

B. Henrikson (Chicago & North Western): The cold punching dies in use at the Chicago shop of the Chicago & North Western might be divided into three different classes as follows: Boiler sheet punching, sheet iron copper and brass, leather and rubber punching. In boiler sheet punching the first important item is to choose the proper kind of material. The best steel to use in boiler punches is one of low carbon content, about 85 points, for both the punch and the die, which should be hardened. The temperature at which the hardening is done should be determined by

the carbon content. The approximate temperature should be between 1,700 and 1,800 deg. Fahr.

The punches used for sheet iron, tin, copper and brass, are commonly called "blanking" dies. This type of die should preferably be made of a special steel of high carbon content, about 110 points. The method of manufacture varies according to the type of the die. The die is sometimes forged to shape and other times made directly from stock. The tempering of these dies should be carefully done in order to avoid warping. The electric furnace is generally used to heat the dies to the required tempering temperature which should be between 1,400 and 1,500 deg. No clearance is allowed between the punch and the die in this case. For dies on sheet iron a slip fit should be allowed. Both the die and the punch should be hardened. For dies used in punching tin the fit between the punch and the die should be tight. The plunger is left soft, only the die being tempered. By doing this it is possible to upset the punch by hammering when either the punch or die becomes worn. The method of making dies for leather and rubber is practically the same as that used in making blanking dies.

Discussion.—As a general rule, a clearance of one-tenth of the diameter of the punch was recommended.

CLOSING EXERCISES

An interesting paper was presented on "Special Tools for Drilling, Reaming and Milling," consisting almost entirely of descriptions of tools that have given particularly good service. The discussion on this subject brought out the great opportunities of milling machine work, one member stating that he had doubled his output by designing cutters for milling machine work, having found it necessary to increase all the arbors used for these cutters to 1½ in., so that a heavier cut could be taken.

The following officers were elected for the ensuing year: President, Henry Otto, Atchison, Topeka & Santa Fe, Topeka, Kan.; first vice-president, J. J. Sheehan, Norfolk & Western, Roanoke, Va.; second vice-president, C. H. Shaffer, general tool inspector, Illinois Central, Chicago; third vice-president, J. C. Bevelle, El Paso & Southwestern, El Paso, Tex.; secretary-treasurer, Owen D. Kinsey, Illinois Central, Chicago. The next meeting will be held in Chicago some time during July, 1915.

PRESIDENT RIPLEY ON WAGE DEMANDS

The following statement by E. P. Ripley, president of the Atchison, Topeka & Santa Fe, was published in the Chicago *Herald* on July 26:

"What position the transportation industry is in today is told in a nutshell by the simple figure of operating ratio. Total operating revenues of the railways in the fiscal year just closed, as compiled within the last few days by the bureau of railway news and statistics from the official reports to the Interstate Commerce Commission, at $3,000,000,000, stood almost $80,000,000 below that for the preceding fiscal year.

"To do the smaller business, operating expenses were entailed which were more than $35,000,000 higher than the year before. Taxes continued their advance and after their deduction the remaining net income fell $130,000,000 below 1913. Here is a ratio between expenses and revenues of 72.33 per cent., against 69.40 per cent. the year before, and if taxes are added the ratio jumps to 76.91 per cent.

"Yet in the face of such a showing we have the engineers and firemen threatening to tie up the railways of the West if their demands are withheld.

"The demand in the present instance is from the men who already have the highest pay of any organized labor on the railroads, and who already have the highest pay for the quality of work demanded that can be found in any industry.

"It has been estimated—I am not vouching for the correctness of the estimate, for I did not make it—that the western roads would have to pay out about $33,000,000 a year more in compensation than they pay out now, were these demands to be met, and the total $33,000,000, of course, would necessarily be a clean loss in net.

"But this is not the worst of the difficulty. It is a question whether this class of labor, that is, the engineers and firemen, are not already overpaid as compared with the great mass of other labor on the railways. We have advices to the effect that if this advance is granted to the engineers and firemen there will next be camping on our doorsteps several times as many conductors and trainmen, to say nothing of station agents, clerks and machinists of all kinds. So the estimate of $33,000,000, if granted to the engineers and firemen, will be likely to be found on final analysis more nearly $100,000,000.

"It doesn't require any special knowledge of arithmetic or extraordinary power of prevision to see where this will land us. The result would be that the strongest roads would be crippled and the weakest, to use an unvarnished phrase, would turn up their toes.

"The poor results for the last fiscal year simply show what might be expected. There has been a depression in general business, such as has recurred at intervals ever since I've known. The railroads have been entirely unable to resist, because they have been hammered continually by lawmaking bodies of one kind or another. In our experience with the Interstate Commerce Commission and with the various state commissions there has been a constant, increasing whittling away of our rates.

"On the other hand, taxes are enormously high and show no check in the tendency to increase. Our own records show that the percentage of increase in taxation during the five years ended June 30, 1912, was slightly over 68 per cent. There has been no diminution of this burden since; on the contrary, the advance has continued. Taxes in the year to June 30, 1913, reached $4,662,152, a sum equivalent to 11.8 per cent. of the operating income for the year and exceeded taxes of 1912 to the extent of 10.8 per cent.

"The crux of the trouble is not far to seek. It is stated in the fact that the Interstate Commerce Commission has enormous powers, with no responsibility. With all its dominion it does not hold itself in any way responsible for the success or failure of the enterprise it controls.

"Yet our expenses to assist it in its work of regulation have mounted until now we alone are paying $250,000 a year for the privilege of being regulated."

TEXT OF COMMISSION'S ACCOUNTING ORDER

In re the Separation of Operating Expenses. Opinion by the commission:

Statistical circular No. 3, issued by the commission through the division of statistics, contained a proposed order requiring railway companies having annual operating revenues of $100,000 and over, covering roads of classes I. and II., to report to the commission separately the greater portion of their freight and passenger expenses, certain common expenses being left unapportioned. A copy of this circular was sent to all railroad companies of these classes under date of March 19, 1914. In order that the subject might be thoroughly discussed a public hearing was held before the commission in Washington on May 2, 1914. Briefs were filed both before and after the hearing.

The question before us is not new. Prior to 1894 a separation of freight and passenger expenses was made in the reports of the carriers. From 1888 to 1893, inclusive, the results of this separation were published by the commission in its annual statistical report. The rule which was followed in the separation as made at that time is quoted below:

> All expenses which are naturally chargeable to either freight or passenger traffic should be entered in their respective columns; expenses which are not naturally chargeable to either traffic should be apportioned on a mileage basis, making the division between freight and passenger traffic in the proportion which the freight and passenger train mileage bears to the total mileage of trains earning revenue.

Soon after this separation of expenses was inaugurated railroad accountants began to suggest that it be discontinued. As early as 1890 a committee was appointed by the National Association of Railroad Commissioners to report upon the question. At the fourth annual convention of this association in 1892 the subject was actively discussed. It was not until 1893, however, that it was finally disposed of by the adoption of the report of the committee that the practice be discontinued. Under date of February 12, 1894, the statistician of the commission advised the carriers that thereafter a separation of operating expenses between freight and passenger service need not be made.

From an examination of the early reports of the carriers, it is clear that the belief of those making the returns was that only a very few expenses were "naturally chargeable" to one service or the other. An arbitrary division of all, or nearly all, expenses on a train-mileage basis is useless, and the discontinuance of the separation at that time was undoubtedly justified. During the last 20 years, however, railway accounting and accounting generally have greatly developed, and for this reason a reconsideration of the matter at the present time seems warranted.

The arguments advanced in support of a separation of the expenses at the present time were that it would be a material aid in the determination of the cost of railway services, not only as between the two services—freight and passenger—as a whole, but also in determining the cost of particular classes of traffic, for the reason that the separation of freight and passenger expenses is fundamental in all cost of service inquiries. That the authoritative formula would simplify their work to a certain extent in rate cases is the argument urged by some of the carriers for a general separation between freight and passenger services of all operating expenses, leaving none unapportioned. It was also claimed that the proposed reports would be of assistance in the study of comparative costs among railways.

The argument was advanced by one carrier that it is desirable to compare only total expenses with total revenues. The proper revenue of a carrier having then been determined, rates should be made in the various branches of the traffic solely on the basis of public utility. We do not believe, however, that sufficient reason has been given for abandoning the policy consistently pursued by the commission of giving consideration to cost in establishing rates. What weight to give to the cost factor depends upon the particular case. The question now before us is the practicability of providing for the ascertainment of cost figures in the general manner indicated in circular No. 3.

In the case of manufacturing concerns it has been shown to be practicable to make some estimate regarding the cost of the individual articles manufactured. This is done not only as a basis for comparison of the efficiency of various departments, but also as a basis for ascertaining at what price the manufactured product should be sold. This naturally suggests the question whether it is not possible to pursue the same or similar methods in the accounting of railway companies. There is probably a difference in the extent to which the ascertained cost could be utilized as between manufacturing and railway companies, for the reason that a manufacturer may discontinue to manufacture a product which he finds to be unprofitable, whereas a railway may be compelled to continue an unprofitable service.

The actual practice of railway companies is helpful in the consideration of the question now before the commission. For approximately one-half the mileage of the large carriers in the United States, operating expenses are now being divided between freight and passenger service. Among the railroads which make this separation are the Pennsylvania lines east and west, the Erie, the Baltimore & Ohio, the Louisville & Nashville, the Chicago, Burlington & Quincy, the Great Northern, and Northern Pacific. On the other hand, the New Haven, the Boston & Maine, the New York Central lines, the Southern, the Union Pacific, and Southern Pacific systems do not make a complete separation of all of their operating expenses between passenger and freight, although some of the important transportation accounts may be kept separately for the two services.

The officials of the roads which make this voluntary separation state that it is done in order to secure efficiency and not for rate-making purposes. If the comparison is made on the same basis year after year, these officials state that it is not important whether the arbitraries which are used are exactly correct or not. To their minds what is exact enough for efficiency purposes could not be considered sufficient as a basis for rate making. It was also argued that the method of keeping these statistics is different when made for efficiency comparisons from what it would be when made suitable for cost of service accounting. Nevertheless the impression seemed to prevail that circular No. 3, as submitted to the carriers, does not conflict with efficiency accounting.

It is erroneous to suppose that the commission is interested in statistics of this character merely for the purposes of rate making. The statistics would be valuable in making comparisons from year to year for the same railroad and for different roads in the same year. It is the duty of the commission to keep itself informed regarding the manner in which the railway business is conducted, and a knowledge of the variations in unit costs is valuable to us even if no rates are based thereon.

The assumption that railway cost accounting cannot be made sufficiently accurate for useful consideration in dealing with rates does not seem warranted. Although not possible 20 years ago, it would appear that at the present time approximately two-thirds of the operating expenses of a railroad can be separated in a reasonably satisfactory manner. The separation of the remaining one-third is useful if a basis is selected which equitably measures the use which either service makes of common facilities. This indicates the extent to which freight expenses can be subdivided among the various branches of freight traffic. Just as fuel, wages, and other direct expenses can be ascertained as between freight and passenger trains, so can they be distinguished as between individual freight trains.

It was urged that should the commission really need information concerning costs, a special study could be undertaken at any time and be pursued until the requirements of the individual case had been met. Special studies will always be necessary, but they cannot take the place of general statistics systematically compiled year after year. The latter, so far as they are applicable, are looked upon as more reliable than those which are collected for any particular case. Whether rightly or wrongly, "special purpose" statistics rarely command that confidence which inheres in figures that are kept continuously on accepted bases without reference to a particular controversy.

It was suggested at the hearing that the commission should wait until the courts had rendered decisions in certain pending rate cases before making a requirement of this character. What the courts have said must carefully be considered and conformed to. As to the cases before the courts at the present time, we believe that the courts have a right to look to this commission and to the various state commissions for a careful study of railway statistics and accounts. What the Supreme Court said in the *Minnesota Rate case, Simpson* v. *Shephard*, in regard to the distribution of capital charges is an incentive to proceed with the work. The court said in that case that after distributing to each class of traffic the property exclusively used by it, comparable use units might be found for distributing the property used in common.

The possible misuse of information collected was also urged as a reason for not developing the subject of railway cost accounting. It was urged that to give cost accounting information to the public would be the same as giving dangerous instruments to children. The systematic development of this subject and its free discussion in the light of all information available is the best safeguard against the misuse of cost figures. There is reason to believe that the failure of carriers to develop cost figures along permanent lines has been responsible for some of the events regarding which many of them have complained in the present

hearing. The action of certain state legislatures and commissions was alleged to have been unjust and unreasonable. Commissions and legislatures are not intentionally unfair, and if any of them have enforced unjust rates would not the kind of statistics here contemplated have convinced them that some other schedule would have been fairer? Would not this class of statistics command confidence which specially prepared figures can not always do? Comparisons of expense and performance have long been made by carriers in contested cases before the commission. These have nearly always rested upon transient data. Those of the future should be based upon permanent analyses and compilations.

The fact that circular No. 3 provides for a separation for only a part of the accounts was referred to. A distinction is to be noted between those expenses which can be distributed between freight and passenger service only from an analysis of pay roll and vouchers, and those which must be distributed on various statistical bases. For the greater part circular No. 3 deals with the former class of expenses. If these expenses were analyzed, it would be possible to complete the distribution for other accounts with the statistical bases which are in our possession. However, the information which is called for by circular No. 3 would be useful in ascertaining particular cost units among railways for different years and for the same railway from year to year. Nevertheless we believe that we should proceed to work out a complete formula for all expenses and require a separation of all expenses on prescribed bases.

The expense of making cost analyses was one of the chief arguments against the adoption of such a requirement. If followed out continuously in the closest detail, it may be that the expense would be prohibitive. That is not suggested here, and a division between freight and passenger service alone will not involve additional expense which can not be justified. The carriers were asked to submit estimates as to the expense of complying with circular No. 3. A request was made for a second estimate, based upon a modification of the circular along the lines suggested by the carriers. Copies of these replies were sent to the chairman of the Association of Railway Accounting Officers. In his opinion, compliance with the circular would mean an expense of $8.78 per mile of road, or a total of $2,057,478 for carriers having operating revenues in excess of $100,000 per annum. This estimate is probably substantially correct if it is intended, as it appears to be, to cover a literal compliance with the circular as interpreted by him; but that is not what is here proposed.

The wide variation in the estimates is noteworthy. No satisfactory explanation has been advanced as to why it should cost the Lackawanna $78.29 per mile, the Lehigh Valley $18, the Southern $14.25, and the Southern Pacific only $3.17. If expense alone were to be the determining factor it would be necessary to have a new estimate after circular No. 3 has been revised in the light of the suggestions received.

Another argument in opposition was that after a simple and relatively inexpensive division between freight and passenger service had been instituted, more comprehensive and expensive requirements would be made in the future. Future requirements must rest upon their own merits and the future alone can decide whether additional requirements will justify the added expense. The carriers also contend that a division would have to be made between state and interstate traffic, because the commission has no jurisdiction over interstate traffic. This argument overlooks the fact that it is not claimed that circular No. 3 would be sufficient in all cases. If it should become neessary for the commission or a court to know the total expenses for interstate passenger traffic the work involved would be simplified very much if the division between freight and passenger service as a whole could be accepted at the start. Moreover, the commission has considered cost in many freight cases and has never found it necessary to separate the state from the interstate cost. Cost does not change because a state line is crossed. The length of the haul and the volume of the traffic are among the determining factors in arriving at cost.

In our opinion ample reason exists for requiring railway companies to extend their analysis of operating expenses with respect to freight and passenger traffic beyond that which has hitherto been required in the annual reports. Circular No. 3 will be revised in the light of suggestions received, and a workable plan developed which will not be unduly burdensome to the carriers and which will yield statistical results of a fundamental character of value alike to carriers and the commission. Additional conferences will be held with the view of eliminating and minimizing as far as possible all objectionable features. It does not seem practicable to do this, effective July 1, 1914. If sufficient progress can be made in the perfection of the circular, carriers will be asked to file a special report for the year ending June 30, 1915, showing the separation between freight and passenger expenses. As early as practicable all carriers in class I will be required to separate operating expenses for each account as follows:

1. Expenses directly assigned to freight service.
2. Expenses directly assigned to passenger and allied services.
3. Expenses apportioned to freight service on prescribed bases.
4. Expenses apportioned to passenger and allied services on prescribed bases.

No operating expenses are to be left unapportioned. (30 I. C. C., 676.)

NEW HIGH RECORD TRAIN LOAD

By R. S. Mounce

The Erie's monster Triplex type locomotive, recently put in service for use as a pusher on Susquehanna Hill was given a hauling capacity test on the Susquehanna division July 23, in which all previous records for train loads, hauled by one locomotive, were broken and a new record established which bids fair to stand uncqualled for some time to come.

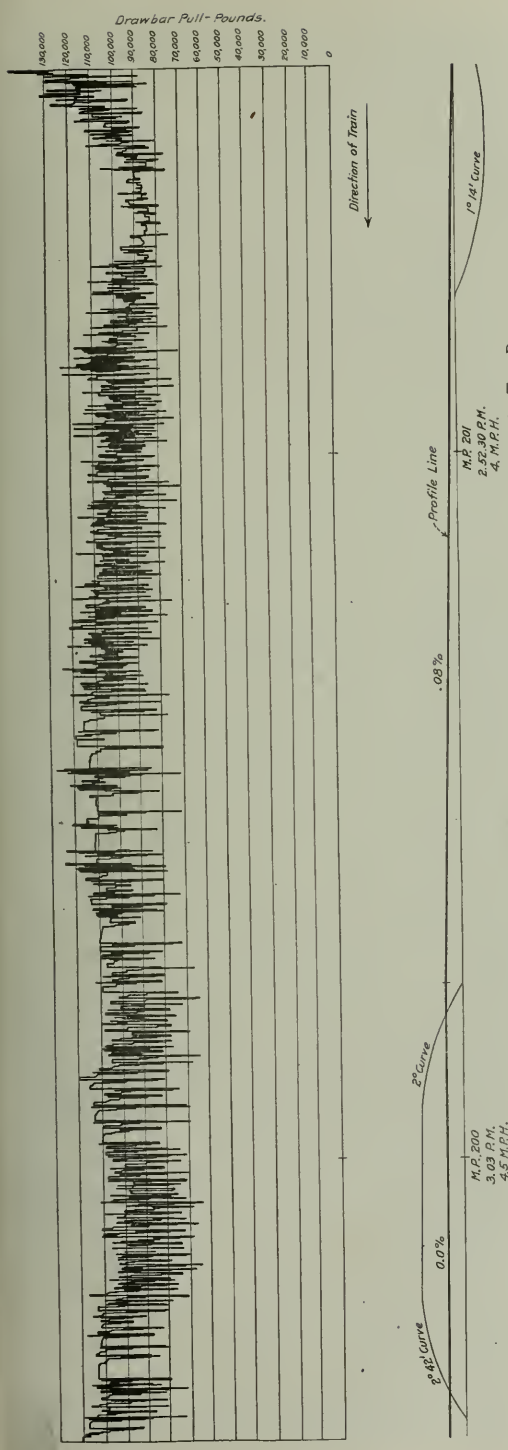
The test was made from Binghamton, N. Y., to Susquehanna, Pa., a distance of about 23 miles. The train consisted of 250 fifty-ton steel gondolas, each loaded to capacity, and a dynamometer car, and weighed 17,912 tons, exclusive of the locomotive. Its total length was 8,547 ft., or 1.6 miles. The grade between the two stations is gradually ascending, the worst condition being a combination of .09 per cent. grade and 5 deg. curvature.

Pushers were used to assist in getting the train under way. They pushed the slack forward until the Triplex lead locomotive had all the cars moving, after which they were uncoupled and followed the train in case they should be needed again. This operation eliminated the danger of pulling out drawheads in starting, which otherwise would undoubtedly have occurred with a train of such length. Portable telephones were used to communicate from the head end to the rear of the train, and this made it possible for the pushers to do their work in unison with the lead engine in starting the train.

A portion of the dynamometer record, which shows the drawbar pull at its maximum, is reproduced on the opposite page. A summary of this record breaking haul is given below:

Number of cars in train	251
Total weight of train (excluding locomotive)	17,912 tons
Total length of train	1.6 miles
Maximum speed attained	14 miles per hr.
Maximum drawbar pull	130,000 lb.
Minimum drawbar pull	67,000 lb.

Railway Construction in Southwest Africa.—It is reported that following long preliminary negotiations with the government, a syndicate has been formed to undertake the construction of railways in German Southwest Africa. The syndicate is said to include among others the Hamburg-American Line, the North German Lloyd Steamship Company, the Woermann Line and a number of banks. The construction company which the syndicate will form will have at the outset about $12,000,000 capital, which will be used at once for construction purposes. The first line, it is planned, will extend from the coast through the territory of the Mossamedes Company to the province of Angola.



A Representative Section of the Dynamometer Record of the Erie Triplex Locomotive on its Test Run

WILL GOVERNMENT REGULATION SUCCEED?*

By Samuel O. Dunn

Whether government regulation of railways and other public service corporations will succeed is a question of foremost importance to the American people. If regulation is a failure the public will be presented with two alternatives. It may let these concerns be managed without regulation and control; or it may acquire and operate them itself.

Many have no doubt as to which of these alternatives would be preferable. They would unhesitatingly choose public ownership. Many would even prefer public ownership rather than private ownership subject to public regulation. I have given some years of study to government ownership; and I have become with respect to the politico-economic opinion now apparently dominant, a heretic. I do not accept the view that if we had to choose between unregulated private management and government ownership we ought to choose public ownership. Under the political conditions that exist in this country, if I had to choose between unregulated private management and government management I would choose unregulated private management. Five years ago I would have said the opposite. That was before I had really studied the subject. Unregulated private management has serious faults. It has developed numerous abuses in this and other countries. But government management is also unregulated management, for the government cannot regulate itself. And unregulated government management has greater faults than unregulated private management. Under unregulated, or practically unregulated, private management of railways we had rebating, stock watering and numerous other abuses. But along with those abuses we had the most enterprising and progressive railway management that ever existed. The unregulated private management developed railways faster, built them cheaper, paid higher wages, charged lower rates, and did more to promote commercial and industrial development than has been done by any other railway management, regulated or unregulated, private or public. It was the first railway management in the world to adopt the air brake. It was the first to adopt the automatic block signal. It was the first to adopt steel freight and passenger cars. It was the first to develop those systematic methods for increasing the average load hauled per car and per train which have done more to reduce the cost of railway transportation, and thereby to keep down the rates that must be charged for it, than all the other methods that have been developed since the railway was invented. As President Hadley of Yale has said, "With all the talent that has been put into the public administration of industry, it is a salient fact that the important inventions have been made in countries enjoying private enterprise. . . . In most cases it took government experts from twenty to twenty-five years to discover them after they had been in use on private (railway) lines." It is this initiative and enterprise which constitute the great merit of private management; and it is the lack of them which constitutes the great defect of public management. And this one demerit of public management is more than an offset to all the shortcomings and offenses of unregulated private management.

Private management means progress, although incidental to that progress there may be abuses. Nowhere has public management meant progress in the true sense. Public management is like the Japanese nation. It is often skillful at imitating improved methods or machinery that others have introduced, but it never creates them. And this is a shortcoming of public management which is ineradicable.

I know that the advocates of public ownership make remarkable claims regarding the results it has secured in other countries, and that it would secure here. But you will search the world in vain for evidence in support of these claims. They tell us that government management would be more economical

*An address before the Indianapolis Transportation Club, May 11, 1914.

than private management; but the evidence shows that under comparable conditions private management is almost invariably more economical than public management. They tell us that public management would provide more adequate facilities than private management; but the evidence shows that under comparable conditions private management usually has provided more adequate facilities than public management. They tell us that our railways would be safer under public management; but when you study the evidence you find that in almost every country where there are both state and private railways the private railways are as safe as, or safer than, the state railways. They tell us that under government ownership railway rates in this country would be lower, in spite of the fact that the evidence shows that, all conditions considered, the rates here are the lowest in the world. They tell us that under government ownership the public would derive a profit from the railways, in spite of the fact that a great majority of state railways do not earn their operating expenses and interest, and, therefore, have a deficit which must be paid from public taxation.

But while to some of us it may seem clear that private ownership, even without regulation, would be preferable to government ownership, the fact must be recognized that it is very doubtful if the public could be convinced of this. The public believes that the only alternatives are either successful public regulation or public ownership. And if regulation fails public ownership very probably will soon follow. Therefore, all who believe in the advantages of private ownership and management should be anxious to see a policy of regulation worked out and adopted which will succeed.

The first essentials of such a policy are that its purpose and scope be clearly defined, and that it be kept to that purpose and within that scope.

The proper purpose of government regulation is the promotion and protection of those interests of the public that are affected by the concerns regulated. And how may this be best accomplished? The fact that a policy of regulation is adopted implies a conviction that the government cannot best promote and protect the interests of the public by undertaking the management of railways and other similar concerns itself. It may be assumed that if the public believed that government management would be preferable it would adopt that policy. By adopting public regulation the public shows that it wants the duties and responsibilities of management left with the owners and officers of these concerns, and intends that the regulating authorities shall interfere with and control their acts and policies only when they require control for the protection of the public. The function of those who regulate is not an executive function. It is a corrective one. It is not ordinarily their place to tell the managements what they must do any more than it is ordinarily the place of a police department to tell citizens what they must do. It is ordinarily their function to tell the managements what things they must not do, and keep them from doing those things, as it is the duty of a police department to tell citizens what they must not do and keep them from doing those things. Because policemen are required to prevent burglaries and apprehend those who commit them is no reason why the police departments should be authorized to control and direct every action of every citizen in every detail of his life. Likewise, because it is necessary to have laws and commissions to control those public service concerns and their officers who may be disposed to act dishonestly or unfairly, it does not follow that all public service concerns and all their officers should be presumed to be malefactors and extortionists and should have their every business act subjected to scrutiny and direction by public authorities.

The purpose of public regulation is, or ought to be, to conserve all the benefits of private enterprise and management while curbing the excesses and abuses to which they give rise when unregulated. To attempt to control and direct in detail the acts and policies of public service concerns while leaving them in private hands would be to sacrifice all of the advantages of private ownership and management, and secure none of the advantages of public ownership and management.

The purpose of public regulation should be, then, not managerial or executive, but corrective. Over what parts of the business of a public service concern should this corrective authority extend? It should extend, it would seem, wherever experience shows that abuses will develop which work a detriment to the public. Experience has shown that railways may discriminate unfairly in their rates. Therefore, the regulating body should have authority to correct unfair railway discriminations. Experience has shown that railways and public utilities may charge exorbitant rates. Therefore, the regulating body should have authority to reduce rates that are unreasonable. Experience has shown that private managements, in the absence of competition, or where there is combination, may give poor service. Therefore, the regulating body should have power to correct defects of service. Experience has shown that such concerns may so keep their accounts as to deceive investors. Therefore, the regulating body should have authority to make them keep proper accounts and make proper reports. There is no necessary conflict between the principle that regulation should be given a wide scope, and the principle that it should not seek to arrogate to itself the functions of management. The regulating body which has a proper conception of its functions, and a reasonable capacity for self-restraint, will have no difficulty in correcting unfair discriminations in rates and shortcomings in service without trying to supersede the traffic manager in initiating rates and the general manager in directing operations.

Experience has shown that if regulation is to be at once tolerably intelligent and tolerably effective it must be taken out of the hands of both legislatures and courts and intrusted to administrative commissions. We have developed regulation by commission to a greater extent than the people of any other country, and some foreign observers whose opinions merit respect have expressed optimism regarding our experiment in this direction. "There can be little doubt," says Sidney Brooks, one of the leading publicists of England, "that it is in the utilization of such commissions to stand between the local authorities on the one hand and the corporations on the other that the United States is destined to lead the world and make the most valuable of all contributions to the problem of combining private initiative and enterprise with protection of public rights." Another Englishman who is a very keen student of public affairs and economic matters in this country is W. M. Acworth; and recently when Mr. Acworth appeared before the British Royal Commission on Railways he described the authority and work of the Interstate Commerce Commission, and advocated the creation of a body with somewhat similar powers in England.

As we have adopted a policy of regulation which in outward seeming approximates the policy which it would appear is adapted to our needs, it might be thought that there could be no reason for serious doubt as to its success. And yet there is much ground for very serious doubt as to whether it will succeed. Why is this? Whose fault is it? What needs to be done to insure the success of regulation?

That the permanent success of regulation is so doubtful is due to the attitude and conduct of the corporations and their representatives, on the one hand, and the attitude and conduct of the public and its representatives, on the other hand.

When the policy of public regulation first began to be adopted most officers of public service corporations resented and resisted it as a meddlesome interference with their work and an encroachment on the property rights of investors. As time passed this general opposition to regulation merely as such declined, and it has finally disappeared. But there are managements of public service corporations here and there which, although some of them are honest and efficient, still regard public regulation in the same old way, and seize every opportunity to flout and defy the regulating authorities and the public

which they represent. A short time ago a newspaper despatch described how a vice-president of a large railway system—which, by the way, is notably well managed—had literally booted out of his office a representative of the Interstate Commerce Commission. Now, nothing could be sillier from the standpoint of the railways themselves than such conduct on the part of a railway officer. Its necessary tendency is to incense the regulating authorities and the public against the railways, and, thereby, to promote drastic and harmful regulation. Again, some railway managements continue to do things which are unwise and dishonorable, if not downright dishonest, and the disclosure of which tends to blacken the reputations of all railway managers and managements. For example, right in the midst of the splendid fight which railway officers have been making for less drastic regulation of their rates and earnings were disclosed the facts regarding the financial legerdemain which contributed so largely to throw the St. Louis & San Francisco into bankruptcy and to compel the New York, New Haven & Hartford to suspend its dividend. These disclosures have done more harm to the cause of fair and salutary regulation for railways than the malevolent and exaggerated attacks of many muckrakers and many demagogues. It is regrettable, but it is true, that one imbecile or dishonest railway manager can do more to turn government regulation in the wrong direction than ten capable and honest railway managers can do to turn it in the right direction.

While the success of regulation is menaced by the tactless, unwise, or unscrupulous conduct of a minority of corporation managers, it is menaced even more by the spirit which animates a large part of the public and which to an even greater degree animates most of the public authorities that are directly concerned with regulation. The public began to adopt laws and create tribunals for regulation in a prejudiced, revengeful spirit. This is not surprising, in view of some of the abuses which had prevailed and which it was the purpose of regulation to correct. It is not very surprising that this prejudiced, revengeful spirit has continued to be shown in view of some of the disclosures regarding corporation management which have continued to be made up to the present time. Nevertheless, that spirit has come to be, as respects the managements of most railways at least, entirely unjustified, and it is now, because of the effects which it is producing, very much the greatest obstacle to the success of public regulation.

One of its effects is the continuance of the adoption of legislation to regulate features of corporation management which either ought not to be regulated at all or ought to be left to be dealt with by the public service commissions. For example, there are the full crew laws which the labor lobby has succeeded in getting ignorant or vote-seeking lawmakers to burden the railways with. You have one of them in Indiana. As means of promoting safety they are worse than worthless. They increase expenses, and they tend rather to increase than reduce the danger of accidents. Why are such laws passed? Sometimes it seems that the public must think that any legislation which will injure the railways is bound to benefit the public. You may say that the public is not responsible for such legislation and does not want it. But in every democratic community or country the people get the kind of legislation and government they really want and deserve. It is mere cant to say they do not. If a democratic government is corrupt, it reflects a corrupt people; if it is vicious, it reflects a vicious people; if it is foolish it reflects a foolish people.

Another menace to the success of regulation is the subjection of railways and other large concerns, such as telephone and telegraph companies, to the requirements of all of the states and of the federal government, besides. This might be tolerable if the various regulating authorities would show a disposition to unify and harmonize their regulations and to be reasonable and just. But, unfortunately, the requirements made by them are extremely diverse and often conflicting. And as to most of the states, it is impossible to say whether their laws, or the men they put on commissions to enforce them, are the more ignorant and unjust.

A spectacle which has been presented at the recent hearings before the Interstate Commerce Commission in the matter of advances in freight rates in eastern territory illustrates the kind of regulation and the kind of regulating officials we have in many states. The state commissions, like the Interstate Commission, are charged with enforcing the regulatory statutes. They are, besides, charged with the regulation of rates. It is tacitly assumed that in passing on the reasonableness of rates they will act as impartial arbiters between the concerns that charge them and those who pay them. Nevertheless, some time ago representatives of the commissions of eight states, all of them west of the Mississippi river, met at Kansas City, adopted resolutions declaring that no advances in rates were justified and designated the chairman of one of these commissions to appear for them before the Interstate Commerce Commission and oppose any advances. These wise and impartial commissioners, without having heard a single word of testimony or argument on either side, settled the entire question to their own satisfaction, and then proceeded to constitute themselves parties to the case. Their representative went to Washington and appeared there, as the record shows, not only for the state commissions which paid his expenses with the money of the taxpayers of their states, but also for two large shippers' organizations, the American National Live Stock Association and the Grain Dealers' Association.

Now, what must we think of the spirit that animates the railroad commissions of those eight states? What must railway men think of their chances of getting a square deal from them? What must investors think of the chance of fair treatment that capital invested in railways has in those states? Manifestly, those state commissions are packed against the railways. Their members have no sense of fairness and only a rudimentary sense of decency. A railway stands as much show of getting a square deal from them as a heretic stood of getting a square deal from the Spanish inquisition under Torquemada, or as a negro accused of rape does from a southern mob. Railway regulation is in the same condition in those states as the administration of the criminal law was in Kansas and Colorado in past years when every distinguished citizen of Dodge City or Cripple Creek had his own private burying ground; and it is not without its significance that in the one western state where railway regulation has been the most drastic the chairman of the commission is an ex-cowpuncher who was once tried for murder, and one of the leading candidates for governor is a former member of the Dalton gang of bandits. This state, I might add, is one of the eight whose commissions sent Mr. Thorne to Washington. Do you say that the action of these eight commissions did not reflect the public opinion of their states? It can hardly be without significance that in every one of them the members of the commissions are elected by the vote of the people.

Perhaps the most serious menace of all to the success of government regulation is the acceptance by many regulating authorities and a large part of the public of the principle that public service corporations should be limited to what is called a "fair return" upon the fair value of their properties. To this principle it is now being attempted to add the principle that there should not be included in valuation any allowances for increment in value or for value created by the investment of earnings. It is commonly assumed that the Supreme Court of the United States has held that all that a public service corporation is entitled to is a "fair return." The court never has laid down any such principle. What it has held is that a concern rendering a public service may not be restricted to less than a "fair return." Furthermore, it has held that such concerns are entitled to benefit by the increase in the value of their properties. But the public assumes, and perhaps correctly, that the court meant that the public may restrict a public service corporation to barely what might be construed to be a fair re-

turn, and a large part of the public has assumed, further, that this minimum which the courts have fixed may properly be taken by the regulating authorities as a maximum.

Now, there are two questions to be considered here. One is, how small a return a public service corporation may be restricted to without confiscation of its property? That is a legal question. The other is, what return ought a public service corporation to be allowed to earn in justice to investors and for the best interests of the public? That is a question of equity and public expediency. Now, it is the question of expediency, not the question of law, with which the public is most vitally concerned, and it is very unfortunate that it has got the two questions confused in its mind. It seems not improbable that it would be better both for the owners of railways and public utilities and for the public if the constitutional rule that public service corporations cannot be denied a fair return had never been established. Then the question of public policy could be presented to the public without being mixed up and confused with a question of constitutional law. This is the situation in our neighbor Canada, as it is in France; and in both of these countries the profits well managed railways are allowed to earn, and which they are actually guaranteed by the public, are substantially larger in proportion than the public and regulating authorities in this country are disposed to allow to be earned. In our attempts to apply the legal formula of a fair return to the solution of a problem that is purely one of public policy and public expediency we are hindering, and threatening to arrest, the improvement and the increase of our transportation facilities.

Now, these are some of the obstacles to the success of government regulation. Will they be overcome? Will the attitude and conduct of public service corporations and their representatives, on the one side, and of the public and its representatives, on the other side, change enough to enable us to improve our system of regulation until it shall accomplish what such a system ought to accomplish, without hindering and hampering the managements of the concerns regulated in doing the things which it is their proper function and their right to do? There is no great reason for pessimism on that score. The attitude and conduct of the owners and managers of public service corporations have improved remarkably within recent years. The number of them who now oppose fair and reasonable regulation is relatively small. On the other hand, there has been, especially within the past year, a remarkable change in public opinion with reference to public service corporations, and especially railways. The talk of business men in their offices and at their clubs, and of people generally on street cars and in trains, as well as the comment of the press, shows that the public is convinced that the policy of railway regulation has been growing too drastic, restrictive and burdensome to be either fair to the concerns regulated or beneficial to the interests of the public.

But while there is ground for optimism it would be easy to be too optimistic. Regulation in most of the states is still an utter failure, because it is ignorant, unpractical, demagogic, and even grossly and viciously unjust. It is much better in the nation, but far from entirely satisfactory. We are not out of the woods. It will take years of educational work and effort to remove the numerous formidable obstacles to the success of regulation. The railway financier who holds up his fellow stockholders and the public, the big shipper who practices piracy on both the railway and the little shipper, the railway official who does not know how to get on with the public, the railway official who grafts, the demagogue who furthers his political ambitions by hurling unjust incentives and cooked-up statistics at the railways, the railway commissioner who discloses his own character and prostitutes his office by constantly appearing as the *persecuting* attorney instead of acting as a just judge, and the numerous people of socialistic temperament and ideas who cannot conceive of any good coming out of a large corporation—these we shall always have with us to oppose all efforts and to defeat many efforts to put and keep regulation on a fair and sound basis. Perhaps we shall overcome them. Perhaps we shall not. If I were a candidate for office or ever intended to become one, I should tell you that all that is necessary to get this great question settled right, is to refer it to the good sense and discriminating judgment of the American people. As I am not a candidate for office and never expect to be, I feel very strongly that it will be necessary to strive strenuously for many years in order to educate the public mind and the public conscience up to the place where they will be disposed and able to solve the problem fairly and intelligently.

THE RAILWAYS OF RUSSIA

M. Edmond Théry, director of the *European Economist*, recently published an elaborate analysis of the Russian Railway system. According to M. Théry, Russia is the most poorly equipped with railway facilities of any of the leading nations of Europe. In fact it has only about one mile of line for each 100 square miles of territory, a condition that acts as a severe handicap on Russian development, and it is vital to such development that the railway mileage should be increased. Such an increase is needed for its agricultural and mineral development, as well as for a rapid military mobilization. The following is a condensed abstract of M. Théry's article:

The first railway to be built in Russia was that running from St. Petersburg to Tzarskoie Selo, a distance of about 16.5 miles, and was intended exclusively for passenger traffic. In 1842, when there were more than 3,600 miles of railway in Europe the Emperor Nicholas ordered the construction of the St. Petersburg-Moscow line, about 400 miles long. This was at the expense of the crown. Work was begun in 1843, but the road was not opened for traffic until November 1, 1851. In 1868 the line was conceded to the Grand Railway Company of Russia, but was reacquired by the state in 1868 with the balance of the company's system. There has followed a series of changing policies in the matter of railway construction. Up to the time of the Crimean war, all lines were built and operated by the state; but from 1857 to 1881, very few lines were built by it, recourse being had to private companies, the interest on whose securities was guaranteed. Then from 1881 to 1891 no more concessions were granted to private companies, but nearly all the new lines were not only built by the state, but it bought about 4,275 miles of road belonging to the companies. Since 1891, though the state built some lines, its energies were almost entirely absorbed in its Asiatic work, so that it reverted to an encouragement of the activities of the companies. The result has been a multiplication of companies and comparatively little railroad building by the state.

After the two great arteries of communication from St. Petersburg to Moscow, and from Varsovia to Vienna had been opened, the first to be built was that from St. Petersburg to Varsovia in 1851. It was started by the state, but the work was interrupted by the Crimean war, and was finished by a French company, the Grand Russian Railway Company, which also built the Nijni-Novgorod line, about 1,050 miles, in 1857. This was the first large concession granted to a private company. Then, for a number of years, the government granted numerous concessions, besides giving financial assistance so that between 1867 and 1879 about 10,800 miles were opened, or an average of 900 miles a year, as compared with an average of 192 miles for the corresponding period from 1855 to 1867. In 1881 the construction of the Krivoi—Roy (Catherine Railway) 310 miles, was undertaken by the state and this inaugurated a period of railway construction and operation by the state. Between 1881 and 1891, the state authorized the construction of a few lines by companies already in existence, but no new companies were incorporated. On the other hand, the state bought 15 lines from the companies, with a mileage of about 4,275. It was during this period that a unification of the tariffs was undertaken. From 1891 to 1901 the state continued its policy of purchase. It took

over about 10,100 miles of road from the private companies, including the Grand Company in 1894 and the Southwestern Railway in 1895. The total of the lines acquired by the state between 1881 and 1901 included 35 companies and 14,400 miles of road. During this same period the state built a number of new lines, both in Europe and Asia, and the ukase of the Czar Alexander III authorizing the construction of the Trans-Siberian Railway bears the date of March 17, 1891. The dates of the opening of the great Asiatic lines are as follows: Oussouri Railway, 1897; Siberian Railway to Irkoutsk, 1899; Irkoutsk to the Manchurian frontier, 1901; Trans-Caspian of the Central of Asia, 1899; Tachkent Railway from Orenborng to Tachkent, 1906. The total length of these Asiatic lines with their branches was about 6,775 miles.

While the government was engaged in this new construction, it granted a number of concessions to private enterprises and even gave up a number of its own lines to the same, so as to form homogeneous systems from an operating standpoint. In this way the following companies were organized between 1891 and 1895, and they still exist.

1. Moscow-Kazan Railway, incorporated in 1863 with 168 miles, and owning 1,610 miles in 1891.

2. Moscow-Kiew-Veronege Railway, incorporated in 1866; owning 294 miles in 1891 and 1,625 miles at the present time.

3. Vladicaucasus Railway, incorporated in 1872 with 600 miles, and has, today, about 1,560 miles and more than 400 miles of recent concessions.

4. Riazan-Ouralsk Railway, incorporated in 1865 with 460 miles, now operating a system of 2,700 miles.

5. The Southeastern Railway, incorporated in 1893, and now operating 2,140 miles.

6. Moscow-Windau-Rybinsk Railway, which from 1869 to 1895 operated but 185 miles, now controls over 1,600 miles of line.

Up to very recent years these six companies, together with the Varsovia & Vienna Railway, which was bought by the state on January 1, 1912 (the only purchase since 1902), operated about 97 per cent. of all the Russian railways that were controlled by private companies. The state controlled 69.6 per cent. of all the railways of the country in 1900, a proportion that has been maintained up to the present. On January 1, 1913, the situation was as follows:

State railways in Europe	22,250	53.8
State railways of Asia	6,775	16.3
Total	29,025	70.1
Private lines	12,409	29.9
Total	41,434	100.00

In addition to this construction was begun in 1912 on 3,850 miles, of which 2,640 miles were for the state and 1,210 miles for private lines. Beyond this, 37 new projects, representing about 2,980 miles, were submitted in 1912, all of which were favorably reported by the commission of new railways. Finally the commission has laid out a program of construction, extending through five years, of at least 18,000 miles.

Besides these main lines, there are a number of purely local lines, the mileage of which has grown from 1,175 miles in 1902 to 1,400 miles in 1912.

The following figures give the cost per mile of line for both the state and the private lines:

	State		Private	
Year	Mileage	Cost per mile	Mileage	Cost per mile
1898	18,040	$54,075	9,237	$53,560
1899	20,117	50,830	10,455	50,367
1900	22,317	51,500	†	†
1901	23,601	52,170	10,800	48,000
1907	27,634	57,330	11,735	50,212
1908*	28,032	57,268	11,804	51,088

* Last official report available. † Report incomplete.

From these figures it appears that the cost of the state roads was more than of the private, but it must be taken into consideration that the proportion of double track was more on the state roads, being 28 per cent. of the whole, whereas on the private lines it was but 13 per cent.

The number of passengers carried rose from 15,500,000 in 1897 to 54,400,000 in 1911. The average number of passenger miles per year from 1897 to 1901 was 1,661,880,000, while from 1907 to 1911 it was 3,178,560,000. If these figures are taken on the basis of mileage operated, they would show an increase of 44 per cent. in density. In freight traffic the annual ton mileage rose from 5,402,964,600 in the period from 1897 to 1901, to 9,651,751,560 in the period from 1907 to 1911. Taken on the basis of mile of line operated the density of traffic rose from 415,800 to 558,360 ton-miles, an increase of 34 per cent.

The cost of operation was only 58 per cent. of the gross receipts in 1897, but it rose steadily up to 66 per cent. in 1901. During the Russo-Japanese war and the internal political trouble that followed, the falling off of traffic produced a marked increase in the ratio, which rose to 73 per cent. in 1907, and since that time, because of the rapid increase of traffic, has fallen to 56 per cent.

On the European lines operated by the state the passenger traffic increased 53 per cent. and the freight 25 per cent. from 1897 to 1911.

The disappointing part of the state operation is that while the gross receipts of the private companies increased 41 per cent., and their operating expenses only 40 per cent., the gross receipts of the state lines increased 22 per cent., and their operating expenses 35 per cent.

Railway operation, in Russia by the state, then, was much more expensive during the 1907-1911 period than it was by the private companies. In fact the ratio of expense to gross receipts on the European system of the state ran from 62 to 69 per cent., while with the private companies it remained stationary at 62 per cent. During the past four years the state management has succeeded in gradually lowering this percentage to 57.6, while the private companies have reduced theirs to 55 per cent.

The principal Asiatic lines were opened and put into operation in 1902. The period of partial operation from 1897 to 1901 was one of loss, so that it is only from 1907 to 1911 that the system can be considered as complete and homogeneous. But, the earlier years of this period were seriously affected by the liquidations of the Russo-Japanese war, so that it was not until 1910 and 1911 that there was any appreciable profit. In 1908 the operating ratio was 108 per cent., and this was reduced to 83 per cent. in 1911, due to an increase of receipts and decrease of expenses. Russia has great faith in the future of the Asiatic system, which is expected to develop the immense territory in which it is located and whose fertility is very great. In 1913 the Trans-Siberian lines had a mileage of 4,165 miles and the Trans-Caspian lines of 6,800 miles.

From the lines comprised in the above mileage, numerous branches have been planned and authorized, which will run into the southern part of Siberia and to the center of Turkestan. It is thought in St. Petersburg that, within the next seven or eight years, the Asiatic system will consist of from 10,000 to 10,500 miles, and that the receipts will quite suffice to pay all fixed charges on the capital invested.

Because of the interest guaranteed on private lines under different forms and at different times, as well as the payment of interest and amortization of capital on the state railways, the Russian treasury has been called upon to make contributions of very considerable amounts, so that starting in 1898 it was not until 1910 that the receipts exceeded the expenditures.

The report of the minister of finance to the Douma in 1913 shows for the years 1908, 1909, 1910 and 1911 the net annual receipts of the state railroads rose from $67,936,000 to $155,751,000. But the question at once arises as to whether these net receipts, large as they are, are sufficient to meet fixed charges. In this case the capital has been obtained from two sources:

1. The sale of bonds in the home or foreign markets.
2. The issuance of government bonds.

For the past 20 years these bonds have been cared for by the

annual budget, but they must be regarded in the same way as though the funds had been borrowed from the public. The interest and amortization of the capital so obtained form a state obligation and are part of the public debt. In the case of the government bonds, the comptroller of the Empire debits the state system each year with a theoretical 4½ per cent. on the total capital employed.

Thus at the end of 1911, the capital represented by the Russian State Railway System amounted to $2,612,595,000 divided into *A*, $1,379,178,000 and *B*, $1,233,417,000 of treasury obligations. To meet the interest and amortization of capittal *A*, an annuity of $56,444,000 was put upon the budget of 1908, or 4.09 per cent. of the capital in circulation. The theoretical annuity upon capital *B* calculated at 4½ per cent., requires, in round numbers $55,500,000

The difference between the net receipts of operation, $155,787,500, and the annuity, $56,444,000, or $99,343,500, represents the real net receipts of the state. But if the state had also been obliged to pay, as a private company would have been obliged, the 4½ per cent. for interest and amortization on the capital which the treasury had furnished gratuitously, amounting to $55,500,000, its profits would have been reduced to $43,843,500.

In 1913 passenger rates were raised, and these rates are the same on the state and the private railways. They are based on a differential sliding scale, and the present rates for first-class passengers are as follows: 2.9 cents per mile for the first zone of 100 versts (66 miles); 2.7 cents per mile for a zone of 200 versts (132 miles); and 2.5 cents per mile for a zone of 300 versts (198 miles).

On express trains an extra charge of about 10 per cent. is made, and if the passenger wishes to reserve a chair in a first or second-class compartment, a reservation ticket is obtained at a cost of from 40 to 75 cents. To occupy exclusively a two passenger compartment for the night, the first class passenger will be required to pay about $3 instead of 76 cents, to which must also be added one rouble (51.5 cents) for bed clothes and a pillow. Passengers have the right of free transportation for 36 lb. of baggage.

On both the state and the private railways, the monthly wages of locomotive engineers range from $67 to $82.50; those of firemen from $56.50 to $67, plus certain premiums paid for economy of fuel and oil and for good service. The pay of trainmen runs from 76 cents to $1.30 a day; that of track laborers is quite variable, running from 57 to 62 cents a day in the provinces to about 76 cents a day in the large cities. The railway employees are granted a pension on retirement proportioned to the number of years of service and the salary received during the last year. They also have the right to a day of rest each week.

In Russia there are no associations of engineers or other railway employees, as such associations are expressly prohibited by law. Hence, with the exception of the strike of 1905, which was really a political demonstration, there has never been a strike or an attempt at a strike on the Russian railways.

Russian locomotives burn wood, coal or oil, according to the region in which they operate. On the Baltic and Northern lines they burn wood. This is also the case on the great Nicholas line running from St. Petersburg to Moscow. Along the Douetz and upon the roads running from Moscow to Varsovia and the German frontier by way of Smolensk and Brest, and on the lines into Little Russia, Kiew and Odessa, they burn coal from the Douetz or Dornbrova. But on lines within easy transportation distance of the Volga, oil is used.

The economic development of Russia has been more rapid than the increase in its production of fuels, so that, for the past ten years, the prices of wood, coal and oil have steadily increased, thus handicapping industries and putting a burden on the inhabitants of cities, where the cost of heating has almost doubled. In consideration of the effect of this condition on manufacturing and the railways, the minister of commerce and industries has just submitted to the vote of the Douma a proposition to cancel the duty for one year on the importation of foreign coal, intended for public service of the railways. Now the duty, which is only 47 cents per gross ton at St. Petersburg and the Baltic ports, rises to $2.03 per ton in the Black Sea ports and the Sea of Azov, where foreign coals could readily compete with those of the Douetz.

During the past few years, railway operation in Russia has made great progress both on the state and private lines. It is still a subject of discussion as to whether it is better for the state to reserve to itself the sole right of railway construction and operation, or grant the rights to private capital under certain reserves of guaranteed interest and state control. Under certain circumstances the state monopoly idea has prevailed, under the pretext that it tends to a more impartial service of the national interests. Those who favor private companies contend that their management is less arbitrary and less expensive to the public in the end than that of the state. Finally they have come back to the state system since the question of national defense has become so important, because it is thought that the problems of strategic railway construction best adapted to the rapid mobilization of troops can most properly be solved by the state.

Count Witte, the former prime minister, with whom railway matters were of the first importance, said, in an address in 1910, that after many years of deficit, the Russian railways had at last returned an income to the treasury in the period from 1895 to 1900, but that this had been again followed by a period of deficits because of the considerable mileage of strategic railways that had been constructed. "In countries," he said, "where political or military purposes control the location of railways, and Russia stands in the front rank of such countries, it is quite the custom to build strategic lines, knowing full well that such roads will not be on a paying basis for a number of years. Between 1889 and 1904, 17,435 miles of railway were authorized and construction thereon begun. Out of this I put 4,030 miles as being incontestably strategic, or 23.1 per cent. and 14.5 per cent. as being purely political, such as the Astrakan Railway. It is quite evident that if these roads had not been built, and if they had not been operated, the general deficit of our railways would have been considerably diminished."

Count Witte's ideas were evidently shared by his successor, M. Stolypine, and they certainly are by M. Kokovtzoff, the actual head of the government, and by the Czar himself. In fact, since 1910, and especially since the accession of M. Kokovtzoff to power in 1911, a fresh impulse has been given to railway construction, for more than 4,600 miles have actually been started or authorized.

LOUD SPEAKING TELEPHONES ON THE LACKAWANNA

The Delaware, Lackawanna & Western, which has attracted no small amount of attention in the past few months because of its successful experiments with the wireless telegraph for communicating with moving trains, has also been carrying on some equally successful work with "loud speaking" telephones for train despatching. No one disputes that the telephone is far superior to the telegraph for transmitting and repeating train orders; but the telephone has its disadvantages. Wearing a telephone constantly on the head is not the pleasantest thing in the world, especially when there is an electrical storm at some point on the line. L. B. Foley, superintendent of telegraph of the Lackawanna, has experimented with several loud speaking devices, but the one now in use, made by the Stentor Electric Manufacturing Company, of New York City, formerly the Electrical Experiment Company, is the first that has proved a success. Loud speaking instruments have been installed on two train despatchers' lines, including all the Lackawanna lines in New Jersey. The two despatchers are stationed at Hoboken.

The device is quite simple. The transmitter is much like the

ordinary transmitter, but is much more efficient. The receiver in like manner is very sensitive and in addition is furnished with a horn similar to that used on a phonograph. It is placed on the despatcher's desk in the position shown in the illustration, or may be on the wall. There is nothing in the nature of an amplifying device. The telephones are simply intended to reproduce at the receiving end the normal conversational tone of voice at the same volume used by the speaker at the transmitting end. The transmitter requires from six to eight volts in the primary circuit and operates on a current of from 0.2 to 0.3 amperes. It is necessary that the loud speaking transmitters be used in all stations on the circuit on which a loud speaking receiver is installed, but no other change in the standard equipment is necessary. The cost of the instruments is small, there being no amplifying devices. A station, provided with both the loud speaking transmitter and the loud receiver, can be equipped at a cost of $50 exclusive of the batteries. In stations where the use of the loud speaking receiver is not necessary, the loud speaking transmitter alone can be put in for $25. The battery cost per station per year is about $1.80. The Lackawanna uses dry cells which have to be renewed twice a year.

With complete installations at all stations a circuit can be

Despatcher's Desk Showing Loud Speaking Telephone Receiver

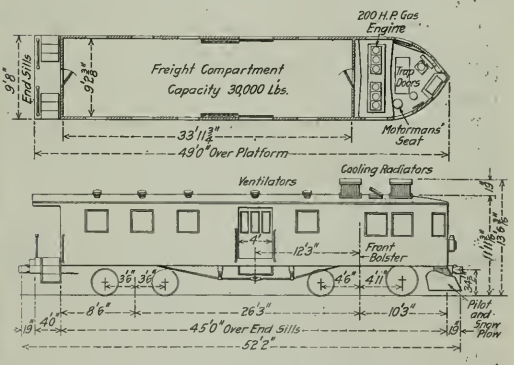
worked without the use of selectors for calling. Without the calling bell the despatcher, to call a station, merely speaks the station's name into his transmitter in an ordinary tone of voice. The name is heard in all the loud speaking receivers on the line and for a distance of at least 15 feet from any one of them. The operator who is called can respond at once. An operator can call the despatcher in like manner.

The operator at a station equipped with the loud receiver can keep track of all that is going on, the same as with the Morse telegraph. As is well known, one of the chief objections to the use of telephones on the train wire has been the isolation of each office from all others except when the operator could take time to put the receiver to his ear. With the Stentor apparatus the operators have less occasion to call on the despatcher for information as to the position of trains. The added opportunity for supervision on the part of the despatcher himself is also worth mentioning. The Lackawanna despatchers are glad to get rid of the head telephones. Disturbances on the line sometimes cause a continual buzzing which is most annoying to the person using the head receiver. In regions where electric storms are common there is the additional chance of receiving violent sounds in the receiver, and the shock sometimes is dangerous as well as inconvenient.

SELF-PROPELLED CONVERTIBLE FREIGHT AND PASSENGER CAR

The Minneapolis & Northern Gasoline Motor Railway has recently purchased a gasoline motor freight car from the McKeen Motor Car Company, which is being used for freight and express service between Minneapolis, Minn., and Anoka. It is a semi-convertible car which, during periods of heavy passenger traffic, can be used for transportation of passengers, removable seats and chairs being installed for that purpose. It is equipped with the McKeen Motor Car Company type "A" motor truck in which have been incorporated many of the important features of the latest model type "C" motor truck. The air brake system has a special Gregory motorman's valve for operation of straight air on the motor car and automatic air on the trailers.

The length of the car over end sills is 45 ft., while the total length is 52 ft. 2 in. The floor plan and side elevation illustrate the general design of the car. It will be noted that the front end is wedge shaped and that the car is entered from a platform at the rear end. The McKeen depressed center side entrance is not a feature of the car, because its use is chiefly for freight and



Convertible McKeen Car for the Minneapolis & Northern Gasolene Motor Railway

express service. The car structure consists of a metal underframe, and continuous 2-in. grooved steel combination side posts and carlines extending from side sill to side sill, with metal diagonal bracing. The outside and inside wall sheathing is of 13/16 in. fir. The floor is of 1⅝ in. fir. The principal dimensions are:

Length over end sills	45 ft. 0 in.
Length over platform	49 ft. 0 in.
Length over-all	52 ft. 8 in.
Width over side sills	9 ft. 8 in.
Width over sheathing	9 ft. 9⅝ in.
Width over-all	10 ft. 4⅜ in.
Width inside	9 ft. 2⅛ in.
Length of freight compartment	33 ft. 11¾ in.
Height, rail to roof	11 ft. 11 3/16 in.
Weight	56,000 lb.

SUBWAY EXTENSIONS IN BUENOS AIRES.—A Buenos Aires municipal decree has been issued authorizing the Anglo-Argentine Tramways Company to construct a tunnel section underneath Plaza Constitucion. The object is to enable the company to test its machinery and ascertain the most suitable procedure to be adopted in the excavation of the subway between Plaza Constitucion and Plazo Retiro. Due to the narrowness of some of the streets under which the route is projected, the subway will be constructed entirely by tunneling.

General News Department

A press despatch from Boston says that the vacation of Chairman Howard Elliott, chairman of the New York, New Haven & Hartford, is to be indefinitely extended, on account of impaired health.

A new ferry boat for the New York Central & Hudson River Railroad has been launched at the Harlan & Hollingsworth shipyard, Wilmington, Del. The boat is named *Weehawken*, and is for service in New York harbor. It is 210 ft. long and 66 ft. wide.

In an attempted train robbery on the Louisville & Nashville, three miles east of New Orleans on the night of July 24, the flagman of the train was shot and killed. The robbers, two of them, boarded the train at New Orleans. They got a small amount of money, and after the shooting, escaped.

Successful experiments with wireless telephone apparatus were made on the Pacific Limited Express of the San Pedro, Los Angeles & Salt Lake road July 17. Conversations were held between a car of the moving train and an office at the station at Los Angeles over distances from five to fifteen miles.

A press despatch from Fairbanks, Alaska, says that the government engineers are making rapid progress on the preliminary surveys for the railway between Fairbanks and the coast. The parties working on both sides of the Tanana river have completed their surveys between Fairbanks and Nonana, a distance of 55 miles.

Representative Park has introduced in Congress a bill to make copies of railroad tariffs admissible as primary evidence in courts. A copy offered as evidence must be accompanied by satisfactory proof that it was procured from the Interstate Commerce Commission, and persons sending to the commission for copies, must pay ten cents to cover postage.

The lines of the Pennsylvania Railroad system—East and West—in the six months ending July 1, 1914, carried 87,000,000 passengers, and not one of them was killed in a train accident. On the lines east of Pittsburgh no passenger has been killed in a train accident since 1912. During this period these lines alone have carried more than 161,000,000 passengers.

Two giant cacti, the largest ever moved from the desert, have been taken from Arizona by the Atchison, Topeka & Santa Fe to San Francisco, and have been placed at the entrance to the Hopi Indian village, which forms a part of the $350,000 reproduction of the Grand canyon of Arizona. One of the cacti stands 25 ft. high and weighs 4,500 lb. The removal cost $1,000 for each cactus.

The United States Board of Mediation and Conciliation, which went to Chicago last week in the effort to bring about a settlement of the controversy between the western roads and their engineers and firemen, has held daily conferences since Monday, July 20, with representatives of the Brotherhood of Locomotive Engineers and the Brotherhood of Locomotive Firemen and Enginemen and the Conference Committee of Managers. Up to the early part of this week no definite results had been accomplished.

Officers of the Catskill Mountain Railway, the Otis Railway and the Catskill & Tannersville Railway, three small companies, have applied to the New York State Workmen's Compensation Commission for release from the obligations of the new compensation law. Under the regulations they are called upon to pay $7,000 a year as premium for state insurance; and this sum, they say, will nearly or quite bankrupt them. The companies are not able to pay the interest on all of their bonded debt. The New York Central & Hudson River proposes to test this new law in the courts, on the ground that it does not apply; this for the reason that the company is subject to the Federal law relating to compensation for accidents.

About 300 members of the Western Society of Engineers were the guests of the Chicago & Western Indiana on July 25, on an excursion by special train to inspect the Chicago Clearing yard, now under construction, which is designed to handle the interchange business between the trunk line railroads entering Chicago. The yard will have facilities to move 8,000 to 10,000 cars a day. It is expected that it will be put in operation late this Autumn. On the way to Clearing stops were made for an inspection of the new lift bridge of the Pennsylvania Lines over the south branch of the Chicago river, which has a movable span of 272 ft. 10 in.; also of the separation of grades of the Chicago, Rock Island & Pacific and the Chicago & Western Indiana at Seventy-ninth street, where the roads cross each other at an angle of about 17 degrees. When the city required the elevation of the tracks above the street it was decided to separate the railroad grades as well, and the plan calls for five Rock Island tracks above and 10 Western Indiana tracks below, with Seventy-ninth street underneath both. The small angle of intersection, together with a street subway, requires a complicated structure.

Automatic Block Signals on the Pennsylvania

The Pennsylvania Railroad announces that on September 1 the main line between Pittsburgh and New York, and between Philadelphia and Washington will be equipped with automatic block signals throughout. With the completion on that day of recent elaborate improvements the Pennsylvania will have more four-track line operated under automatic signals than any railroad in the world. Within the past three years the company has equipped 253 miles of its main lines with automatic signals, at a cost of $6,000,000.

The signal system on the lines east of Pittsburgh and Erie, automatic, non-automatic and interlocking, represents an estimated investment of approximately $18,000,000. The electro-pneumatic interlocking switch and signal system in the New York station and on the electric line between Sunnyside yard, Long Island, and Manhattan Transfer, N. J., cost $1,750,000. Eighteen hundred men are employed to maintain the Pennsylvania's signal system, and it costs $1,500,000 yearly to keep these signals in order.

Opening of Cape Cod Canal

The Cape Cod Canal, connecting Buzzard's Bay with Cape Cod Bay and shortening by 70 miles the water route between New York and Boston, was opened to commerce July 29, but with only 15 ft. of water, about 10 ft. less depth than will be finally provided.

The dedication ceremonies took place at the village of Buzzard's Bay and were witnessed by thousands. Seth Low, president of the Chamber of Commerce of the state of New York, presided. The speakers included August Belmont, president of the canal company; Assistant Secretary of the Navy Roosevelt; Governor Walsh of Massachusetts, and Congressman Thomas C. Thacher, the representative from the Cape district.

Railway Revenues and Expenses for 1914

The Bureau of Railway News and Statistics, Chicago, has issued a bulletin giving the railway revenues and expenses of the railways in the United States for the fiscal year ending June 30, 1914, as computed from the monthly reports of the Interstate Commerce Commission, with the figures for June estimated from incomplete reports. The bulletin shows total operating revenues of $3,091,669,713, a decrease of $79,776,279, as compared with 1913, operating expenses as $2,236,182,518, an increase of $35,191,237, and net operating income as $712,133,126, a decrease of $130,276,210. The ratio of operating expenses to total operating revenues for the year was 72.33 per cent., as compared with 69.4 per cent. in 1913. This operating ratio is the highest in the history of American railways. The bulletin says that not

within a decade has the net income of the railways in the United States been as low per mile of line as for this year, and that when it is considered that a mile of railway in the United States represented a net investment of $64,000 in 1914, against only $52,000 in 1904, the true significance of the shrinkage in net income per mile of line becomes startlingly apparent. The difference of $12,000 per mile represents the additional investment of over $3,000,000,000, with no increase in revenue per mile to take care of it. While the total operating revenues were greater both absolutely and per mile of line, than in any year since 1907, except 1913, operating expenses were greater than for any previous year, although $9 less per mile of line than for 1913. The net operating income per mile of line was $2,812, as compared with $3,384 in 1913, and $3,342 in 1907. The ratio of net operating income to total operating revenues was 23.03 per cent. The operating ratio for the last half of the year is given as 75.7 per cent. Of the $79,000,000 lost in gross revenues, over $75,000,000 was in freight traffic, while the earnings in passenger traffic show an increase of about $59,000.

Bulletin of Revenues and Expenses of Large Steam Roads in May

The advance figures in Section I of this summary have been compiled by the Interstate Commerce Commission from the reports of operating revenues and expenses of roads having annual operating revenues above $1,000,000 for the month of May, 1914, filed in the division of statistics by July 10, 1914. The figures, which are subject to correction, embrace returns for 177 roads.

The figures in Section II are reproduced from the printed Bulletin of Revenues and Expenses of large roads for the same month of 1913.

SECTION I—COMPARATIVE FIGURES BASED ON REPORTS OF 177 LARGE ROADS

FOR THE MONTH OF MAY

Item	United States		Eastern District		Southern District		Western District	
	1914	1913	1914	1913	1914	1913	1914	1913
Average mileage operated	223,796.87	221,993.80	57,162.53	57,003.83	42,077.34	41,994.48	124,557.00	122,995.49
Operating revenues	$227,914,276	$252,553,478	$99,348,323	$113,287,429	$37,082,330	$38,703,875	$91,483,623	$100,562,174
Operating expenses	172,804,501	182,687,409	77,246,785	83,264,508	28,162,078	28,898,799	67,395,638	70,524,102
Net operating revenue	55,109,775	69,866,069	22,101,538	30,022,921	8,920,252	9,805,076	24,087,985	30,038,072
Revenues per mile	1,018	1,138	1,738	1,987	881	921	734	818
Expenses per mile	772	823	1,351	1,461	669	688	541	573
Net revenue per mile	246	315	387	526	212	233	193	245

FOR THE ELEVEN MONTHS ENDING WITH MAY

	1914	1913	1914	1913	1914	1913	1914	1913
Average mileage operated	223,244.17	221,217.42	57,212.58	56,972.88	42,024.15	41,927.26	124,007.34	122,317.28
Operating revenues	$2,695,185,747	$2,758,282,992	$1,157,112,428	$1,196,115,009	$430,034,439	$419,687,083	$1,108,038,880	$1,142,480,900
Operating expenses	1,945,738,543	1,912,466,260	882,915,981	857,591,796	311,180,783	300,506,987	751,641,779	754,367,477
Net operating revenue	749,447,204	845,816,732	274,196,447	338,523,213	118,853,656	119,180,096	356,397,101	388,113,423
Revenues per mile	12,073	12,469	20,225	20,994	10,233	10,010	8,935	9,340
Expenses per mile	8,716	8,645	15,432	15,053	7,405	7,167	6,061	6,167
Net revenue per mile	3,357	3,824	4,793	5,941	2,828	2,843	2,874	3,173

SECTION II—FIGURES REPRODUCED FROM THE BULLETIN OF REVENUES AND EXPENSES OF ALL LARGE ROADS

FOR THE MONTH OF MAY

	1913	1912	1913	1912	1913	1912	1913	1912
Average mileage operated	222,172.02	220,458.83	58,036.52	57,915.49	41,713.04	41,511.13	122,422.46	121,032.21
Revenues per mile	$1,154	$1,030	$2,023	$1,727	$923	$857	$820	$755
Expenses per mile	833	735	1,479	1,253	689	626	576	524
Net revenue per mile	321	295	544	474	234	231	244	231

FOR THE ELEVEN MONTHS ENDING WITH MAY

	1913	1912	1913	1912	1913	1912	1913	1912
Average mileage operated	221,651.88	219,527.30	58,005.56	57,821.76	41,646.09	41,287.01	122,000.23	120,419.53
Revenues per mile	$12,649	$11,532	$21,409	$19,348	$10,038	$9,416	$9,375	$8,503
Expenses per mile	8,753	7,982	15,260	13,642	7,191	6,676	6,192	5,712
Net revenue per mile	3,896	3,550	6,149	5,706	2,847	2,740	3,183	2,791

The Campaign of 1915

The Kansas railroads and representatives of the Brotherhood of Railroad Trainmen have addressed letters to members of the legislature and candidates for the legislature, regarding proposed labor legislation to be introduced in the next session. The first letter was sent by R. U. Snider, representative of the Brotherhood of Railway Trainmen. He says that the measures introduced "for the benefit of railroad men" at the last session of legislature, which were defeated, will again be presented to the next session of the legislature, though partly modified, and that the one most desired is the full crew bill. He expresses the opinion that the full crew bill as presented at the last legislature was a little too drastic, and asks if the men can have support if the bill is modified to place an additional brakeman on freight trains consisting of more than 30 cars. The letter also contains the following: "The trainmen of the state come directly in contact with many of her citizens and are in a position, therefore, to do much good to the office seeker, and we take the liberty at this time to ascertain if our measures will receive the support due them at your hands at the next session of the legislature." A reply to this letter was sent to the legislators and candidates by C. W. Kouns, general manager of the Atchison, Topeka & Santa Fe, as chairman of the Kansas committee of the Committee on Relation of Railway Legislation to Operation. He says: "The 'full crew' is a term which tends to deceive those who are not familiar with railroad phraseology. It gives the impression that the railroads are operating with short crews, which is not so. The conductor, two brakemen, the engineer and firemen constitute a full crew on trains where five men are sufficient for the duties devolving upon them. On many trains three brakemen already are employed, when three are needed to do the work. These are local freight trains stopping at stations to load and unload shipments, and to place cars for loading and unloading. Most of these local trains, on which three brakemen are employed, haul less than 30 cars, while Mr. Snider's campaign is to induce the legislature to force the railroad to employ three brakemen on the through freight trains which have practically nothing for two brakemen to do from one terminal to another."

Mr. Kouns calls on the legislators to withhold assent to this unfair bill, imposing a useless financial burden on the Kansas railroads, until after a thorough investigation.

Summary of Revenues and Expenses of Steam Roads

The Bureau of Railway Economics' summary of revenues and expenses and comments thereon for May, 1914, are as follows: Railways operating 225,858 miles of line are covered by this summary, or about 90 per cent. of all steam railway mileage in the United States. Their operating revenues for the month of May, 1914, amounted to $232,567,938. This amount includes revenues from freight and passenger traffic, from carrying mail and express, and from miscellaneous sources connected with rail operation. Compared with May, 1913, total operating revenues show a decrease of $25,038,021. Total operating revenues per mile averaged $1,030 in May, 1914, and $1,150 in May, 1913, a decrease of $120, or 10.4 per cent. There was a decrease

of 13.4 per cent. in freight revenue per mile, and a decrease of 2.8 per cent. in passenger revenue per mile.

Operating expenses, which include all the costs of maintaining track and equipment, operating trains, securing traffic, and of administration, amounted to $176,029,940. This was $9,921,181 less than for May, 1913. These operating expenses per mile of line averaged $779 in May, 1914, and $830 in May, 1913, a decrease of $51 per mile, or 6.1 per cent.

Net operating revenue, that is, total operating revenues less operating expenses, amounted to $56,537,998, which was $15,116,840 less than for May, 1913. Net operating revenue per mile of line averaged $250 in May, 1914, and $320 in May, 1913, a decrease of $70 per mile, or 21.7 per cent.

Taxes for the month of May amounted to $11,905,010, or $53 per mile, an increase of 11.2 per cent. over May, 1913.

Operating income, which is net revenue from rail and auxiliary operations, less taxes, averaged $197 per mile of line, and in May, 1913, $273, thus decreasing $76, or 27.9 per cent. Operating income for each mile of line for each day in May averaged $6.35, and for May, 1913, $8.81. Operating income is that proportion of their operating receipts which remains available to the railways for rentals, interest on bonds, appropriations for betterments, improvements, new construction, and for dividends.

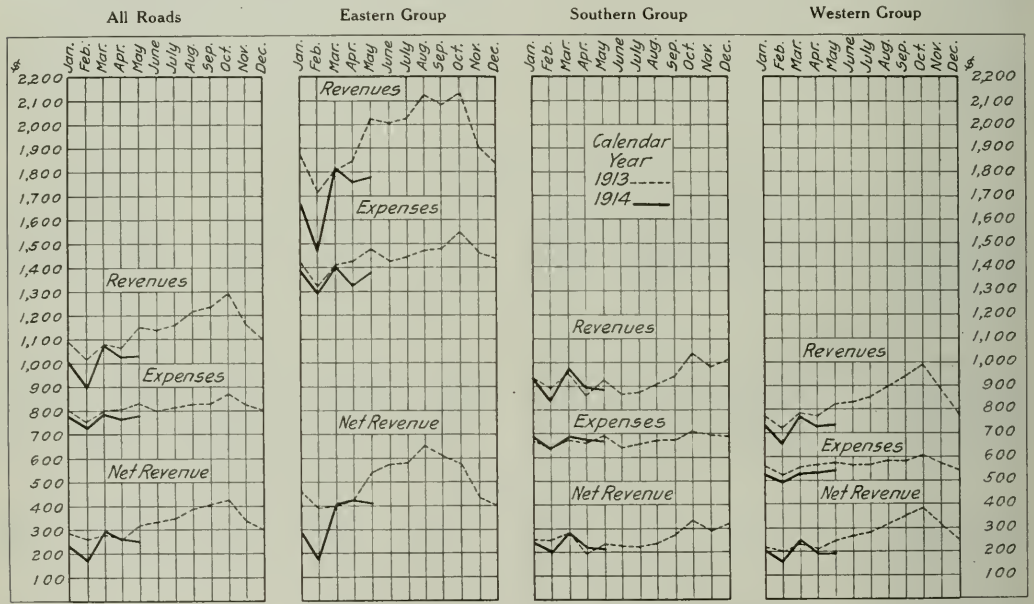
The operating ratio for May, that is, the per cent. of total operating revenues absorbed in operating expenses, was 75.7 per cent., which is comparable with 72.2 per cent. in May, 1913, and 71.4 per cent. in May, 1912.

The railways of the eastern district show a decrease in total operating revenues per mile of line as compared with May, 1913, of 12.3 per cent., the railways of the southern district a decrease of 4.4 per cent., and the railways of the western district a decrease of 10.2 per cent. Operating expenses per mile decreased 7.3 per cent. in the east, decreased 2.7 per cent. in the south, and decreased 5.6 per cent. in the west. Net operating revenue per mile decreased 26.1 per cent. in the east, decreased 9.2 per cent. in the south, and decreased 21.0 per cent. in the west. Taxes per mile show an increase of 6.3 per cent. in the east, an increase of 13.8 per cent. in the south, and an increase of 15.5 per cent. in the west. Operating income per mile decreased 32.1 per cent. in the east, decreased 12.9 per cent. in the south, and decreased 28.1 per cent. in the west.

Comparison of returns for eleven months of the current fiscal year with those of the corresponding months of the previous fiscal year reveals a decrease in total operating revenues per mile of 3.2 per cent., an increase in operating expenses per mile of 0.9 per cent., and a decrease in net operating revenue per mile of 12.4 per cent. This net operating revenue per mile decreased 19.5 per cent. in the east as compared with the corresponding period of the previous year, decreased 0.5 per cent. in the south, and decreased 9.7 per cent. in the west.

When the returns for the five months of the calendar year 1914 are compared with those of the corresponding months of 1913, they show a decrease in total operating revenues per mile of 6.7 per cent., a decrease in operating expenses per mile of 3.9 per cent., and a decrease in net operating revenue per mile of 14.5 per cent. This net operating revenue per mile decreased 23.6 per cent. in the east as compared with the corresponding period of the previous year, decreased 4.1 per cent. in the south, and decreased 9.7 per cent. in the west.

The diagram shows the variations in operating revenues, operating expenses, and net operating revenue per mile for the separate months of the calendar year 1913 and of the calendar year 1914 to date. The following table shows the per cent. of operating revenues consumed by each class of expenses:



Monthly Revenues and Expenses per Mile of Line in 1914

PER CENT. OF TOTAL OPERATING REVENUES.

	May.		Fiscal year ending June 30.		Eleven months ending May 31.	
	1914.	1913.	1913.	1912.	1914.	1913.
Freight revenue	68.4	70.7	69.8	68.7	69.1	70.0
Passenger revenue	23.1	21.3	22.2	23.2	22.8	22.0
Other transportation	7.3	6.9	6.9	7.1	7.0	6.9
Non-transportation	1.2	1.1	1.1	1.0	1.1	1.1
Maintenance of way and structures	15.5	15.3	13.3	12.7	13.4	13.2
Maintenance of equipment	18.6	17.2	16.4	15.9	17.6	16.4
Traffic expenses	2.2	2.1	2.6	2.1	2.1	2.0
Transportation expenses	36.5	35.1	35.2	35.9	36.4	35.2
General expenses	2.9	2.5	2.4	2.5	2.6	2.4
Total operating expenses (excluding outside operations and taxes)	75.7	72.2	69.3	69.1	72.1	69.2
Averages per mile per day:						
Operating revenues per mile per day	$33.22	$37.09	$37.76	$34.78	$36.41	$37.61
Operating expenses per mile per day	25.14	26.77	26.17	24.05	26.26	26.02
Net operating revenue per mile per day	8.08	10.32	11.59	10.73	10.15	11.59
Operating income per mile per day	6.35	8.81	10.08	9.28	8.48	10.11

Association of Railroad Superintendents

The twenty-seventh annual meeting of the American Association of Railroad Superintendents, which is to be held in New York City on August 20 and 21, will be held at the Hotel Woodward. The Long Island Railroad has extended the courtesy of a free trip for members of the association over a portion of its electrified territory, including Flushing, Jamaica, Flatbush Avenue station, Jamaica Bay trestle and Long Beach. Aside from this no definite plan of entertainment has been outlined. It is expected that the program will include addresses by a railroad president, a vice-president, and a superintendent of transportation, in addition to the reports of committees.

MEETINGS AND CONVENTIONS

The following list gives names of secretaries, dates of next or regular meetings, and places of meeting.

AIR BRAKE ASSOCIATION.—F. M. Nellis, 53 State St., Boston, Mass. Next convention, May 4-7, 1915, Hotel Sherman, Chicago.

AMERICAN ASSOCIATION OF DEMURRAGE OFFICERS.—A. G. Thomason, Boston, Mass.

AMERICAN ASSOCIATION OF DINING CAR SUPERINTENDENTS.—H. C. Boardman, D. L. & W., Hoboken, N. J. Next convention, October, Washington.

AMERICAN ASSOCIATION OF GENERAL PASSENGER AND TICKET AGENTS.—W. C. Hope, 143 Liberty St., New York.

AMERICAN ASSOCIATION OF FREIGHT AGENTS.—R. O. Wells, I. C. R. R., East St. Louis, Ill.

AMERICAN ASSOCIATION OF RAILROAD SUPERINTENDENTS.—E. H. Harman, Room 101, Union Station, St. Louis, Mo. Next convention, August 20 and 21, New York.

AMERICAN ELECTRIC RAILWAY ASSOCIATION.—E. B. Burritt, 29 W. 39th St., New York. Annual convention, October 12-16, Atlantic City, N. J.

AMERICAN ELECTRIC RAILWAY MANUFACTURERS' ASSOCIATION.—H. G. McConnaughy, 165 Broadway, New York. Meetings with American Electric Railway Association.

AMERICAN RAILWAY ASSOCIATION.—W. F. Allen, 75 Church St., New York.

AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—C. A. Lichty, C. & N. W., Chicago. Next convention, October 20-22, 1914, Los Angeles, Cal.

AMERICAN RAILWAY ENGINEERING ASSOCIATION.—E. H. Fritch, 900 S. Michigan Ave., Chicago. Next convention, March 16-18, 1915.

AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION.—J. W. Taylor, Karpen Bldg., Chicago.

AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—A. R. Davis, Central of Georgia, Macon, Ga.

AMERICAN SOCIETY FOR TESTING MATERIALS.—Prof. E. Marburg, University of Pennsylvania, Philadelphia, Pa.

AMERICAN SOCIETY OF CIVIL ENGINEERS.—Chas. W. Hunt, 220 West 57th St., New York; 1st and 3d Wednesday, except June, July and August, New York.

AMERICAN SOCIETY OF ENGINEERING CONTRACTORS.—J. R. Wemlinger, 11 Broadway, New York; 2d Thursday of each month, at 2 P. M., 11 Broadway, New York.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 39th St., New York.

AMERICAN WOOD PRESERVERS' ASSOCIATION.—F. J. Angier, B. & O., Baltimore, Md. Next convention, January 19-21, 1915, Chicago.

ASSOCIATION OF AMERICAN RAILWAY ACCOUNTING OFFICERS.—E. R. Woodson, 1300 Pennsylvania Ave., Washington, D. C. Annual convention, April 28, 1915, Atlanta, Ga.

ASSOCIATION OF RAILWAY CLAIM AGENTS.—C. W. Egan, B. & O., Baltimore, Md.

ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.—Jos. A. Andreucetti, C. & N. W. Ry., Chicago. Annual convention, October 19-23, Chicago.

ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—P. W. Drew, 112 West Adams St., Chicago.

ASSOCIATION OF TRANSPORTATION AND CAR ACCOUNTING OFFICERS.—G. P. Conard, 75 Church St., New York.

ASSOCIATION OF WATER LINE ACCOUNTING OFFICERS.—W. R. Evans, Chamber of Commerce, Buffalo, N. Y.

BRIDGE AND BUILDING SUPPLY MEN'S ASSOCIATION.—L. D. Mitchell, Detroit Graphite Co., Chicago, Ill. Meeting with American Railway Bridge and Building Association.

CANADIAN RAILWAY CLUB.—James Powell, Grand Trunk Ry., Montreal, Que.; 2d Tuesday in month, except June, July and August, Windsor Hotel, Montreal.

CANADIAN SOCIETY OF CIVIL ENGINEERS.—Clement H. McLeod, 176 Mansfield St., Montreal, Que.; 1st Thursday, October, November, December, February, March and April, Montreal.

CAR FOREMEN'S ASSOCIATION OF CHICAGO.—Aaron Kline, 841 Lawler Ave., Chicago; 2d Monday in month, except July and August, Lytton Bldg., Chicago.

CENTRAL RAILWAY CLUB.—H. D. Vought, 95 Liberty St., New York; 2d Friday in January, May, September and November and 2d Thursday in March, Hotel Statler, Buffalo, N. Y.

CIVIL ENGINEERS' SOCIETY OF ST. PAUL.—Edw. J. Dugan, P. O. Box 654, St. Paul, Minn.; 2d Monday, except June, July, August and September, Old State Capitol Bldg., St. Paul.

ENGINEERS' SOCIETY OF PENNSYLVANIA.—Edw. R. Dasher, Box 75, Harrisburg, Pa.; 1st Friday after 10th of each month, except July and August, 31 So. Front St., Harrisburg, Pa.

ENGINEERS' SOCIETY OF WESTERN PENNSYLVANIA.—Elmer K. Hiles, Oliver Bldg., Pittsburgh; 1st and 3d Tuesday, Pittsburgh, Pa.

FREIGHT CLAIM ASSOCIATION.—Warren P. Taylor, Richmond, Va.

GENERAL SUPERINTENDENTS' ASSOCIATION OF CHICAGO.—A. M. Hunter, 605 Grand Central Station, Chicago; Wednesday preceding 3d Thursday, Transportation Bldg., Chicago.

INTERNATIONAL RAILWAY CONGRESS.—Executive Committee, 11, rue de Louvain, Brussels, Belgium. Convention, 1915, Berlin.

INTERNATIONAL RAILWAY FUEL ASSOCIATION.—C. G. Hall, 922 McCormick Bldg., Chicago.

INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—Wm. Hall, 829 West Broadway, Winona, Minn.

INTERNATIONAL RAILROAD MASTER BLACKSMITHS' ASSOCIATION.—A. L. Woodworth, Lima, Ohio. Next convention, August 18-20, Hotel Wisconsin, Milwaukee, Wis.

MAINTENANCE OF WAY & MASTER PAINTERS' ASSOCIATION OF THE UNITED STATES AND CANADA.—T. J. Goodwin, C. R. I. & P., Eldon, Mo. Next convention, November 17-19, 1914, Detroit, Mich.

MASTER BOILER MAKERS' ASSOCIATION.—Harry D. Vought, 95 Liberty St., New York.

MASTER CAR BUILDERS' ASSOCIATION.—J. W. Taylor, Karpen Bldg., Chicago.

MASTER CAR & LOCOMOTIVE PAINTERS' ASSOCIATION OF THE UNITED STATES AND CANADA.—A. P. Dane, B. & M., Reading, Mass. Next convention, September 8-11, Nashville, Tenn.

NATIONAL RAILWAY APPLIANCES ASSOCIATION.—Bruce V. Crandall, 537 So. Dearborn St., Chicago. Next convention, March 15 to 19, 1915, Chicago.

NEW ENGLAND RAILROAD CLUB.—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass.; 2d Tuesday in month, except June, July, August and September, Boston.

NEW YORK RAILROAD CLUB.—H. D. Vought, 95 Liberty St., New York; 3d Friday in month, except June, July and August, New York.

NIAGARA FRONTIER CAR MEN'S ASSOCIATION.—E. Frankenberger, 623 Brisbane Bldg., Buffalo, N. Y. Meetings monthly.

PEORIA ASSOCIATION OF RAILROAD OFFICERS.—M. W. Rotchford, Union Station, Peoria, Ill.; 2d Thursday in month, Jefferson Hotel, Peoria.

RAILROAD CLUB OF KANSAS CITY.—C. Manlove, 1008 Walnut St., Kansas City, Mo.; 3d Friday in month, Kansas City.

RAILROAD MASTER TINNERS, COPPERSMITHS & PIPEFITTERS' ASSOCIATION.—L. G. Thompson, C. & E. I., Danville, Ill.

RAILWAY BUSINESS ASSOCIATION.—Frank W. Noxon, 30 Church St., New York.

RAILWAY CLUB OF PITTSBURGH.—J. B. Anderson, Penna. R. R., Pittsburgh, Pa.; 4th Friday in month, except June, July and August, Pittsburgh.

RAILWAY DEVELOPMENT ASSOCIATION.—W. Nicholson, Kansas City Southern, Kansas City, Mo.

RAILWAY ELECTRICAL SUPPLY MANUFACTURERS' ASSOCIATION.—J. Scribner, 1021 Monadnock Block, Chicago. Meetings with Association of Railway Electrical Engineers.

RAILWAY FIRE PROTECTION ASSOCIATION.—C. B. Edwards, Mobile & Ohio, Mobile, Ala. Annual meeting, October 6, Washington, D. C.

RAILWAY GARDENING ASSOCIATION.—J. S. Butterfield, Lee's Summit, Mo.

RAILWAY SIGNAL ASSOCIATION.—C. C. Rosenberg, Bethlehem, Pa. Annual meeting, Bluff Point, N. Y., September 22-24.

RAILWAY STOREKEEPERS' ASSOCIATION.—J. F. Murphy, Box C, Collinwood, Ohio.

RAILWAY SUPPLY MANUFACTURERS' ASSOCIATION.—J. D. Conway, 2136 Oliver Bldg., Pittsburgh, Pa. Meetings with M. C. B. and M. M. Associations.

RAILWAY TELEGRAPH & TELEPHONE APPLIANCE ASSOCIATION.—G. A. Nelson, 50 Church St., New York. Meetings with Association of Railway Telegraph Superintendents.

RICHMOND RAILROAD CLUB.—F. O. Robinson, C. & O., Richmond, Va.; 2d Monday in month, except June, July and August.

ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.—L. C. Ryan, C. & N. W., Sterling, Ill. Next convention, September 8-10, 1914, Chicago.

ST. LOUIS RAILWAY CLUB.—B. W. Frauenthal, Union Station, St. Louis, Mo.; 2d Friday in month, except June, July and August, St. Louis.

SALT LAKE CITY TRANSPORTATION CLUB.—R. E. Rowland, Hotel Utah Bldg., Salt Lake City, Utah; 1st Saturday of each month, Salt Lake City.

SIGNAL APPLIANCE ASSOCIATION.—F. W. Edmunds, 3868 Park Ave., New York. Meeting with annual convention Railway Signal Association.

SOCIETY OF RAILWAY FINANCIAL OFFICERS.—Carl Nyquist, La Salle St. Station, Chicago. Annual meeting, September 15-17, Hotel Aspinwall, Lenox, Mass.

SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—E. W. Sandwich, A. & W. P. Ry., Atlanta, Ga.

SOUTHERN & SOUTHWESTERN RAILWAY CLUB.—A. J. Merrill, Grant Bldg., Atlanta, Ga.; 3d Thursday, January, March, May, July, September, November, 10 A. M., Candler Bldg., Atlanta.

TOLEDO TRANSPORTATION CLUB.—J. S. Marks, Agent, Interstate Despatch, Toledo, Ohio; 1st Saturday in month, Boody House, Toledo.

TRACK SUPPLY ASSOCIATION.—W. C. Kidd, Ramapo Iron Works, Hillsburn, N. Y. Meetings with Roadmasters' and Maintenance of Way Association.

TRAFFIC CLUB OF CHICAGO.—W. H. Wharton, La Salle Hotel, Chicago.

TRAFFIC CLUB OF NEW YORK.—C. A. Swope, 291 Broadway, New York; last Tuesday in month, except June, July and August, Waldorf-Astoria, New York.

TRAFFIC CLUB OF PITTSBURGH.—D. L. Wells, Erie R. R., Pittsburgh, Pa.; meetings bimonthly, Pittsburgh. Annual meeting, 2d Monday in June.

TRAFFIC CLUB OF ST. LOUIS.—A. F. Versen, Mercantile Library Bldg., St. Louis, Mo. Annual meeting in November. Noonday meetings October to May.

TRAIN DESPATCHERS' ASSOCIATION OF AMERICA.—J. F. Mackie, 7122 Stewart Ave., Chicago.

TRANSPORTATION CLUB OF BUFFALO.—J. M. Sells, Buffalo; first Saturday after first Wednesday.

TRANSPORTATION CLUB OF DETROIT.—W. R. Hurley, Superintendent's office, L. S. & M. S., Detroit, Mich.; meetings monthly, Normandie Hotel, Detroit.

TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, N. Y. C. & H. R., East Buffalo, N. Y. Next meeting, September 15-18, Hotel Sherman, Chicago.

UTAH SOCIETY OF ENGINEERS.—Frank W. Moore, Newhouse Bldg., Salt Lake City, Utah; 3d Friday of each month, except July and August, Consolidated Music Hall, Salt Lake City.

WESTERN CANADA RAILWAY CLUB.—W. H. Rosevear, P. O. Box 1707, Winnipeg, Man.; 2d Monday, except June, July and August, Winnipeg.

WESTERN RAILWAY CLUB.—J. W. Taylor, 1112 Karpen Bldg., Chicago; 3d Tuesday of each month, except June, July and August, Karpen Bldg., Chicago.

WESTERN SOCIETY OF ENGINEERS.—J. H. Warder, 1735 Monadnock Block, Chicago; regular meeting 1st Monday in month, except January, July and August, Chicago. Extra meetings, except in July and August, generally on other Monday evenings.

Traffic News

The definite announcement of a steamship passenger service from the Atlantic to the Pacific coast through the Panama Canal to be inaugurated with the opening of the Panama-Pacific International Exposition has been made by the traffic department of the exposition. The International Mercantile Company will operate the "Panama-Pacific Line." The trips will be made by the *Finland* and the *Kroonland*, two of the finest Atlantic ocean vessels and both in the Red Star fleet.

Clifford Thorne, chairman of the Iowa Railroad Commission, has already begun a campaign against the expected plan for an advance in freight rates on the western roads. He has addressed a letter to the shippers of the state to heed its suggestions. Much can be done to ease the situation when car shortage begins by following the suggestions of the Association of Western Railways."

Car Surpluses and Shortages

Arthur Hale, chairman of the committee on relations between railroads, of the American Railway Association, in presenting statistical bulletin No. 171-A, giving a summary of car surpluses and shortages by groups from July 15, 1913, to July 15, 1914 says: The total surplus on July 15, 1914, was 228,384 cars; on July 1, 1914, 220,875 cars, and on July 15, 1913, 76,280 cars.

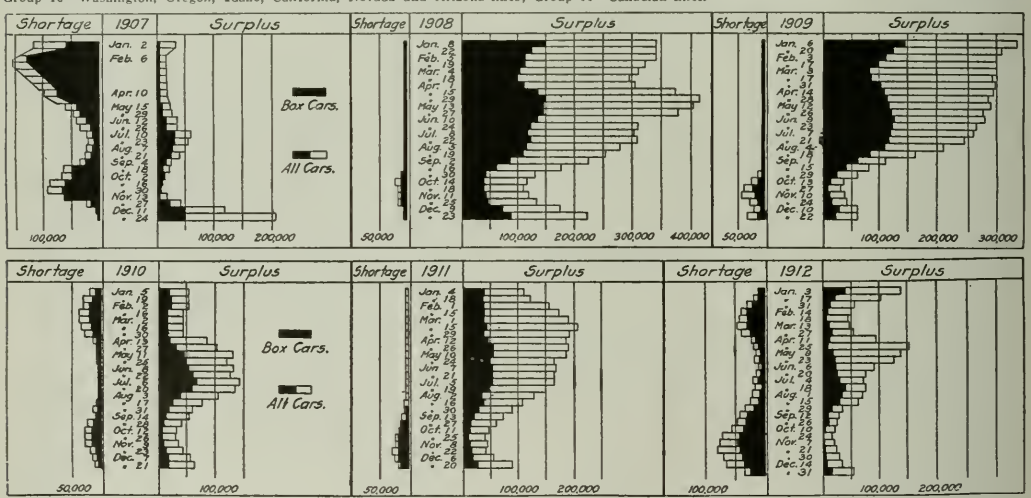
The total surplus increased about 7,500 cars in the past two weeks, and stands at 228,384, the largest for the same period in any year since 1909.

Surplus coal cars increased generally, and the total box car surplus shows an increase in all sections, except in the winter

CAR SURPLUSES AND SHORTAGES

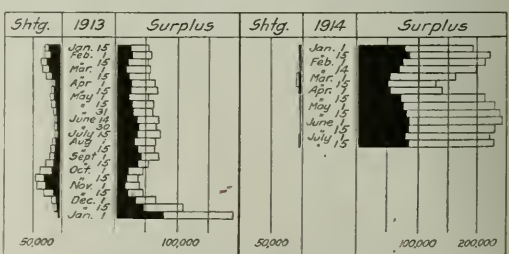
Date	No. of roads.	Surpluses Box.	Flat.	Coal, gondola and hopper.	Other kinds.	Total.	Shortages Box.	Flat.	Coal, gondola and hopper.	Other kinds.	Total.
Group *1.—July 15, 1914	8	2,092	345	1,580	450	4,476	13	3	11	2	29
" 2.— " 15, 1914	28	3,573	244	23,189	9,497	36,503	0	6	0	0	6
" 3.— " 15, 1914	32	5,970	738	44,619	4,887	56,214	98	50	0	214	362
" 4.— " 15, 1914	12	5,849	2,009	6,563	1,728	16,149	0	17	0	0	17
" 5.— " 15, 1914	23	1,691	622	5,710	1,658	9,681	251	2	0	0	253
" 6.— " 15, 1914	29	19,877	510	5,933	5,721	32,041	194	9	5	7	215
" 7.— " 15, 1914	4	2,563	41	723	1,249	4,576	0	0	0	0	0
" 8.— " 15, 1914	15	11,877	363	2,203	4,157	18,600	126	113	154	16	409
" 9.— " 15, 1914	14	870	128	122	892	2,012	6	15	106	0	127
" 10.— " 15, 1914	22	12,993	1,228	2,858	9,281	26,360	179	196	16	34	425
" 11.— " 15, 1914	4	18,638	701	0	2,433	21,772	0	0	0	0	0
Total	191	85,993	6,929	93,509	41,953	228,384	867	411	292	273	1,843

*Group 1 is composed of New England lines; Group 2—New York, New Jersey, Delaware, Maryland and Eastern Pennsylvania lines; Group 3—Ohio, Indiana, Michigan and Western Pennsylvania lines; Group 4—West Virginia, Virginia, North and South Carolina lines; Group 5—Kentucky, Tennessee, Mississippi, Alabama, Georgia and Florida lines; Group 6—Iowa, Illinois, Wisconsin and Minnesota lines; Group 7—Montana, Wyoming, Nebraska, North Dakota and South Dakota lines; Group 8—Kansas, Colorado, Missouri, Arkansas and Oklahoma lines; Group 9—Texas, Louisiana and New Mexico lines; Group 10—Washington, Oregon, Idaho, California, Nevada and Arizona lines; Group 11—Canadian lines.



dressed to the western state commissions a long letter enclosing a copy of a "strictly private and confidential" letter sent out by J. M. Johnson as chairman of a meeting of western railroad officers held in Chicago in May to consider the matter of asking for an increase in rates. The letter outlined a tentative plan which had been considered at that meeting. Mr. Thorne calls on the western commissioners to "give the matter some consideration." He estimates from the tentative plan that the western railroads "have agreed to attempt to secure an advance in freight revenues aggregating $100,000,000."

Chairman John H. Roemer, of the Wisconsin Railroad Commission, has issued a public statement to shippers, advising that all coal, lumber and cement shipments be made immediately, before the time to move crops, in order to avoid the possibility of a car shortage. Mr. Roemer cites the circular sent out last



Car Surpluses and Shortages, 1907 to 1914

wheat states and on the Pacific coast, where there is a slight reduction; there is still, however, a considerable surplus there.

The total shortage on July 15, 1914, was 1,843 cars; on July 1, 1914, 1,335 cars, and on July 15, 1913, 6,875 cars.

The shortage of 1,843 cars is spread out over the whole country and is trifling in any group.

The accompanying table gives car surplus and shortage figures by groups for the last period covered in the report and the diagram shows total bi-weekly surpluses and shortages from 1907 to 1914.

Car Balance and Performance

Arthur Hale, chairman of the committee on relations between railroads, of the American Railway Association, in presenting statistical bulletin No. 472, covering car balances and performances for March, 1914, says:

The committee presents herewith statistical bulletin No. 172, covering car balance and performance for March of this year.

The miles per car per day were 23.8 compared with 21.8 for February. This figure for March, 1913, was 23.7.

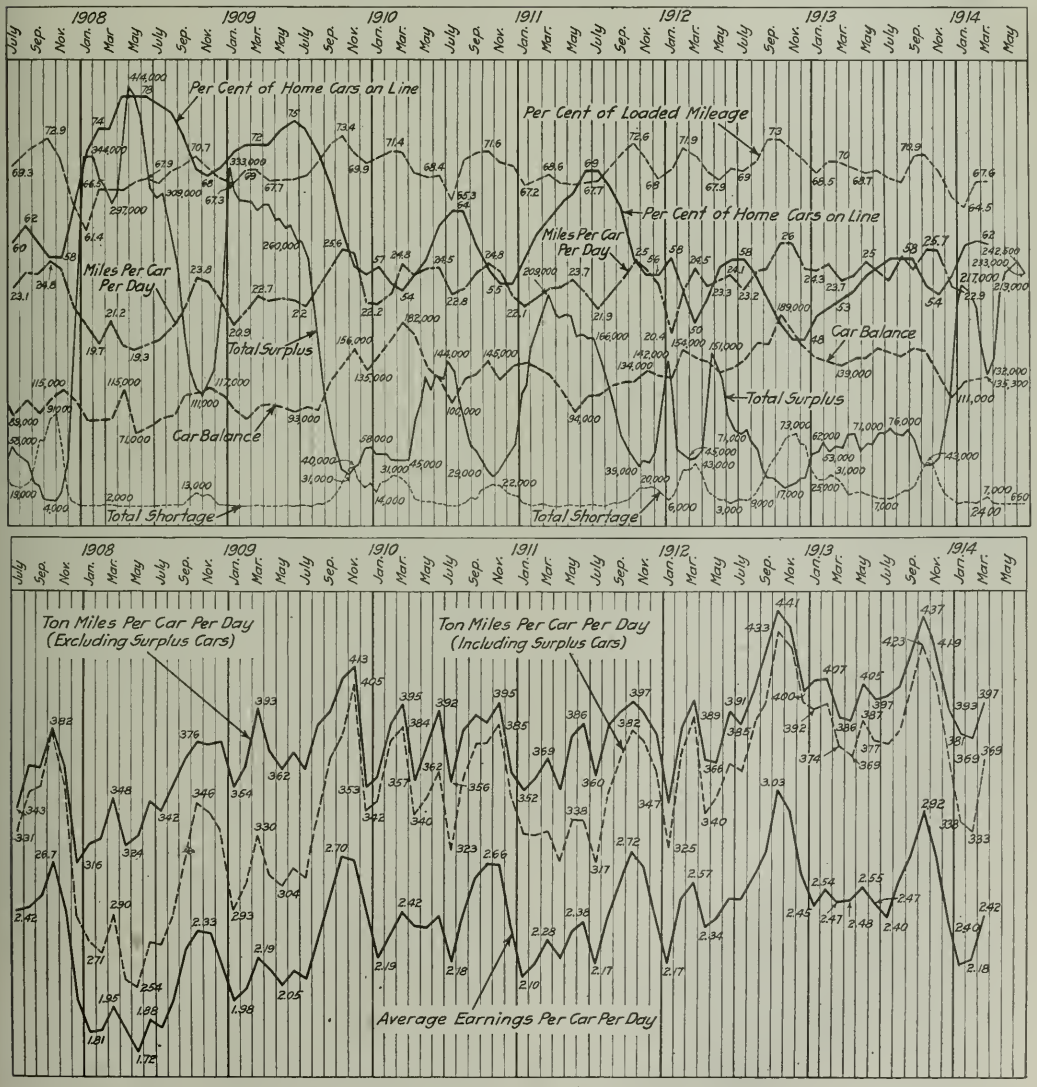
Ton miles per car per day for March were 369, compared with 333 for February. This is a decrease of 1.34 per cent., compared with the figure for March, 1913, which was 374.

The proportion of home cars on line was 62 per cent., compared with 63 per cent. in February. This is an increase of 9 points over March, 1913.

The per cent. of loaded car mileage increased from 67.5 per cent. in February to 67.6 per cent. in March. This figure for March, 1913, was 70.0 per cent.

The average earnings per car per day increased 22 cents to $2.42 in March. This figure for March, 1913, was $2.47.

The table on the next page gives car balance and performance in the month covered by the report, and the diagram shows car earnings and car mileage and different car performance figures monthly from July, 1907.



Freight Car Mileage, Earnings and Performance, 1907 to 1914

CAR BALANCE AND PERFORMANCE IN MARCH, 1914

	New England.	N. Y., N. J., Del., Md., Eastern Pa.	Ohio, Ind., Mich., Western Pa.	Va., W. Va., No. and So. Carolina.	Ky., Tenn., Miss., Ala., Ga., Fla.	Iowa, Ill., Wis., Minn.	Mont., Wyo., Neb., Dakotas.	Kan., Colo., Okla., Mo., Ark.	Texas, La., New Mex.	Ore., Idaho, Nev., Cal., Ariz.	Canadian Lines.	Grand Total.
Revenue freight cars owned	89,574	704,330	207,712	199,116	178,570	456,391	20,242	145,910	31,358	144,680	177,958	2,355,841
Average number of system cars on line	50,977	408,916	131,410	122,210	102,371	323,773	8,970	89,276	22,569	79,156	116,089	1,455,717
Railway-owned cars: Average foreign on line	49,149	268,961	93,258	75,579	61,967	127,334	10,162	56,103	17,827	35,541	37,578	833,459
Total railway-owned cars on line	100,126	677,877	224,668	197,789	164,338	451,107	19,132	145,379	40,396	114,697	153,667	2,289,176
Excess	10,552	*26,453	16,956	*1,327	*14,232	*5,284	*1,110	*531	9,038	*29,983	*24,291	*66,665
Per cent. of cars on line to total owned:												
Home	57	58	63	61	57	71	44	61	72	55	65	62
Foreign	55	38	45	38	35	28	50	34	57	24	21	35
All railways	112	96	108	99	92	99	94	95	129	79	86	97
Private cars on line	4,038	33,087	9,192	5,652	9,423	15,652	1,845	7,335	4,244	9,505	2,589	102,562
Total all cars on line	104,164	710,964	233,860	203,441	173,761	466,759	20,977	152,714	44,640	124,202	156,256	2,391,738
Per cent. of cars in shop	7.34	7.53	12.09	8.06	9.48	6.07	6.45	9.65	8.72	7.30	5.50	7.91
No. of freight engines owned	1,470	10,875	3,114	3,510	2,939	7,408	502	2,921	847	2,940	2,632	39,158
Average cars on line per freight engine owned	71	65	75	58	59	63	42	52	53	38	59	61
Total freight-car mileage	59,027,401	514,888,004	148,720,853	153,828,770	141,495,257	338,726,854	25,236,392	104,188,170	36,265,337	124,487,337	109,165,188	1,756,029,563
Average miles per car per day	18.3	23.4	20.6	24.4	26.3	23.3	38.8	22.9	26.7	32.3	22.5	23.8
Per cent. loaded mileage	72.8	66.3	68.3	65.4	70.3	70.0	74.5	66.7	63.3	54.7	77.7	67.6
Ton-miles of freight, including company freight	709,346,116	8,503,635,392	2,416,375,155	2,446,530,298	2,131,809,776	4,152,153,908	383,342,492	1,128,283,835	440,877,582	1,716,568,211	1,640,145,264	25,669,068,029
Average ton-miles, including company freight:												
Per car-mile	12.0	16.5	16.3	15.9	15.1	15.1	15.2	13.6	12.2	14.4	15.0	15.4
Per loaded car-mile	16.5	24.9	23.9	24.3	21.6	22.0	20.4	20.3	19.2	26.7	19.3	21.0
Per car per day	220	386	338	388	399	366	589	316	321	458	339	369
Gross freight earnings	$7,397,823	$49,053,867	$13,672,476	$15,009,551	$14,028,667	$34,568,074	$2,728,688	$11,043,671	$2,698,727	$17,876,525	$11,265,489	$179,343,558
Average daily earnings: Per car owned	$2.66	$2.24	$2.12	$2.43	$2.53	$2.44	$4.35	$2.35	$2.78	$3.99	$2.04	$2.45
Per railroad car on line	2.38	2.33	1.96	2.45	2.75	2.47	4.60	2.45	2.16	5.05	2.36	2.53
All cars on line	2.29	2.23	1.89	2.38	2.60	2.39	4.20	2.33	1.95	4.66	2.33	2.42

*Denotes deficiency.

Commission and Court News

INTERSTATE COMMERCE COMMISSION

The commission is to make a general country-wide investigation into the practice of railroads in refusing to accept freight at certain points for lack of cars or other reasons.

Examiner Esch held a hearing at Chicago last week in an investigation by the commission in the matter of stopping in transit for partial loading and unloading of livestock. The Western Trunk Line roads in May filed tariffs increasing the charge for stopping a train for partial loading or unloading from $2 to $5, which were suspended by the commission. The roads now want to abandon the stops.

Examiner Brown held a hearing in Chicago on July 21, on the complaint of the E. C. Best Company, of Milwaukee, charging unreasonable and discriminatory rates on potatoes in heated cars for shipment to Minnesota, North and South Dakota, Wisconsin, Illinois and Missouri points. A new tariff was filed in April, making increases of 4 to 7 cents per hundred pounds to these points, which the complainant alleges to be discriminatory to Minnesota potato shippers. The shippers also object to an alternative clause in the new tariff, which provides a rate for a car heated by the carrier and another rate for cars to be heated by the shipper.

A hearing was held at Chicago last week before Examiner Brown, on a petition filed by the Atchison, Topeka & Santa Fe, Chicago, Burlington & Quincy, Missouri, Kansas & Texas, Missouri Pacific, St. Louis & San Francisco, Kansas City Southern, St. Joseph & Grand Island and the Union Pacific, asking for the cancellation of a tariff filed by the Kansas City Stockyards Company, imposing a trackage charge of 75 cents a car on every carload of cattle sent into the yards of the Stockyards company, for unloading, or loading, at a stockyards chute. The Stockyards company does not operate engines, the cars being brought onto its tracks by the locomotives of the trunk line carriers. The railroads allege that these tracks are mere plant facilities.

Complaint has been filed with the Interstate Commerce Commission by Charles R. McCormick & Co., against the San Pedro, Los Angeles & Salt Lake and other roads, in a case similar to the Shreveport rate case recently decided by the Supreme Court. The complaint involves rates made by the Arizona Railroad Commission, which result in rates on lumber and forest products from Flagstaff, Williams and Cliff, Ariz., to other Arizona points, lower than from San Pedro and Los Angeles, Cal. The complainant asks for a reduction enabling it to meet the competition created by the state rates. The complainant cites a paragraph from an order of the Arizona commission as follows: "In establishing rates on lumber and timber which we deem reasonable as compared with the San Pedro rates, we announce that if the carriers further disturb this relationship by a reduction in the San Pedro rates, it is to be reasonably expected that this commission will make a similar readjustment of the rates in northern Arizona."

A hearing on the application of the western railways for a general readjustment of freight rates from the Missouri river to Utah points was begun at Salt Lake City on July 21, before Commissioner H. C. Hall. The rates were filed by the railways some time ago and were suspended by the Interstate Commerce Commission on the protest of the Salt Lake City Commercial Club Traffic Bureau until July 20, and since that time they have been again suspended until January 20, 1915. The first day's session was taken up by the testimony of W. A. Poteet, chairman of the Trans-Missouri Freight Bureau, who presented a large amount of documentary evidence as to the proposed changes in rates and the plan on which they had been compiled. Mr. Poteet said that the equalization of rates west of the Missouri river was destroyed by the decisions of the Interstate Commerce Commission in the Salt Lake, Spokane and Colorado rate cases, and that the proposed advances were intended to bring about a readjustment to restore the equality from eastern

shipping points. The new tariffs, he said, established a more equitable relationship than that now in effect, and include 187 items on which rates are increased, 158 on which the rates are reduced, and 62 on which no changes are made. The advances, he said, were to correct discrimination against Colorado points. The Traffic Bureau of Utah (the new name of the Commercial Club Traffic Bureau) which is the principal complainant in the case, asked for a postponement until October 1, which was agreed to by the railroads, but Commissioner Hall said it was necessary for the case to be heard at the time set if it was to be heard before a commissioner, on account of the itinerary which had been arranged.

Rates on Apples from Virginia to Eastern Cities

John Nix & Company et al. v. Southern Railway et al. Opinion by the commission:

The commission finds that the rates on apples from points in Virginia to New York, Philadelphia, Baltimore and Washington are not unreasonable nor discriminatory. (31 I. C. C., 145.)

Rates on Cast Iron Pipe from Birmingham

Southern States Supply Company v. Southern Railway, et al. Opinion by the commission:

The commission finds that the rate of 22 cents per 100 lb. on cast iron pipe in carloads from Birmingham, Ala., to Columbia, S. C., is neither unreasonable nor prejudicial. (31 I. C. C., 30.)

Complaint Dismissed

Edward Wolverton v. Union Pacific. Opinion by the commission:

Complaint is made that double the first-class rate charged for the transportation of an automobile, crated, from Wamsutter, Wyo., to Boulder, Colo., was unreasonable to the extent that it exceeded the first-class rate. The evidence shows that the automobile was not crated in accordance with the classification requirement, and that double the first-class rate was the published rate for such a shipment. (31 I. C. C., 23.)

Lumber to Nashville, Tenn.

Opinion by Commissioner Hall:

The commission finds that certain proposed increases in the rates on lumber from points in Kentucky and Tennessee on the Memphis division of the Louisville & Nashville to Nashville, Tenn., are not justifiable. The carrier seeks to remove certain inconsistencies and inequalities in the rates, but it is the commission's opinion that the inconsistencies and inequalities which the proposed schedule would create are greater than any it seeks to do away with. (31 I. C. C., 186.)

Kaufman, Tex., Discriminated Against

Kaufman Commercial Club v. Texas & New Orleans et al. Opinion by Commissioner Daniels:

The commission finds that defendants' rates on grain and grain products from points in Kansas and Oklahoma to Kaufman, Tex., are prejudicial as compared with the rates to Terrell, Tex., about 10 miles to the north of Kaufman and in a different rate group. It is, therefore, ordered that the rates on the commodities involved to Kaufman should not be in excess of those to Terrell. (31 I. C. C., 167.)

Refusal to Deliver Cars Except Upon Certain Conditions as to Routing

R. E. Downie Pole Company v. Northern Pacific et al. Opinion by the commission:

The defendant refused to furnish its own cars for a shipment of cedar poles from complainants' spur at Inglewood near Redmond, Wash., unless complainant would agree to route the shipment over the Northern Pacific via its lines to Portland, thereby giving the road a longer haul. Complainant was therefore compelled to ship via Portland, thereby losing the benefits of the lower rate through Seattle. The Northern Pacific did not restrict the application of its local rates on poles from Redmond to Seattle to intrastate traffic. It filed the tariffs naming those rates with this commission, and in the absence of joint through rates between it and the Oregon-Washington Railroad & Navigation Company via Seattle was required to use them in constructing through rates on traffic through that gateway. That requirement carried with it the duty on the part of the Northern Pacific to furnish cars and to make suitable arrangements with the Oregon-Washington for the transportation beyond Seattle. The commission, therefore, awards damages for the excess in the rates via Portland over those via Seattle. (31 I. C. C., 142.)

Tennessee Central Joint Passenger Fares

Blanton W. Burford et al v. Louisville & Nashville et al Opinion by the commission:

The refusal of the Louisville & Nashville and the Nashville, Chattanooga & St. Louis, to enter into arrangements with the Tennessee Central for through routes and joint interstate passenger fares from points on their lines to Bloomington, Horn Springs and Hamilton Springs, Tenn., points on the Tennessee Central at which complainants' resorts are located, while participating in through routes and joint fares to resorts on the lines of the Southern Railway, the Illinois Central and other carriers is held by the commission to be discriminatory. (31 I. C. C., 182.)

Class Rates from Pueblo to Durango, Col.

Pueblo Commerce Club v. Denver & Rio Grande. Opinion by the commission:

Complaint is directed against the second, third, fourth and fifth class rates from Pueblo to Durango, Col., principally on the ground that they are the same as the corresponding class rates from Denver to Durango. The commission, however, finds that the rates are not discriminatory. Although Pueblo does not appear to be given the full benefit of its location with respect to the rates to Durango, it has a compensating advantage in that it is given the same rates as Denver to points in Wyoming and Nebraska to which the distance from Pueblo via the short line is 119 miles greater than from Denver. (31 I. C. C., 133.)

Grain Elevation Allowances at St. Louis

Opinion by Commissioner McChord:

The commission finds justified the withdrawal by the carriers of an elevation allowance of one-fourth cent per bushel at St. Louis and East St. Louis on grain when destined to Evansville, Ind., it appearing that the proportional out of which the allowance is made is a compelled rate. It is also held that a comparison of rates from St. Louis and East St. Louis to Evansville with that from Peoria to the same destination does not necessarily signify undue discrimination if the withdrawal of the respondents' concurrence in the rate from the latter point would not affect the movement, rates, or practices respecting elevation. The test of discrimination is the ability of one of the carriers participating in the two through routes to put an end to the discrimination by its own act. (31 I. C. C., 696.)

Rates on Boots and Shoes from Boston to Atlanta

In re the investigation and suspension of advances in rates by carriers for the transportation of boots and shoes from Boston, Mass., and other points to Atlanta, Ga. Opinion by Commissioner Clements:

The commission finds that the respondents have failed to justify certain proposed increases in the rates on boots and shoes from Boston, New York and other eastern port cities to Atlanta, Ga., via water and rail routes and it is, therefore, ordered that they maintain for the future rates not in excess of those at present in effect, which were prescribed by the commission in the case of *Kiser & Company v. Central of Georgia* (17 I. C. C., 430) decided November 27, 1909, and the two year period having expired. (31 I. C. C., 154.)

Rental Charges for Insulated Cars

Opinion by Commissioner Harlan:

The rule under consideration in this case relates to the movement of potatoes from points of origin in Minnesota and neighboring states and reads as follows: "When shipper orders a refrigerator or other insulated car to be heated by him or to move without heat, a charge of $5 per trip will be made for use of car and will accrue to the owner thereof." The commission finds this rule to be reasonable. It will probably work to increase the available supply of cars, particularly since the private car lines have announced their willingness to supply cars on this

basis. It is also the fact that in the beginning potatoes moved in box cars during the fall months and that rates were fixed on that basis, but that now they were more largely in refrigerator cars during the winter months. (31 I. C. C., 255.)

Milling-in-Transit Charges

F. W. Stock & Sons v. Lake Shore & Michigan Southern. Opinion by the commission:

Complainant having mills at Hillsdale and Litchfield, Mich., on defendant's line draws its grain from points in Michigan, Indiana, Illinois and western trunk line territory, and ships grain products principally to points in the east. The tariffs provide for milling in transit on the basis of the through rate applying on the grain or grain product, whichever is higher, from point of origin to destination, plus a charge of one-half cent per 100 lb. If there is an out-of-route or back haul and provided the grain moves into the milling point and the product out over the same road, the charge is made on the basis of a distance scale varying from 1½ cents for 25 miles or less to 5½ cents for 250 and over 175 miles plus the local, reshipping or proportional rate from the milling point to final destination. The commission finds that this arrangement is neither unreasonable nor discriminatory. (31 I. C. C., 150.)

Apple Rates from Espanola, N. Mex.

M. W. Thompson v. Atchison, Topeka & Santa Fe, et al. Opinion by the commission:

In the original report in this case, the commission held that the rates on carload shipments of apples from Espanola, N. Mex. (a local station on a branch narrow-gage line of the Denver & Rio Grande), to certain points in Arizona were unreasonable to the extent that they exceeded a rate of 80 cents per 100 lb., minimum weight, 30,000 lb. In view of the facts developed on rehearing, however, the commission is of the opinion that the 80-cent joint rate was possibly too low. The present rate from Santa Fe to the points of destination is $1, and that rate, covering a large number of points of origin, is not here in issue. A lower rate from Espanola would not be proper if the $1 rate is to be maintained from Santa Fe and other points. Without deciding whether the present rate of $1 from Colorado common points and Santa Fe is reasonable, it finds that a joint rate should be established from Espanola on the same basis. (31 I. C. C., 138.)

Fruit Rates from California to Florida

Pacific Fruit Exchange v. Southern Pacific et al. Opinion by Commissioner Meyer:

At present deciduous fruits in carloads move from California points to Montgomery, Ala., at a combination rate of $1.60 per 100 lb., made up of the western lines blanket or territorial rate of $1.15 to Memphis and an unpublished proportional of 45 cents from Memphis beyond. The rate to Tampa, Fla., is $1.92 made up of $1.62 to Jacksonville and 30 cents beyond. Request is made that the blanket rate of $1.15 be applied to Montgomery and that of $1.92 be applied to Tampa. The southern lines are opposed to the idea. The western lines have favored it, on the other hand, but have been unwilling to decrease their own revenues in order to permit the necessary reductions. The commission does not believe that the application of blanket rates would be justified, but that remedy should be sought in negotiations which are now going on between the southern and western carriers concerning reductions in the rates involved, and it is prepared to take up the matter again if reductions are not made. It is also found that the southeastern roads' proportionals of the through rates are not unreasonable. A fourth section application requesting permission to continue lower rates to Montgomery than to intermediate points such as Baltimore, to which it is intermediate via certain routes is granted, it appearing that the larger part of the traffic moves over a circuitous route. (31 I. C. C., 159.)

The Minnesota Rate Case as Affecting Passenger Fares

Hans Trier v. Chicago, St. Paul, Minneapolis & Omaha. Opinion by Commissioner Daniels:

This case was originally reported in 30 I. C. C., 352, a brief abstract of the report being given in the *Railway Age Gazette* of May 29, 1914, page 1210. Rehearing is now asked on the ground that the commission did not give due heed to this question: Does the fact that the rate charged for one leg of an interstate journey exceeds the maximum allowed by the statute of the state in which that leg lies cast the burden of proof on defendant to establish the reasonableness of the through rates? The commission decides this question in the negative and dismisses the petition for a rehearing. It holds that for the purpose of determining the reasonableness of an interstate rate, a rate established by the state is no more to be presumed reasonable than one voluntarily by the carrier.

On principle it would seem that the reasonableness *per se* of an interstate rate should be independently determined. It is inclined to doubt the propriety and legality of permitting the assumption that a passenger who buys a through ticket for an interstate journey pays a charge which consists of a combination of a number of state charges, or of an interstate charge plus an intrastate charge. It would seem that an interstate journey should be viewed in its entirety, and that a complainant should not be permitted, except so far as the fourth section is applicable, to divide the interstate rate into as many parts as the number of states through which the interstate journey runs, merely for the purpose of ascertaining whether each separate intrastate leg of an interstate journey carries a rate which conforms to the rate prescribed for intrastate trips by the state in which that leg lies. (31 I. C. C., 707.)

STATE COMMISSIONS

The Missouri Railroad & Warehouse Commission has issued a decision ordering the cancellation of tariffs filed in October, 1913, by the Atchison, Topeka & Santa Fe, Missouri, Kansas & Texas, St. Louis & San Francisco, Kansas City Southern, and Chicago, Burlington & Quincy, naming team track charges for the detention of cars after free time upon the team tracks at Kansas City, Mo. The tariffs were suspended by the commission some time ago pending an investigation.

The Missouri Public Service Commission held a hearing at Jefferson City on July 21, on a proposed order requiring the publication of additional joint rates and through routes. The hearing was postponed until September 24, by which time it is expected the roads will be able to present a satisfactory plan. The commission advised the roads that any rates filed under this plan would not militate against their proposal to ask for a general advance in freight or passenger rates in the state.

The Pennsylvania Public Service Commission, acting on the application of certain railroad companies, has concluded that the law of the state does not prevent a common carrier from according free or reduced rate transportation to a contractor, his men, materials, tools, equipment and supplies, etc., necessary to be transported by such contractor in the performance of work being done for the carrier by the contractor. The contractor, under such circumstances, is, to all practical intents and purposes, an employee of the carrier engaged in work for the carrier, and the transportation is, in substance and effect, transportation rendered by the carrier to itself.

PERSONNEL OF COMMISSIONS

Thomas L. Wolf has resigned as rate clerk for the Illinois Public Utilities Commission to engage in other business.

John F. Meaney has been appointed a member of the Massachusetts Public Service Commission in place of George W. Bishop, whose term has expired. Mr. Bishop has been a railroad commissioner for many years. He has now been appointed chief of one of the bureaus of the commission.

COURT NEWS

All evidence to be presented by both sides in the suit of the state of Illinois against the Illinois Central to collect $2,500,000 in back taxes has been presented before the special master, L. D. Puterbaugh, who has set August 24 for the beginning of arguments.

Railway Officers

Executive, Financial, Legal and Accounting

J. R. Frink has been elected secretary and treasurer of the Macon, Dublin & Savannah, with headquarters at Macon, Ga., vice A. S. Hale, resigned, effective July 16.

H. E. Cartwright has been appointed auditor of disbursements of Wells Fargo & Company, with headquarters at Chicago, succeeding J. G. Innes, resigned to accept service in the operating department.

Operating

John F. Tracy, assistant trainmaster of the St. Paul division of the Northern Pacific, has been appointed trainmaster at Minneapolis, Minn.

E. A. Sollitt, assistant division superintendent of the Wabash at Montpelier, Ohio, has been appointed acting superintendent of the Peru division, with office at Peru, Ind., in place of J. C. Sullivan, granted leave of absence on account of ill health.

Traffic

Jonathan Story has been appointed traveling passenger agent of the Wabash, with headquarters at Boston, Mass., reporting to J. D. McBeath, New England passenger agent.

W. B. Groseclose, formerly assistant freight traffic manager of the Missouri, Kansas & Texas, has been appointed traffic manager of the Detroit, Toledo & Ironton, with headquarters at Detroit, Mich. The office of general freight and passenger agent, heretofore filled by H. C. Bell, is abolished. Mr. Groseclose was born October 27, 1858, at Salisbury, N. C. He entered railway service in 1876 and from that time until 1888 was consecutively clerk, operator and agent of the Indianapolis & St. Louis and the Atchison, Topeka & Santa Fe, and cashier, agent and route agent of the Adams and Wells Fargo expresses. On December 10, 1888, he was appointed agent of the St. Louis, Arkansas & Texas, of Texas, retaining that position until April, 1890, when he became general agent. From July, 1890, until July, 1893, he was general freight agent of the same road which is now the St. Louis Southwestern, of Texas. In July, 1893, he became the general manager of the Tyler Car & Lumber Company, Tyler, Tex., but in June, 1894 was appointed commissioner of the Galveston Freight Bureau. From January 15, 1895, to November 15, 1898, he was assistant general freight agent of the Missouri, Kansas & Texas, of Texas, at Houston, Tex. On November 15, 1898, he was appointed to a similar position on the Missouri, Kansas & Texas, at St. Louis, and on January 15, 1901, succeeded to the position of general freight agent. From June 1, 1910, to January 1, 1914, he held the position of assistant freight traffic manager, with headquarters at Chicago, as above noted.

W. B. Groseclose

R. E. Larmour has been appointed assistant general freight agent of the Canadian Pacific, with office at Vancouver, B. C., and has been succeeded as division freight agent at Vancouver by H. A. Plow. Gerald Hiam has been appointed division freight agent at Fort William, Ont., succeeding C. S. Morse, transferred, and K. Elliott has been appointed city freight agent at Calgary, Alta., all four of the above appointments being effective July 1. Effective July 25, O. H. Becker has been appointed district freight agent at Portland, Ore., succeeding E. L. Cardle, resigned, and has been succeeded as district freight agent at Tacoma, Wash., by Nelson Fleming.

J. W. Gray, assistant general claim agent of the Beaumont, Sour Lake & Western, has been appointed general claim agent of the Houston Belt & Terminal, vice W. J. Laffey, resigned, and has been succeeded by C. E. Belk.

C. C. Cameron, coal traffic manager of the Illinois Central, has been appointed general freight agent of the northern and western lines, and has been succeeded by Burton J. Rowe, assistant general freight agent of the northern and western lines. These officers will have headquarters at Chicago.

J. H. Peebles, superintendent of the Nashville, Chattanooga & St. Louis, has been appointed assistant general passenger agent of this road and the Western & Atlantic with headquarters at Chattanooga, Tenn. W. I. Lightfoot, assistant general passenger agent at Nashville, Tenn., has assumed immediate charge of the solicitation of all passenger traffic.

Engineering and Rolling Stock

Thomas Turnbull has been appointed assistant chief engineer of the Canadian Northern, effective July 21.

Purchasing

George E. Scott, whose appointment as purchasing agent of the Missouri, Kansas & Texas, with headquarters at St. Louis, Mo., has already been announced in these columns, was born May 27, 1885, at Cleveland, Ohio. He received a grammar school education, and began railway work with the Lake Shore & Michigan Southern in July, 1901, as telegraph messenger at Toledo, Ohio. Subsequently he was clerk to the assistant superintendent and superintendent, and from December, 1905, to January, 1907, was secretary to the general superintendent and assistant general manager of that road at Cleveland. He was then until July, 1911, secretary to the vice-president of the New York Central Lines at Chicago, being made assistant chief clerk to the vice-president on the latter date. In May, 1912, Mr. Scott went to the Missouri, Kansas & Texas, as secretary to the president, and one year later was made assistant purchasing agent. On January 1 of this year he became acting purchasing agent, and on July 1 was appointed purchasing agent, as above noted.

Photo by Matzene, Chicago.
G. E. Scott

OBITUARY

Daniel J. Malone, superintendent of shops, of the Oregon Short Line, at Pocatello, Idaho, was shot and killed, July 24, by Frank Madden, foreman of the tin shop. The murderer, with the same revolver, at once killed himself. The men were both old employees and had long been friends, but Madden, it is believed, had became mentally unbalanced because of criticisms received on account of unsatisfactory work. Mr. Malone was born at Western Point, Md., in 1860, and he was on the Union Pacific for a number of years before going to the Oregon Short Line in 1890. Madden was 60 years old. Malone had four brothers, two of whom met death in murders very much like this one; Edward in West Virginia in 1896, and Michael, division foreman on the Southern Pacific, in Nevada, in 1906.

Equipment and Supplies

LOCOMOTIVE BUILDING

The Western Maryland is said to be in the market for 16 Mallet type locomotives.

The Inter Mountain has ordered four locomotives from the Lima Locomotive Corporation.

The Cincinnati, Hamilton & Dayton is in the market for 30 Mikado and 5 Pacific type locomotives.

The Mobile & Ohio has ordered one superheater Consolidation freight locomotive from the American Locomotive Company. This locomotive will have 24 by 30 in. cylinders, 63 in. driving wheels, a total weight in working order of 220,000 lb., and a steam pressure of 190 lb.

CAR BUILDING

The Southern Pacific has ordered 50 passenger cars from the Pullman Company.

The Wabash has ordered 7 postal cars from the American Car & Foundry Company.

The Baltimore & Ohio is inquiring for 1,000 box cars for the Cincinnati, Hamilton & Dayton.

The Erie has ordered 200 gondola cars from the Standard Steel Car Company and will soon place orders for an additional 600.

The Chicago, Indianapolis & Louisville has ordered 254, 36 ft. 40-ton box cars from the Haskell & Barker Car Company.

The Minneapolis & St Louis has ordered two postal cars from the Pullman Company, and is in the market for 500 gondola and about 750 box cars.

The Delaware, Lackawanna & Western has ordered 96 suburban passenger coaches and 14 suburban combination baggage and smoking cars from the Pullman Company.

The New York Central & Hudson River has placed orders for 1,000 box cars for its own use, the number being divided equally between the Haskell & Barker Car Company and the Barney & Smith Car Company

The Canadian Northern has ordered 5 steel underframe postal cars from the Preston Car & Coach Company, 15 steel underframe baggage and 5 steel underframe first class cars from the National Steel Car Company, 8 all-steel suburban cars from the Pressed Steel Car Company, 7 wood colonist cars from the Crossen Car Company and 11 steel underframe standard sleeping, 2 steel underframe compartment sleeping, 7 steel underframe compartment observation sleeping, 7 steel underframe dining and 7 steel underframe tourist cars from the Canadian Car & Foundry Company.

IRON AND STEEL

The Missouri Pacific has ordered 110 tons of steel for single track deck girder spans from the American Bridge Company.

W. S. Barbee and Railway Traction & Supply Company has ordered 250 complete bumping posts, amounting to 127 tons of steel, from the American Bridge Company.

The Paducah & Illinois has ordered 587 tons of miscellaneous material for its bridge at Metropolis, Ill. The Chicago Bridge & Iron Company received an order for 180 tons of this allotment, the remainder of the order being placed elsewhere.

The Trans-Amazon Railway of Ecuador.—It is reported that the preliminary studies for the Trans-Amazon Railway of Ecuador are advancing rapidly and that about one-half of the work is already completed.

Supply Trade News

The Railway & Traction Supply Company has moved its office from room 1307 to larger quarters in room 504, Rector building, Chicago.

W. H. Cadwallader, assistant to the general manager of the Union Switch & Signal Company, has been appointed general manager.

The American Flexible Bolt Company, Pittsburgh, Pa., has opened offices at 50 Church street, New York, with R. W. Benson in charge as general sales manager.

The Ogle Construction Company, Chicago, has recently received contracts from the Illinois Central for the erection of a 500-ton coaling station at Jackson, Miss.; one of 200 tons at Rolling Fork, Miss., and one of 300 tons at Amboy, Ill.

It is announced that Charles R. Crane will retire shortly as president of the Crane Company, Chicago, to be succeeded by R. T. Crane, Jr., now first vice-president, and that R. T. Crane, 3rd, will be advanced from second vice-president to first vice-president.

The Roberts & Schaefer Company, Chicago, has received a contract from the Canadian Northern for the designing and building of five Holmen type locomotive coaling plants for installation at Trenton, Capreal, Hector, Foley and Fitzbach, Ont. The approximate contract price was $70,000.

The American Car Roof Company, Chicago, manufacturer of the Christy steel freight car roof, has changed its method of business and now gives the right to build the Christy roof on cars to the car builders themselves on a royalty basis. This arrangement makes it possible to equip a car with this particular roof, in the same shop that the car itself is being built.

Sidney G. Johnson, until recently vice-president in charge of sales and engineering of the Union Switch & Signal Company, has been appointed assistant to the president of the General Railway Signal Company, Rochester, N. Y., and will have his headquarters at the New York office of the company at 55 Liberty street. A portrait of Mr. Johnson and a sketch of his career appeared in the *Railway Age Gazette* of March 27, 1914, page 765, at the time of his appointment as vice-president of the Union Switch & Signal Company.

E. A. Fleming, chief clerk to the president, Rock Island Lines, Chicago, and the designer and patentee of the form of trip pass that has been used by that company during the past year, is now placing the pass on the market in order that other carriers may, if desired, secure the privilege of using the form. The pass, which is termed the Fleming "automatic" trip pass, has been given a test of 12 months, during which time 250,000 passes were issued. The Interstate Commerce Commission after a special examination of the pass returns covering a period of six months gave its approval and consent to the further use of the form. A circular has been issued giving a very complete description of the form and its special features. This pass form and the method of using it were described in the *Railway Age Gazette* of August 15, 1913, page 275.

Judge Hazel in the U. S. District Court at Buffalo has upheld the directors and majority stockholders of the United States Light & Heating Company, Niagara Falls, N. Y., in the receivership of that corporation by ordering the answer of Henry A. Ackerman stricken out and vacating the appointment of receivers in the action which was brought by the Picher Lead Company. Simultaneously, he appointed James O. Moore, of Buffalo, and James A. Roberts, of New York, receivers in a new action brought by the Central Trust Company of New York, which holds $200,000 of the company's notes. The Central Trust Company is not antagonistic to the existing control of the United States Light & Heating Company. The plaintiffs in the other receivership proceeding, Henry A. Ackerman and G. M. Walker, who were appointed receivers at the outset of the Picher Lead Company's action, were removed a few days ago.

TRADE PUBLICATIONS

DENVER & RIO GRANDE AND WESTERN PACIFIC.—The passenger department of these companies has issued an attractive folder devoted to panoramic views and descriptions of scenes along the route through the Colorado-Utah Rockies and the Sierra Nevada mountains.

WATERPROOFING.—The Standard Asphalt & Rubber Company, Chicago, has issued a 16-page booklet descriptive of the various "Sarco" methods and materials. It also shows a number of illustrations of important structures in which this material has been used.

STEEL TRACK WORK.—The St. Louis Foundry Company, St. Louis, has issued a 56-page booklet devoted to illustrations and the description of its solid cast manganese steel track work for steam and electric railroads. This booklet also contains tables of dimensions for switches and for point mates.

SOUTHERN PACIFIC.—This company has recently published an elaborate folder, entitled "Seven Months Before," which shows by comprehensive photographs the arrangement of the buildings of the Panama Pacific International Exposition in San Francisco. It also quotes rates from all important cities to the exposition grounds.

STAY BOLTS.—The Flannery Bolt Company, Pittsburgh, Pa., has recently issued its 1914 catalog of Tate flexible stay bolts. The booklet which has 30 pages contains detailed descriptions of the bolts with instructions concerning their ordering, installation, adjustment, etc. There are a large number of views of the bolts and sleeves and a number showing typical installations.

CONCRETE BINS.—The Brown Hoisting Machinery Company, Cleveland, Ohio, has issued catalog S, 1914, descriptive of Brownhoist suspended concrete bins for storing coal, coke, ashes, cement, sand and other materials. These bins are reinforced with Ferro-inclave reinforcement and are equipped with Brownhoist chutes, gates and spouts; and, being made of concrete, they are not subject to deterioration by the action of acids. The catalog is very well illustrated and contains a number of views of typical installations.

GREAT NORTHERN.—The passenger department has issued a 160 page booklet, entitled "Annotated Timetables of the Great Northwest," which gives a brief description of the principal cities and scenic attractions on its line from St. Paul and Minneapolis west to the Pacific coast. The descriptions are given in order, with their mileage from St. Paul or from Seattle, and give the principal facts of interest about each place, together with maps and profuse illustrations.

HEAT-TREATING FURNACES.—Tate, Jones & Company, Inc., Pittsburgh, Pa., have recently issued a catalog devoted to their heat-treating furnaces for annealing, hardening and tempering of steel and all heat-treating operations. The catalog attempts to show wherein Tate-Jones furnaces are superior to others and the various types of furnaces are illustrated and described in detail, care being taken to show for what kind of work each furnace is designed.

BORING MILLS.—The Pratt & Whitney Company, Hartford, Conn., has recently issued an attractive catalog describing its side head boring mill. The booklet contains a detailed description of the machine and a number of engravings showing the machine itself and a number of its parts, special attention being given to the central control feature whereby all the controlling levers, etc., are within easy arm's reach of the operator and may be manipulated by him without the necessity for his moving out of his position or taking his eye off the work that is at hand.

LINK BELT.—The Link Belt Company, Chicago, has recently issued section "A" of catalog No. 110 descriptive of the original Ewart detachable link belt and sprocket wheels. The booklet has 112 pages. It contains actual size views of the various types and sizes of detachable links, the number of the link, the approximate number of links in 10 ft., and the average ultimate strength in pounds being given for each size. There are also sections devoted to methods for obtaining the working strains and horse powers, and to price lists, attachments, chains and sprocket wheels.

Railway Construction

ALTON & JACKSONVILLE (Electric).—Reported incorporated to build a line between Jacksonville and Alton, Ill., about 50 miles. Among the incorporators are F. L. Butler, W. T. Meloan, J. S. McClellan and H. Okin.

THE CHICAGO & ALTON will resume work presently on the enlargement of the freight yards at Venice, Ill. The work consists of the placing of additional tracks sufficient to hold 500 cars.

CHICAGO & NORTH WESTERN.—An officer writes that a contract has been let to Peppard & Burrill, Minneapolis, Minn., for the construction of a branch line from Koepenick, Wis., eastwardly seven miles to the west bank of the Wolf river. The line will tap a lumber district to the north of the Menominee reservation.

ILLINOIS CENTRAL.—It is reported that this company is having surveys made for its proposed extension from Jackson, Miss., to Birmingham, Ala., about 200 miles distant. It is also said that the company is considering a project of building a 15 or 20 mile line from Haleyville, Ala., to Brilliant, the northern terminus of its independent line from Winfield, to connect with a line to be built by the Alabama, Tennessee & Northern from Reform to Winfield, about 40 miles, the connection being made for the purpose of giving the Illinois Central access to Mobile.

JANESVILLE & MADISON TRACTION (Electric).—A contract is reported let to M. M. Doran, Madison, Wis., for grading the section between Edgerton and Stoughton, Wis., of the proposed interurban line from Janesville to Madison. (March 20, p. 703.)

MASCOTT & WESTERN.—Incorporated in Arizona for the purpose of constructing a line from Willcox, Ariz., southeast to the mines of the Mascott Copper Company at Dos Cabezos, about 18 miles distant. The incorporators include F. N. McCauley, D. S. Stevenson, C. V. Weston, J. A. Street, J. C. Knapp, C. M. Stoddard and M. A. Pickett, all identified with the Mascott Copper Company.

NEW YORK, CHICAGO & ST. LOUIS.—An officer writes that work will be started shortly on the elimination of West Side grade crossings of the road at Cleveland, Ohio. The cost of the work will be about $3,000,000. Robert Hoffman, chief engineer, department of public service, city of Cleveland.

NEW YORK SUBWAYS.—The New York Public Service Commission, First district, has opened bids for the construction of section No. 5 of routes 4 and 36, including that part of the Broadway-Fourth avenue subway in Manhattan, extending easterly from Fifty-ninth street and Seventh avenue to Fifth avenue, where it divides into two branches, one continuing through Fifty-ninth street and the other through Sixtieth street to Second avenue. It is said that the Degnon Contracting Company, New York, presented the lowest bid of $2,808,661.

OGDEN-LOGAN & IDAHO (Electric).—An officer writes that a new company by this name is being organized to take over the properties of the Ogden Rapid Transit and the Logan Rapid Transit companies, and that a contract has been let to the Utah Construction Company for the grading for a line which will unite the two present systems and extend from Ogden, Utah, to Logan, and thence to Preston, Idaho. The line will pass through Ogden, Willard, Brigham, Honeyville, Deneyville, Collinston, Mendon, Wellsville, Hyrum, Millville, Providence, Logan, Hyde Park, Smithfield, Richmond, Webster and Lewiston, Utah, and Preston, Idaho, a territory at present served by the Oregon Short Line. One-fourth of the line only will involve difficult construction work. There will be a number of bridges, but no trestles or tunnels. The maximum grade will not exceed 1¾ per cent., and the maximum curve 8 per cent. The line will mainly do a passenger business, but it may also have some traffic in agricultural products and possibly coal. Contracts have already been placed for all track materials, bridges, cars, etc. R. W. Armstrong, Ogden, Utah, is chief engineer.

PENNSYLVANIA RAILROAD.—An officer writes that a contract has been let to the Latta & Terry Construction Company, Phil-

cent. in the opposite direction. Coal will constitute most of the traffic.

The Chicago & Alton will resume work presently on the enlargement of the freight yards at Venice, Ill. The work consists of the placing of additional tracks sufficient to hold 500 cars.

RAILWAY STRUCTURES

Chattanooga, Tenn.—The Cincinnati, New Orleans & Texas Pacific is now preparing plans, it is said, for a new brick, steel and concrete freight station and warehouse to cost about $250,000, and to be erected on a site at the corner of Market and Union streets, now occupied by an old passenger station.

Colburg, Mo.—The Chicago, Milwaukee & St. Paul is now starting work on 12 additional reinforced concrete grain storage tanks at Colburg, Mo. These tanks are set on a pile foundation. The total capacity of these additional 12 tanks is 500,000 bu., 20 tanks with a total capacity of 750,000 bu. have already been completed. James Stuart & Company are the contractors.

Dyersburg, Tenn.—The Illinois Central is said to be planning to lay out a small yard and to construct shops, the total costing about $150,000.

Ludlow, Ky.—The Cincinnati, New Orleans & Texas Pacific, it is said, has purchased 28 acres of land near Ludlow, and intends to build an addition to its shops and to lay new tracks and sidings.

McPherson, Kan.—The Atchison, Topeka & Santa Fe is just completing the plans for a new passenger depot at McPherson, Kan. The estimated cost is $16,000.

Portsmouth, Ohio.—The Chesapeake & Ohio is reported to have decided to build its proposed bridge over the Ohio river, at a point about eight miles east of Portsmouth, Ohio, and a short distance above the mouth of the Little Scioto river. The railroad follows the south bank of the Ohio, which makes a bend to the northward at this point, so that the crossing of the stream will be near the apex of an acute angle and in the general direction of the line which will be built from there to a point near Columbus, Ohio, about 93 miles. The bridge will consist of two cantilever spans, each 750 ft. long, and 24 plate girder spans, each 80 ft. long, making its total length 3,420 ft. It is estimated that the cost will be about $2,000,000.

Spartanburg, S. C.—A contract is reported let by the Piedmont & Northern to J. A. Jones, 404 Realty building, Charlotte, N. C., for a warehouse and station, 108 by 110 ft. in size and costing about $40,000.

Tacoma, Wash.—The Oregon-Washington Railroad & Navigation Company has awarded a contract to O. R. Larson, Tacoma, for the construction of new freight terminals at this point.

Toronto, Ont.—The contract for the construction of the new union station to be constructed by the Toronto Terminals Railway for the Grand Trunk and the Canadian Pacific has been awarded to the P. Lyall Construction Company, of Montreal and Toronto, the amount of the contract being about $3,000,000. The station will be constructed on a site east of the present building and will be bound by Front, Bay and York streets. The architects are Ross, Macdonald & Jones, with whom is associated J. M. Lyle. J. R. W. Ambrose is chief engineer of the terminal company. The erection of the union station is part of a $15,000,000 development project which includes a large amount of grade separation to be effected along the water front.

A Chinese Railroad in the Banking Business.—A $250,000 loan borrowed by the Chinese authorities at Mukden from the South Manchuria Railway last year fell due at the end of May. It was agreed, however, that the loan be extended an additional year.

Railway Extension in Russia.—It is reported that construction work is soon to begin on a 95 mile narrow gage railway from Riga, on the Gulf of Riga, in the eastern part of Russia to Moisekull. It is announced that work is to be begun at three points along the line and that the road is to be in operation by January 15, 1917.

Railway Financial News

Buffalo, Rochester & Pittsburgh.—A semi-annual dividend of 2 per cent. has been declared on the common stock. This compares with 3 per cent. paid six months ago.

Evansville & Indianapolis.—A protective committee for the first mortgage 6 per cent. bonds and for the first consolidated mortgage 6 per cent. bonds has been formed consisting of Frederick H. Shipman, chairman, treasurer of the New York Life Insurance Company; William B. Cardozo, vice-president of the Farmers' Loan & Trust Company; Ellis W. Gladwin, vice-president and secretary of the Home Life Insurance Company; Edward H. Ladd, Jr., of Ladd & Wood; Raymond M. Smith, of Megargel & Company.

International & Great Northern.—Holders of the $11,000,000 3-year 5 per cent. notes have agreed to an extension for two and a half years at 6 per cent., the notes to be repaid at maturity at 101. The notes were originally bought by J. & W. Seligman & Company and associates, and the following statement was given out by Frederick Strauss, of J. & W. Seligman & Company, after a meeting of the holders of these notes:

"An understanding has been arrived at between the trustees of the estate of Jay Gould, the owners of a majority interest in the stock of the International & Great Northern Railway, whereby an option has been given to a committee consisting of Alexander J. Hemphill, president of the Guaranty Trust Company; Alvin W. Krech, president of the Equitable Trust Company; Benjamin Strong, Jr., of the Bankers Trust Company; S. H. Voorhees, of the Royal Bank of Canada; Franklin Q. Brown, of Redmond & Company; R. Lancaster Williams, of Middendorf, Williams & Company, and Frederick Strauss, of J. & W. Seligman & Company, representing a majority of the noteholders, to purchase 51 per cent. of the preferred stock of the International and Great Northern Railway Company, and 51 per cent. of the stock of the International and Great Northern Corporation (the Virginia holding company which owns the entire common stock of the railroad company), which option if exercised will insure control to the purchasers.

"It cannot be too clearly impressed upon noteholders that no arrangements have been made or are contemplated whereby nonassenting noteholders will be paid. The alternative of a failure to extend the notes is a receivership, with all the complications and disadvantages that this implies."

Kansas City, Mexico & Orient.—The Kansas Public Utilities Commission, on application of the new company—the Kansas City, Mexico & Orient Railroad—to issue bonds and stocks to the amount of $76,000,000, finds that the physical property is worth at least $25,000,000, and on this authorizes a stock issue of $20,000,000. The company is permitted to borrow $6,000,000 on 2-year notes to pay its floating debt and for immediate use for improvements and betterments. The company is also permitted to issue $31,000,000 income bonds to be used as collateral for the $6,000,000 notes.

Northern Central.—See Pennsylvania Railroad.

Pennsylvania Railroad.—The Pennsylvania Public Service Commission has approved the lease of the Northern Central. (See July 3, 1914, page 40.)

Southern Railway.—A sub-committee of the Senate Committee on Naval Affairs is engaged in an investigation of charges filed by B. W. Dulaney, a coal operator of Bristol, Tenn., which claim that the Southern Railway has not developed southern coal fields because of a desire on the part of the voting trustees to prevent too keen competition with the Pennsylvania coal fields. President Harrison was a witness and denied absolutely that the Southern Railway had in any way been improperly influenced in its policy or had failed to do its best to develop southern coal fields.

Wabash, Chester & Western.—J. F. Gilster has been appointed receiver of this road, which runs from Menard, Mo., to Mount Vernon, 65 miles. The receivership followed the application of the St. Louis Union Trust Company, trustee for the $500,000 bonds outstanding.

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WE GUARANTEE, that of this issue 9,000 copies were printed; that of these 9,000 copies, 7,441 were mailed to regular paid subscribers to the weekly edition, 250 were provided for counter and news companies' sales, 1,185 were mailed to advertisers, exchanges and correspondents, and 124 were provided for samples and office use; that the total copies printed this year to date were 299,700, an average of 9,366 copies a week.

Volume 57 August 7, 1914 Number 6

Contents

Audible Distant Signals on the Orleans Railway

The use of cab signals in France, noticed last February, page 255, has now made so much progress that the (English) Institution of Mechanical Engineers made it the subject of a general discussion at its last meeting, which was held in France (Paris) July 7. The most interesting feature of the discussion is the statement of Mr. Solacroup, locomotive superintendent of the Orleans Railroad, to the effect that his road has taken no action on the government's request to try cab signals, for the reason that it does not need them; it has something fully as satisfactory, in the shape of an audible distant signal (torpedoes placed on the rail) loud enough to be heard by everybody in the first car of the train; and *"there is no accident on record* on the Orleans Railway due to a driver having passed a stop signal in front of him." This system of audible signals has been in use fifty years! The Orleans operates 4,600 miles of road, and owns 2,000 locomotives. Aside from this, the principal information brought out by the Institute's discussion is that the other prominent French railways are using cab signals to a considerable extent, but that they are making progress slowly and with caution. They all speak of their installations as experimental. This, however, cannot be said to apply to the Northern, which, as our readers know, has used cab signals for a long time—about forty-two years. The pressure exerted by the French government has been long-continued but gentle; and the railroads' attitude appears generally to have been decided by the conservatives. The Eastern has equipped two important sections of road for cab signal operation. The P-L-M has started extensive installations, as heretofore noted; and the Midi (Southern) has 20 engines and 30 signals fitted. The state railroads have 112 locomotives equipped. Mr. Aspinall, general manager of the Lancashire & Yorkshire, was at the meeting and said that his road was trying a cab signal.

THE DECISION IN THE RATE ADVANCE CASE

THE decision of the Interstate Commerce Commission in the eastern rate advance case affords ground for both pessimism and optimism. The railway managers earnestly believed that conditions which had been created by developments over a period of years warranted and demanded an increase in the net revenues of the eastern carriers. From past experience they thought that the only practical way to obtain this was by a general increase of freight rates. They feared that they could not get an increase of as much as 10 per cent., although they believed that this much was needed. They thought that the very least which should be allowed them was 5 per cent. This they hoped that they could get, and therefore, this they asked for.

The commission finds that "the net operating income of the railroads in Official Classification territory, taken as a whole, is smaller than is demanded in the interest of both the general public and the railroads." Then it finds that the situation of the railways in Trunk Line territory and New England is better than that of the railways in Central Freight Association territory, and refuses increases east of Pittsburgh and Buffalo. In Central Freight Association territory, also, it refuses increases on minerals, cement, brick, and other bulky commodities constituting over one-half of the tonnage, but authorizes an increase of 5 per cent. in the rates on the rest of the traffic. As the traffic on which the increases are to apply already carries much higher rates than that on which increases are refused, the additional revenues will certainly be much more than half of what the C. F. A. lines asked. Advances in lake-and-rail rates are refused, but this probably will prevent increases by the railways on only a relatively small amount of traffic. The additional in net revenue that will result directly from the foregoing concessions will be small compared with the increases which the railways need and which the commission admits that they need.

But there is another side to the matter. Three years ago, in the decision in the original rate advance cases, the commission held that the railways did not need larger revenues. In the present case it holds unanimously that, taken as a whole, the roads in Official Classification territory do need larger revenues, both in their own interest and in that of the public. Three years ago the decision of the commission was unanimous. In the present case two of the commissioners, Messrs. McChord and Daniels—the latter an appointee of President Wilson—dissent, and contend that advances should have been allowed in the territory east as well as west of Pittsburgh and Buffalo. The opinion of Commissioner Daniels implies that he believes that all the advances the roads asked for, except those in lake-and-rail rates, should have been allowed. The commission suggests that there are numerous rates in eastern territory which have been reduced below a fair basis by competition, and that

the carriers can add to their revenues by advancing these. There is great merit in this suggestion, and it is to be hoped the roads will act in harmony with it. The commission shows that it believes that passenger rates are too low, and implies a willingness to co-operate with the railways in securing advances in them. The commission probably has enough power, if it has the courage to exercise it, to nullify all the state two-cent fare laws. It remains to be seen what it will actually prove willing to do. The commission suggests that the railways may increase their revenues by making charges for special services now rendered to shippers for nothing, and by discontinuing certain allowances that they make to shippers. There is merit in this suggestion; but already experience has shown the difficulty of so acting on it in practice as to obtain the desired results.

It is asserted that there are various ways in which important economies in operation can be effected, such as by increasing trainloads, and more especially car loads; by adopting means for securing savings in fuel; by unloading unprofitable outside investments; by scrutinizing the relations of directors and officers with concerns from which the railways buy supplies and the contracts with sleeping car companies, private car lines, and so on. To our mind, the most meritorious of these suggestions is that regarding increases in car efficiency. But it is probable larger car loads cannot be obtained without advancing minimum weights; and commercial difficulties and the opposition of shippers will be met which the railways cannot overcome without the assistance of the commission. Will the commission give its assistance? Probably the best answer that could be made to all of the more or less academic suggestions of the majority of the commission regarding the possible operating economies is given by Commissioner Daniels in his dissenting opinion: "The proposals in the majority report whereby carriers may conserve their revenues without advancing their rates are held not to constitute a necessary or proper function of the commission in deciding a plain issue as to the reasonableness of suggested rate advances. Many of the expedients are ingenious, some of them are promising, most of them are remote in possible effect, and all of them pale into insignificance as against the admitted economies in fuel and the heavier car and train loading attained by the carriers within the last few years."

The summation of the matter seems to be that a majority of the commission has awakened to a partial realization of the railway situation in the United States, and especially in eastern territory; that a minority of the commission has awakened to a full realization of it; that the group of railways which probably needs relief the most is to be given some relief immediately; and that if the railways, the shippers, the state regulating authorities and the commission can co-operate in adopting the various suggestions which the commission makes, the tendency will be for the railway situation, as a whole, to improve. A large part of the difficulties of railways in recent years has been due to the business situation in general; and if it improves, the situation of the railways also will tend to improve. In view, however, of the general European war, what are going to be the commercial and industrial developments in the United States?

It will be interesting to see how the decision will be received. A few months ago it would have helped business. Coming, as it does now, in the midst of a great European war, it will be almost impossible to trace its effects because of the other powerful influences that are operating on commerce and industry. The commission will, probably, find that it has rendered a decision which pleases nobody very much. The habitual and professional critics of the railways will denounce the commission for having conceded anything. Railway men and business men generally and the public will criticize it for not having granted enough. Meanwhile, the carriers should waste no time in beginning to try to act on the various suggestions for increasing their net revenues the commission has made, so far as those suggestions are practical. The welfare of the railways and that of the country require that the closest possible co-operation should be developed and maintained between the roads and the commission.

THE CONDUCT OF THE RATE ADVANCE CASE

REPRESENTATIVE government rests upon two theories—that the people are competent to select legislators who shall be capable of deciding public questions, and secondly, that the great mass of people, as a mass, have an intuitive capacity to decide wisely on questions of grave public importance. The highest function, therefore, of a legislator, might well be to combine in his official actions the best of his own judgment with a sympathetic interpretation of the will of his constituents. The Interstate Commerce Commission is a branch of the legislature. A few years ago there might have been some doubt as to how far the commission's duties were quasi judicial. Today there can hardly be a doubt in the mind of an unprejudiced observer of events that the commission, both by the decree of the court of public opinion and by the decisions of the Supreme Court of the United States, is a branch of the legislature, and as such has the duty and the power of representing and interpreting the will of the people. The manner of trying questions of law and questions of governmental policy are quite radically different, although the present tendency in American government is apparently to make legal procedure more sensitive to contemporary public opinion and less dependent on precedent.

The 5 per cent rate advance case was a question of the gravest public policy, and it was a question moreover which was to be passed on by a branch of the legislature. Few criticisms of railroad managers have been better founded than the criticism leveled against the older school which refused to take the public into its confidence. The rate advance case was conducted on the railroads' side by a man whose own sterling honesty and democratic simplicity made the idea of underhand methods or autocratic rough-shod riding abhorrent. On the commission's side the case was conducted by a lawyer whom even the majority of railroad men would acknowledge to be a broad-minded and public-spirited citizen. It was inevitable, therefore, that the question would be thrashed out, not only within the walls of the Interstate Commerce Commission's hearing room, but before the public as a whole.

In the preparation of the railroads' case there was first of all the stupendous problem of eliminating the non-essential. Secondly, there was the problem of presenting the essential points in a non-technical way which could be understood not only by Commissioner Harlan and his colleagues, but by the American public. In this particular case the majority of the Interstate Commerce Commission failed to reflect and interpret fully public opinion, probably because of a certain lingering feeling among some of the commissioners that their actions should partake of the aloofness of the judiciary. It is probably this feeling which called forth the adverse comments in Commissioner Harlan's opinion on the "campaign of publicity."

The case as conducted by Chairman Harlan was above serious criticism. No attempt was made either by the chief counsel for the commission or by the counsel for the railroads to "play politics." Clifford Thorne was a bit out of place, but his presence was not taken seriously either by Mr. Brandeis or the commission. Commissioner Harlan was admirably fair in his questions and in his attitude toward the admission of all relevant matters pertaining to the case. The only criticism that might possibly be leveled against the commission was that it gave somewhat undue weight to organized opposition. It is quite apparent also from the opinion that Commissioner Harlan and Mr. Brandeis worked in close accord in formulating it. The commission by its appointment of Mr. Brandeis acknowledged its need for help, and by its adoption of many of Mr. Brandeis' opinions as a whole confirmed this acknowledgment. The pity of it is that the commission did not rely on and reflect crystallized public opinion.

W. M. Acworth, in his testimony before the English Royal Commission on Railways, expressed a belief that the legal railroad commission court of England should be superseded by full jurisdiction given to the president of the Board of Trade who should be assisted by a non-political board of experts. Applying this theory to the American form of railroad regulation

there would be a cabinet officer with final authority who would, of course, in the great majority of cases rely upon the opinions of the expert body—the Interstate Commerce Commission—but who would be more directly representative of public opinion than are the commissioners, and who could in a case where public opinion strongly demanded a certain policy, guide the commission toward a compliance with the policy; in other words the policy of the government representing the will of the voters would be a consistent policy in all its branches.

It was a recognition of the fact that the rate advance case was one of broad and vital public policy comparable to the tariff question, which led the railroads to conduct their case, as the case of all important matters of policy, in a democratic form of government must be conducted, both before the legislature and the electorate. The success of the railroads before the general public more than compensates for the disappointment or but partial success with the commission.

PREVENTING LOSS AND DAMAGE CLAIMS

THE article in this issue by H. R. Lake, describing the work of the freight loss and damage organization on the Atchison, Topeka & Santa Fe should be of absorbing interest to every operating officer. For five years the Santa Fe has been conducting a most vigorous campaign in the prevention of loss and damage to freight, which has resulted in a reduction in the percentage of loss and damage payments from over 3 per cent. of gross revenue to less than 1 per cent. Various causes have combined to bring about an increase in loss and damage claims on the railroads as a whole in recent years until the total of such payments now amounts to about $30,000,000 annually, a sum which certainly warrants the closest analysis and the most earnest efforts toward its reduction. The size and capacity of cars have been increasing and their strength has been proportionately increased so that the cars themselves can stand the heavier shocks which added weight naturally brings. Moreover, the development of more powerful locomotives, hump-yard switching and the use of automatic couplers have increased rough handling. At the same time shippers have not increased the strength of their packages, or the bracing and packing.

The fact that loss and damage claims have increased has not been entirely lost sight of. Many roads have conducted campaigns to bring about an improvement but have found it no easy task either to ascertain the causes or to apply the most effective remedies. On several roads, in spite of the most vigorous efforts, it was found that little headway was made until it was decided that the prevention of loss and damage is an operating department duty, and not a function of the claim department. This was done on the St. Louis & San Francisco, whose successful campaign for the reduction of loss and damage through a special organization in the operating department was described in the *Railway Age Gazette* of November 12, 1909, page 925, and September 8, 1911, page 186, and for the past three or four years the operating department on the Santa Fe has handled the investigation of loss and damage claims.

There is much to be said in favor of the handling of claims, or at least the investigation of claims, through this department. It is the department whose shortcomings are largely responsible for the claims and it would seem that it is in the best position to effect needed reforms. On the Frisco the entire work of handling, investigating and settling claims has been turned over to the operating department. On the Santa Fe practically the entire operating department has been turned into a committee for the study of loss and damage and for the purpose of correcting the mistakes. This work is now well organized, and the methods used on the Santa Fe have already aroused the interest of other roads. On July 1, a similar plan was adopted by the Chicago, Burlington & Quincy

There are many reasons why the investigation of O. S. and D. reports should be conducted by the operating department. The freight claim agent's business is to determine whether liability exists in respect to claims entered, to determine the measure of the liability and to settle with the claimant with reasonable promptness. If he is then charged with the investigation as to the cause of the loss or damage he is at a marked disadvantage as compared with the department on which the responsibility really rests. The operating department is naturally more familiar with conditions within its jurisdiction, and is, moreover, a far better position to administer discipline or apply any corrective measures as the result of its own investigations than upon the recommendation of a representative of another department.

Because of the close relationships existing between railways in the handling of freight, the best results can only be obtained through co-operation of all the roads. This being so, there has been a strong movement to bring about such co-operation through the medium of a national loss and damage bureau or association, to be organized by the operating departments for the purpose of preventing loss and damage, instead of adjusting it afterward, which is the function of the Freight Claim Association.

In 1910, the General Managers' Association of the Southeast adopted resolutions requesting the general managers' associations of New York, Chicago and St. Louis, and Texas to appoint committees on loss and damage to work along the lines of a similar committee of the southeastern association, looking to the establishment of a bureau for the whole country, either independently or as a part of the organization of the American Railway Association. The suggestion for the organization of committees by the other associations was not adopted, but the plan resulted in the formation by the American Railway Association of a subcommittee on Packing, Marking and Handling of Freight, which has done very good work.

It was then proposed that the Freight Claim Association amend its constitution, and turn its attention actively to the prevention of claims, on the ground that that association had proved itself one of the strongest of railroad organizations, and as it had done most effective work in its own field, there was no need of having two associations, both working on loss and damage. This plan met with approval and at the recent annual convention of the Freight Claim Association held at Galveston in May, it was decided to enlarge the scope of its work to include not only the settlement of freight claims, but the study of causes and the prevention of freight claims. A new committee on Causes and Prevention was formed for this purpose. The past work of the Freight Claim Association furnishes good evidence that it should be able to accomplish important results in this direction, but the active prosecution of the campaign must be done by the individual roads, and as previously stated, the operating department seems in the best position to carry on the needed investigation. The General Superintendents' Association of Chicago has had a strong committee at work on this subject since June, 1913.

The Southeastern Claim Conference and the General Managers' Association of the Southeast have been advocating for some time a plan which it is believed will have an important bearing on loss and damage claims by promoting better methods of loading. Under the existing rules of the Freight Claim Association, unlocated losses in interline traffic are prorated on an agreed average percentage of probability. For instance, the unlocated loss of an entire package is charged 30 per cent. to the loading carrier, 20 per cent. to the unloading carrier, and the remaining 50 per cent. is prorated on mileage. It is argued that if an initial line goes to extra expense and extraordinary diligence to put freight in the right car, and has a system of records by which it can show affirmatively that the package was put in the right car, it should be exempted from the 30 per cent. presumption against the loading line on average probability, and that responsibility would be centered where it belongs if the initial line were held wholly responsible, unless it can show by a positive affirmative record that the package was put in the right car at the start. Various plans for obtaining such affirmative record have been proposed and are being investigated.

A THREATENED STRIKE AND ITS MORAL

THE vital defects of the Newlands-Erdman arbitration law are made manifest by the very narrow escape which the United States has just had from a strike of all the engineers and firemen on the 98 railways west of Lake Michigan and the Illinois Central Railroad. That a strike was averted is not in any part due to the engineers and firemen, or to the board of mediation and conciliation. It is due to the intervention of President Wilson and to the public-spirited and patriotic action of the railway managers. The true issue involved was clouded during the last few days of the negotiations because of a step taken by the mediation board which was grossly unfair, and which resulted in placing the railways in a wholly false position.

The main developments in the controversy were as follows: On October 10, 1913, the engineers and firemen made demands which, if granted, would have increased their wages approximately $27,000,000, or 40 per cent. The railway managers long had been aware that some such demands were to be presented. They were as dissatisfied with the existing schedules as were the employees. Controversies, negotiations and struggles over a long period of years have caused rules and principles to be incorporated in the schedules which the railway managers regard as unfair and uneconomic. Therefore, when the employees presented their proposals the railways gave notice of cancellation of the existing schedules and made counter proposals. The purpose of these counter-proposals was to correct the anomalous, unfair and wasteful rules and principles referred to. It was claimed by the employees that the railways' plan would result in a reduction of their wages. The Conference Committee of Managers replied that, if the employees' committee would join it in a revision of the parts of the schedules to which the railways objected, it would join with the employees' committee in a revision of the wage schedules which would secure to the employees at least as large compensation as they already were receiving. The employees rejected this proposal and made new and additional demands, the granting of which, together with their original demands, would have increased their wages by $33,000,000, or 50 per cent.

No agreement being reached, the employees took a strike vote. The Conference Committee of Managers then proposed arbitration of *all* of the demands of both the employees and the railways. When the employees rejected this the managers suggested that the two parties join in asking the Board of Mediation and Conciliation to tender its good offices. The employees rejecting this suggestion, the managers alone asked for mediation. In the course of the mediation the board made various proposals to each side with the object of securing a basis of agreement or arbitration. Finally, it made this proposal: The schedules in effect prior to October 10, 1913, to be restored; *all* of the demands made by the railways to be withdrawn; the demands made by the employees in May, *which were additional to their original demands, and were made merely in a spirit of bluff and bravado*, to be withdrawn; the original demands of the employees presented in October, 1913, and *they only*, to be arbitrated. The very thing which the managers were fighting for was recognition of the principle that demands made by the railways on their employees as well as demands made by the employees on the railways should be submitted to arbitration, and the very thing the mediation board asked the railways to accept as a basis for arbitration was the principle that the demands of the employees should be arbitrated and *that the demands of the railways should not be arbitrated.*

Of course, the employees immediately accepted this plan. They had everything to gain and nothing to lose by it. And of course the managers rejected it. They had everything to lose and nothing to gain by it. Thus, although the railroads were the first to propose arbitration, and insisted upon arbitration, and were at all times willing to arbitrate *all* the points in issue, the mediation board and the employees deftly put them in the position of refusing to arbitrate.

This was the situation when President Wilson invited the representatives of the employees and of the railways to confer with him at the White House. Meantime, a terrible and totally unexpected condition of affairs had developed. All Europe was going to war. The business situation in the United States had become strained to the breaking point. Every stock exchange in the country was closed. It was apprehended that only some such great catastrophe as this threatened strike in the West was needed to precipitate a violent panic. The President of the United States appealed to the employees and the railways to settle their differences. He appealed in the name of patriotism, of the public welfare, of humanity. The railway managers repeated their proposal to arbitrate all differences. It was suggested by President Miller of the Burlington that in order to avoid a rupture at such a critical moment both parties suspend all further controversy for 90 days. But the leaders of the employees had called a strike for August 7; and they showed their public spirit and patriotism by coolly announcing that unless the railways accepted the absolutely unfair plan of arbitration that had been last proposed by the mediation board and accepted by the employees the strike would occur on schedule time! They had the railways and the country by the throat and they didn't intend to relax their grip, no matter what were the consequences. The railways' managers promptly rose to the occasion, and accepted the one-sided plan of arbitration they had previously rejected. In the interest of the public welfare they agreed to compromise on the basis of "heads I lose, and tails you win."

The moral of all this is clear. No consideration of fairness, public welfare or patriotism exercises any restraining influence on certain leaders of organized labor. In the absence of laws forbidding strikes they will call strikes if they think they have anything to gain by them, even though the ultimate result may be that the heavens will be rolled together as a scroll, and the earth will be consumed with fervent heat. The public may think that because it is so often threatened with general railway strikes which do not come, there is no serious danger that any ever will come. But that is the way that the people of Europe regarded the incessant talk of a great European war, and the great European war has come. And unless legislation is passed forbidding strikes and lockouts, at least until after there has been arbitration, and the findings of the arbitration board have been made public, there will be a railway strike in this country one of these days whose consequences will be more terrible than the public can now even imagine.

BROOKLYN RAPID TRANSIT

SINCE the growth of the population in the city of Brooklyn has assured to the Brooklyn Rapid Transit Company a substantial annual increase in its operating revenues, the problem has been to conserve to the company and especially to its stockholders their share of the increased earnings. To do this it has been necessary to offset increases in wage scales through the training of employees to greater usefulness, to offset very large increases in taxes through economies in some branch of operation, and to overcome what was not many years ago a strong prejudice against the company on the part of its patrons.

Total passenger earnings in the fiscal year ended June 30, 1914, were $24,709,000; in 1913, $23,453,000. Net income, after the payment of operating expenses and charges to income for betterment, amounted to $12,015,000 in 1914, as compared with $11,659,000 in the previous year. The growth of the company's business is shown by the annual increase in passenger earnings over each succeeding year. The increase in 1910 was 7.44 per cent.; in 1911, 4.28 per cent.; in 1912, 5.66 per cent.; in 1913, 3.94 per cent., and in 1914, 5.35 per cent.

Despite the increases in wages the cost of general operating (transportation), exclusive of maintenance, consumes a smaller proportion of operating earnings now than in 1910. The ratio in 1910 was 35.21; in 1911, 34.59; in 1912, 33.89; in 1913, 33.53, and in 1914, 34.67. On the other hand, the ratio of maintenance

charges has been slightly increased. In 1910 it was 16.53; in 1911, 16.21; in 1912, 16.39; in 1913, 16.13, and in 1914, 17.03.

The net surplus in 1914 available for dividends was $5,316,000, an increase over 1913 of $819,000. Dividend requirements in 1914 were $3,660,000, and in 1913 $2,441,000. The increase in dividend requirements was due to conversion of bonds and stocks mentioned later.

The relation of either a street railway company or a steam railroad company to its patrons is in the great majority of cases the relation of the employees to the public. Street railway employees are a difficult class of labor to deal with. Their work is hard and is full of annoyances. It is difficult to establish and to hold a permanent force of men and for this reason it is particularly difficult to train either motormen or conductors thoroughly. Furthermore, a very large item of expense for a street railway company results from damage claims and personal injury suits. This is, of course, a worse than nonproductive expenditure and is dependent both on the care and training of the employees of the company and on the attitude of the public in the city served. The substantial financial success in the last few years of the Brooklyn Rapid Transit is probably in considerable part due to the broadminded, farsighted policy which the company has adopted towards its employees and toward the education of both employees and patrons in regard to safety.

In 1914 the company spent $69,000 for medical services and sick and death benefits not reached by the Employees' Benefit Association. The company has a system of compulsory medical inspection and free medical attendance for employees excused on account of illness. In the first complete year of operation of this system—the calendar year 1913—10,000 men benefited from it. Time lost on account of illness was 24 per cent. less in 1913 than in 1912. The medical inspection bureau now has a chief inspecting physician and five assistants. First aid instruction is also being given employees in all departments.

The safety campaign which the Brooklyn Rapid Transit is carrying on is quite unusually broad in its scope. The company has a bureau of public safety which co-operates with the board of education of New York City and with the parochial schools. This bureau gives instruction in 179 public schools and 26 parochial schools, with a total membership of 262,000 children. Besides this 23 parents' organizations were addressed and moving picture lectures given in the city parks.

Working along analogous lines, the legal department has during the last few years been making special efforts to settle damage and personal injury claims promptly. In 1907 damages were 3.86 per cent. of total operating earnings; in 1908, 4.14; in 1909, 3.66; in 1910, 2.66; in 1911, 3.43; in 1912, 2.95; in 1913, 2.51, and in 1914, 2.14.

Liberal expenditures were made for maintenance of way and maintenance of equipment. In 1914 $2,022,000 was spent for maintenance of way, which is 20.47 per cent. more than was spent in 1913, and $2,316,000 for maintenance of equipment, which is 5.17 per cent. more than was spent in 1913. More liberal expenditures were also made for additions and betterments. Exclusive of the amount spent for the work on the new dual subway and extensions of elevated lines, $1,544,000 was spent for additions and betterments and charged to capital account. Of this amount $958,000 was for cars and electrical equipment, and $306,000 for track and roadway. Work on the dual system has been progressing about as fast as was expected and $11,000,000 was spent during the year on this account.

The financial position of the Brooklyn Rapid Transit Company was very considerably improved during the year by the conversion of refunding mortgage 4 per cent. bonds into stock, the conversion privilege expiring July 1, 1914. On June 30, 1913, there were $120,435,000 bonds outstanding, and at the end of June, 1914, $100,972,000, the amount of stock outstanding having increased from $49,837,000 to $75,592,000. The company earned net in 1914 the equivalent of 7.87 per cent. on the present outstanding stock.

Letters to the Editor

THE RAILROAD TROUBLE

Grayslake, Ill., August 3, 1914.

To the Editor of the Railway Age Gazette:

It happened once upon a time, about four years ago, that after having made a somewhat extended investigation of the subject, a witness who was testifying before the Interstate Commerce Commission in what was then known as the Western Advanced Rate Cases, stated that because the units of cost were steadily increasing and the units of revenue were steadily decreasing, the railroads would make less money the more business they did. The witness was publicly laughed at by the learned counsel for the opponents of the railroads, jumped on for a harmless sort of a fool by the commission, and privately advised by experienced railroad officials that it might be a good theory, but they didn't take much stock in its working out that way.

Now comes the Bureau of Railway Statistics, and shows that while the business for these four years has increased from $2,787,266,000 to $3,091,670,000, the net operating income has decrease from $838,617,000 to $712,133,000. Just what the derided witness stated would happen has happened within four years, and will not only continue, but will increase in ratio, until net earnings will disappear, unless something deflects the present course of either the line of expense or the line of revenue from their direction toward each other.

A glance at the separate accounts shows where the trouble lies with expenses. From 1910 to 1914 maintenance of way increased sixteen hundredths of 1 per cent.; maintenance of equipment, 2.43 per cent., traffic, six hundredths of 1 per cent.; transportation, 3.24 per cent.; general expenses, seventeen hundredths of 1 per cent. Maintenance of way is largely material, and what labor it contains is practically all unorganized; maintenance of equipment is very largely organized labor; traffic is the expenses of getting the business, and represents no organized labor; transportation is the cost of moving the business, and is very largely organized labor; general expenses include salaries of officials and incidental expenditures. We find that the substantial increase in costs falls practically entirely upon organized labor. In the three accounts, maintenance of way, traffic and general expenses, the increase was thirty-nine hundredths of 1 per cent. In the two accounts, maintenance of equipment and transportation, the increase was 5.67 per cent. During this period, revenues increased 7.33 per cent.; expenses increased 21.05 per cent., and net income decreased 15.08 per cent.

The deduction of the witness referred to seems to be borne out by the results. If an increase in business of 204 million dollars cost 388 million dollars to get, how long will it take to wipe out the net earnings simply by increasing the business? And the increase has been unbroken annually; for the four years the ratio of expense to revenue has been, respectively, 66.27 : 69.38; 69.40 : 72.33. And the two years showing the big jumps are the years in which substantial advances in the demands of organized labor were enforced. Demands are now pending which if secured in full would of themselves put the 1914 ratio up to over 74 per cent., and make the increase in transportation account over 5 per cent. The assertion that the more business the railroads get the less money they make, does not look as absurd as it did in 1910.

Four years more at the same ratio would bring the net operating income below the necessary payments for interest and dividends. As many railroads are making no dividend payments, four years at the same raito will see the commencement of the inevitable period of receiverships not based on high finance

or stock juggling. Another four years would wipe out more than half the dividends, and in twelve years the interest on the bonds would begin to go. With the destruction of dividends and the impairment of interest payments reasonably in sight, it is not to be wondered at that railroad stocks are no longer desirable for investment, and that long-term railroad bonds are not sought after.

The trouble is that the governments of this country have put a hopeless block in the way of increased revenues that are at all adequate, and at the same time refuse to put any check whatever upon the increase of expenses.

The time has come when the government must accept the full responsibility attaching to the powers it has assumed, or accept responsibility for the wrecking of the greatest commercial institution of the world.

The real trouble with the American railroad today is unregulated and uncontrolled organized labor. That railroad labor had organize and protect its interests, no one can deny. But when its rapacity reaches the point at which it portends public disaster of inestimable damage, there should be some substantial and effective consideration of the interests of the public.

If the car which carries the freight is so much an instrument of commerce that the public has a right to regulate the charges for its use, why isn't the man who hauls the car equally an instrument of commerce, and equally subject to public regulation? Railroad labor gets almost 50 per cent. of the money the public pays to the railways, and the stockholders get about 5 per cent. Shouldn't the government be as solicitous about the reasonableness of the 50 per cent. as it is about the 5 per cent? When it becomes apparent that the load that is bearing the railways down is the power of organized labor, shouldn't the government determine the reasonableness of its demands? If reasonable the government should then permit the railways to charge enough to meet them. If not the government should condemn the demands.

I do not assert that organized labor imposes an undue demand upon railroad revenues. I do not know whether its toll is reasonable or unreasonable. But it is clear that its ever-increasing toll is the burden that is breaking the backs of the railways in their present inability to make adequate revenue provisions. If the reasonableness of a railroad rate is, as it surely is, a fair subject for administrative determination, why is not also the 50 per cent. of that ratio which is imposed upon the railways by a force beyond their control and in many cases against their fair judgment? William Ellis.

THE IMPORTANCE OF THE CONDUCTOR

Haileyville, Okla., July 10, 1914.

To the Editor of the Railway Age Gazette:

It is accepted as truth by those who know, that not enough attention is given to the employment of men for the train service to ultimately get proper men for the position of conductor. We begin with the brakeman. When a brakeman is required, the average employing officer, or sometimes a clerk of a few months' experience as a stenographer, takes the applicant into a corner and puts such questions to him as he can remember having heard his superior use in examinations. He may omit important matters, many of which should have been determined by the superintendent personally.

Was the applicant's past record fully investigated? What about his education? How about his physique and personal appearance? What was his manner in entering the office? Would not a man, say, six feet in height, broad-shouldered and straight, and with a steady gait, present a far better appearance when going through a train taking up tickets, than a tall, slim, swingy, or a short, chunky, bow-legged individual? If it were necessary for the conductor to give a passenger a written memorandum concerning some connection or other important matter should he not be able to write so that the ordinary person could read it? Would a commercial institution place a man in charge of a $100,000 business without knowing something of his educational qualifications, his past record, and his personal appearance? When you start a man out with a $20,000 locomotive and eight or ten fine passenger cars loaded with men, women and children, what do you expect of him? He should be a man possessing a good stock of broad general knowledge. Has he the proper interest of the company at heart so that he will thoroughly investigate accidents that occur within his notice, making the proper notations, and securing statements from passengers and others to fortify the company against suits at law? It should be borne in mind that whenever a call boy is employed he may some day be a conductor; and if he is not of the right kind of material and not properly coached he will prove an undesirable conductor. Just as soon as a brakeman demonstrates that he is not of the proper material for a conductor he should be dropped from the list, for he will not even make a good brakeman, knowing, as he does, that that is all there is in store for him. When a man in the train service is discharged for cause and his record has shown that he is not fit to be retained in the employ his reinstatement should be fought to the last, however strong a fight may be put up by the organizations to which he belongs.

A man in any capacity who does not work for the interest of the company at all times is not a desirable employee. To get over the road as quickly as possible with the least work is not doing the company justice. A local train is run for the purpose of doing the local work and not to see how quickly it can reach the terminal, leaving the bulk of the work for the fellow on the opposite run. I have in mind a case that occurred not long ago at a small station where two passenger trains were to meet. One reached this point 15 or 20 minutes in advance of the other. A stock shipper was waiting at this station to load a car of stock for an extra westbound which had made the first station east for the passenger trains. The car had not been spotted at the chute, as the chute was located on the passing track. The conductor of the waiting passenger train heard the conversation between the operator and the stock man, and of his own accord took his engine and spotted the car at the chute so that it was loaded by the time the extra arrived. In this way he saved an hour's delay to the extra and did not delay the passenger train a minute. This conductor did not ask for local freight pay for the balance of the trip; neither did he make any talk about it. On another occasion when there was trouble on account of a washout this same conductor found that a car of ice had been loaded and was being badly delayed on account of there being no freight service. He picked up the car and took it to the next station, which was its destination, without stopping to ask for instructions. The conductor just mentioned is still running his passenger train; never has any trouble, and never complains about being delayed by the despatcher or by freight trains. If he should happen to get into trouble he would certainly have a lot of friends who would come to his rescue.

On the other hand a case recently developed where a conductor on a "red ball" train with 20 "red balls" and 30 empties set out 4 red ball loads instead of empties to get over a hill; this because the empties were on the rear end and it was easier for the brakemen to set out four loads at the head end. Is such a fellow as this a good man for the company? His action brought severe criticism; but he is still running his train, and is protected by his organization.

What a farce we see every day in the full crew laws. The brakemen now on the trains have nothing to do but clean the lamps and get out on top when passing through stations; and half of them do not do that. J. L. Coss,

Assistant Chief Despatcher, Chicago, Rock Island & Pacific.

Mileage of Railways in Russia.—The Russian ministry of ways of communication has announced that the mileage of Russian railroads is 43,788, of which 29,594 miles belong to government railroads. In addition, the railroads in Finland cover 2,430 miles and the Eastern Chinese Railroad, 1,073 miles. There are also temporary lines covering 2,031 miles. There are 5,657 miles under construction, and permission has been granted for the building of 3,899 miles.

Decision in the Five Per Cent Rate Advance Case

Abstract of the Majority and Dissenting Opinions with the Exact Language of the Commissioners Preserved

The following is the majority opinion by Chairman Harlan:

The Interstate Commerce Commission on June 21, 1913, ordered a proceeding to inquire into the following matters:

1. Do the present rates of transportation yield the common carriers by railroad operating in official classification territory adequate revenue?

2. If not, what general course may carriers pursue to meet the situation?

In adopting this plan for the investigation the commission was not unanimous. Two of its members dissented on the general grounds that until the proposed increased rates had been filed as required by law there could be no effective basis for the inquiry and no legal warrant for a finding or for an order based thereon. To avoid any such question of law, the carriers on October 15, 1913, filed tariffs providing increased rates on practically all freight traffic moving in official classification territory. These tariffs were suspended by the commission.

The rates now proposed by the carriers are commonly spoken of as providing a five per cent. increase in freight charges. As a matter of fact the increases range from less than three per cent. on some traffic, and as high as fifty per cent. in certain short haul traffic.

The additional revenue expected to accrue under the rate advances discussed in a case of 1910, was estimated at $27,000,000. The increased revenue under the proposed advance here under consideration, as estimated by the carriers' experts, would aggregate about $50,000,000.

On November 24, 1913, the hearings were commenced and were continued at intervals until May 1, 1914. The record was closed so far as the first question in the general investigation is concerned, except as to certain inquiry formally addressed to the carriers by the commission, to which they have not yet fully responded, and except as to the relations of the Baltimore & Ohio with the Cincinnati, Hamilton & Dayton, concerning which a hearing was had on May 29, 1914.

PROTESTS AGAINST PROPOSED ADVANCES

Protests againts general increase in freight rates were presented by the railroad commissions of the Iowa, North Dakota, South Dakota, Nebraska, Kansas, Oklahoma, Arkansas and Missouri, and by the National Council of Grain Dealers' Association, and the Farmers' Association of Iowa. Protests against increase in lake and rail rates were presented by the Chicago Association of Commerce, and the Board of Trade of Duluth. Protests against proposed increases in rates so far as they effected specific articles of which the tonnage in some cases is large were presented by many shippers, particularly by shippers of coal, coke, ore, brick, cement, lumber, ice, sand, gravel, paper, pulp, corn products and petroleum. The hearing of these special protests occupied 36 days.

RELATIONS OF THE CARRIERS AND THE PUBLIC

The general duties that common carriers owe to the public are well understood. They must provide prompt and safe service and they are held to strict responsibility for injuries or damage to property which they undertake to carry and for which they are under obligation not to charge an excessive rate for the services. This was a rule of common law, and it has been emphasized by specific legislation; on the other hand we cannot doubt that there are responsibilities on the part of the public to members of privately owned companies.

Investors in railroad securities share part of the consequences of dishonesty or inefficiency on the part of those selected to manage the properties. No one could reasonably contend that the public should pay higher transportation rates because once prosperous properties like the New Haven, Chicago & Eastern Illinois, the Alton, the Frisco, or the Cincinnati, Hamilton & Dayton, may now be in need of additional funds as a consequence of mismanagement. Investors in railroad securities must also take the risk of those errors of judgment which not infrequently attend the careful management of enterprises conducted for profit, but they likewise should be permitted to enjoy fully the profits which naturally flow under reasonable scale of rates, from the exercise of good judgment, integrity and efficiency in the management of the properties. The public owes to the private owners of these properties, when well located and well managed, full consent to earn a fair return on the investment, and the carriers owe to the public an efficient service at reasonable rates.

The property investment of the 35 railway systems in official classification territory, as shown by their exhibits, aggregated about $3,787,000,000 on June 30, 1898. The return upon this amount in net operating income for that year is stated at 4.39 per cent. During the next few years conditions in the transportation world improved rapidly. In 1900 the property investment as reported stood at about $3,952,000,000. The net operating income for that year is stated at 5.28 per cent. In 1903 their property investment was reported at about $4,300,000,000. The net operating income for that year reached 5.85 per cent. It is obvious that if we select either the low ratio of the net operating income for 1898 or the high ratio of 1903, as a basis for comparison, some very unsound inferences may result. All things considered, it is clear that in place of a comparison of one particular year or period with another, we must take a more comprehensive view of the trend of railway earnings. We shall, therefore, begin our examination with the year 1900, omitting the years 1898 and 1899, which show relatively low earnings and appear not to be fairly representative of railroad conditions.

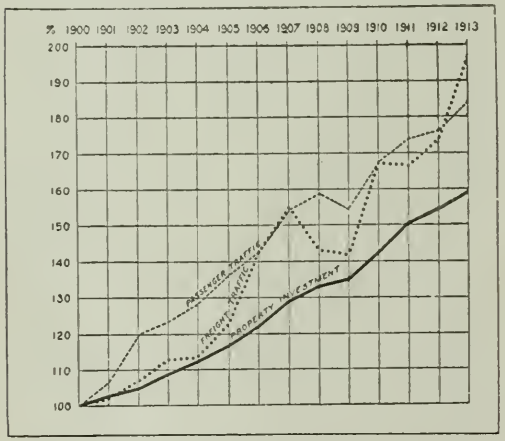
During those 14 years the property investment of these carriers has increased from $3,952,000,000 to $6,281,000,000. This represents an advance in the property investment account of 59 per cent. The operating revenue shows a far greater advance during the same period of years, having increased by 110 per cent. It will be noted, however, that the operating expenses increased even more rapidly, or by 133 per cent. in the 14 years, the result being that the net operating revenue shows a lower ratio of increase than does the gross revenue. Expressing the thought in a more definite form, it may be said that in 1900 it cost the carriers 64.62 cents in operating expenses to secure $1 of revenue, while in 1913 the cost had risen to 71.77 cents. Had the operating cost of securing their revenue remained the same in 1913 as in 1900 the net operating revenue of these carriers in 1913 would have been greater than it was by more than $100,000,000. The taxes increased during that period in about the same proportion as did operating expenses; but the decrease in the capital cost per unit of production was so great that the ratio of net operating income to property investment was larger in 1913 than it was in 1900. The explanation of this reduced capital cost is due mainly to two facts; first, the advance in the art of railroading; and, second, the increase in the density of traffic, both resulting in the greater utilization of the plant.

CAUSES OF INCREASED OPERATING RATIO

We have already mentioned the fact that the returns of these carriers in gross operating revenues have increased much more rapidly since 1900 than the property investment. It will be observed, however, from the accompanying chart, showing the ratio between the two accounts, that while the gross revenues, as compared with property investment, increased quite regularly from 1900 to 1907, they have remained practically stationary, with some fluctuations, since the latter date. This has been due not to a

relative decrease in the volume of the traffic moved but largely to a decreased return per ton mile and per passenger mile since 1904, and especially during the years 1906 to 1913. If the ton-mile and the passenger-mile rates earned in 1906 had been repeated in 1913 the net operating income of the carriers during the latter year would have been at least $30,000,000 greater than it actually was.

There is, however, no basis of record for the assumption that the reduction in these earnings per ton mile has been caused wholly by the adoption of lower rates for the service. There are many factors, other than rate reductions, that affect the earnings of carriers per ton mile. Without any reduction whatever in the charge for the service a reduction in the revenue per ton mile will be brought about by a relative increase in the length of haul or in the volume of traffic taking low rates. A very marked reduction in revenue per unit of service results also from the absorptions occasioned by payments for switching, lighterage, elevation, etc. The record indicates that some of the decrease in the yield per ton mile was due to voluntary rate reductions by the carriers; some rate reductions have also resulted from the orders of this commission and from the orders of state commissions. But it may fairly be assured that the



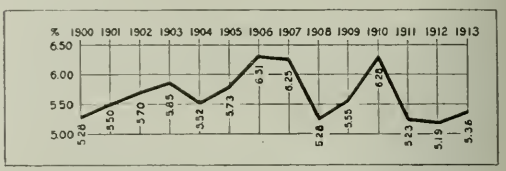
Comparison of Increases in Capital Investment and Traffic, 1900 to 1913 Inclusive

causes that we have just mentioned were more influential than any lowering of the rates on freight.

The reduced earnings on passenger traffic were caused largely by reductions which the carriers were compelled to make in their passenger fares in Ohio, Indiana, Michigan, Illinois, and in other states, under local legislative action. We shall refer later to this very important phase of the case, but it is proper to say at this point that the returns made by ten of the roads, representing only a portion of the mileage in what is known as central freight association territory, show that during the period from 1906 to 1913, inclusive, there was an estimated loss of nearly $18,000,000 in revenues due to state legislation under which those carriers were compelled to make substantial reductions in their local passenger fares with accompanying reductions in their interstate passenger fares.

Another cause which has depressed the ratio of revenue to investment in recent years, is the increasing proportion of investment in property, which, although used in transportation and acquired in response to a public demand for better service, is relatively unproductive under present practices. Among other things, investments in equipment of improved type, displacing other equipment of equal capacity, the elevation of tracks, and the construction of expensive terminal facilities in the large cities, while adding to the value of the service rendered, have not yielded proportionate returns in revenue. The greater part of these expenditures has been for the immediate benefit of the passenger service.

The carriers were also prevented from realizing the full benefit of the increase in gross earnings by the great increases in operating expenses and taxes.

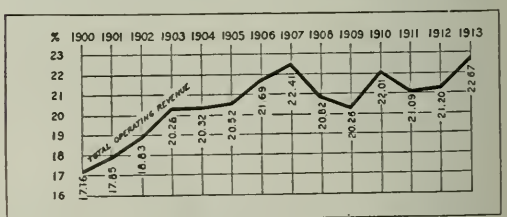


Ratio of Net Operating Income to Property Investment

At two points, 1906 and 1910, the rising line in the operating ratio has been interrupted; but both those years were periods of relatively large railroad earnings. The lower operating ratios of those two years were obviously due to the greater density of traffic; and conversely the higher operating ratios of 1904 and 1908 were due to the lower density of traffic incident to the business depression during those years. There were also large revenues in 1911, 1912, and in 1913, but they were offset by the large increase in wages and other operating costs during that period, in consequence of which the operating ratio was held at a high level.

Each of the different groups of expenses has played a part, but not an equal part, in increasing the operating ratio of railroads. The advance in relation to revenues of the last group of expenses, shown on the table and charts as general and outside operations, has been confined almost entirely to the expense of conducting outside operations, such as boat and ferry lines, harbor terminal transfers, sleeping, dining, and special car services, grain elevators, stock yards, hotels and restaurants. Many of these enterprises result in substantial losses to the carriers; and they often involve services for which no charge is made or for which the charge when made is unremunerative. The expenses incident to these so-called outside operations have grown rapidly in recent years.

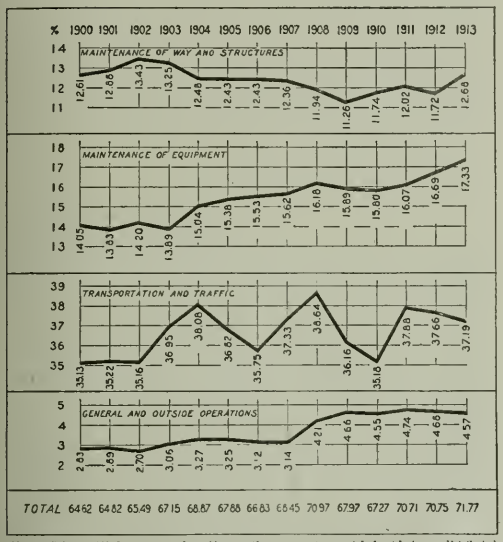
The transportation and traffic expenses, as shown on the above chart, have very substantially advanced in ratio to revenue during the 14 years under review. This group includes expenses incident to the actual moving of traffic and the most important items are the cost of fuel and the wages of employees, both of which in recent years have been increased to such an extent as to account for a great portion of the total increase in



Ratio of Total Operating Revenue to Property Investment

operating expenses. Compilations made by the commission of the answers of the carriers to its questions concerning fuel show that the average price of coal increased 7.7 per cent. from 1910 to 1913. Exhibits filed by 30 of the 35 railway systems involved in this proceeding indicate an increase of 9.02 per cent. in the average daily wage paid in 1913 as compared with 1909, and that if the scale of wages for 1909 had been in effect during 1913 the labor costs of the latter year would have been less by about $51,000,000 than they actually were. What part of this

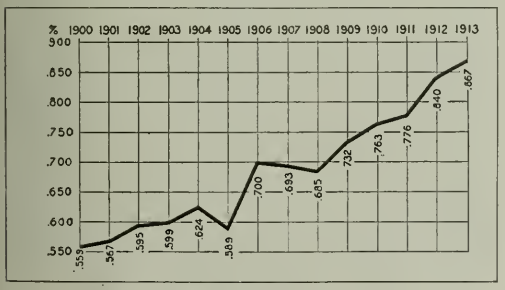
amount properly belongs to operating expenses and what part to the betterment and improvement accounts does not appear. It is interesting to note, however, that notwithstanding wages constitute an exceptionally large part of the transportation expense, this group of expenses has shown a relatively smaller advance than other groups. That the ratio was not still greater in 1913 is a tribute to the ability of operating officials and an evidence of the possibilities in the direction of economy. A relatively



Note.—Prior to 1908 the expenses of outside operations were not separately kept but were distributed among the other groups. This accounts for the sudden rise in the ratio line for general and outside operations.

Ratio of Groups of Operating Expenses to Operating Revenues

small portion of the increase was made necessary by the so-called full crew and hours of service laws and similar federal or state statutes. A substantial part of the increase in this group has been due to the increase in the special services performed for shippers at terminals and elsewhere without the imposition of any charge or for an inadequate charge. Such special services, which are considered later in this report, include



Ratio of Taxes to Property Investment

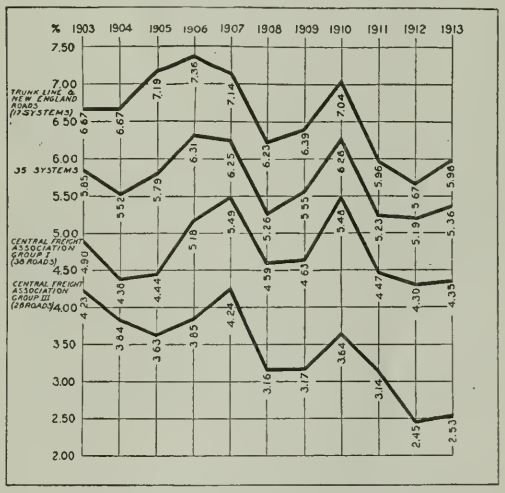
reconsigning, switching, storage, teaming, etc., the cost of performing which falls for the most part within the group of transportation expenses.

The most extraordinary increase in the operating expense accounts from 1900 to 1913 was in the maintenance group, and especially in the maintenance of equipment.

The safety-appliance acts, boiler-inspection laws, state legislation requiring the elimination of grade crossings, and other enactments show the demands of the public for a higher standard of service; and a portion of the increase in maintenance charges is due to such causes. These laws, to no small extent, enforce measures of precaution which the carriers ought to take and which they would voluntarily have taken in many particulars in pursuance of sound railway policy and practice. It is, nevertheless, true that in many cases they have had the effect of hastening improvements in equipment and roadway that would have come later, and of burdening the maintenance expenses of the years in which the improvements were made. Wise policy requires that a railway property should be kept up to the level of its highest reasonable efficiency at all times; and the postponement of needed repairs either in road or equipment because of a temporary falling off in revenues can not be justified or be regarded as true economy.

FINDINGS AS TO THE ADEQUACY OF PRESENT REVENUES

In view of a tendency towards a diminishing net operating income as shown by the facts described we are of opinion that the net operating income of the railroads in official classification territory, taken as a whole, is smaller than is demanded in the interest of both the general public and the railroads; and it is our duty and our purpose to aid, so far as we legally may, in



Comparison of Ratios of Net Operating Income to Property Investment

the solution of the problem as to the course that the carriers may pursue to meet the situation.

The financial condition of the various railroads composing the 35 systems varies greatly, as disclosed by their net corporate income as well as by their net operating income. The condition of some of them is so prosperous that they clearly do not need a higher net income; the condition of others is such as to preclude the expectation of a return upon outstanding capital stock or the possibility of raising much additional capital without a thorough reorganization.

SHALL THE PROPOSED ADVANCE IN FREIGHT RATES BE APPROVED?

Treating as one road the 35 railway systems that have joined in this application for our approval of a so-called 5 per cent. advance in their freight charges, we have reached the conclusion that their net operating income is insufficient and should be increased. We proceed now to consider under our general order of inquiry "what general course may carriers pursue to meet the situation."

They proposed but one remedy—the so-called 5 per cent. increase in freight rates. As that remedy was offered through the

formal filing of tariffs, we are legally bound to adopt it, if the new rates are just and reasonable, even though it may not seem to us the best remedy available. But we are unable upon the record to find that the rates so proposed are just and reasonable, except as hereinafter stated.

NO INCREASE OF PASSENGER FARES PROPOSED

The proposed advance in rates is limited to freight traffic; and it does not extend even to all the traffic of that character. Yet practically every railroad seeking approval of these increases in freight rates maintains a passenger service also; and passenger train revenues amount to more than 24 per cent. of the total transportation revenues of the carriers, as heretofore stated. It is consistent with the evidence of record as to some of these carriers that the increase shown in the ratio of operating expenses to operating revenues is attributable wholly to the increased cost of passenger service; and it is probable, in the case of every railroad showing a largely increased operating ratio, that the increased ratio is due, in large measure, to its passenger service. The unit of cost of moving certain kinds of bulk freight carried in large volume appears to have been reduced by more efficient operating methods despite increases in the rate of wages; on the other hand, the unit cost of moving passengers has been almost uniformly increased independently of the effect of wage advances, through the use of heavier equipment, the adoption of safety devices, and better service.

Passenger fares are paid directly to the carriers by those making use of the service, and they know what it costs them. Payments for freight charges, while less direct, are none the less actual. The general public does not know, and probably does not stop to consider what proportion of the cost of a ton of coal, or of the price of a dwelling, or the rent of an apartment represents freight charges, but the cost of freight transportation enters into the cost or selling price of practically everything used by the public. In many cases, to be sure, freight charges represent but a small proportion of the total cost of things used or consumed, but it is quite probable that the average family pays much more in the course of a year as freight charges than it does for passenger fares. We know of no provision of law under which we should be justified in increasing freight rates to provide a return upon property used exclusively in the passenger service, much less to take care of losses incurred in such service. In our opinion each branch of the service should contribute its proper share of the cost of operation and of return upon the property devoted to the use of the public.

DIFFERENCES IN FREIGHT TRANSPORTATION COSTS

But even if the evidence clearly established an increase in the general freight operating expense ratio, we should not be at liberty on this record to conclude that the cost of transporting each kind of freight had increased, much less that it had increased proportionately. The evidence is clear that as to certain classes of bulk or heavy freight, like coal, coke, ore, cement, brick, tile, clay, and plaster, the use of larger cars must have reduced operating costs, whereas in respect to expedited package freight, shipped in cars moving on a regular schedule regardless of the quantity of their contents, the use of larger cars, involving greater unused car capacity, must have increased the operating costs. Similarly the extension of the expedited service in carload freight must have increased the cost, while the heavier train loading of the slow train, in which the heavy or bulk freight usually moves, has tended to decrease the cost.

DIFFERENCES IN TERRITORIAL CHARACTERISTICS

There is a wide difference in the character and profitableness of the traffic moving under substantially similar conditions in different parts of official classification territory. That territory is divided into three parts: The New England territory, with 8,071 miles of railroad reaching a population of 1,389 persons per mile; the trunk line territory, with 23,777 miles of railway line and a population of 889 per mile; and the central freight association territory, with 35,849 miles of railroad and a population of but 506 per mile. In the New England territory only 17 per cent. of the population is rural, in trunk line territory 30 per cent. is rural, and in central freight association 46 per cent. With 2,000,000 less population than trunk line territory, the area of central freight association territory is 74,000 square miles greater and is traversed by 12,072 more miles of railroad; it embraces nearly three times the area of the New England territory and is traversed by 27,778 more miles of railway. Its navigable lakes and rivers constitute one of the influences affecting the level of the rail rates now prevailing there. In the New England territory there are no coal mines, and a large part of the traffic is of a high-grade character. In trunk line territory the products of mines furnish a large part of the tonnage, while on group III of the central freight association lines the traffic is more diversified. The differences in the freight earnings per ton per mile are illustrated as follows:

Illustration of Differences in Earnings per Ton-Mile in Three Territories

Names	1910 Cents.	1911 Cents.	1912 Cents.	1913 Cents.
Boston & Maine	1.085	1.095	1.089	1.054
New York, New Haven & Hartford	1.417	1.390	1.371	1.345
New York Central lines east of Buffalo	.642	.647	.653	.623
Pennsylvania lines east of Pittsburgh	.618	.619	.617	.617
Central freight association lines	.570	.573	.575	.563

READJUSTMENT OF CENTRAL FREIGHT ASSOCIATION RATES

The testimony tending to show that a readjustment of rates in central freight association territory is what is needed was not disputed. The class-rate structure is honeycombed with inconsistencies.

The attitude of the officials of the roads operating in central freight association territory, as disclosed on the record, indicated that they joined in this proceeding not because they thought the so-called 5 per cent. increase of rates would meet their requirements or that this form of relief is appropriate in central freight association territory, but only because of the desire of other and more powerful lines operating in trunk-line territory to present to us in this proceeding one general plan of relief. These officials, while stating that the so-called 5 per cent. increase would add substantially to their revenues, expressly condemn the present basis of rates as unsuitable and unsatisfactory. The leading railroad witness on the question affirmed, with some earnestness, that "the class rates do not sustain any logical relation to each other," and that under the present basis of rates "certain shippers of certain classes of freight have not for years borne their share of the burden of transportation, and in addition to the rates being extremely low they are unscientific and illogical."

CONCLUSIONS

In what has preceded we have found, treating as one road the 35 railway systems in official classification territory that have asked for this so-called 5 per cent. increase in rates, that their net operating income is insufficient and should be increased. There remains for consideration the question whether the proposed increases in rates should be approved.

We have seen that the class rates in central freight association territory are on a lower scale than can be found elsewhere in the country, and that many of the commodity rates are too low and are probably unremunerative, considering the diversified nature of the traffic. The class rates and many of the commodity rates may therefore with propriety be increased. This approval, however, is subject to the following limitations:

(*a*) With respect to certain heavy commodities, namely, brick, tile, clay, coal, coke, starch, cement, iron ore, and plaster protestants made such a showing as to constrain us to hold that the carriers have failed to sustain their burden under the statute.

(*b*) Reference has heretofore been made to the fact that the proposed tariffs are based on a minimum increase of 5 cents per ton on all commodities moving under rates stated in cents per ton when less than $1 per ton; with respect to certain hauls, this would result in increases much in excess of 5 per cent. and in certain cases the increases would be as high as 50 per cent. The

carriers have failed to establish the propriety of this minimum increase, and the evidence offered by the protestants makes it clear that it would work hardships and discriminations and can not be approved, since under it a disproportionate burden is cast upon the heavy short-haul traffic.

(*c*) The tariffs also name many other rates involving increases exceeding 5 per cent. by varying amounts; these rates also must be condemned as throwing upon the traffic affected by them a disproportionate burden, for which no justification has been shown.

(*d*) There may be also a number of rates throughout central freight association territory that still are controlled by the force of unexpired orders of this commission, entered after specific investigations in formal cases. No showing has been made why those orders should be modified.

Except in respect of the rates above referred to we are of the opinion that the proposed intraterritorial rates in the central freight association territory have been justified by the carriers and may be put into effect.

We find that the financial condition of the trunk-line carriers does not warrant a general increase of freight rates and shall also show that the needs of the New England lines are being cared for locally. The carriers failed to prove either that the existing rates in trunk-line or New England territories are too low or that the increased rates proposed for those territories would be just and reasonable rates. Nor have they proved that the existing interterritorial rates in official classification territory are too low or that the proposed increases in those rates would be just and reasonable. The carriers will be required therefore to cancel all the tariffs in which these rates are proposed.

Upon the whole record we find that the carriers have not met the burden of justifying their proposed increased lake-and-rail rates. On general grounds, also, those increases must necessarily fall with the fall of the increases in the all-rail rates. The carriers that have published such rates will therefore be required to cancel them except in so far as any increase here approved in central freight association rates may require, under established bases, some increase in the rail-and-lake rates or in the factors upon which those rates are based.

THE EFFECT ON THE TRUNK LINES OF RATE INCREASE IN CENTRAL FREIGHT ASSOCIATION TERRITORY

Increased revenues resulting from increases in rates in central freight association territory will afford some relief to practically all the lines in official classification territory which are in need of additional revenues, except the New England lines. The latter roads have only a relatively small interest in this proceeding, and their requirements are being considered locally in conferences with the state authorities and others. It will also aid several large roads not included in the 35 systems and more than 30 small roads in central freight association territory which appear to be in greatest need.

In the conduct of these inquiries the commission has not had the full co-operation of the carriers and the shippers have not had an opportunity of being fully heard. For these reasons our suggestions as to the steps to be taken to secure additional revenues are to be regarded as tentative merely. The information collected and put on record convinces us, however, that great opportunity exists for increasing the net revenues of all carriers in official classification territory, otherwise than by resorting to a general advance in their freight rates.

The practice of granting free transportation of passengers and private cars, although less general than formerly, in part because of prohibitory legislation upon that subject, is still a heavy burden upon the railway passenger service, and it is recommended that the practice be still further restricted by the carriers.

Compilations prepared by the Commission show that the revenue from private cars handled free during the year 1913 on 88 of the roads which have made answer to our question would, at tariff rates, have amounted to $644,250.79.

We suggest a careful review of methods for increasing freight-car efficiency. In certain departments of railroading great advances have been made in efficiency in recent years; for instance, by increasing the train loading. On the other hand, the cost of the freight car as an element in the cost of transporting goods seems to have grown greater instead of less. The capital cost of equipment has increased more rapidly within recent years than the capital cost of the road. The ratio of the maintenance of equipment expense to gross revenue has grown largely, but it is not unreasonable to expect that such added costs can be overcome, as they have been in some other departments of railroading and in many other industries, by advances in management and methods. It is, however, in the use and operation of cars that we must look for the most substantial economies.

IS THERE A CRISIS OR CAUSE FOR ALARM?

It was insisted during the hearings that the carriers are facing a crisis and that the need of relief is so urgent as not to permit of the orderly investigation of the possible sources of additional revenue other than by the proposed freight rate increase. The executives admitted the propriety and need of a general readjustment of many of their present rates and practices, and the possibility of further economies and of increased efficiency; but they insisted that grave and serious responsibilities would be incurred if we failed to relieve the situation by at once approving the proposed 5 per cent. increase in rates. The principal danger suggested was that the carriers would encounter great difficulty in renewing their maturing short-term notes and other obligations unless investors were assured that the carriers' revenues would be increased immediately. Subsequent developments have shown that there was little foundation for any such view. During the world-wide financial stringency prevailing in 1913 the railroads, in common with states, cities, and the industries, found it difficult to secure loans, however good the security, but with the growing ease in the money markets this difficulty has largely disappeared. According to the standard financial journals, nearly $500,000,000 of bonds and notes have been disposed of by the railroads since January 1, 1914. Recently $35,000,000 of Baltimore & Ohio Railroad Company short-term notes were taken at par in an afternoon. The interest rates exacted were undoubtedly high as compared with those prevailing generally during the 14 years preceding, but the burden of high interest rates is not confined to railroad securities.

The credit of our railroads has undoubtedly suffered in recent years, but largely from causes that were independent of their rates. Their borrowing power has suffered relatively, because of the great competition for money by governments, states, municipalities, public-service corporations, and industries. It has suffered actually because of the mismanagement of great railroad systems of international repute. The conspicuous decline in the securities of certain railroads and the circumstances leading up to the appointment of receivers for others have impaired the confidence of the public in the stability of railroad securities. This feeling of insecurity has been increased, first, by the fact that recklessly mismanaged railroads have been largely under the control of powerful banking houses theretofore considered conservative; and, secondly, by the fact that the great railroad systems have become interlocked with weak lines either directly through stock ownership or by common directorships or otherwise.

The credit of some of our leading railroads has also been strained by the too free use of it in unwise and sometimes disastrous extensions of their lines, and even more seriously by the acquisition of properties not forming a part of their railroad system or used at all in transportation service. The campaign of publicity hereinafter referred to has also increased the strain on the credit of the railroads. But the earning capacity of our railroads is so great that their credit will soon be restored if their revenues are conserved. The crop estimates give promise of greatly increased gross revenues for the current fiscal year.

THE CAMPAIGN OF PUBLICITY

The letters and telegrams received disclosed an unmistakable purpose to hurry the commission to a conclusion before the record had been closed and before there could be an opportunity to hear, much less to consider, the testimony that the protestants and others desired to offer in protection of what they conceived to be their interests as shippers. Respectable journals joined in demanding the immediate approval of the proposed rates. Cartoons appeared in the public press depicting the commission as an obstruction to progress and prosperity, as if increasing the burdens of commerce by an increase in the rates for its transportation was the only solid foundation for our permanent prosperity. One traffic association offered to deluge the commission's offices with thousands of telegrams; other organizations started chains of letters, some of which, in identical language, are still reaching the offices of the Commission from widely separated parts of the country; others took the trouble to send to members of the commission clippings from newspapers and magazines containing editorials and news items relating to the case and denouncing our delay in disposing of it. All this was done regardless of the fact that the commission is under the express statutory obligation of affording a full hearing in such matters to all who desire to be heard and have reasonable grounds for a hearing.

Most of these communications were doubtless well intended, but they have not been helpful. Those that have been examined disclose that the writers were without any real understanding either of the many intricate questions involved in the investigation or of the facts disclosed upon the record; and they show little appreciation of the statutory standards by which we must be controlled when considering the rates and practices of carriers. Many asserted that business was dull and that an increase in rates "would give things a start." The general thought running through practically all the communications was that new enterprises were being held up; that men were out of employment; that business was in need of a stimulus; and that the laying of an additional burden upon commerce through increased freight charges would be a sufficient tonic to start a general forward movement, because the railroads themselves would then become large purchasers of supplies. The law fixes the standards by which the rates and practices of carriers must be judged and the commission can act only in accordance with those standards and after a full hearing; we have no authority to approve rate increases with a view to stimulating business. Nevertheless, the writers of many of these letters urged immediate action by the commission on the ground that the prompt approval of the increased rates would "restore confidence" in the financial and business world and that such a result in itself would be a sufficient basis for action by the commission; and in many cases they frankly stated that they would prefer an increase in rates rather than a continuance of the present dullness of trade because the burden of increased rates could "be passed along to the consumer."

Mr. Willard, president of the Baltimore & Ohio Railroad Company, and chairman of the committee of executives in charge of the presentation of the case of the carriers, while frankly admitting that the carriers had established a publicity bureau for the purpose of accurately advising the press and shippers of the facts developed upon the record, disclaimed any personal responsibility for the propaganda, and definitely stated that his personal endeavors were limited to an effort to have the facts correctly laid before the public. Whether other and subordinate officials of the carriers may be responsible we do not know, nor have we sought to ascertain. There can be no doubt, however, that this clamor and outcry have tended to mislead the public and have seriously aggravated the present commercial depression.

This matter is referred to because of its general impropriety and because it shows the existence of a widespread misconception as to our powers and duties.

We may justly feel proud of the development of our transportation system. Despite occasional discreditable chapters, the history of our railroads has been marked by great achievements. There is among the carriers a growing spirit of co-operation with the commission in its efforts to enforce the law. With the application of correct and helpful accounting, the establishment of sound business methods, and a better understanding by both carriers and the public of their mutual obligations, to which we believe this investigation has contributed, the future is full of promise. We see no reason why our American railroads should not enjoy a large measure of prosperity consistently with just and reasonable rates.

In order to give effect to our findings and conclusions herein and to avoid confusion in establishing the rates herein approved, it will be necessary for the various carriers to cancel all the tariffs now under suspension; and an order to that effect will be entered.

DISSENTING OPINIONS

Commissioner McChord: To prevent in central freight association territory the increased rates proposed in the majority report and to deny increases to the trunk lines appears to me to be unwarranted by the facts of record and not in harmony with the general basis of rate adjustment that has so long existed in official classification territory, and I deem it proper to state briefly what seem to me to be certain practical reasons which lead me to this conclusion.

To disallow an increase in the joint through rates and at the same time allow an increase in central freight association territory to and from the Ohio river gateways would have the effect of allowing increased locals to central freight association lines on this through traffic at the expense of their southeastern connections, who would be expected to shrink their earnings to the extent the central freight association lines increased theirs.

The two subdivisions of this territory, to wit, central freight association and trunk line, constitute one great industrial community which supplies the bulk of the manufactured products of the country and through which move the great streams of east and west bound commerce. The two territories are divided only by an imaginary line.

Within each territory are some of the greatest commercial centers of the country, each in active competition with the other in the purchase and sale of raw materials and manufactured products. For many years the rates between these cities have borne a fixed and well understood relation each to the other. Commercial conditions have, to a considerable extent, come to be based upon this relationship and, in so far as is shown by this record, it appears to have given general satisfaction. It must follow that any general increase of rates within central freight association territory alone will change the rate relationship as between cities in that territory and cities in trunk line territory, perhaps to the advantage of the latter

Viewed from a commercial, geographical, or transportation standpoint, and in the light of the facts of record, I am convinced that the reasons which impelled the commission to approve certain changes in central freight association rates apply equally to trunk-line rates, and that the transportation conditions in the two territories are not absolutely so much unlike as to indicate the wisdom of dissimilar treatment of the rates proposed by the carriers in the entire official classification territory.

Commissioner Daniels: In the conclusions reached in the majority report I am unable to concur. Except as hereafter indicated, the 5 per cent. advance should have been granted in trunk-line territory no less than in central freight association territory. To the extent that an increase is permitted upon rates in central freight association territory I concur. The majority opinion, however, falls far short, in my judgment, of giving even to the carriers in that region the relief to which the evidence of record clearly shows they are entitled.

For more than a decade the operating and maintenance expenses of the railroads of the United States have constantly

risen. The rates charged, on the other hand, have been either static or declining. Unable to raise their rates without the sanction of this commission, the railroads have found that the margin between their receipts and their outgo has progressively narrowed; that their net profit from operation has tended to decline; that their operating ratio—the number of cents out of every dollar received which are absorbed by the cost of conducting their business—has steadily increased. Despite recent investments of hundreds of millions embodied in extensions and improvements, the addition to net operating income has been meager in the extreme. In conspicuous instances, despite such additional investments, there has been an absolute decrease in net operating income; this decline in net earnings has occurred during a period when the carriers have handled an increasingly greater tonnage and carried more passengers than ever before. While they have been furnishing greater and better service, both in the transportation of freight and the carriage of passengers, their net operating income has at the same time progressively dwindled.

While the suggestions offered at the close of the majority report as to methods of conserving and increasing railroad revenue are, many of them, interesting and significant, others are more or less conjectural, and most of them remote in possible effect. This commission is not constituted by law a board of general managers of the railroads of the country, and the assumption of tendering suggestions as to management ought never to delay or postpone the settlement of a plain matter of law and fact involved in an application for advanced rates.

The testimony offered by the carriers deals mainly with insufficiency of return. Such testimony is germane and proper. Evidence establishing general inadequacy of return impeaches the general reasonableness of rates which result in such inadequate return. It is not conclusive evidence that rates are unduly low, but it creates a reasonable presumption to that effect, and it suffices to meet the burden of proof cast by the law upon the carriers which propose rate advances.

Failure to advance passenger fares at the same time is no persuasive reason for declining permission to increase freight charges to a level that is just and reasonable. Peculiar difficulties center around the advance of passenger fares, and while they eventually ought to be made to bear their proper share of transportation expenses, their elevation under existing circumstances must in point of time inevitably follow comprehensive adjustment of freight rates.

To deny advances which would establish rates just and reasonable, and in consonance with changed conditions of costs and income, will but postpone a necessary and inevitable readjustment. It is true that the difficulties confronting the carriers may be temporarily lessened or even for a time offset by unusually heavy tonnage arising, for example, from exceptional crops; but in the ebb and flow of material prosperity from year to year these difficulties will reappear and, without adequate offset in the shape of higher rates or otherwise, will eventually become chronic.

The averment was made that the maintenance costs have been excessive, but it is significant that the majority report though canvassing this particular subject fails anywhere to find that the maintenance costs are excessive.

Certain of the carriers seeking to make this advance are charged with waste or other financial irregularities. The New Haven, which has been shown guilty of such practices in the past, is not interested, save to a slight degree, in the present decision; but even if a few vitally interested railroads had been shown culpable it would not change the conclusion, because it has already been demonstrated that where their lines are inextricably interlaced with other lines no practical distinction can be made in according advances. The attempt would defeat its own end. So with this in view the majority report accords, of necessity, the same advances to the Cincinnati, Hamilton & Dayton, the Pere Marquette, and other lines in central freight association territory whose administrative integrity has been impeached, as to the remaining lines in the same region whose management has not been questioned.

THE BURDEN OF PROOF UNDER THE STATUTE*

It is clear that evidence of inadequate returns upon the fair value of property devoted to the public use is *prima facie* a showing that present rates are unduly low, and that rates higher than those current are presumably just and reasonable. To this extent revenue evidence is rate evidence; and revenue evidence applying to rates in their totality is rate evidence which applies to each specific rate.

The contention that the commission may not pass upon rates as a whole, but that it is obliged under the law to consider and to pass separately upon each particular rate between every two points, is expressly and explicitly repudiated.

The obvious conclusion, both from reason and from precedent, is that the commission may legally deal with rate schedules as a whole, and also that insufficiency of revenue is a proper ground upon which, nothing substantial to the contrary appearing, to accord advances which will result in just and reasonable rates.

The further contention is made that the proposal of a 5 per cent. advance upon existing rates presumes a relationship between particular rates which is just and proper; that there is no conclusive evidence of this fact; and that a 5 per cent. advance would simply accentuate the disparities, inequalities, and inconsistencies already interwoven in the rate fabric. It is clear that this contention can not have prevailed in the majority opinion. Had it done so the 5 per cent. advance could not have been accorded in central freight association territory. There exists a presumption in favor of inter-relations in a rate fabric that have long continued undisturbed. Moreover, there are commonsense limits within which any attempts at a rate adjustment are necessarily confined. Every act of rate making necessarily carries vestiges of discrimination; the very classification of freight assimilates into one class many articles not identical in weight, bulk, value, or fragility. The commission is not called upon to do the impossible and to show such meticulous attention to the adjustment of fractions as to preclude the possibility of any readjustment of rates whatever. With a demonstration of inadequate revenues, and with a presumption in favor of the propriety of the interrelation between rates long in effect, an advance moderate in amount, calculated to produce but a reasonable increment in earnings, and affecting all traffic in the same proportionate degree, is the plain dictate of law and of common sense in the premises.

Another contention that sought to impeach the propriety of granting advances was founded on the idea that the failure to increase passenger rates simultaneously with the proposed advance in freight rates would impose on freight traffic an undue burden.

It is becoming increasingly clear that passenger traffic does not bear its proper share of the joint costs incurred by the carriers for the transportation of freight and passengers. But it is even more clear that as a practical matter passenger fares can not be speedily readjusted upon a higher basis. Although the record in this case clearly shows that the carriers generally do not find passenger traffic highly remunerative, the suggestion that they should add to their revenues by advancing their passenger rates is of little force in view of the fact that they are powerless to adopt it. In recent years state commissions and state legislatures have established maximum intrastate passenger rates. So long as the rates thus established are not so low as to be deemed confiscatory in violation of the fourteenth amendment to the federal constitution the carriers are bound to observe them. The activity of the states in this respect has been so general that the carriers no longer can fairly be expected to

*Note.—It ought to be said, however, that what is above stated as to the burden of proof and the authority of the commission to pass upon rates as a whole does not imply that these views are opposed to those of the majority.

look upon their intrastate passenger traffic as a possible field for the substantial augmentation of their revenue.

CONCLUSION

The ratio of return upon the property investment has been indicated. The contention of the carriers is that upon investments in property amounting to approximately $640,000,000 since 1910, no commensurate return has been made, and that the net operating revenue between 1910 and 1913 shows an actual decline. It is no sufficient rebuttal of these contentions, if the supporting figures are true, to point out that the "revenues received by the carriers have been earned by the whole investment, and it is not correct to say that a part of the investment made since a given date has earned no return." The point of the contention is that additional investment can not be expected on the showing made on the last increments of investment. It may be true that physically the $640,000,000 invested since 1910 has been annexed to or blended with the property previously existing. It is admittedly true that the net return has come from working the entire property, old and new. But it is equally certain that if the marginal investment affords no addition to net revenue, the incentive to add further investments is lacking. From this standpoint, the financial standpoint, the case is exactly as though the original property had alone yielded the entire net revenue, and the addition had failed to make any return whatever. Expected earnings constitute in the last analysis the bid which the carriers must make for new capital for needed improvements, extensions, new rolling stock, and similar purposes. It is not necessary to say that on such a showing the investing public will hardly be eager to intrust its funds to transportation enterprises. Where well-secured, long-time bonds bearing 4½ per cent. interest command little over par, and where stock can be sold at par only on the prospect of a much higher rate of return, it is clear that the carriers must make a better showing of net revenue before they can as a whole enlist large additional supplies of capital.

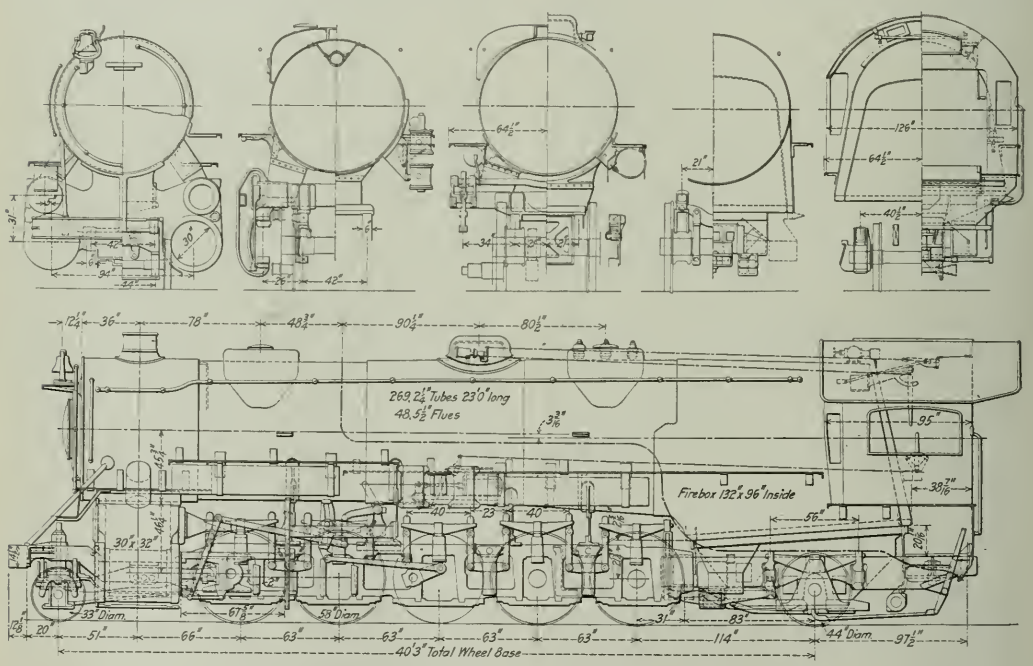
BALTIMORE & OHIO 2-10-2 TYPE LOCOMOTIVE

The Baltimore & Ohio recently placed in service a large locomotive of the 2-10-2 type which was built by the Baldwin Locomotive Works. It will develop a tractive effort of 84,500 lb. and marks an interesting step in the development of the non-articulated locomotive for heavy freight service. The tractive effort exceeds that of many Mallet articulated locomotives of the 2-6-6-2 type; while at the same time, the capacity for speed and the simplicity of construction, especially as concerns the driving mechanism and steam piping, commend it for heavy road service where operating conditions are severe and locomotives must be kept in service a large proportion of the time.

The ratio of adhesion is approximately 4. Many locomotives are operating successfully with a ratio as low as this, and with reasonably careful handling, the full starting tractive effort may be developed under ordinary service conditions.

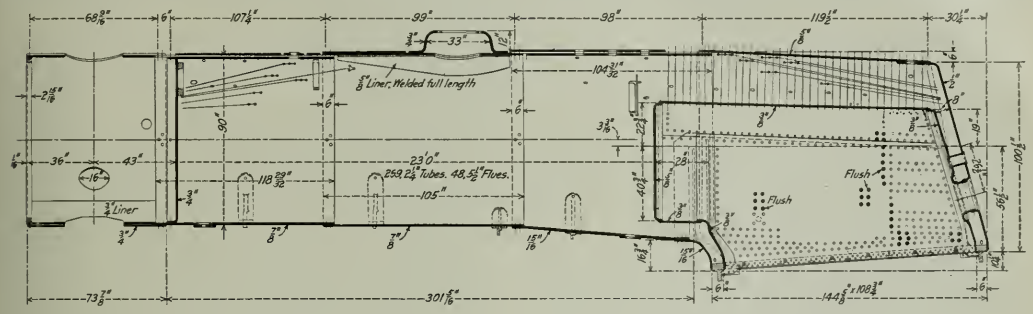
The boiler is of the straight top type with a combustion chamber 28 in. long and tubes 23 ft. long. The third ring in the barrel is tapered, with the slope placed on the bottom in order to give a free entry to the throat. The equipment includes a Security sectional arch and a Street mechanical stoker. The superheater is of the Schmidt type, and is composed of 48 elements. The dome is of pressed steel, 33 in. in diameter and 12 in. in height. Owing to restricted clearance limits, the whistle is tapped into the side of the dome in a horizontal position, and the safety valves are screwed directly into the boiler shell.

The cylinders are each cast in one piece with a half-saddle, and the castings are bolted to the smokebox and to each other by double rows of 1¼ in. bolts. The steam distribution is controlled by 16 in. piston valves, driven by Walschaert motion and set with a lead of ¼ in. The valves have a steam lap of 1¼ in., and are line and line on their exhaust edges; the Ragonnet power reverse mechanism is applied. No vacuum relief valves are used, but the cylinders are equipped with by-pass valves of the Sheedy pattern.

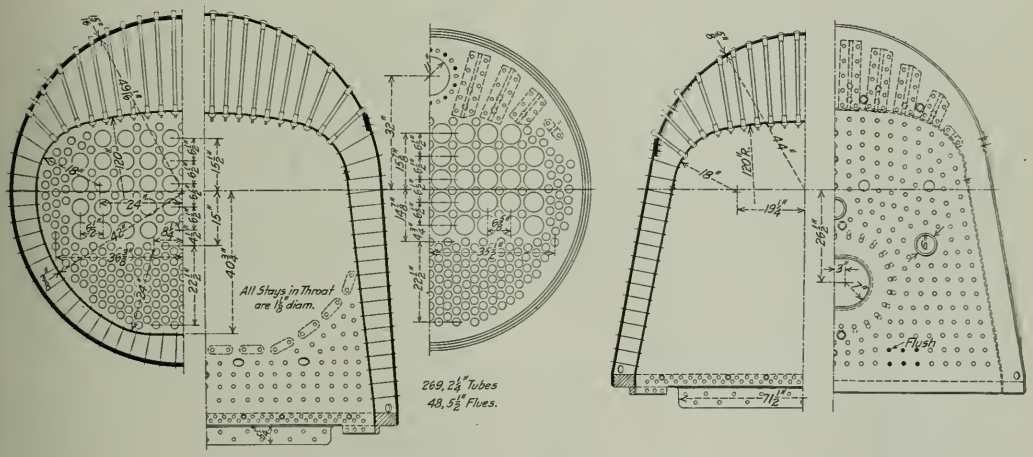


Longitudinal and Sectional Elevations, Baltimore & Ohio 2-10-2 Type Locomotive

The cylinders and steamchests are lined with bushings of Hunt-Spiller metal, and the piston and valve packing rings are of the same material. The pistons are steel forgings, of dished section, and are fitted with bull rings of Hunt-Spiller metal. These rings are secured to the pistons by retaining rings, which are electrically welded in place. The main rods are of I-section, and the main stubs are of the Markel solid end type; the side rods are of rectangular section. The knuckle pins are fitted in case-hardened steel spherical bushings to allow the rods a limited amount of lateral flexibility. A total lateral play between the rails and flanges amounting to one inch is allowed on the front and back driving wheels, while the play on the second and fourth pairs is ¾ in. The wheels of the third or main pair have plain tires, and all the driving wheels have a lateral play of ¼ in. in the boxes. These provisions for flexibility are necessary in order that the locomotive can traverse the sharp curves on the mountain divisions of the Baltimore & Ohio.



Boiler for the Baltimore & Ohio 2-10-2 Type Locomotive



End and Sectional Elevations of the Boiler

The frames have a width of 6 in. and a depth over the driving

Heavy 2-10-2 Type Locomotive for the Baltimore & Ohio

pedestals of 7 in. The pedestal binders are secured by three bolts on each side. The frames are braced transversely by the guide yoke and valve motion bearer; also by crossties placed respectively over the fourth pair of driving pedestals, and between the fourth and fifth pairs of driving wheels. The second and fourth pairs of pedestals are also braced by steel castings which extend the full depth of the frames. The rear frame sections are spliced to the main frames immediately back of the rear driving pedestals, and are braced by a steel casting which serves the triple purpose of a crosstie, a support for the front end of the firebox, and a carrier for the radius bar pin of the trailing truck. The main frames have single front rails, 13 in. deep, cast integral with them, and each cylinder is secured to the corresponding frame by 16 horizontal bolts, 1⅛ in. in diameter, and by a key at the back, providing a connection with a liberal amount of bearing area.

The trailing truck is of the Hodges type, with the spring hangers placed at an angle so that they will swing in planes tangential to the arc in which the truck swings. The first and second pairs of driving wheels are equalized with the leading truck, and the three remaining pairs with the trailing truck.

In designing this locomotive, care was necessary in order to keep the overall dimensions within the specified clearance limits. The bell is mounted on the righthand side of the smokebox front, on a level with the headlight. There are four sandboxes, two for use when going ahead and two for backing up. They are mounted right and left, on the top of the boiler, and the corners are rounded to keep within the tunnel clearances. For the same reason the cabroof is rounded with a comparatively short radius.

The tender is of the Vanderbilt type, with capacity for 10,000 gal. of water and 16 tons of coal. The wheels are of forged and rolled steel, manufactured by the Standard Steel Works Company.

The success which locomotives of the 2-10-2 type have achieved thus far, points to their increasing use for freight service where the hauling capacity of Mikado type locomotives is inadequate, and where conditions are such that Mallet locomotives cannot be used to advantage. Locomotives of the 2-10-2 type can be built to develop high tractive effort, and at the same time carry moderate wheel loads.

The following are the principal dimensions and data:

General Data

Gage	4 ft. 8½ in.
Service	Freight
Fuel	Bit. coal
Tractive effort	84,500 lb.
Weight in working order	406,000 lb.
Weight on drivers	336,800 lb.
Weight on leading truck	22,700 lb.
Weight on trailing truck	46,500 lb.
Weight of engine and tender in working order	584,000 lb.
Wheel base, driving	21 ft. 0 in.
Wheel base, total	40 ft. 3 in.
Wheel base, engine and tender	76 ft. 6 in.

Ratios

Weight on drivers ÷ tractive effort	3.99
Total weight ÷ tractive effort	4.81
Tractive effort × diam. drivers ÷ total equivalent heating surface*	647.80
Total equivalent heating surface* ÷ grate area	86.00
Firebox heating surface† ÷ total equivalent heating surface*, per cent.	4.27
Weight on drivers ÷ total equivalent heating surface*	44.52
Total weight ÷ total equivalent heating surface*	53.66
Volume both cylinders	26.2 cu. ft.
Total equivalent heating surface* ÷ vol. cylinders	288.8
Grate area ÷ vol. cylinders	3.36

Cylinders

Kind	Simple
Diameter and stroke	30 in. by 32 in.

Valves

Kind	Piston
Diameter	16 in.
Outside lap	1¼ in.
Inside clearance	Line and line
Lead in full gear	¼ in.

Wheels

Driving, diameter over tires	58 in.
Driving, thickness of tires	4 in.
Driving journals, main, diameter and length	13 in. by 13 in.
Driving journals, others, diameter and length	11 in. by 13 in.
Engine truck wheels, diameter	33 in.
Engine truck, journals	6 in. x 10 in.
Trailing truck wheels, diameter	44 in.
Trailing truck, journals	8 in. by 14 in.

Boiler

Style	Straight top
Working pressure	200 lb.
Outside diameter of first ring	90 in.
Firebox, length and width	132 in. by 96 in.
Firebox plates, thickness	⅜ in.
Firebox, water space	6 in
Tubes, number and outside diameter	269—2¼ in.
Flues, number and outside diameter	48—5½ in.
Tubes, length	23 ft.
Heating surface, tubes	5,215 sq. ft.
Heating surface, water tubes	35 sq. ft.
Heating surface, firebox	258 sq. ft.
Heating surface, combustion chamber	65 sq. ft.
Heating surface, total	5,573 sq. ft.
Superheater heating surface	1,329 sq. ft.
Total equivalent heating surface*	7,566 sq. ft.
Grate area	88 sq. ft.

Tender

Tank	Vanderbilt
Wheels, diameter	33 in.
Journals, diameter and length	6 in. by 11 in.
Water capacity	10,000 gal.
Coal capacity	16 tons

*Total equivalent heating surface = total evaporative heating surface + 1.5 times the superheating surface.
†Including combustion chamber heating surface.

SOME DON'TS FOR THE CLERKS

By R. L. White

Don't throw the pins away when you clear up your desk. Chances are they still have the sharp point and can be used again.

Don't throw the letterhead and blind copies in the waste basket because you made an error in date or salutation. Tear the good bottom portion off; it makes admirable paper to "figger" on.

Don't sharpen the next pencil as you would whittle a stick. There is a difference between the two. Watch the man who makes the pretty point on the pencil.

Don't use a large envelope for mailing the next man's mail to him when small or medium size would suffice. A suit of clothes costs more than a pair of trousers.

Don't ever use more than one envelope for one time of mailing to one party. It takes you just as long to address the extra envelope or envelopes as it would to get all mail together. Think of the mail clerk, the train baggageman and the man who opens two or more envelopes when one would have sufficed.

Don't throw the rubber bands on the floor. Bands cost one railroad in this country fifty thousand dollars a year. If you doubt the high cost of rubber bands buy one box.

Don't throw the pencil away because it is half used up. A pencil lengthener can be used and permits usage to the last inch.

Don't throw carbon paper away until it has "served full time." Don't leave carbon paper on top of your typewriter to be blown to the floor by the janitor's broom.

Don't use the printed letterheads or printed forms for scratch paper. Scratch paper is far cheaper; it requires a printer to feed to the printing press.

Don't throw away the top sheet of the writing paper pad. Oftentimes it is not the least bit soiled.

Don't fail to count your needs before printing mimeograph circular letters. It is wasted energy and waste of paper to print more copies than you really need.

Don't throw away your old file records without recovering the file; it can oftentimes be used again.

Don't fail to turn off the electric fan when you leave at night. The motor wears out the same as you do.

Don't fail to turn out the lights, where proper to do so, before going home at night.

Japanese Railway Ferry Service.—Connection between the Japanese and the Korean-Manchurian railway services of the imperial government of Japan is made by the Shimonseki-Fusan railway ferry service, which, among other equipment, has two new boats capable of eighteen knots, which were completed and put on the run during 1913.

Santa Fe System Freight Loss and Damage Organization*

Investigation of Claims by the Operating Department; Results of a Vigorous Five-Year Campaign

By H. R. Lake

Chief Clerk to General Superintendent, Atchison, Topeka & Santa Fe

RELATION OF FREIGHT LOSS AND DAMAGE TO FREIGHT OPERATION

The prevention of loss and damage to freight is primarily the work of the operating department. Therefore investigation of all OS&D reports should be conducted to a conclusion by that department. The function of the freight claim department is to deal with the claims, determine as nearly as practicable the carrier's liability and adjust the transaction with the claimant. The aim of the former department is, or should be, to eliminate the cause and, therefore, the claim, and to the extent that success is attained the labor and worry of the claim department are reduced. The aim of every well-regulated claim department is to make prompt and equitable settlement with the patron. Therefore, there should be no conflict of authority or interest in the conduct and disposal of this great problem of the railway service.

The operating department has a peculiar interest in seeking out and eliminating the causes of loss and damage, for the reason that every dollar paid out on that account is chargeable directly to operation. Loss and damage claim payments have increased to an alarming extent; on some roads more than 3 per cent. of the total freight revenue is so paid out. There are no beneficial returns, but instead a feeling of resentment on the part of the shipping public which finds vent in many directions.

After all the best talking cards for a freight solicitor are "regular delivery" and "safe delivery," and the accomplishing of safe delivery is just as much the duty of the operating department as "regular delivery," and it is upon the general superintendent that that duty devolves. The freight claim department, not being in direct touch with freight operation, would not be expected to realize as the operating department does what it means to increase train haul, which so greatly affects operation, nor would it be expected to be familiar with operating costs. The freight claim department is not charged with holding down cost of operation, and since it is not, that department could hardly be expected to have as much interest as the operating department in the prevention of loss and damage claims, the payment of which results in a direct charge to operating expense.

The total amount of money paid out in claims for loss and damage to freight during the fiscal years of 1910, 1911, 1912 and 1913 by various roads of which I have record was:

AMOUNT OF LOSS AND DAMAGE TO FREIGHT, FISCAL YEARS 1910, 1911, 1912 AND 1913

	Loss and damage payments				Per cent. L. & D. to freight revenue			
Eastern Roads:	1913	1912	1911	1910	1913	1912	1911	1910
B. & O.	$1,239,794	$894,816	$673,629	$538,070	1.55	1.23	1.00	.78
C. C. C. & St. L.	454,397	357,131	374,154	365,209	1.96	1.75	1.87	1.89
Erie	519,620	470,549	432,125	391,049	1.17	1.18	1.08	1.02
L. S. & M. S.	731,105	484,471	461,905	399,763	1.86	1.46	1.46	1.23
Lehigh Valley	204,022	193,682	249,662	228,838	.56	.63	.78	.75
L. & N.	539,249	426,517	443,679	398,713	1.26	1.05	1.14	1.05
Mich. Cent.	348,740	336,045	295,768	260,644	1.64	1.74	1.53	1.35
N. Y. C. & H. R.	1,343,590	931,844	738,557	782,182	1.95	1.52	1.26	1.38
N. Y. N. H. & H.	589,596	346,932	349,101	334,566	1.73	1.08	1.15	1.11
N. & W.	187,771	149,055	189,156	149,678	.50	.44	.63	.50
Penn.—East	1,095,013	814,078	719,895	686,847	.70	.58	.53	.49
Penn.—West	775,418	579,047	528,146	434,653	.94	.83	.81	.63
Southern	1,043,614	888,123	760,018	834,326	2.32	2.14	1.92	2.19
Wabash	648,521	486,518	508,592	512,892	2.98	2.55	2.52	2.63
Western Roads:								
A.T.&S.F. system	942,839	939,676	1,091,436	1,141,014	1.21	1.31	1.52	1.60
C. B. & Q.	1,356,659	1,114,628	1,169,142	938,586	2.12	1.91	2.00	1.59
C.R.I.&P. system	1,122,226	793,932	1,134,647	1,099,455	2.42	1.93	2.62	2.60
C. M. & St. P.	1,677,673	1,042,985	1,215,627	833,317	2.46	2.44	2.71	1.86
C. & A.	207,173	179,016	166,159	115,159	2.09	1.92	1.80	1.39
C. & N. W.	1,091,127	929,563	986,638	729,165	2.00	1.99	2.01	1.47
C. & S.	50,994	43,686	48,656	37,024	.74	.70	.70	.48
D. & R. G.	143,847	147,207	141,022	114,931	.80	.85	.82	.66
Great Nor.	579,779	508,611	591,807	465,913	.99	1.06	1.36	1.00
Ill. Cent.	1,353,361	1,074,728	895,477	584,560	3.18	2.77	2.20	1.51
K. C. S.	135,801	112,159	94,027	76,445	1.71	1.67	1.28	1.05
M. K. & T.	598,634	530,109	505,543	497,192	2.86	3.02	2.87	2.91
Mo. Pac. system.	1,040,480	983,110	988,918	444,798	2.27	2.49	2.63	1.16
Sou. Pac.	645,110	539,788	763,176	743,663	1.23	1.23	1.76	1.53
S. L. & S. F.	545,523	499,036	552,414	549,974	1.74	1.81	1.97	1.99
S. L. S. W.	167,135	126,622	122,166	100,112	1.69	1.41	1.38	1.21
So. Pac.	1,003,841	988,136	907,012	1,079,988	1.25	1.35	1.23	1.40
M. St.P. & S.S.M.	290,619	243,292	218,145	141,821	1.24	1.28	1.44	.81
Union Pacific	751,671	523,700	442,582	475,165	1.18	1.61	1.24	1.28

These figures show that one of the eastern roads' percentage of loss and damage to freight revenue in 1913 was 2.98, in 1912 2.55, in 1911, 2.52 and in 1910 2.63. Another important eastern road jumped from .78 per cent. in 1910, to 1.55 per cent. in 1913, an increase of nearly 100 per cent., representing in dollars and cents $701,724. Their total claim payments for the year were over $1,200,000.

One of the western roads which has a mileage of over 4,000, paid loss and damage claims amounting to 3.18 per cent. of its freight revenue for 1913 having risen from 1.51 per cent. for 1910. Another western road having a mileage of over 7,000 miles jumped from a percentage of loss and damage freight revenue of 1.16 in 1910 to 2.49 in 1912, an increase of 114.6 per cent. This increase represented in dollars and cents $538,312.

RELATION OF ONE OPERATING DIVISION TO ANOTHER

Centralization of forces for the purpose of concentrating effort in the prevention of loss and damage to a degree is necessary to accomplish the best results and I speak advisedly, for we, on the Santa Fe, have tried out division organization and found it to be lacking for the want of proper supervision. The relation of one operating division to another to bring about the results must necessarily be close because loss and damage is confined to no one division, or grand division for that matter, and, as it is a system-wide proposition, it must be met with combined and well-directed forces which is impracticable with each division working independent of the other. Again, minimization of expense is a featured condition of a well-organized movement and it can best be accomplished through centralization, but we may even go too far in that direction. Extending the authority of one man over more than one general superintendent's operating district, unless he bear the title of general manager or assistant general manager, where the territory is under one general manager, is apt to result in a clash of authority and bring about the same objection as that which obtains when the work is handled by the freight claim agents.

With no intention of criticizing any method of handling that may have been adopted by any other railroad, let me urge that you profit by the experience of the Santa Fe and steer clear of divisional organization which contemplates the investigation of OS&D reports in the offices of the division superintendent by an ordinary clerk, because in the end the experiment will be a costly one.

To begin with, our loss and damage work was under the direction of the freight auditor. The general superintendent or his superintendents personally seldom if ever saw an OS&D, and except for a general idea from lump sums appearing on the monthly freight operation sheet chargeable to loss and damage, had no knowledge of what part freight loss and damage represented in the cost of operation, nor what caused the payment of such large amounts. Being accustomed to seeing those charges month after month, they became hardened to the thought that it was a necessary evil of transportation and when the amounts increased as they did, month by month, would console themselves with the thought that the loss and damage was en

*From papers presented before the General Superintendents' Association of Chicago.

titled to show some increase because of an increase in business, never going far enough into the question to determine whether or not there was a disproportionate increase in loss and damage compared with business handled. This went on and on until a time came when there was an actual decrease in business handled, yet there was an even more than usual increase in loss and damage. Then the general superintendent asked himself, Why are things used and so? The management cuts his track force allowance 25 per cent. this month and in doing so says operating expenses must be held down to a certain point and it is then that the general superintendent looks about to see where he can make a saving that his track may be gotten in shape for the winter. In going over his operation sheet again, his eye rests on loss and damage. He notes $30,000, or approximately the same amount as his force allowance was cut. It was after just such an experience as this that it was decided to relieve the freight claim agent of the investigation of loss and damage and turn it over to the division superintendents, the idea being to get at the seat of the trouble and remove it. In the movement to prevent loss and damage, we had to feel our way. We continued to fall behind, simply because of a lack of united effort.

There are 14 operating divisions on the Atchison proper, four on the Coast Lines and four on the Gulf Lines, a total of 22. To each of these divisions there was assigned a $75 OS&D clerk who was supposed to investigate under the direction of the superintendent's chief clerk, all loss and damage reports. Any one who has had experience as a division superintendent, or in a division superintendent's office, knows that the chief clerk is a very busy man, without looking after what he has always regarded as being inconsequential OS&D reports. I dare say there is not a superintendent's office in the country that has more force than needed at any time during the month, and from the first to the fifteenth of the month—pay roll and distribution time—everybody is on the job from early until late and all other work takes a back seat, so to speak. The OS&D clerk is also pressed into service on payrolls, distribution and other monthly reports which you cannot put in the auditor's office too early to suit him. The result is, that OS&Ds which up to this time had been considered of least importance pile up higher and higher until the rush is over, when everybody available turns to and makes the OS&Ds scatter, not so much with the intention of getting at the seat of the trouble, as with the evident purpose of moving the papers; and there is where such plan fails. I would rather investigate one OS&D to a finality, locate the employee responsible for the freight going astray, or for damage, and take corrective action with that one employee than to investigate 25 in a haphazard manner and accomplish no certain purpose. Anything that is worth doing at all is worth doing right and there is no branch of the railroad service where the application of this old adage is more essential than in the investigation of OS&Ds.

Then suppose the Illinois division checks over without marks a box of dry goods which later develops checked short on the Los Angeles division. To match up the over with the shortage it is necessary for the Illinois division to communicate in some way with 21 divisions, while the Los Angeles division is busy at the same time looking for the box to fill a shortage. True, this could be accomplished by a daily exchange report of freight checking over without marks, but note the many divisions with which this report must be exchanged.

In the reorganization of the loss and damage work on the Santa Fe, after proving the failure of the divisional plan of action, we concentrated our forces, but not without first giving due consideration to an even more centralized plan, namely, that of handling the work for the entire system from one central office. On first thought the centralized plan appealed to us as being ideal, upon the theory that if it is better to concentrate in six general superintendents' offices, instead of 22 division superintendents' offices, why should it not be better to handle from one central office, under the direction of one official? However, we finally decided, after much deliberation, that the plan of having each general superintendent handle the work of his respective district has distinct advantages over the more centralized plan and for more than three years we have been so working, and with most gratifying results.

I might say further that this work was not turned over to the general superintendents without some directing influence other than a desire on their part to reduce operating expenses through prevention of loss and damage. The assistant to the vice-president in charge of operations was charged with the duty of reducing loss and damage, and was not only empowered to organize a system loss and damage committee and various sub-committees, but to act when, in the judgment of himself and other members of the committee, it was time to act to remove a cause for loss and damage. And this official was given the undivided support of every other official that he chose to assist him in the work; therefore, the system and organization which the Santa Fe has gradually evolved is the work not alone of one man but of all the officials of the operating, freight traffic and auditing departments, assisted in no small degree by the agents of the more important terminals and points of interchange. Our officials themselves have attended the semi-annual get-together meetings at which every department concerned in freight traffic over the entire system is represented. While the general superintendent should be charged with carrying out the actual operation of loss and damage investigation and the applying of curative measures, he alone cannot succeed; he must have the undivided support of every department concerned in the traffic because there are classifications, tariffs, claims, and many other features that he is not acquainted with that play an important part in the successful handling of this work, and there is not a day in which he does not need to counsel with the other departments.

ORGANIZATION

First of all we have a loss and damage committee covering the entire system, with membership consisting of

Assistant to vice-president—chairman,
Assistant general freight agent—secretary,
Assistant to general manager,
Claims attorney,
Superintendent of transportation,
General storekeeper,
Superintendent car shops,
General superintendents,
Superintendents,
Chief special agents,
Freight agents—Chicago, Kansas City, San Francisco, Los Angeles, Dallas, Galveston, Ft. Worth,
Manager Santa Fe Refrigerator Despatch,
General freight agents,
General live stock agent,
General baggage agent,
Freight auditors,
Freight claim auditors.

This committee meets at some convenient point on the line semi-annually. In addition to the members the following representatives are in attendance and take an active part in the deliberations:

Chief clerks to general superintendents,
General superintendents' chief of OS&D bureaus,
Superintendents,
Transportation inspectors,
Agents—important stations,
Head claim clerks of auditors' staff,
Special agent,
Traffic representatives,
Freight conductors,
Warehouse foremen.

This committee considers every phase of loss and damage from every angle. If a decision cannot be reached on any one recommendation or question that is brought before the committee, a sub-committee is appointed, charged with the special duty of making further study of the subject and reporting to the chairman its findings, and at that time giving its recommendation looking to a solution.

The present active sub-committees are: Cooperage; OS&D; Standing committee on seals; Oil; Blocking and stowing of automobiles; Eggs; Method of loading, stowing and bracing of freight; Refrigerator rules in book form; marking L. C. L. freight at stations; Loading, stowing and bracing furniture; Character of butter and candy pails; Leaky roofs, system and foreign cars; Form of receipt required of consignee for freight delivered.

The sub-committees already discharged after completing the duties assigned are: Inspection cards; Mismarking and butter tub covers; Crockery and glassware; Household goods shipped by forwarding companies; Leaky oil valves; Marking tobacco; Loading tobacco and cigars; Form for reporting delays to live stock; Packing house products; Card waybills, loading and stowing; Paper seals for boot and shoe boxes; Preparing cars for sugar loading; Crating of stoves; Handling potatoes; Connecting line shipments; Closer inspection of foreign cars at junction points; Marking L. C. L. freight at stations; Notifying owners of freight lost in transit.

The system committee has had nine meetings, the last of which was at San Diego, Cal., March 23-26, 1914. All members of the committee and others attending the meeting are supposed to keep on the alert between meetings and bring up any subjects that would be likely to prove of system-wide interest; in fact, any topic the discussion of which would be likely to result in the adoption of some improved rule or practice to prevent loss and damage; some six or eight weeks before the date is set for the next meeting the secretary calls for suggested topics for consideration and these constitute our docket. Every member suggesting a topic is supposed to come prepared to intelligently discuss it and give some solution. At these meetings we also consider every item of increase in our loss and damage statements for a six months' period ending with June and December, and inquire closely into the reasons therefor.

Just prior to the semi-annual meeting, the general superintendent calls local loss and damage meetings at which consideration is given to every item of interest in connection with loss and damage that may be suggested, so fortifying himself with ideas and the opinions of his division men. Such meetings are attended by superintendents, trainmasters, transportation inspectors, agents, conductors, warehouse foremen, and frequently by the freight claim auditor, freight auditor, division freight agent, general live stock agent and others who are interested in the loss and damage movement. These local meetings are conducted along the same lines as the system meetings, being different only in that they are localized to one general superintendent's territory.

In addition to these meetings the division superintendents hold monthly good service meetings at which any and every feature of freight and passenger operation is discussed. These meetings are attended by the superintendent, who acts as chairman, trainmaster, master mechanic, transportation inspector, special agent, local agents and other station men, conductors, brakemen, engineers, firemen; in fact, every employee who has to do with the operation. The minutes of these meetings are written up and exchanged with superintendents and general superintendents so that the entire system is constantly exchanging ideas; and there never was a better school of instruction for matters of this kind.

The working force employed wholly in the prevention of loss and damage in each general superintendent's office consists of chief of bureau, two investigators, one stenographer, one file clerk. This force handles all loss and damage correspondence, and compiles all loss and damage statistics. This bureau is under the direct supervision of the chief clerk to the general superintendent.

In addition to this the general superintendent of one of the districts employs one statistician to compile certain data respecting claim payments for the entire system, a position created at a recent system loss and damage meeting. This man, however, does not prepare all loss and damage statistics for general superintendents. Each bureau prepares its individual monthly analytical statement showing:

Analysis of OS&Ds investigated, showing cause developed by the investigation,
Statement of disciplinary action taken,
Inspection of cars of bulk grain passing given points,
Statement of carload shipments of eggs forwarded and out-turn checks,
Statement of test checks of loading at important stations,
Statement of grain doors recovered,
Report of arrests and convictions by the chief of the special service department,
Statement of OS&Ds issued by stations compared with same month of the previous year, and OS&Ds charged to each individual station, compared with same month of the previous year,
Statement of astray way bills, compared with same month previous year,
Statement of OS&Ds charged to each conductor, separate as between overs, damage, and pilferage,
Statement of errors definitely placed with conductors.

Also each general superintendent has a transportation inspector for each operating division. In view of the general nature of the work performed by these men, they might better be known as service inspectors. The duties are observation and correction of everything wrong pertaining to the obligations of the carrier, the shippers and the consignees of freight from the time it is placed in our possession until delivery is completed.

The transportation inspectors have a wide field for action, which is not restricted. Special attention is given to the following important items, the observance of which is essential to the proper handling of freight without loss or damage:

Education of Agents.—Instruct agents concerning the importance of promptly reporting unmarked overs and of forwarding marked overs to destination or delivering them to consignee or connecting lines without delay. The prompt reporting of unclaimed and refused freight. The prompt rendering of O. K. reports and of other matters making for efficiency in the station service.

Astray Waybills.—One of the most important factors in preventing wrong payments of claims is the matching of astray waybills with revenue waybills. Agents are careless in this respect. In examining stations they take a number of astray waybills for which revenue waybill reference is not shown, and search for revenue waybills to cover, and impress upon the agent the importance of watching this matter closely.

Defective and Dirty Cars.—Much damage to mill products arises from leaky roofs, and heavy losses of grain are chargeable to unsound cars and poor grain doors. These features are given particularly close attention at grain and milling stations. Cars set for grain or other loading are examined and if any are found unfit for the commodity which they are intended to carry, the inspectors ascertain who is responsible therefor and report the matter to the superintendent.

Delayed Correspondence.—They search the stations for delayed correspondence and if any is found, ascertain the cause and assist agents in getting it up. They do not take the agent's word respecting the condition of his correspondence but satisfy themselves by personal examination of the places where correspondence is kept. During this examination they look for unreported waybills and generally assist the agent in getting his work up where it seems necessary.

Delivery of Freight.—Many agents are exceedingly lax in delivering freight. Draymen are permitted to help themselves and delivery receipts are frequently not taken at the time of delivery. Freight should not be delivered until after the freight bills are made out, except where some special arrangement is made, and the agent should check the freight from the freight bills and take receipt at the time of delivery.

Loading, Stowing, Unloading, etc.—The improper performance of these functions is probably the greatest single source of losses and damages. Under this head may be classed: Failure to load in geographical order; unskillful and careless loading; failure to properly rearrange the cargo when freight is taken out

at intermediate stations; stowing heavy freight on top of other freight for intermediate stations, necessitating carrying the other freight several stations beyond where it belongs; the piling of heavy freight on other freight not strong enough to bear it; lack of diligence on part of train crews in searching for freight for intermediate stations.

Loading in Station Order.—They examine cars unloaded at stations where they are working to see whether the load is well stowed, or if the car contains any over freight, whether the freight is arranged in geographical order, etc., and take up direct with superintendent or agent, giving car number, seals, date of arrival, name of conductor and way bill reference.

Proper Stowing of Cars.—They examine loads stowed at stations at which they may be working, compare discrepancies discovered with the station records and see whether proper record was made of the condition of the freight and whether the station is responsible for the discrepancy or not. They give particular attention to freight loaded in wrong cars and follow their investigations to a satisfactory conclusion.

Manner of Transacting Business.—They are importuned to make investigations in a tactful and friendly manner, proceeding in the main along educational lines, trying to make the employee feel that their business is to help rather than to censure and that the report of their findings will be fair.

Marking.—The want of proper marking is one of the greatest sources of loss. They devote especial attention to this feature at jobbing centers. When freight is not properly marked, they discuss the matter with the agent and the shipper with a view to having it corrected, and where competition is an obstacle, investigate the feasibility of overcoming the trouble by joint agreement with other roads.

Station Force and Facilities.—If the force at any one station seems to be insufficient or there is a lack of facilities for handling the freight economically, they go carefully into the matter, giving their estimate of the cost of supplying the station's need and in like manner investigate any excessive force.

Claims that the freight claim auditor cannot satisfactorily adjust by mail are sent to the general superintendent for further investigation and adjustment by the transportation inspectors; because of their knowledge of the operating conditions of the division they are perhaps better able to adjust such claims than a special adjuster sent out from the freight claim department; in fact, they save many times their salaries every month in avoiding improper claim settlements, and expediting proper claim settlements.

These men report direct to the general superintendents but work very closely with superintendent and trainmaster, and unhesitatingly render assistance when called upon by them. Although they make special report of all irregularities of any consequence to the general superintendent, they often show in their report that the same thing has already been brought to the superintendent's or trainmaster's attention and corrected. They are privileged to write the superintendent direct on any question pertinent to their work but in each case send copy of such communication to the general superintendent.

In addition to these special reports of irregularities, the transportation inspectors make a weekly report to the general superintendent showing briefly where they were each day, what trains ridden, stations inspected, claims adjusted; in short, a brief summary of their week's work.

Next in importance to transportation inspectors are our train riders. The latter are assigned to no certain operating district but are placed by the chief special agent, to whom they report. The chief special agents report to the general superintendent and place the train riders where they are most likely to be needed. For instance, our line was infested with thieves between Chicago and Joliet and between Lexington Junction and Kansas City; and even now, notwithstanding our close surveillance, we are bothered occasionally with thieves breaking into cars while in trains but we are glad to be able to say that this policing of trains has had a most wonderful effect. We have four of these men assigned to the Eastern district. The work is important in that they catch the box car thief in the very act of his depredation, and the moral effect it has upon the hobo element is far-reaching.

EDUCATION OF EMPLOYEES

There are few, if any, railroads that have not placed in the hands of their station and trainmen ample instructions, the compliance with which will almost entirely eliminate loss and damage. But of what avail are these instructions if they are not complied with or even studied by the employees who are supposed to be guided by them? What precautions, if any, are taken to see that a complete file of instructions is maintained at every station and is in possession of each freight conductor? When a change is made in agents, what effort is made to see that the new agent has proper instructions?

We are accomplishing this on the Santa Fe through a series of examination letters, which are now being conducted with the agent and station forces over the entire system. Each examination letter consists of from 15 to 20 pertinent questions on freight traffic, and is put out to our agents and their forces once a month. They are required to mail to the general superintendent a written answer to each of those questions within a week or 10 days from the date of its receipt, and are graded on their replies. A grade sheet showing the percentage made by each agent or clerk is sent to every employee who takes these examinations, that he may know just what grade the others received. Should he take more than 10 days in replying to an examination letter, 1 per cent. for each day delayed, after 10 days, is deducted from his percentage. The questions asked in these examinations are carefully selected and to answer them an employee simply must know the rules. We have been carrying on these examinations for over a year, and we can already see the result in an improved efficiency. When we began the examination the average percentage of correct replies was low, but on the last examination there was a far greater percentage that ran from 90 per cent. to perfect than there was that fell below 90. To some extent we have conducted this same sort of an examination with our freight conductors and intend to go into that even further.

CO-OPERATION OF THE SHIPPER

It goes without saying that the support of the shippers in this great undertaking will make it far less difficult. Manufacturers and shippers working on a close margin pack their wares in the cheapest possible containers and already they have got a start on the railroads that is going to be difficult to overcome. We have made mention of the heavier power and stronger equipment that is being used today, which in the ordinary course of things would call for even more secure bracing and packing of freight than was the custom in years gone by, but instead of having better bracing and packing, we are having worse.

We recently made a test check at five of our more important stations covering a period of one week to see what percentage of wooden packages were in bad order, and also the fiber-board packages. We handled *outbound* RG.DGC wooden packages weighing less than 100 lb. Of this number, 508 were in bad order. We handled at the same time 30,749 fiber-board packages of which 449 were in bad order. We handled *inbound and on transfer,* 11,148 wooden packages of which 56 were in bad order and 2,416 fiber-board packages, of which 131 were in bad order. The fiber-board package is of recent origin and it behooves the carriers to see that its use is restricted to the class of freight shipments for which it is suitable. It is for the railroads to so amend their classifications as to properly limit the use of these containers. The shipper is just as anxious to have his goods delivered to his customer in good order as he is to have them delivered promptly, and we believe that if properly approached, he will assist the railroads in accomplishing that end, but we cannot go to a shipper and persuade him to use a better container than our classification provides. Good work can be done with shippers to get them to give correct descriptions of the

weights and kind of freight they ship, to pack their shipments securely, and to legibly mark all consignments—erasing all old marks. We have already had gratifying results from the efforts thus far made.

CLAIM AND OS&D ANALYSIS

You may think in the handling of OS&Ds that because you get a good many covering the loss of candy, you are paying out a large percentage of your money in the settlement of candy claims and would probably pay no special attention to millinery claims because you may find you only had one or two in a three-months period. An analysis of three-months claim payments showed that we had 179 claims on candy, representing 2.28 per cent. of the total number of claims paid, whereas the amount of money was only $643.74 or .83 per cent. of the total amount of money paid out in claims, whereas we had two claims on millinery representing .02 per cent. of the total number of claims, but in amount of money equalling $439.06, representing 57 per cent.

We paid 69 claims in a period of three months on potatoes, representing .84 per cent. of the total claims paid, but the amount of money represented by these 69 claims was $1,992.35 or 2.59 per cent. of the total amount of money paid out. In this three-months analysis, there were 8,193 claims and 397 commodities, represented; 5,640 claims, or 68.8 per cent. of the total paid were on 43 commodities or only 10.8 per cent. of the total commodities, 1,636 claims or 19.9 per cent. of the total number were paid on 79 commodities or 19.9 per cent. of the commodities; in other words, 122 commodities took in 88.7 per cent. of the total claims paid, leaving 275 commodities representing only 11.3 per cent. of the claims.

Without proper analysis, how do you expect to go about the elimination of loss and damage? It is of even greater importance to classify the *causes* for loss and damage than it is to classify the *commodities* with which you are having the most trouble. It is also important that you know with what shippers or consignees you are having the most trouble. This same three-months analysis showed that on a total of 66 claims for beer, 28 were by one shipper, out of a total of 25 claimants and the same brewing company was the claimant in 28 out of 66 claims paid. We have every confidence in our ability to prove this shipper's carelessness. On bathtubs we had a total of 42 claims and 16 of the 42 shipments were made by one firm. Would that not indicate that there was something especially wrong with the manner in which that firm put up the bathtubs for shipment?

This same analysis shows that on boots and shoes we prorated 48 claims with 13 different railroads and 20 of these claims were against one railroad. Would not that record indicate that there was considerable thievery going on on that railroad? Nine were with another railroad, making 29 out of the 48 shipments prorated with two railroads out of a total of 13 railroads. On one of these railroads, by reason of our persistently following up pilferage, they succeeded in sending to the penitentiary a number of their employees.

The same analysis showed that we paid 41 claims on cement; 20 of them were due to damage from wet. Would that not indicate that the cars into which the cement was loaded were either leaky or that the damage was done at the side door? Further investigation developed that damage was done mostly at the side door, and as a result of this record we commenced the stripping of side door cracks of cars loaded with cement, just as we do in the case of flour.

There were 51 claims paid on coke; 27 of these claims were paid to one company representing $521.38 out of a total claim payment of $694.54. The coal company in this case happened to be the shipper, also the claimant. Would not that record indicate to you that there was something wrong with the scales of that coal company? Detail analysis of claims and OS&Ds is one of the most essential features in the handling of loss and damage.

DETAIL OF ROUTINE. FORMS IN USE

Form 1,565, *Over, Short and Damage Report.*—Whenever freight checks over without marks, short or damaged, at any station, an agent makes out this report in duplicate, keeping an impression copy for his record, sending both copies to the general superintendent. One of these copies is placed in his permanent file; the other is used in connection with his investigation; in fact it forms the basis of investigation. We require our agents to answer every interrogatory, returning the report to them whenever any question is unanswered. In the case of freight checking over, a very clear description is given.

Form 1,566 *O. K. Report.*—An agent who has made an OS&D covering a shortage, fills out one of these forms whenever freight checking short is received. This report is also sent to the general superintendent in duplicate, the agent keeping an impression copy for his record. There is space for the agent to show car number from which the freight was received. By tracing this car back, we can find out in nine cases out of ten the cause for the freight checking short in the first place. In most cases, it was loaded in the wrong car, in which event we charge the improper handling to freight checker or stowman who is responsible. The receipt of one of these O. K. reports closes our investigation immediately insofar as tracing for the shortage is concerned, but the investigation is continued further to develop responsibility for the shortage in the first place, and when this responsibility is definitely placed, some disciplinary action is usually taken, as it is invariably shown that it was due to carelessness.

Form 1,568, *Report of Concealed Shortage or Damage.*—The need of this report developed after the general superintendents took over the investigation of OS&Ds. The agents make no OS&D for a concealed shortage or damage which is not developed before delivery of the freight to consignee, and formerly these shortages or damages were reported to the freight claim auditor, in the form of a letter. It developed that we had a good many concealed shortages or damages and that it was just as important, or more so, to investigate such shortages or damages as it was to investigate an over, short or damage that developed before delivery to consignee.

Form 1,413, *Pilferoge Report.*—Whenever freight is received indicating pilferage, agents make out one of these reports, sending it to the general superintendent in duplicate, the same as an OS&D. Agent makes this report in addition to a regular OS&D, because in pilferages there is information furnished that is not needed in an ordinary OS&D. We do not attach to this report the importance that we do to an OS&D, but it is helpful in the checking of our investigations. A copy of pilferage reports is also sent to our chief special agent, who assists in the investigation, even to the extent of assigning a special man to investigate.

Form 1,688 is designed to simplify our investigation: The use of such a form may be objected to by some who may prefer to handle by individual letters, on the theory that an agent or conductor will not pay as much attention to a printed form as a typewritten letter, but when the general superintendent is investigating OS&Ds they soon get that idea out of their heads and pay just as much attention to these forms as they do to a letter. Many OS&Ds are completed without the writing of a single letter, these forms being used exclusively; however, when it comes to closing out an OS&D with discipline we usually write a letter to the superintendent directing him in the matter or explaining to him the circumstances, allowing him to use his own judgment in the matter.

Form 1,414, *Seo Report.*—This is a special report covering cars that are found in trains or at stations with broken seals. A broken seal is usually evidence of pilferage and every case of this kind is given a special investigation in which the chief special agent assists.

Freight Conductor's OS&D Report Form 1,552.—Freight conductors make this report in triplicate for each shipment check-

ing over, short or damaged, and mail original copy to general superintendent. The duplicate copy in case of shortage, is attached to and remains with waybills for the car until it is made empty, unless shipment is found in the meantime, in which event conductor turns this report over to agent to whom freight is delivered. If not found, agent where car runs empty mails the report to the general superintendent. The agent at station where shortage is found shows on duplicate copy reference to astray billing on which freight is sent to destination and mails to general superintendent.

In case of freight checking over, conductor turns over to agent the duplicate copy of report where freight is left and agent shows thereon reference to revenue billing, if freight belongs at his station, or reference to astray billing, if freight belongs elsewhere, and mails to general superintendent.

In case of damaged shipment, conductor turns duplicate copy of report over to agent where freight is left and agent checks same against revenue billing and attaches to station OS&D report which he makes and mails to general superintendent. This report is put up in book form and the triplicate copy remains in the book for the conductor's record. The report provides for showing full reference to the train, the waybill and car number, covering each shipment on which there is reported over, short or damage. It gives apparent cause for damage, if any, and reference to car in which shortages are found, or in which freight checks over, and the disposition made of the freight by the conductor.

OS&D Record.—When an OS&D is received in the general superintendent's office, it is immediately entered in an OS&D record, which is a loose leaf system. These loose leaves are filed in the binders alphabetically, according to station.

The different headings on this form may be explained as follows:

a. OS&D reference, agent's number. Agents carry their OS&Ds consecutively, beginning with 1. If any agent's OS&D goes astray it is known in the general superintendent's office immediately upon receipt of the next numbered OS&D, for instance, should we receive Atchison OS&Ds up to No. 5, and the next one we received would be 7, we would know that No. 6 was missing and would call upon the agent for a duplicate, thus insuring the receipt of every OS&D.

b. All OS&Ds are numbered in the geenral superintendent's office consecutively beginning with 1 and without regard to the station. This is our file reference and OS&Ds are filed according to this number, in numerical order.

c. Date. In this column there is recorded the date of the agent's OS&D.

d. Billing station. The name of the station billing the freight that checked over, short or damaged is entered here.

e. Name of the conductor handling into the receiving station is entered here.

f. Train number. There is entered here, the number of the train handling freight into stations that checked over, short or damaged.

g. Name of commodity checking over. For instance, one case guns, one barrel of salt, or one bundle of sash weights.

h. Disposition of commodity checking over. For instance, the case of guns that checked over at Atchison may be found to be short at Burlingame. It would be sent to Burlingame and under "H" there would be written Burlingame.

i. Date freight checked over, forwarded to proper destination.

j. Commodities checking short.

k. Point at which commodity was found.

l. Description of freight checking damaged.

m. Description of freight checking pilfered.

n. Cause of OS&D.

After our investigation is completed, we can, in most cases, determine the cause of the OS&D, that is, the initial cause, and under this heading we merely show a number indicating reference to the cause—so arranged to avoid unnecessary labor writing out the causes, some of them being lengthy.

Under the heading "Action taken" is shown disciplinary action taken. We use the Brown system of discipline by which system we assess demerit marks and when an employee receives as many as 60 demerit marks, he is taken from service. He is given credit marks, however, to offset demerits for a period of perfect service.

At the beginning of the general superintendent's campaign, OS&Ds when investigations were completed, were passed to the freight claim auditor. At present, however, the general superintendent is holding the OS&D investigation papers in his file until the auditor calls for them which he does when claim is filed. If no claim is filed, the papers are never called for.

Memorandum of Overs.—In addition to recording freight checking over, all overs are reported in this memorandum and filed in a loose leaf binder alphabetically in order to give quick reference. When the OS&D are received in the office each day they are separated into overs, damaged and shorts. The overs are entered first in this memorandum of overs, and as the shortages are entered, reference is made to this memorandum, and by so doing, it is possible to immediately match up overs and shorts; every time OS&D papers are returned to the office, reference is had to this memorandum, so that if an overage is reported after an investigation has been started, we catch it on this memorandum and thus stop further investigation. System general superintendents exchange with each other a daily report of freight checking over, giving full description. These are numbered consecutively so that each general superintendent will know immediately if one of the reports goes astray. The overs so reported from other parts of the system are also entered in this memorandum of overs, so that if there is a piece of freight anywhere on the system that would fill any one of our shortages, we have the information before us without having to conduct a lot of correspondence to develop the fact.

These two forms are the only ones used in recording OS&Ds in the general superintendent's office. We have not used a card index in any place. Our experience with card indexes is that you lose more time with them than they are worth. OS&Ds, as explained, are filed in numerical order and the conductor's report serves the purpose of a file index book, in addition, giving the information needed to prepare the monthly analytical statement.

Check Clerk's Over Report.—This was designed with the intention of having reported to the general superintendent all freight checking over with marks, in fact, all over freight except dead overs, which are reported on regular OS&D forms.

Form 1,579 Standard, Bulk Grain Car Condition and Weight Report.—This was designed to locate grain leakages and secure better coopering of cars. Provision has been made to show teh loading agent's record wherein full way bill reference to given, including the weights and kind of weights, whether they be track scale weights, hopper scale, wagon scale, automatic or estimated, the name of the employee inspecting and approving condition of car for bulk grain loading being also shown. Following this is the in transit agent's and conductor's record in which report of leakages in transit is shown. The name of the conductor, employee or inspector reporting leakage, station, train and place where leakage was seen, and advice as to what repairs were made, or action taken to prevent further loss and an estimate of possible extent of leakage. Following this is the unloading or junction agent's record which gives the out-turn weight and the kind of scales over which the grain was weighed. We have got very gratifying results from the use of this form, enabling us as it has to get a line on inaccurate scales, both at originating point and destination, and as a result of the use of the form, we have made many inspections of shippers' and consignees' scales for our own account and found inaccuracies which have not only saved us the payment of claims but put us on record with the shipper or consignee as knowing that his scales are inaccurate, weights over which cannot be used in adjustment of claims until necessary repairs have been made. Our grain claims for the season of 1912 were reduced over $20,000, and this form played no little part in their reduction.

Daily Report of Stock Movement.—During the year 1911, we reduced our live stock claims $99,304.72, or 49.9 per cent.; during the year 1912, we made further reduction of $3,092.32, or 2.8 per cent. Our reduction in 1912, compared with 1911, was low because we had a most unusual record to go up against, having cut the live stock claims in 1911 in two. Our experience has been that the best way to cut live stock claims is to give regular service. We have been trying to get an early start with our stock, keep it moving at a fair rate of speed and make an early market, and that is what we are doing, and this report I feel has done more to accomplish the results than any other one thing, in that it has placed before the general superintendent personally every morning the actual movement of live stock over his district, each train and its average rate of speed, and if there is any one train that moved at a lower rate of speed than he feels we were justified in maintaining, he immediately gets after the superintendent. A copy of this report is also mailed under personal cover in a traingram envelope each morning to the superintendent so that the general superintendent knows that he has the information in his hands, and in most cases the superintendent is after the slow movement before he hears from the general superintendent.

WHY RAILROADS SHOULD CO-OPERATE

So interlaced are the railroads of this country in serving the shipping public that no one of them can well disregard the influence of conditions upon other roads made possible through uniform tariffs and classifications. The relationship of railroads must needs become closer and closer if they would save themselves needless expense and agitation. Should not the originating line of a car of sugar be just as much interested as the delivering line in knowing that the car used had protruding nails or bolt heads that did damage to the sacks and caused a loss for which both companies share in the claim that is paid, or that a car of flour was damaged because of flour having been loaded into a leaky car or that a car of automobiles had been damaged because of the shipper using too frail a blocking; and should not that line have just as much interest in working with the shipper of the automobiles in persuading them to adopt a safer plan of blocking their cars? Surely they are even more responsible for the damage than is the delivering line. The mere fact that they would adopt safer methods, and many have adopted our standards.

If railroads were properly inspecting cars before loading, properly loading the freight, taking up vigorously with shippers and insisting upon proper loading and compliance with the classification, and properly handling freight, there would not be so much damage done. The Santa Fe has made great strides, but it has considerable house cleaning to do. If it succeeds, even only in a small degree, in influencing other railroads to join in the elimination of causes of loss and damage, it will have done more for the cause than it has yet accomplished in any one direction.

In the past 15 months, from one district alone, there have been addressed to the general superintendents of other railroads 1,206 letters, calling attention to specific instances of loss and damage; 401 cases were due to defective equipment, 215 cases to poor stowing, insufficiently braced, etc., 376 cases to pilfering, 110 cases over without billing (these 110 letters covered some 2,500 shipments), 104 cases miscellaneous causes. We have gotten acknowledgments from about one-tenth of those letters and have in the meantime received only about 25 letters from other lines calling attention to similar conditions on cars of freight interchanged with our line.

We feel justified in our desire to interest all railroads in this movement, because nearly 40 per cent. of the claims we pay are prorated with other lines, under Freight Claim Association rules. If we would free our operating accounts of this burden, we must work together, for even though we individually equip ourselves with necessary machinery and clean our own houses, we will still pay loss and damage claims because of our neighbor's neglect.

ANALYSIS OF CLAIMS

The analysis that follows covers 26,203 claims representing in dollars and cents, $324,302.27, divided as between carload and L.C.L., carload $218,239.41, L.C.L. $106,062.86. Has it ever occurred to you before that loss and damage to freight in carloads is more than twice that of L.C.L., considering the movement as a whole? Most people not posted would have scarcely thought that. Let us see what caused the paying of these claims:

Cause	Number of claims	Per cent.	Carload	Per cent.	Less than carload	Per cent.	Total	Per cent.
Wrecks	94	.359	$12,195.95	5.583	$2,138.80	2.017	$14,344.75	4.420
Delay	309	1.179	13,673.76	6.266	2,074.99	1.956	15,748.75	4.856
Defective equipment—leaky roof	665	2.538	14,412.43	6.604	827.39	.779	15,239.82	4.699
Freezing	370	1.412	6,878.54	3.152	1,852.95	1.747	8,731.49	2.699
Transferring carload freight	24	.091	810.96	.371	9.42	.009	820.38	.253
Unclean cars	363	1.385	2,847.40	1.305	376.45	.354	3,223.85	.994
Fire in excess of insurance collected	6	.023	107.51	.049	62.64	.059	170.15	.052
Improper refrigeration and ventilation	36	.137	2,650.34	1.214	89.23	.084	2,739.57	.845
Concealed damage	2,710	10.342	4,143.40	1.898	13,563.50	12.798	17,706.90	5.459
Damage, other causes except carelessness of employees	12,721	48.548	97,152.31	44.516	39,111.89	36.877	136,264.20	42.017
Loss of entire packages	2,758	10.525	12,176.11	5.579	22,484.78	21.199	34,660.89	10.688
Loss from packages	1,683	6.424	2,280.73	1.045	7,054.93	6.651	9,335.67	2.940
Loss from bulk shipments	2,323	8.865	42,318.41	19.391	285.29	.269	42,603.70	13.137
Concealed loss	1,336	5.098	275.84	.126	8,426.47	7.935	8,702.31	2.683
Theft	288	1.141	1,264.14	.569	2,952.76	2.784	4,216.90	1.302
Loss, other causes except carelessness of employees	177	.675	1,005.16	.461	1,388.40	1.309	2,393.56	.738
Loss and damage due to carelessness of employees	340	1.336	4,046.40	1.854	3,362.98	3.171	7,409.38	2.284
Totals	26,203		$218,239.41		$106,062.86		$324,302.27	

they do not settle with the claimant is no reason why they are not interested under the Freight Claim Association rules, which is now the governing factor in adjustment of claims between carriers. We both pay, and the wide-awake railroad today that inspects its fragile freight at point of interchange pays less than the other. Not only does it save itself money in claims, but the delivering line as well.

The Santa Fe has saved thousands of dollars on automobiles alone, simply through its inspection for defective bracing at junction points, and as a result of the alarming conditions disclosed by those inspections, has conducted a campaign with the various automobile manufacturers for better bracing that is not only saving money for itself today but for every other railroad in the country. While we have met with some opposition in certain quarters we have the assurances of fully 90 per cent. of the shippers whose attention was called to their inferior blocking, that

A total of 347 commodities are represented in that quarter of a million dollars and it is interesting to note that out of that 347, 31 commodities, or 8.8 per cent. of the whole, represent 57.9 per cent. of the total claims paid. Thirty-two other commodities, or 9.2 per cent. of the whole represent 19.3 per cent. of total claims paid so that 63 commodities or 18 per cent. of the whole represent 77.2 per cent. of all our trouble.

It ought to be an easy matter for the railroads to get together and so supervise the handling of those 63 commodities as to prevent the causes for claims and at the same time make substantial headway on the other 284 commodities.

Suppose there were placed before you still another statement classifying those claim payments as between shipper, claimant, point of origin, destination, cause, carload and L.C.L. for each commodity, and you noticed as we did, for instance, on coal and coke that out of a total of 373 claims paid, representing

$4,555.40, that 87 of them, or 23.6 per cent. were on one shipper over one scale. What would be your conclusion? No doubt the same as ours, that there was something radically wrong with their scales, it being unreasonable to suppose that nearly one-fourth of our claims would be on coal lost from one shipper's consignment, and principally from one mine, weighed over one scale when we have scores of shippers and mines in operation on our line of road. Out of 31 claims on collars and cuffs 21, or 67.7 per cent., were on one shipper, and that shipper was also the claimant on 15 of those claims.

It is going to take the closest possible supervision on the part of the railroads to prevent or make any improvement in the bad conditions forced upon them through the growing demand for cheaper and lighter packing cases, and packing material; in fact, it has already got to the point where containers offer no protection whatever from the sneak thief, who can now in a surprisingly short space of time, open a case of valuable goods, extract therefrom a part of the contents and replace the package in as good condition as it was before, leaving no evidence of the theft. Why have not the railroads, not only in justice to themselves, but in justice to society, the right to demand of the shipper a container for his goods that cannot be entered hurriedly without leaving unmistakable evidence of it so that when a pilferage occurs we will know it forthwith and be in a position to trace the theft before he has had an opportunity to make his getaway or cover his tracks? We on the Santa Fe are going to the expense of making a test on a representative number of shipments of commodities susceptible to theft, by first invoicing the shipments as received from connecting line or direct from the shipper that we may have a definite knowledge of what they contain and then securely gluing a strip of tough fibrous poper or cloth around each end of the box, similar to the method of sealing cigar boxes, and across the ends of certain makes of boxes.

If this scheme develops protective features worth while duplicating, will be successful in convincing the shipping public of their duty from an economic standpoint to add such protection to their shipments? Will we have the moral support of the country at large to our plea for a safe container? That remains to be seen. Certainly not if railroads do not co-operate and show by their activity along the same lines of endeavor, their desire for protection against the ever-present thief. It may be asked, why lay so much stress upon concealed loss? Is it of such moment as to cause so much uneasiness? In answer to which, while I might point out several causes for loss and damage, occupying greater prominence in the category of causes, for loss and damage to freight, there are none that has shown such dogged resistance to close supervision than has concealed loss. Instead of a five years' campaign conducted on the Santa Fe having had any effect on the reduction of loss from this source, there has been an increase of 90 per cent., and I attribute this increase very largely to the susceptibility of the container to easy manipulation. The great majority of packages, instead of affording protection, are nothing less than an invitation to commit theft.

NEW PASSENGER TERMINAL AT DALLAS, TEXAS

The Union Terminal Company, Dallas, Tex., is a corporation whose stock is owned equally by the Gulf, Colorado & Santa Fe; the Chicago, Rock Island & Gulf; the Missouri, Kansas & Texas Railway of Texas; the St. Louis, San Francisco & Texas; the Houston & Texas Central; the St. Louis Southwestern; the Trinity & Brazos Valley, and the Texas & Pacific. This company was organized to provide passenger terminal facilities for the above roads, which comprise all those now operating into Dallas with the exception of the Texas & New Orleans, which will be admitted as a tenant of the Houston & Texas Central.

At present there are five passenger stations in Dallas, four of which are relatively close together, while the fifth is removed about a mile. Practically all the stations have become inadequate

Track Layout, Showing Entrance to Proposed Union Station

and beginning about 1907 there has been active agitation for a union terminal for all the roads. After considerable preliminary study, five companies, the Gulf, Colorado & Santa Fe; the St. Louis, San Francisco & Texas; the Chicago, Rock Island & Gulf; the Missouri, Kansas & Texas, and the Trinity & Brazos Valley, agreed to construct joint terminal facilities for their use, while the Texas & Pacific; the Houston & Texas Central, and the Texas & New Orleans decided to construct joint facilities for their lines, leaving the St. Louis Southwestern in its present location. Plans on this basis were well under way, but they were not satisfactory to Dallas interests and further negotiations were undertaken, resulting in an agreement being reached in 1911 for all companies to join in one large terminal, if a satisfactory location could be found. A number of sites were carefully studied, as a result of which the present location was finally chosen in 1912; its principal advantages are its proximity to the business center, its convenience of access by most of the railways and its freedom from street crossing entanglements. Plans for this work have now been practically completed and contracts have just been let.

The main lines of the Missouri, Kansas & Texas; the St. Louis Southwestern, and the Chicago, Rock Island & Gulf, the latter carrying as tenants the Trinity and Brazos Valley, and the St.

Louis, San Francisco & Texas, now traverse the adopted station site from north to south, while the Texas & Pacific crosses it just north of the north throat of the depot yard. The Gulf, Colorado & Santa Fe with its tenant, the St. Louis, San Francisco & Texas, will reach the station from a connection with the terminal tracks at Santa Fe Junction. The Houston & Texas Central will use the Missouri, Kansas & Texas tracks from a point south of the city to Katy Junction, about four miles north of the station. The Texas & New Orleans passenger trains which now enter Dallas over the tracks of the Houston & Texas Central will be diverted to the Gulf, Colorado & Santa Fe at Central Junction and enter the station via Santa Fe Junction. The Trinity & Brazos Valley now enters Dallas from the north over the tracks of the Chicago, Rock Island & Gulf and departs for the South over the Missouri, Kansas & Texas. The St. Louis, San Francisco & Texas enters Dallas from the north over the Rock Island tracks and departs for the east via the Gulf, Colorado & Santa Fe.

The station is to be of the through type with four lead tracks entering from the north, 18 depot tracks arranged in pairs, of which 10 are to be built at once, and four lead tracks at the south end, two of which are for immediate construction. The tracks will be spaced 13 ft. centers between pairs with 28 ft. centers at platforms. The tracks will hold from 14 to 20 coaches with engine and tender. Two exclusive freight tracks will also be built from between North Junction and South Junction, while provision is made for a third track for the exclusive use of the St. Louis Southwestern whenever it may be required. From South Junction to Santa Fe Junction, four tracks are planned, although only two will be built at present.

The passenger station is to be 282 ft. long by 135 ft. wide and will be placed 35 ft. back from the west line of Houston street, one of the principal thoroughfares. The building will be of the Renaissance type of architecture with a base of Texas granite and the upper parts of brick. It will rest on a solid rock foundation 25 ft. below the floor level. The front part of the first floor will contain the lobby and ticket office with a baggage checking room opposite, a parcel checking room, and an emergency hospital and stores, with the rear part devoted to a large baggage storage room. Near the south end of the building a broad staircase will lead to the second floor, where the various waiting rooms, restaurants, etc., are located. This staircase is situated immediately opposite a wide entrance to Houston street and connects with the passenger bridge or thoroughfare over the depot tracks, thus permitting direct travel between the streets and trains without passing through the ticket lobby or waiting room.

The facilities on the second floor include the general white waiting room, 135 ft. long and 70 ft. wide, with a high arched ceiling, extending to the roof of the building. A large loggia extends along the front of this waiting room, and affords an outdoor adjunct to it, while a concourse enclosed by glazed sash stretches along its track side. North of this room will be the white women's waiting and retiring rooms with toilets and baths, and the matron's room and the restaurant facilities. At the south end of the building will be the white men's smoking and toilet rooms, barber shop and baths, and the negro waiting rooms and toilets.

The third floor will consist of two unconnected parts, over those parts of the second floor north and south of the general waiting room. The south wing will be used for the despatcher's office, conductors' room, and offices of the Union Terminal Company and the Pullman Company, and the north wing will in part be assigned to the restaurant service.

To avoid the necessity of crossing tracks at grade, bridges have been selected in place of subways. Had the latter been used, the difficulty of water-proofing them, in view of the fact that the lower parts would be below high water line, and that in part they would be constructed in a high fill, would have made entire success doubtful. A bridge 36 ft. wide in the clear, consisting of girders encased in concrete, will span all tracks from a point opposite the head of the staircase mentioned above. The walls of this thoroughfare will be of glazed sash. From it the track platforms will be reached by stairways located on each side of the thoroughfare.

Track platforms, 18 ft. wide and 6 in. above the top of rail, are provided between each pair of tracks. These platforms are to be covered by reinforced concrete butterfly sheds, between the thoroughfare and the baggage bridges, the extreme ends of the platforms being left uncovered to facilitate the loading of baggage and express. For the accommodation of the different express companies, a building 500 ft. long by 50 ft. wide, and one story high, is located south of the depot building, with a 40-ft. teamway along the east side and tracks for carload express on the west side, the floor of the building and platform being 3 ft. 9 in. above the roadway and tracks. South of this building a commodious garage will be erected for housing electric trucks, which it is planned to use. In order to reach trains with baggage, express and mail, bridges, 15 ft. wide in the clear, of the same type as the thoroughfare, will span the tracks, 300 ft. each side of the thoroughfare, with elevators for trucks at their east ends and also at each track platform.

Facilities for caring for and storing passenger equipment and engines, and making emergency repairs to them are located at South Junction, and the power plant for furnishing heat, light and power for the terminal facilities is also placed here.

The Texas & Pacific crosses the terminal tracks at grade just north of the north throat. This cannot be avoided under present circumstances for high water conditions, as well as the necessity of maintaining the connections shown on the map, prevent the depression of the terminal tracks, and the very great cost of elevating the Texas & Pacific through the city makes that, at the present time, impracticable to consider.

Two new interlocking plants will be constructed, one at North Junction to control the crossings and the connections and switches at the north end of the depot tracks, and one at South Junction to control the crossings and connections there and the south switches of the depot tracks. In addition, the existing plants at Santa Fe Junction and Central Junction will be enlarged to take care of the increase in functions made necessary.

The Union Terminal Company has leased from various railways a part of its holdings, and has also purchased at a cost of $1,750,000 about ten acres of property, for the most part expensive business blocks, improved with high grade warehouses. In addition, in order to obtain the vacation of the various streets intersecting the site, it was necessary to purchase over 80 acres of river bottom land lying west of the site between Commerce street bridge and Oak Cliff viaduct. Of this tract, 32 acres was given to the city of Dallas for wharfage purposes, if the Trinity river should ever become navigable, upon the express condition that there should never be any other streets opened at grade across the Terminal tracks.

In order to admit trains of the Texas & Pacific to the station, it is necessary to construct a new bridge across the Trinity river. This bridge will be located on an 11 deg. 30 min. curve, and will consist of a through span, 150 ft. long, with 26 ft. between centers of trusses. Whenever required by the government, this span will be converted into a lift span, the river being technically navigable.

New French Railway Proposed.—For several years past the business interests of Havre have agitated the question of a second railway line from Havre to Paris, supplementing the double track line of the Western Railway of the state system, which now carries the heavy freight as well as passenger traffic between the port and the capital. The administration of the state railways has made an investigation and report concerning the cost of the project. It is estimated that the proposed line could be built for $16,405,000, and that it could be constructed in about ten years.

STRIKE ON WESTERN RAILWAYS AVERTED

A strike by all of the enginemen and firemen on the railways west of Lake Michigan and Fort William, in the United States and Canada, has been averted by the intervention of President Wilson. The history of the controversy between the western lines and the engineers and firemen has been partly told by the *Railway Age Gazette* in its issues of June 5, page 1240, and July 24, page 179.

On July 31, Warren S. Stone, grand chief of the Brotherhood of Locomotive Engineers, and W. S. Carter, president of the Brotherhood of Locomotive Firemen and Enginemen, announced in a statement to the newspapers that a strike would be called for August 7, unless the railways in the meantime should agree to arbitrate only the original demands made by the men, without considering the counter demands of the roads.

This announcement was made after the efforts of the United States Board of Mediation and Conciliation to bring about a settlement of the differences between the railways and the engineers and firemen by mediation had proved unavailing, the board having been in daily conference at Chicago with the engineers and firemen, and the Managers' Conference Committee from July 20 until July 30. On July 30, W. L. Chambers and Martin A. Knapp returned to Washington, leaving G. W. W. Hanger in Chicago to keep in touch with any further developments; and on July 31, Messrs. Stone and Carter, and members of the Conference Committee of Managers, headed by A. W. Trenholm, general manager of the Chicago, St. Paul, Minneapolis & Omaha, left Chicago for Washington at the request of President Wilson to discuss the case with him.

During the ten days of the conferences with the members of the board of mediation, during which every effort was made to bring about a settlement, the representatives of the enginemen and firemen steadily refused to submit the entire case to arbitration, and repeated their threat to declare a strike. On July 29 the members of the board telegraphed to President Wilson, advising him of the situation, and President Wilson replied, inviting representatives of both sides of the controversy to confer with him at the White House on Saturday morning.

Before leaving for Washington Messrs. Stone and Carter gave out their statement announcing the date of the strike, and declaring that they had accepted a proposition by the mediators that only the original demands of the men be submitted to arbitration, which the managers had refused, because the proposition did not include the submission to arbitration of any of the companies' counter demands.

This was one of several propositions made by the mediators, all others being rejected by the representatives of the employees, who had repeatedly refused arbitration, but thus sought to place the responsibility for refusing arbitration on the roads.

The plan of arbitration proposed by the mediators considered only the demands submitted by the men October 10, 1913, which meant consideration only of the demands for increased wages and other changes in working conditions which would be equivalent to an increase in wages. The counter proposals of the managers that certain provisions of the existing agreements be submitted to arbitration were not contained in the plan.

The Conference Committee of Managers conferred with the President at the White House on July 31, at 2 o'clock and the representatives of the engineers and firemen conferred with the President at four o'clock. The president represented to both sides that it was their patriotic duty to agree to some plan for averting a strike. The outbreak of a great war in Europe had, he said, created a very bad situation which would be greatly aggravated by a strike. He pointed out that the administration was making efforts to build up the American merchant marine in order to transport the crops from the United States to Europe, and that a strike on the western roads would defeat its efforts. The employees refused to change their position. On Sunday evening, August 2, the President sent a letter to the Conference Committee of Managers, in which he said in part:

"In view of the world-wide conditions it is obvious that the suspension of business on roads serving more than half the territory of the United States would be a calamity of incalculable magnitude. The situation has reached a crisis which hardly permits a full consideration of the merits of the controversy, and I feel that in the circumstances I can appeal with confidence to your patriotism and to your regard for the public welfare to make whatever sacrifice is necessary to avert a national disaster."

On Monday morning Mr. Trenholm, chairman of the Conference Committee of Managers, replied in a letter to the President in which he said that in response to the request of the President the managers had decided to recede from their positions and to accept arbitration, as proposed by the mediation board. He added that the Conference Committee of Managers never would have assented to arbitration that did not recognize the right of the railroads to present their claims to the arbitration board, if it had not been for the crisis in European affairs and the consequent effect that would be produced by a strike in this country. "Under ordinary circumstances," said Mr. Trenholm in his letter, "we should feel that our plain duty to the interests committed to our charge would not merely justify, but would require us to insist upon a plan of arbitration that would recognize our right to be heard upon claims regularly presented on our behalf."

On Monday, August 3, Darius Miller, president of the Burlington, speaking for the executives of all the western railroads, issued the following statement:

"The President appealed to the railroads upon the large ground of patriotism and grave public emergency, and the roads have acquiesced.

"In doing so the committee representing the roads did the big thing, although at a sacrifice of the right to be heard—that is exactly what it amounts to. The organizations lost one of their great opportunities to show the country that they are as big as the railroads; that their leaders are as patriotic and as anxious for the public welfare as the officers of the roads.

"My suggestion was, in view of the appeal of the President, who did what every great leader would do under the circumstances, that both parties should suspend all further controversy for ninety days and thereby relieve the country of the added anxiety of a strike.

"In times like these it is unwise and unpatriotic to press selfish demands and doggedly threaten to carry any apparent advantage to a crisis. That is what the men have done, and there is where they have lost their opportunity vastly to gain in public respect and confidence.

"As usual, the railroads have made the sacrifice, and some months from now they will see the price expressed in dollars and cents. But, on the whole, I think the position of the roads is the better one. It always has and probably always will happen that the test of the better citizenship is the willingness to make sacrifices to serve the public interest. That is the big thing that the Western roads have done, and perhaps that is a good definition of patriotism.

"I do not think the public fully understands the difference between the parties. The men initiated the conditions that led to the crisis by demanding more pay and reduced hours at a time when all industrial conditions were halting and depressed. The existing schedules and rules have been the growth of years of individual trading and compromise to avoid trouble, until they differ widely on different roads and contain many rules that are wrong in principle and uneconomic in application. For these reasons the roads asked to have the schedules revised and all questions, on both sides, submitted to arbitration, coupled with a guarantee that rates of pay would not be reduced.

"This the organization refused, and it was only after pressure from the mediators that they finally agreed to arbitrate even their own demands, and they have denied the right of the roads even to be heard; and, following the recommendation of the mediators for peace at any price, the President was apparently compelled to follow the only course open to him—namely, appeal for a settlement upon the broader grounds of the public welfare."

General News Department

A fire on July 30, destroyed some of the docks and passenger wharves at Seattle, Wash., including the Grand Trunk Pacific pier, causing damage estimated at $500,000.

Announcement was made at the locomotive shops of the Pennsylvania, at Altoona, last Saturday, that henceforth the men would work 50 hours a week, instead of 40 hours, as hitherto.

The examiners of accounts of the Interstate Commerce Commission—the men who go about the country visiting railroad accounting offices—are to have their territory divided; and they and their clerks will have district headquarters. These branch offices of the "Division of Carriers' Accounts" will be established at New York, Pittsburgh, St. Louis and San Francisco.

Collision on the Kansas City Southern

Thirty-eight persons were killed and 25 injured, six fatally, on August 5, by a northbound passenger train on the Kansas City Southern crashing head on into an interurban car on the Missouri & North Arkansas near Tipton Ford, 12 miles south of Joplin, Mo., at 5:30 p. m., August 5. The Missouri & North Arkansas Railway uses the Kansas City Southern tracks from Joplin to Neosho. The cars met on a curve. The interurban car, which was going about 35 miles an hour, was telescoped and took fire.

Italian Railway Strike Punishments

As a result of the Italian railwaymen's strike, the following measures have been adopted: Forty-eight employees of various grades have been called upon to resign; two stationmasters, 16 lower employees, and 362 mechanics and firemen have been degraded; increases in salary of other persons taking part voluntarily in the strike will be postponed for periods varying from six months to two years, alternatively they will be suspended from duty for periods of from 6 to 12 days. The council of administration has decided to commend those employees who did not leave work and thus maintained the fidelity and discipline which are the first bases of good railway service.

Safety at Pacific Coast Grade Crossings

Statistics seem to indicate that Pacific coast pedestrians and drivers exercise more care this year at crossings than they did in 1913, though there is still plenty of room for improvement. The Southern Pacific has made every effort to educate careless people and now has the satisfaction of seeing a little improvement. Observations made in widely separated localities in August, September and October, 1913, showed that of 17,021 motor vehicles observed, the drivers of 11,836, or 69½ per cent., looked neither to the right nor to the left before crossing the tracks; 2.7 per cent. looked one way only; and 27.8 per cent. looked in both directions. The astonishing number of 3,301, or 19.3 per cent. of the total ran over the crossings at a reckless rate of speed, and only 35 drivers stopped their machines before crossing.

Of the 4,889 drivers of teams, 39.4 per cent. looked in neither direction; 8.6 per cent. looked one way only; and 52 per cent. looked in both directions.

Similar observations were made in June of this year, and mostly at the same crossings. Twenty-three per cent. more drivers of automobiles are looking in both directions than last year. The number of drivers of teams looking both ways shows no improvement, both years being 52 per cent., but 6 per cent. more are looking one way than did last year. Pedestrians show an increase of 29 per cent. looking in both directions.

Freight House, Tacoma, Wash.

The Oregon-Washington Railroad & Navigation Company is building a new freight house on the tide flats at Fifteenth street and the city waterway, Tacoma, Wash. The building is 50 ft. by 342 ft. in area, and is one story high, except at the head house end for a depth of 81 ft., where it is two stories. It is supplied with a basement under the head house on the track side. Both floors of the head house are devoted to office space. The building is a semi-fireproof structure of brick, resting on a concrete foundation.

The floors throughout are of reinforced concrete slabs. Those in the freight house are covered with a 1 in. layer of asphalt. Those in the public space, vestibule, steps and back hall are finished in terrazzo, while all the other floors in the head house have a surface of cement one-half inch thick. All window sills and copings are also of concrete.

Kinnear steel rolling doors are used throughout the freight house, two of which on the freight house side of the fire wall of the head house are equipped with fusible links.

The roof is of five-ply tar and gravel construction built in accordance with the Barrett specifications. The lumber used is fir. The building is heated by a hot water system.

Three tracks run parallel with the shed on one side and a driveway on the other side. In the rear of the building is a wooden platform 14 ft. by 19 ft., used for unloading automobiles. The freight house is fitted with new style automatic dial scales.

The building is being put up by O. F. Larson of Tacoma, the approximate cost being $50,000.

President Ripley on Proposed Strike

President E. P. Ripley of the Atchison, Topeka & Santa Fe, has addressed the following letter to all employees of his road:

"A statement to the public by the railroad enginemen has been widely circulated in the western territory as a justification for the action of enginemen in demanding more pay and shorter hours, and refusing to arbitrate the questions involved. The statement is long and involved and for the most part is either wholly untrue, or states but a portion of the truth. The statement has been sent broadcast with request to have it printed in the newspapers in whole or in part.

"In order that the full situation may be known to the public and especially to our own employees, I desire to state these facts:

"The railroads propose a full arbitration of all questions involved; the enginemen offer to arbitrate only the question of their own demands.

"In order that it might be apparent to all that no attempt is being made to reduce wages the railroads gave the enginemen assurance that if the arbitration is unsatisfactory the men will have the option of rejecting it and continuing to work on the existing schedule.

"It seems hardly necessary to state that any claims that the Santa Fe has not or will not live up to any agreement it makes are ridiculous. You all know that it does and that it will.

"We have before us the question of being able to live or perish. We cannot operate this railroad except with loyal and faithful employees. We will, of course, stand by the result of any arbitration, but to submit to 'arbitration' which ignores all justice and provides only that the claims of one side be adjudicated is absurd.

"You know the record of the company for square dealing, and you may rest assured that it is not being departed from in this case."

Locomotive Smoke in Chicago

The method of controlling locomotive smoke in Chicago under the direction of the General Managers' Association has been referred to several times in these columns. That this arrangement has proved very successful is shown by the biennial returns made by the department of smoke inspection of the city. This summer's returns, including 9,453 observations, shows the best record for summer reading since the department was established. This

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF JUNE, 1914

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses						Net operating revenue (or deficit).	Outside operations, net.	Taxes.	Operating income (or loss).	Increase (or decr.) comp. with last year.
		Freight.	Passenger.	Total. inc. misc.	Maintenance: Way and structures.	Maintenance: Of equipment.	Traffic.	Transportation.	General.	Total.					
Alabama & Vicksburg	143	$94,589	$38,126	$142,597	$20,291	$32,232	$3,888	$48,755	$9,029	$114,195	$28,402	—$317	$7,206	$20,879	$682
Alabama Great Southern	309	287,147	107,957	427,687	74,834	125,410	13,501	142,862	12,547	369,154	58,533	—295	16,190	42,048	—32,862
Arizona & New Mexico	109	65,718	8,306	77,175	10,463	8,515	965	12,948	5,626	38,517	38,658	.....	3,000	35,658	—726
Atchison, Topeka & Santa Fe	8,340	5,109,679	2,138,580	7,896,117	1,197,375	1,294,506	180,761	2,241,918	176,324	5,090,884	2,805,233	.....	453,269	2,351,964	139,718
Atlantic Coast Line	4,673	1,917,059	665,594	2,851,072	446,878	575,203	53,790	1,061,174	109,013	2,246,058	605,014	—2,263	129,159	473,592	—54,502
Baltimore & Ohio Chicago Terminal	77	.....	526	133,097	10,085	20,778	794	54,521	4,422	90,600	42,497	1,096	19,021	24,572	—1,547
Buffalo, Rochester & Pittsburgh	586	676,324	93,259	809,117	119,352	137,464	11,092	250,108	19,390	537,406	271,711	—335	24,000	247,376	—57,686
Canadian Pacific Lines in Maine	233	41,679	20,915	69,989	36,195	15,296	6,223	37,707	5,104	100,525	30,536	.....	14,450	44,986	24,521
Carolina, Clinchfield & Ohio	248	156,181	16,858	176,935	16,959	34,426	8,252	38,699	16,455	114,791	62,144	..... Cr.	+1,859	64,003	34,610
Carolina, Clinchfield & Ohio of S. C.	18	6,928	1,456	8,534	1,085	91	1,953	2,324	1,202	6,655	1,879	..... Cr.	+1,819	3,698	2,667
Charleston & Western Carolina	341	102,773	28,457	138,995	Cr. —6,055	28,857	3,166	54,432	7,879	88,279	50,716	.....	11,652	39,064	7,785
Chicago & Erie	270	323,369	57,851	424,519	147,492	93,810	20,938	205,103	13,708	481,051	—56,532	—4,025	20,280	—80,837	147,866
Chicago & North Western	8,095	4,444,958	1,943,144	7,277,793	1,605,644	950,524	101,190	2,492,782	140,293	5,290,433	1,987,360	23,347	405,791	1,558,222	—311,527
Chicago, Indiana & Southern	359	299,398	24,108	333,998	43,244	94,179	6,713	114,596	11,762	270,494	63,504	640	18,600	45,544	12,204
Chicago Junction	12	.....	.....	155,625	7,592	18,394	966	82,538	3,623	113,113	42,512	9,919	1,349	51,082	12,151
Chicago, Peoria & St. Louis	255	101,467	21,755	131,040	23,461	28,326	5,749	60,439	5,574	123,549	7,491	.....	8,864	—1,373	—2,637
Chicago, Rock Island & Gulf	477	158,695	49,463	225,559	29,087	29,315	9,267	95,876	7,319	170,864	54,695	—519	8,814	45,362	—11,461
Chicago, St. Paul, Minneapolis & Omaha	1,753	845,581	503,293	1,449,756	288,758	144,792	31,207	507,730	37,714	1,010,201	439,555	4,740	82,283	362,012	—9,425
Cincinnati, Hamilton & Dayton	1,015	637,366	129,223	864,643	698,044	208,421	19,990	440,143	16,323	1,382,921	—518,278	.....	51,983	—570,261	—698,695
Cincinnati, New Orleans & Texas Pacific	337	661,659	160,364	867,263	132,434	220,181	27,896	264,595	33,556	678,662	188,601	807	31,000	158,408	—14,706
Cincinnati Northern	246	93,046	18,790	118,370	18,585	25,456	2,489	44,590	3,290	94,410	23,960	.....	6,000	17,960	—6
Cleveland, Cincinnati, Chic. & St. Louis	2,361	1,861,461	793,753	2,922,876	406,784	620,528	70,220	1,128,853	77,712	2,304,097	618,779	4,831	124,500	499,110	194,742
Colorado Midland	338	98,602	24,239	136,675	36,203	31,907	7,900	61,256	5,717	142,983	—6,308	—1,126	10,000	—17,434	3,850
Cumberland Valley	162	264,886	73,817	351,650	51,659	31,030	4,493	76,067	10,380	173,629	178,021	66	5,916	172,045	77,439
Delaware, Lackawanna & Western	960	2,495,258	735,505	3,463,576	570,111	513,135	87,533	986,345	74,354	2,231,478	1,232,098	21,456	185,000	1,068,554	27,587
Detroit & Mackinac	411	62,982	26,293	96,059	17,310	18,072	2,333	38,538	2,859	79,112	16,947	—2,327	9,148	5,472	—12,278
Detroit & Toledo Shore Line	79	92,899	.....	93,621	4,878	9,556	1,530	27,313	2,385	45,662	47,959	.....	5,945	42,014	—22,663
Duluth & Iron Range	292	730,934	19,104	757,630	110,729	77,962	1,294	145,545	12,592	348,122	409,508	13,654	43,368	379,794	—213,988
Duluth, Missabe & Northern	364	684,195	32,357	722,469	125,326	77,658	2,499	123,651	14,160	343,294	379,175	3,105	36,630	345,650	—396,663
El Paso & Southwestern Co	1,029	681,793	116,507	836,062	114,866	105,440	19,344	224,967	7,148	471,765	364,297	—7,773	38,211	318,313	72,463
Elgin, Joliet & Eastern	777	710,691	12	761,921	151,371	155,308	5,337	209,949	21,535	543,500	218,421	.....	23,379	195,042	—270,168
Erie	1,988	3,391,665	808,384	4,573,877	570,762	771,377	99,519	1,414,175	113,055	2,968,888	1,604,989	39,744	32,661	1,612,072	146,522
Florence & Cripple Creek	87	84,942	14,714	101,140	10,019	9,352	Cr. 277	28,586	6,003	53,683	47,457	.....	9,819	37,638	—4,021
Florida East Coast	696	176,445	119,289	347,658	78,327	51,718	5,721	189,636	11,389	336,791	10,867	—213	19,717	—9,063	—14,823
Galveston, Harrisburg & San Antonio	1,338	629,159	263,179	928,760	150,670	168,699	29,217	447,260	34,344	830,190	98,570	—2,737	8,300	87,533	79,117
Houston, East & West Texas	191	76,267	32,249	114,547	23,890	15,509	1,983	39,816	3,768	84,966	29,581	.....	914	28,667	3,677
Houston & Texas Central	830	301,720	143,666	472,983	83,038	63,533	15,764	270,194	17,922	450,451	22,532	—434	5,020	17,078	19,211
Illinois Central[1]	4,763	3,443,281	1,102,483	5,241,543	745,690	1,218,697	101,670	1,844,300	133,431	4,043,788	1,197,755	3,727	331,247	862,781	—364,523
Indiana Harbor Belt	105	.....	.....	292,027	45,194	37,741	2,597	119,736	7,849	213,117	78,910	4,510	6,000	77,420	21,494
Kanawha & Michigan	177	128,125	30,595	165,625	16,822	33,186	3,014	64,598	7,178	124,798	40,827	—3	9,580	31,244	—46,159
Kansas City Southern	827	758,028	132,178	980,467	99,056	119,013	29,468	285,496	43,400	576,433	404,034	.....	66,648	337,386	109,686
Lake Erie & Western	906	390,958	65,036	483,174	53,093	86,294	11,238	182,683	12,703	346,011	137,163	.....	24,000	113,163	22,832
Lake Shore & Michigan Southern	1,854	2,662,728	1,183,406	4,383,454	534,007	997,866	78,836	1,400,473	114,917	3,126,099	1,257,355	34,659	196,500	1,095,514	—157,363
Lehigh & Hudson River	97	130,999	3,507	141,495	7,862	13,413	1,382	50,652	9,538	82,847	58,648	.....	5,768	52,880	7,531
Lehigh & New England	293	264,228	1,034	344,410	32,311	25,489	1,860	53,563	6,446	119,669	154,741	.....	5,670	149,071	116,619
Louisiana & Arkansas	279	95,726	23,383	122,770	28,475	31,355	2,607	36,119	4,502	103,058	19,712	.....	7,091	12,621	10,577
Louisiana Ry. & Navigation	351	127,957	25,614	165,395	24,628	18,852	5,507	48,677	6,034	103,698	61,697	.....	7,064	54,636	31,629
Louisiana Western	208	109,216	61,341	181,253	20,669	40,320	7,342	57,577	6,816	138,724	42,529	—323	1,780	40,426	—1,413
Maine Central	1,207	625,671	338,328	1,031,888	165,684	131,584	12,828	353,680	48,975	712,751	319,137	—5,972	65,587	247,578	157,825
Michigan Central	1,800	1,677,744	860,994	2,839,363	294,483	456,238	61,417	1,073,012	65,380	1,950,530	888,833	2,117	134,000	756,950	—17,416
Missouri & North Arkansas	365	56,798	33,970	97,438	31,724	23,102	3,361	39,063	5,591	102,841	—5,403	.....	11,838	17,241	7,116
Missouri, Oklahoma & Gulf	332	51,682	18,479	73,455	13,551	10,682	4,758	39,998	5,995	74,984	—1,529	321	6,461	—7,669	10,683

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF JUNE, 1914—CONTINUED

Name of road.	Average mileage operated during period.	Operating revenues: Freight.	Passenger.	Total. inc. misc.	Operating expenses: Maintenance: Way and structures.	Maintenance: Of equipment.	Traffic.	Transportation.	General.	Total.	Net operating revenue (or deficit).	Outside operations, net.	Taxes.	Operating income (or loss).	Increase (or decr.) comp. with last year.
Missouri, Oklahoma & Gulf of Texas	19	$6,168	$342	$6,693	$1,567	$917	$233	$4,622	$443	$7,782	—$1,089	.....	$197	—$1,286	$2,984
Mobile & Ohio	1,122	899,451	121,036	1,080,029	114,979	238,165	42,476	418,407	31,805	845,832	234,197	$1,332	31,150	201,715	—59,334
Monongahela Connecting	6	.....	.....	75,391	10,363	10,528	300	38,288	2,508	61,987	13,404	.....	2,038	11,366	—5,286
Morgan's La. & Texas R. R. & S. S. Co.	405	224,904	91,986	346,995	44,469	63,116	11,769	147,044	14,439	280,837	66,158	—1,591	2,973	61,594	60,399
New Orleans & North Eastern	203	247,335	50,547	319,613	26,527	75,469	10,352	114,969	16,667	243,984	75,629	—7	14,423	61,199	182
New Orleans, Texas & Mexico	286	77,604	23,106	110,505	47,918	11,994	6,678	48,223	10,006	124,819	—14,314	.....	4,969	—19,283	—16,158
New York, Chicago & St. Louis	567	690,801	167,718	897,610	146,909	98,055	48,653	407,471	19,318	720,406	177,204	—1,204	59,389	116,611	—137,452
New York, Susquehanna & Western	141	174,859	44,787	241,485	36,502	31,015	1,951	100,336	4,862	174,666	66,819	2,913	5,222	64,510	—4,846
Norfolk & Western	2,037	3,187,496	410,289	3,714,153	461,544	727,918	57,359	1,119,237	70,165	2,436,223	1,277,930	—3,101	140,000	1,134,829	42,421
Norfolk Southern	860	233,877	75,180	339,223	54,045	39,964	6,556	126,862	20,586	248,013	91,210	6,014	10,577	86,647	—11,377
Pittsburgh & Lake Erie	224	1,189,802	140,145	1,383,415	158,604	329,902	14,331	332,838	28,839	864,514	518,901	—364	53,500	465,037	—292,459
Pittsburgh, Shawmut & Northern	282	141,059	9,998	153,737	23,499	44,055	1,545	49,616	4,596	123,311	30,426	.....	Cr. 4,713	31,139	7,995
Richmond, Fredericksburg & Potomac	88	180,204	72,161	284,174	37,493	30,983	2,737	95,262	7,280	173,775	110,399	559	2,150	108,808	58,096
Seaboard	3,098	1,337,857	391,085	1,947,287	212,941	246,232	71,967	707,182	66,610	1,304,932	642,355	—3,587	87,000	551,768	—27,550
Southern in Mississippi	281	47,377	28,392	83,657	16,829	9,639	2,154	40,224	3,645	72,491	11,166	.....	7,750	3,416	22,049
Spokane International	163	60,162	17,865	81,748	11,810	5,092	2,222	23,472	3,681	46,277	35,471	.....	3,809	31,662	11,532
Texas & New Orleans	458	216,428	103,535	339,512	75,287	77,965	8,126	164,831	12,778	338,987	525	—586	3,310	—3,371	—27,545
Toledo & Ohio Central	446	149,369	49,726	225,649	70,214	75,015	6,374	119,626	11,905	283,134	—57,485	—558	23,737	—81,780	—281,923
Toledo, Peoria & Western	248	57,206	34,774	104,060	17,861	24,747	3,075	43,718	3,684	93,085	10,975	.....	6,321	4,654	—24,751
Union R. R. of Pennsylvania	31	.....	.....	382,954	82,898	95,284	105	136,652	4,809	319,748	63,206	7,782	6,000	64,988	—103,330
Vicksburg, Shreveport & Pacific	171	58,194	41,586	110,994	20,169	23,094	3,544	46,043	5,743	98,593	12,401	16	7,200	5,217	—9,071
Virginian	503	441,972	32,674	488,223	70,535	62,883	4,885	109,245	16,216	263,764	224,459	5,982	21,550	208,891	—2,103
Washington Southern	36	51,303	35,271	116,705	15,424	9,939	1,203	45,361	2,984	74,911	41,794	—477	5,498	35,819	15,604
Yazoo & Mississippi Valley	1,372	588,100	201,835	847,834	110,266	123,857	16,242	347,415	27,636	625,416	222,418	174	82,772	139,820	24,441

TWELVE MONTHS OF FISCAL YEAR ENDING JUNE 30, 1914

Alabama & Vicksburg	143	$1,199,217	$498,640	$1,830,544	$281,855	$415,257	$47,557	$663,557	$74,431	$1,482,657	$347,887	—$4,597	$97,799	$245,491	—$139,320
Alabama Great Southern	309	3,662,745	1,298,781	5,385,308	688,650	1,406,891	162,171	1,832,894	136,858	4,227,464	1,157,844	—6,607	189,857	961,380	—271,284
Arizona & New Mexico	109	818,840	108,173	966,678	128,590	114,512	9,676	181,657	38,890	473,325	493,353	.....	33,383	459,970	—71,772
Atchison, Topeka & Santa Fe	8,346	61,089,211	24,633,111	93,540,268	12,649,572	16,181,249	2,135,094	27,061,010	2,145,776	60,172,701	33,367,567	.....	4,773,441	28,594,126	1,598,513
Atlantic Coast Line	4,645	24,825,313	9,212,170	36,832,898	5,116,944	6,094,706	649,821	13,118,266	1,232,351	26,212,088	10,620,810	—9,640	1,561,159	9,050,011	—986,052
Baltimore & Ohio Chicago Terminal	77	.....	7,746	1,594,454	180,793	276,804	8,859	742,832	62,145	1,271,433	323,021	10,144	220,965	112,200	—80,256
Buffalo, Rochester & Pittsburgh	581	9,153,942	1,184,417	10,709,535	1,447,952	2,216,194	150,553	3,880,161	243,203	7,938,063	2,771,472	—2,897	234,000	2,534,575	—523,415
Canadian Pacific Lines in Maine	233	929,363	347,555	1,389,305	369,043	226,550	81,413	646,254	61,327	1,384,587	4,718	.....	139,450	134,732	114,569
Carolina, Clinchfield & Ohio	248	2,266,136	203,086	2,520,306	179,300	329,345	83,465	476,494	117,225	1,185,829	1,334,477	.....	124,891	1,209,586	117,530
Carolina, Clinchfield & Ohio of S. C.	18	134,214	21,494	158,902	11,566	1,052	19,452	29,731	7,657	69,458	89,444	.....	6,431	83,013	1,103
Charleston & Western Carolina	341	1,608,172	391,331	2,095,812	349,878	347,283	41,851	797,699	63,756	1,600,467	495,345	.....	66,651	428,694	68,559
Chicago & Erie	270	4,251,634	697,008	5,460,145	1,088,150	1,354,195	258,577	2,891,561	158,709	5,751,192	—291,047	—41,806	176,299	—508,552	499,419
Chicago & North Western	8,071	53,989,475	21,540,543	83,677,051	12,179,690	12,187,123	1,357,643	31,941,194	1,739,492	59,405,142	24,271,909	—14,150	4,252,790	20,004,969	—1,192,308
Chicago, Indiana & Southern	359	3,884,135	309,824	4,329,897	609,415	1,335,311	106,068	1,573,703	126,701	3,751,198	578,699	4,107	206,067	376,739	—410,396
Chicago Junction	12	.....	.....	2,029,764	186,385	207,659	13,280	1,084,489	53,200	1,545,013	484,751	108,215	28,433	564,533	—56,884
Chicago, Peoria & St. Louis	255	1,263,705	314,282	1,676,617	325,286	399,854	77,331	822,845	63,195	1,688,511	—11,894	.....	72,264	—84,158	—129,098
Chicago, Rock Island & Gulf	477	1,961,454	638,642	2,819,779	358,987	368,223	115,435	1,169,980	94,182	2,106,807	712,972	—9,419	115,055	588,498	—523,041
Chicago, St. Paul, Minneapolis & Omaha	1,748	11,427,563	5,415,710	17,992,371	2,612,610	2,283,926	353,956	6,939,604	442,474	12,632,570	5,359,801	16,166	973,283	4,402,684	134,215
Cincinnati, Hamilton & Dayton	1,015	7,413,458	1,601,955	10,084,217	2,364,445	1,876,602	252,619	5,000,570	243,605	9,737,841	346,376	.....	464,609	—118,233	1,697,120
Cincinnati, New Orleans & Texas Pacific	337	8,303,851	2,043,306	10,872,690	1,116,637	2,745,835	307,400	3,263,566	273,282	7,706,720	3,165,970	—9,447	368,000	2,788,523	—266,686
Cincinnati Northern	245	1,166,617	226,248	1,459,278	317,900	393,311	32,726	650,473	43,131	1,437,541	21,737	.....	70,059	—48,322	—183,599
Cleveland, Cincinnati, Chic. & St. Louis	2,363	23,834,969	9,001,100	36,027,653	5,381,809	8,927,514	912,701	15,814,934	835,082	31,872,040	4,155,613	—10,503	1,471,668	2,673,442	—3,865,650
Colorado Midland	338	1,335,132	273,221	1,761,982	342,491	426,855	94,064	796,827	69,375	1,729,612	32,370	—13,909	108,000	—89,539	—158,388
Cumberland Valley	162	2,644,895	713,617	3,511,897	653,777	408,056	60,019	1,175,023	103,933	2,400,808	1,111,089	878	72,796	1,039,171	56,810

REVENUES AND EXPENSES OF RAILWAYS

TWELVE MONTHS OF FISCAL YEAR ENDING JUNE 30, 1914—CONTINUED

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses					Net operating revenue (or deficit).	Outside operations, net.	Taxes.	Operating income (or loss).	Increase (or decr.) comp. with last year.
		Freight.	Passenger.	Total. inc. misc.	Maintenance: Way and structures.	Maintenance: Of equipment.	Traffic.	Transportation.	General.	Total.				
Delaware, Lackawanna & Western	960	$28,634,755	$8,508,362	$39,819,284	$5,213,785	$6,168,919	$878,896	$12,509,900	$849,909	$25,621,409	$14,197,875	$418,109	$2,100,000	$12,515,984	—$1,552,864
Detroit & Mackinac	411	795,306	336,572	1,210,333	147,398	195,753	28,545	448,330	32,854	852,880	357,453	—3,314	105,905	248,234	—40,584
Detroit & Toledo Shore Line	79	1,529,888	.....	1,544,330	145,352	126,318	20,649	444,122	31,695	768,136	776,194	.....	66,976	709,218	61,069
Duluth & Iron Range	282	6,118,596	286,168	6,518,526	917,388	780,475	13,597	1,578,530	168,929	3,458,919	3,059,607	—6,064	350,917	2,702,626	—759,257
Duluth, Missabe & Northern	360	6,841,548	386,446	7,311,844	1,236,324	1,044,609	28,402	1,556,133	174,893	4,040,361	3,271,483	19,922	406,118	2,885,287	1,393,288
El Paso & Southwestern Co.	1,001	7,399,309	1,259,099	9,057,553	1,283,247	1,241,720	204,892	2,575,383	291,388	5,596,630	3,460,923	—45,846	487,224	2,927,853	—198,975
Elgin, Joliet & Eastern	794	10,510,790	58	11,252,392	1,696,696	2,400,430	71,134	3,332,900	254,078	7,755,238	3,497,154	.....	426,863	3,070,291	—2,364,091
Erie	1,988	38,527,944	9,551,565	52,344,668	5,910,596	9,960,686	1,258,320	18,631,887	1,322,667	37,084,156	15,260,512	302,965	1,689,427	13,268,120	—3,241,613
Florence & Cripple Creek	87	1,007,051	199,975	1,228,512	140,864	116,875	22,581	368,800	54,185	703,305	525,207	.....	75,865	449,342	—76,525
Florida East Coast	686	2,593,683	2,075,543	5,347,819	866,799	736,909	97,186	1,815,484	136,843	3,653,221	1,694,598	13,166	239,717	1,441,715	189,042
Galveston, Harrisburg & San Antonio	1,338	7,946,787	3,222,544	11,824,091	1,608,766	2,209,606	405,100	5,079,464	419,091	9,722,027	2,102,064	43,010	573,952	1,485,102	—595,167
Houston, East & West Texas	191	963,050	400,979	1,443,373	239,618	157,692	22,717	592,445	49,224	1,061,696	381,677	.....	57,010	324,667	23,711
Houston & Texas Central	813	4,293,862	1,805,151	6,551,983	1,094,993	948,620	172,802	3,118,516	220,684	5,555,615	996,368	3,711	326,310	666,346	436,474
Illinois Central	4,763	43,871,272	13,715,979	65,873,700	9,205,946	14,510,079	1,290,778	24,150,040	1,618,484	50,775,327	15,098,373	—17,651	3,341,247	11,739,475	488,627
Indiana Harbor Belt	105	.....	.....	3,284,687	447,026	407,308	34,567	1,550,796	93,979	2,533,676	751,011	29,469	75,542	704,938	—167,275
Kanawha & Michigan	177	2,654,551	377,634	3,110,148	422,236	704,237	34,937	974,304	84,076	2,219,790	890,358	—168	126,429	763,761	—247,727
Kansas City Southern	827	8,241,359	1,675,168	10,993,454	1,135,525	1,339,155	324,676	3,660,700	450,265	6,910,321	4,083,133	.....	567,858	3,515,275	21,462
Lake Erie & Western	906	4,556,124	849,225	5,743,649	882,715	1,163,306	168,609	2,368,420	145,178	4,728,228	1,015,421	.....	267,640	747,781	—434,458
Lake Shore & Michigan Southern	1,854	34,091,616	12,920,411	53,344,156	6,816,584	12,568,436	1,023,172	19,214,897	1,194,171	40,817,260	12,526,896	118,383	2,409,212	10,236,067	7,833,306
Lehigh & Hudson River	97	1,635,624	49,341	1,774,792	255,284	268,964	16,897	691,963	60,022	1,293,130	481,662	.....	49,769	431,893	—126,868
Lehigh & New England	293	2,157,448	13,948	2,255,800	292,897	303,627	23,860	585,782	51,114	1,257,280	998,520	.....	43,126	955,394	154,349
Louisiana & Arkansas	279	1,374,925	271,961	1,700,208	325,039	276,273	30,312	442,516	61,724	1,135,864	564,344	.....	69,255	495,089	—68,418
Louisiana Ry. & Navigation	351	1,553,670	291,928	1,971,718	363,295	235,970	73,090	793,531	79,714	1,545,600	426,118	.....	80,060	346,058	—60,833
Louisiana Western	208	1,464,675	735,805	2,314,284	259,973	492,649	89,018	741,930	80,027	1,663,597	650,687	—9,393	114,732	525,562	—126,062
Maine Central	1,207	7,400,035	3,517,583	11,685,969	1,671,469	1,796,981	138,025	4,516,044	364,901	8,487,420	3,198,549	50,167	611,496	2,536,886	41,494
Michigan Central	1,800	21,724,654	9,211,975	34,268,454	4,540,846	5,991,964	765,391	14,877,408	693,073	26,868,682	7,399,772	24,533	1,494,814	5,880,425	—3,243,135
Missouri & North Arkansas	365	792,106	419,658	1,293,618	337,444	252,606	44,052	522,874	68,178	1,225,154	68,464	.....	72,338	—3,874	22,517
Missouri, Oklahoma & Gulf	332	877,214	247,862	1,171,787	264,418	194,220	63,688	578,073	82,757	1,183,156	—11,369	4,516	74,309	—81,162	—92,639
Missouri, Oklahoma & Gulf of Texas	19	112,755	6,108	120,913	16,182	17,350	2,310	65,019	9,311	110,172	10,741	.....	2,392	8,349	17,097
Mobile & Ohio	1,122	10,708,321	1,522,933	12,975,431	1,502,120	2,682,921	508,751	4,986,924	400,111	10,075,827	2,899,604	19,166	416,519	2,463,919	467,832
Monongahela Connecting	6	.....	.....	964,736	103,769	168,936	3,600	477,185	32,408	785,898	178,838	.....	31,288	147,550	—94,338
Morgan's La. & Texas R. R. & S. S. Co.	405	3,166,399	1,175,750	4,700,887	626,343	733,756	145,229	1,952,206	156,589	3,614,123	1,086,764	—17,252	268,628	800,884	305,165
New Orleans & North Eastern	203	3,048,400	641,436	3,975,710	409,603	869,012	123,091	1,494,548	159,276	3,055,530	920,180	—3,628	182,586	733,966	—13,910
New Orleans, Texas & Mexico	286	1,256,619	223,290	1,581,020	509,460	161,207	45,441	639,065	111,632	1,466,805	114,215	.....	18,515	95,700	—151,609
New York, Chicago & St. Louis	566	9,709,884	1,637,823	11,757,111	1,532,606	1,826,178	585,287	5,501,256	233,044	9,678,371	2,078,740	—31,074	487,603	1,560,063	—1,327,215
New York, Susquehanna & Western	141	2,132,197	545,481	2,978,174	327,256	271,266	26,817	1,247,328	72,483	2,045,150	933,024	—17,697	149,331	765,996	—9,771
Norfolk & Western	2,037	38,038,622	4,908,679	44,470,619	4,998,612	9,214,007	737,690	14,068,578	916,955	29,935,842	14,534,777	—19,854	1,620,000	12,894,923	—819,577
Norfolk Southern	860	2,729,272	952,510	3,990,020	613,371	561,696	70,938	1,466,146	214,754	2,926,905	1,063,115	9,152	125,810	946,457	—333,969
Pittsburgh & Lake Erie	224	15,188,097	1,800,413	17,622,031	1,866,776	3,913,846	188,412	4,573,615	356,178	10,898,827	6,723,204	4,118	689,885	6,029,201	—3,544,334
Pittsburgh, Shawmut & Northern	282	1,937,331	130,902	2,099,974	374,875	570,057	20,048	755,158	59,809	1,779,947	320,027	.....	19,404	300,623	—176,713
Richmond, Fredericksburg & Potomac	88	1,589,470	1,028,089	2,977,081	318,251	341,844	38,027	1,109,699	88,302	1,896,123	1,080,958	—15,529	91,430	914,269	129,598
Seaboard	3,084	17,307,034	5,430,531	25,291,758	3,094,200	3,404,471	796,755	9,258,623	757,346	17,311,395	7,980,363	—20,360	999,000	6,961,003	141,065
Southern in Mississippi	281	752,734	434,248	1,289,586	289,047	127,103	29,787	546,253	48,364	1,040,554	249,032	.....	100,864	148,168	174,650
Spokane International	163	745,784	231,316	1,020,069	153,013	64,785	23,727	304,679	45,729	591,933	428,136	.....	42,436	385,710	—37,390
Texas & New Orleans	458	2,665,901	1,249,797	4,174,321	776,758	953,506	102,366	1,803,341	158,721	3,794,692	379,629	—7,395	214,132	158,102	—198,949
Toledo & Ohio Central	446	4,381,494	647,151	5,336,893	997,741	1,153,250	95,292	2,192,360	129,535	4,568,178	768,715	6,516	265,715	505,484	—826,870
Toledo, Peoria & Western	248	723,351	486,292	1,293,609	252,675	325,691	30,678	582,990	44,121	1,236,155	57,454	.....	73,921	—16,467	—210,294
Union R. R. of Penosylvania	31	.....	.....	4,077,366	668,402	1,196,472	1,283	1,856,353	51,582	3,774,092	303,274	57,223	99,500	260,997	—1,011,062
Vicksburg, Shreveport & Pacific	171	1,043,678	577,975	1,776,777	292,025	352,086	42,930	621,904	64,472	1,373,417	403,360	—2,483	83,861	317,016	—6,344
Virginian	503	5,790,645	384,884	6,340,079	846,211	1,004,113	62,260	1,481,339	136,297	3,533,220	2,806,859	82,871	257,195	2,632,535	304,951
Washington Southern	36	467,091	507,773	1,297,291	174,102	168,639	15,996	530,994	37,635	927,366	369,925	—5,203	43,962	320,760	57,585
Yazoo & Mississippi Valley	1,372	8,827,297	2,890,791	12,535,499	1,762,776	1,763,276	188,567	4,642,306	331,773	8,688,698	3,846,801	—1,528	583,771	3,261,501	1,350,214

year the average density is 6.304, as compared with 11.99 last summer. While the latest average is larger than that shown in the autumn of 1913 (5.79), it must be remembered that usually a great deal more smoke will be shown in the warm weather than in cold.

Out of seven reports this is the sixth in which the Chicago, Burlington & Quincy has maintained first place. The Burlington certainly is to be congratulated on the success it has attained, especially when it is considered that this road has a very large number of locomotives operating in the city. J. H. Lewis is chief inspector for the Burlington and also chairman of the Railroad Smoke Inspectors' Association, which reports to the General Managers' Association.

The roads in Chicago maintain 50 smoke inspectors, at a cost of about $65,000 per year in salaries, to keep locomotive smoke to a minimum. That this expenditure is warranted is shown by the smoke returns for the summer of 1914, as follows:

Railroad	Density, Summer, 1914	Density, Summer, 1913	Standing, Summer, 1913	Density, Autumn, 1913	Standing, Autumn, 1913
1—C. B. & Q.....	1.63	7.74	5	1.64	1
2—Santa Fe	3.04	4.73	1	2.45	3
3—Northwestern ...	3.25	7.65	4	2.25	2
4—Lake Shore	3.75	9.49	6	2.76	4
5—Soo Line	3.94	10.86	7	13.54	27
6—C. G. W.....	4.3	13.37	12	3.99	6
7—Mich. Cent.	4.39	12.23	11	6.32	13
8—Grand Trunk ...	4.68	16.62	23	4.89	9
9—St. Paul	4.81	11.75	8	3.64	5
10—Pennsylvania	5.15	16.58	22	7.89	22
11—C. & W. I.....	5.32	17.1	25	6.61	15
12—C. & O.....	5.5	14.78	17	4.	8
13—Illinois Cent.	5.5	7.43	3	3.99	7
14—B. & O. C. T....	6.14	12.14	10	7.23	21
15—N. Y. C. & St. L.	7.11	11.9	9	6.42	14
16—Rock Island	7.24	14.66	15	5.16	10
17—C. & E. I.....	7.87	14.73	16	6.92	17
18—C. I. & S.....	8.66	15.12	19	5.29	11
19—Wabash	9.81	14.12	14	7.19	19
20—C. & A.....	11.31	16.56	21	6.84	16
21—Ill. Northern	11.54	6.31	2	6.03	12
22—Pere Marquette..	12.04	18.8	28	7.19	20
23—B. & O.....	12.12	13.4	13	12.41	25
24—Monon	12.21	15.63	20	7.15	18
25—Belt	12.26	18.06	26	9.27	23
26—E. J. & E.....	12.77	18.45	27	11.91	24
27—Erie	15.71	20.51	29	12.57	26
28—C. Junction	18.1	17.01	24	19.29	28
29—Pullman	26.49	Not listed		48.42	31
30—C. R. & I.....	35.	14.94	18	41.46	30
31—C. Short Line....	45.45	29.23	32	34.	29

New York Central Lines and Officials Indicted

The federal grand jury at Chicago on July 31, returned three indictments before United States Judge Geiger, against the Lake Shore & Michigan Southern; the Cleveland, Cincinnati, Chicago & St. Louis, and the Chicago, Indiana & Southern railways; the O'Gara Coal Company of Chicago; William C. Brown, former president of the New York Central Lines; John Carstensen, vice-president of the New York Central Lines; R. M. Huddleston, general auditor, New York Central Lines; Thomas J. O'Gara, former president of the O'Gara Coal Company, and William A. Brewerton, secretary of the O'Gara Coal Company. The indictments are based on evidence gathered by the Interstate Commerce Commission in connection with its investigation of the relations between railways and coal companies in Illinois, on which the commission recently made a report to Congress, which was abstracted in the *Railway Age Gazette* of July 24, page 185.

The indictments charged conspiracy to violate the Interstate Commerce law and the Elkins act by giving and accepting rebates on coal shipments, and participating in the financing of the coal company. The railroads and the coal company were also indicted over a year ago for rebating. The first indictment charges discriminations in favor of the O'Gara Coal Company, in that extensions of time were granted by the railroads in which to pay freight bills. The second indictment charges violation of the Elkins act in the granting of discriminations by the extension of credit for the payment of freight bills. This indictment includes 50 counts, charging that the railroads accepted a less, or different, compensation for freight charges than the public tariffs on coal shipments. It also includes 49 counts, charging acceptance of coal in payment of freight bills, and 50 counts, charging discrimination in favor of the O'Gara company in connection with the buying of fuel coal and the method of payment. This indictment also charges the railway officials with loaning the O'Gara company $500,000 in cash. The third indictment charges 112 separate violations of the Elkins act, and is directed against the coal company, O'Gara and Brewerton, who are charged with accepting concessions and rebates.

MEETINGS AND CONVENTIONS

The following list gives names of secretaries, dates of next or regular meetings, and places of meeting.

Air Brake Association.—F. M. Nellis, 53 State St., Boston, Mass. Next convention, May 4-7, 1915, Hotel Sherman, Chicago.

American Association of Demurrage Officers.—A. G. Thomason, Boston, Mass.

American Association of Dining Car Superintendents.—H. C. Boardman, D. L. & W., Hoboken, N. J. Next convention, October, Washington.

American Association of General Passenger and Ticket Agents.—W. C. Hope, 143 Liberty St., New York.

American Association of Freight Agents.—R. O. Wells, I. C. R. R., East St. Louis, Ill.

American Association of Railroad Superintendents.—E. H. Harman, Room 101, Union Station, St. Louis, Mo. Next convention, August 20 and 21, New York.

American Electric Railway Association.—E. B. Burritt, 29 W. 39th St., New York. Annual convention, October 12-16, Atlantic City, N. J.

American Electric Railway Manufacturers' Association.—H. G. McConaughy, 165 Broadway, New York. Meetings with American Electric Railway Association.

American Railway Association.—W. F. Allen, 75 Church St., New York.

American Railway Bridge and Building Association.—C. A. Lichty, C. & N. W., Chicago. Next convention, October 20-22, 1914, Los Angeles, Cal.

American Railway Engineering Association.—E. H. Fritch, 900 S. Michigan Ave., Chicago. Next convention, March 16-18, 1915.

American Railway Master Mechanics' Association.—J. W. Taylor, Karpen Bldg., Chicago.

American Railway Tool Foremen's Association.—A. R. Davis, Central of Georgia, Macon, Ga.

American Society for Testing Materials.—Prof. E. Marburg, University of Pennsylvania, Philadelphia, Pa.

American Society of Civil Engineers.—Chas. W. Hunt, 220 West 57th St., New York; 1st and 3d Wednesday, except June, July and August, New York.

American Society of Engineering Contractors.—J. R. Wemlinger, 11 Broadway, New York; 2d Thursday of each month, at 2 P. M., 11 Broadway, New York.

American Society of Mechanical Engineers.—Calvin W. Rice, 29 W. 39th St., New York.

American Wood Preservers' Association.—F. J. Angier, B. & O., Baltimore, Md. Next convention, January 19-21, 1915, Chicago.

Association of American Railway Accounting Officers.—E. R. Woodson, 1300 Pennsylvania Ave., Washington, D. C. Annual convention, April 28, 1915, Atlanta, Ga.

Association of Railway Claim Agents.—C. W. Egan, B. & O., Baltimore, Md.

Association of Railway Electrical Engineers.—Jos. A. Andreucetti, C. & N. W. Ry., Chicago. Annual convention, October 19-23, Chicago.

Association of Railway Telegraph Superintendents.—P. W. Drew, 112 West Adams St., Chicago.

Association of Transportation and Car Accounting Officers.—G. P. Conard, 75 Church St., New York.

Association of Water Line Accounting Officers.—W. R. Evans, Chamber of Commerce, Buffalo, N. Y.

Bridge and Building Supply Men's Association.—L. D. Mitchell, Detroit Graphite Co., Chicago, Ill. Meeting with American Railway Bridge and Building Association.

Canadian Railway Club.—James Powell, Grand Trunk Ry., Montreal, Que.; 2d Tuesday in month, except June, July and August, Windsor Hotel, Montreal.

Canadian Society of Civil Engineers.—Clement H. McLeod, 176 Mansfield St., Montreal, Que.; 1st Thursday, October, November, December, February, March and April, Montreal.

Car Foremen's Association of Chicago.—Aaron Kline, 841 Lawler Ave., Chicago; 2d Monday in month, except July and August, Lytton Bldg., Chicago.

Central Railway Club.—H. D. Vought, 95 Liberty St., New York; 2d Friday in January, May, September and November and 2d Thursday in March, Hotel Statler, Buffalo, N. Y.

Civil Engineers' Society of St. Paul.—Edw. J. Dugan, P. O. Box 654, St. Paul, Minn.; 2d Monday, except June, July, August and September, Old State Capitol Bldg., St. Paul.

Engineers' Society of Pennsylvania.—Edw. R. Dasher, Box 75, Harrisburg, Pa.; 1st Friday after 10th of each month, except July and August, 31 So. Front St., Harrisburg, Pa.

Engineers' Society of Western Pennsylvania.—Elmer K. Hiles, Oliver Bldg., Pittsburgh; 1st and 3d Tuesday, Pittsburgh, Pa.

Freight Claim Association.—Warren P. Taylor, Richmond, Va.

General Superintendents' Association of Chicago.—A. M. Hunter, 605 Grand Central Station, Chicago; Wednesday preceding 3d Thursday, Transportation Bldg., Chicago.

International Railway Congress.—Executive Committee, 11, rue de Louvain, Brussels, Belgium. Convention, 1915, Berlin.

International Railway Fuel Association.—C. G. Hall, 922 McCormick Bldg., Chicago.

International Railway General Foremen's Association.—Wm. Hall, 829 West Broadway, Winona, Minn.

International Railroad Master Blacksmiths' Association.—A. L. Woodworth, Lima, Ohio. Next convention, August 18-20, Hotel Wisconsin, Milwaukee, Wis.

Maintenance of Way & Master Painters' Association of the United States and Canada.—T. I. Goodwin, C. R. I. & P., Eldon, Mo. Next convention, November 17-19, 1914, Detroit, Mich.

Master Boiler Makers' Association.—Harry D. Vought, 95 Liberty St., New York.

Master Car Builders' Association.—J. W. Taylor, Karpen Bldg., Chicago.

Master Car & Locomotive Painters' Association of the United States and Canada.—A. P. Dane, B. & M., Reading, Mass. Next convention, September 8-11, Nashville, Tenn.

National Railway Appliances Association.—Bruce V. Crandall, 537 So. Dearborn St., Chicago. Next convention, March 15 to 19, 1915, Chicago.

New England Railroad Club.—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass.; 2d Tuesday in month, except June, July, August and September, Boston.

New York Railroad Club.—H. D. Vought, 95 Liberty St., New York; 3d Friday in month, except June, July and August, New York.

Niagara Frontier Car Men's Association.—E. Frankenberger, 623 Brisbane Bldg., Buffalo, N. Y. Meetings monthly.

Peoria Association of Railroad Officers.—M. W. Rotchford, Union Station, Peoria, Ill.; 2d Thursday in month, Jefferson Hotel, Peoria.

Railroad Club of Kansas City.—C. Manlove, 1008 Walnut St., Kansas City, Mo.; 3d Friday in month, Kansas City.

Railroad Master Tinners, Coppersmiths & Pipefitters' Association.—C. G. Thompson, C. & E. I., Danville, Ill.

Railway Business Association.—Frank W. Noxon, 30 Church St., New York.

Railway Club of Pittsburgh.—J. B. Anderson, Penna. R. R., Pittsburgh, Pa.; 4th Friday in month, except June, July and August, Pittsburgh.

Railway Development Association.—W. Nicholson, Kansas City Southern, Kansas City, Mo.

Railway Electrical Supply Manufacturers' Association.—J. Scribner, 1021 Monadnock Block, Chicago. Meetings with Association of Railway Electrical Engineers.

Railway Fire Protection Association.—C. B. Edwards, Mobile & Ohio, Mobile, Ala. Annual meeting, October 6, Washington, D. C.

Railway Gardening Association.—J. S. Butterfield, Lee's Summit, Mo.

Railway Signal Association.—C. C. Rosenberg, Bethlehem, Pa. Annual meeting, Bluff Point, N. Y., September 22-24.

Railway Storekeepers' Association.—J. P. Murphy, Box C, Collinwood, Ohio.

Railway Supply Manufacturers' Association.—J. D. Conway, 2136 Oliver Bldg., Pittsburgh, Pa. Meetings with M. C. B. and M. M. Associations.

Railway Telegraph & Telephone Appliance Association.—G. A. Nelson, 50 Church St., New York. Meetings with Association of Railway Telegraph Superintendents.

Richmond Railroad Club.—F. O. Robinson, C. & O., Richmond, Va.; 2d Monday in month, except June, July and August.

Roadmasters' and Maintenance of Way Association.—L. C. Ryan, C. & N. W., Sterling, Ill. Next convention, September 8-10, 1914, Chicago.

St. Louis Railway Club.—B. W. Frauenthal, Union Station, St. Louis, Mo.; 2d Friday in month, except June, July and August, St. Louis.

Salt Lake City Transportation Club.—R. E. Rowland, Hotel Utah Bldg., Salt Lake City, Utah; 1st Saturday of each month, Salt Lake City.

Signal Appliance Association.—F. W. Edmunds, 3868 Park Ave., New York. Meeting with annual convention Railway Signal Association.

Society of Railway Financial Officers.—Carl Nyquist, La Salle St. Station, Chicago. Annual meeting, September 15-17, Hotel Aspinwall, Lenox, Mass.

Southern Association of Car Service Officers.—E. W. Sandwich, A. & W. P. Ry., Atlanta, Ga.

Southern & Southwestern Railway Club.—A. J. Merrill, Grant Bldg., Atlanta, Ga.; 3d Thursday, January, March, May, July, September, November, 10 A. M., Candler Bldg., Atlanta.

Toledo Transportation Club.—J. S. Marks, Agent, Interstate Despatch, Toledo, Ohio; 1st Saturday in month, Boody House, Toledo.

Track Supply Association.—W. C. Kidd, Ramapo Iron Works, Hillsburn, N. Y. Meetings with Roadmasters' and Maintenance of Way Association.

Traffic Club of Chicago.—W. H. Wharton, La Salle Hotel, Chicago.

Traffic Club of New York.—C. A. Swope, 291 Broadway, New York; last Tuesday in month, except June, July and August, Waldorf-Astoria, New York.

Traffic Club of Pittsburgh.—D. L. Wells, Erie R. R., Pittsburgh, Pa.; meetings bimonthly, Pittsburgh. Annual meeting, 2d Monday in June.

Traffic Club of St. Louis.—A. F. Versen, Mercantile Library Bldg., St. Louis, Mo. Annual meeting in November. Noonday meetings October to May.

Train Despatchers' Association of America.—J. F. Mackie, 7122 Stewart Ave., Chicago.

Transportation Club of Buffalo.—J. M. Sells, Buffalo; first Saturday after first Wednesday.

Transportation Club of Detroit.—W. R. Hurley, Superintendent's office, L. S. & M. S., Detroit, Mich.; meetings monthly, Normandie Hotel, Detroit.

Traveling Engineers' Association.—W. O. Thompson, N. Y. C. & H. R., East Buffalo, N. Y. Next meeting, September 15-18, Hotel Sherman, Chicago.

Utah Society of Engineers.—Frank W. Moore, Newhouse Bldg., Salt Lake City, Utah; 3d Friday of each month, except July and August, Consolidated Music Hall, Salt Lake City.

Western Canada Railway Club.—W. H. Rosevear, P. O. Box 1707, Winnipeg, Man.; 2d Monday, except June, July and August, Winnipeg.

Western Railway Club.—J. W. Taylor, 1112 Karpen Bldg., Chicago; 3d Tuesday of each month, except June, July and August, Karpen Bldg., Chicago.

Western Society of Engineers.—J. H. Warder, 1735 Monadnock Block, Chicago; regular meeting 1st Monday in month, except January, July and August, Chicago. Extra meetings, except in July and August, generally on other Monday evenings.

Traffic News

Press despatches from Washington say that traffic officers of the road west of Chicago have had informal conferences with the Interstate Commerce Commission looking to the presentation of new freight tariffs providing for extensive increases in rates.

H. G. Wilson, who for the past seven years has been traffic commissioner of the Commercial Club of Kansas City, has resigned, and on September 1 will retire to become traffic commissioner of the traffic bureau of the Commerce Club of Toledo, Ohio, which has recently been organized.

The Missouri railroads have announced that they will make an application to the Missouri Public Service Commission within 90 days for a general increase in freight and passenger rates throughout the state. The roads have been gathering data in support of the application for several months.

The Chicago & North Western has given notice that from September 1 it will no longer absorb tunnel and lighterage charges in Chicago. This means the cancellation of tariffs with the Merchants' Lighterage Company, the Chicago Lighterage Company, and the Chicago Warehouse & Terminal Company.

An embargo on all grain shipments to Galveston, Tex., for export was issued last week by the Atchison, Topeka & Santa Fe and the Chicago, Rock Island & Pacific to their connecting roads on account of a shortage of steamers from the port of Galveston. The embargo was effective throughout the week, expiring Saturday night.

The Luckenbach Steamship Company announces sailings of its express freight steamers from New York to San Francisco through the Panama Canal. The first sailing from New York is on August 7, and the schedule is as follows: *New York*, August 7; *Cristobal*, August 16; *Balboa*, August 17; *East San Pedro*, August 27, and *San Francisco*, August 31.

The summer meeting of the National Industrial Traffic League is to be held at the Copley-Plaza hotel, Boston, Mass., on August 12-15. The program includes reports from the committees on Demurrage and Storage, Freight Claims, Transportation Instrumentalities, Weighing, Graduated Storage Charges, Handling L.C.L. Shipments at Transfer Points, Uniform Classification, Spotting Charges, the Legislative Committee, Classification Committee, Bill of Lading Committee, and Tariff Committee. An interesting entertainment program also has been arranged.

Key West-Havana Car Ferry Near Completion

Mr. Flagler's long-cherished dream of through cars to and from Cuba will soon be an accomplished fact. The oversea railroad of the Florida East Coast to Key West has been in successful operation for several years past, and by next January the final link of the through route to Havana, a gigantic car ferry, with a capacity of 30 freight cars, will be running between Key West and Havana. This car ferry is now under construction at Cramp's yard, Philadelphia, and will cost approximately $500,000. It will be 380 feet long and will have four tracks, the two inner tracks holding 8 cars each and the two outer tracks 7 each. The launching is expected to take place about the middle of September. The speed will be 15 knots an hour and the time between Key West and Havana will probably be about six hours. It is expected that arrangements will be made with the Cuban railways whereby cars can be run through to all points on the Island which are reached by standard gage lines.

Blockade of Export Freight

The Pennsylvania, the Baltimore & Ohio and the Norfolk & Western early this week issued notices that on account of the suspension of ocean traffic, because of the war in Europe freight to be exported from Atlantic ports could no longer be received. Merchandise in warehouses and grain in cars was already considerably congested at New York and the sudden stoppage of

ocean traffic was very quickly felt. As we go to press it is expected that an embargo on export freight will be announced by all of the railroads; but it is expected that on account of the probable great demand for grain in Europe the European governments will very soon take action looking to the restoration of the grain movement across the Atlantic.

Car Balance and Performance

Arthur Hale, chairman of the committee on relations between railroads, of the American Railway Association, in presenting statistical bulletin No. 174, covering car balances and performances for April, 1914, says:

The committee presents herewith statistical bulletin No. 174, covering car balance and performance for April, 1914.

The miles per car per day were 23.0, compared with 23.8 for March. The same figure for the month April, 1913, was 24.0.

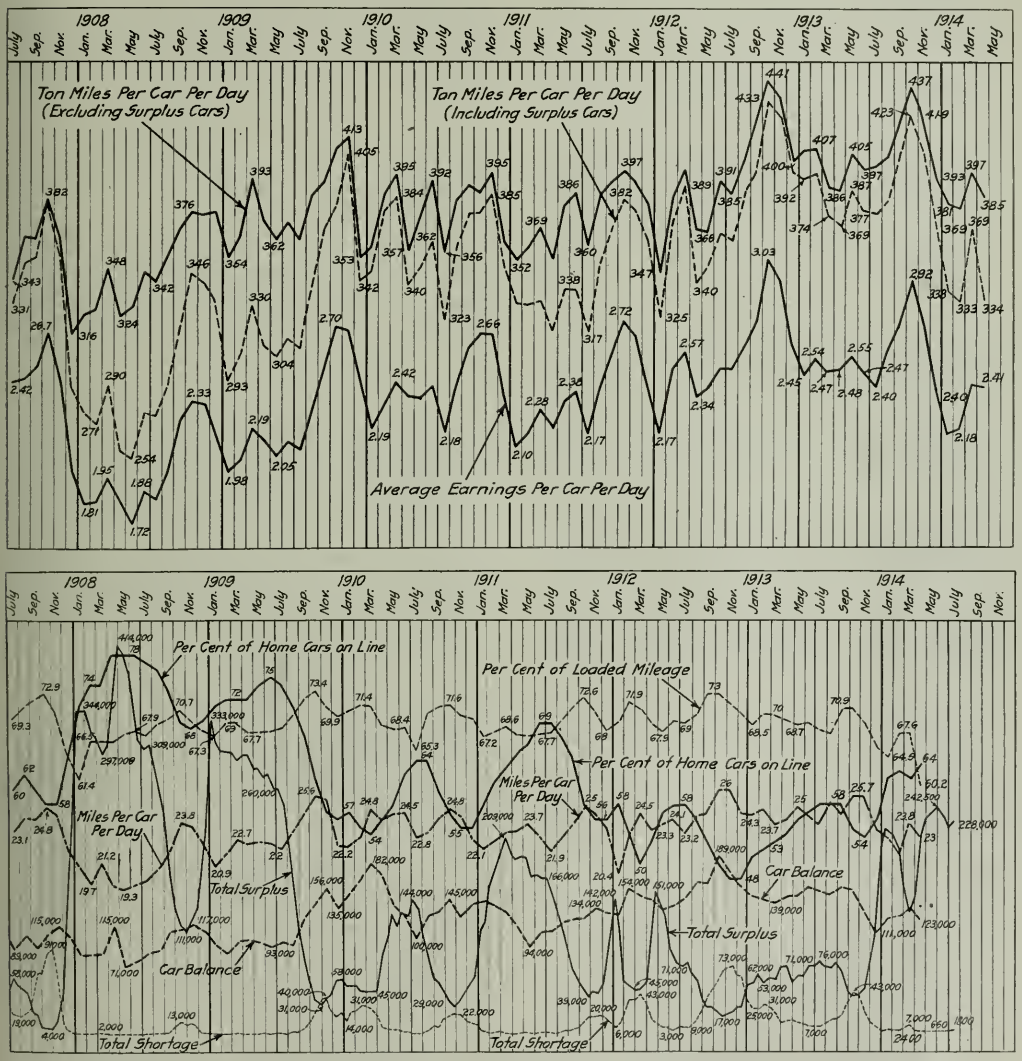
Ton miles per car per day for April were 334, compared with 369 for March. This is a decrease of 0.95 per cent. compared with the figure for April, 1913, which was 369.

The proportion of home cars on line was 64 per cent., compared with 62 per cent. in March. This is an increase of 10 points over April, 1913.

The per cent. of loaded car mileage decreased from 67.6 per cent. in March to 60.2 per cent. in April. This figure for April, 1913, was 69.4 per cent.

The average earnings per car per day decreased one cent to $2.41 in April. This figure for the month of April, 1913, was $2.48.

The table on the next page gives car balance and performance in the month covered by the report, and the diagram shows car earnings and car mileage and different car performance figures monthly from July 1907.



Freight Car Mileage, Earnings and Performance, 1907 to 1914

CAR BALANCE AND PERFORMANCE IN APRIL, 1914

	New England.	N. Y., N. J., Del., Md., Eastern Pa.	Ohio, Ind., Mich., Western Pa.	Va., W. Va., No. and So. Carolina.	Ky., Tenn., Miss., Ala., Ga., Fla.	Iowa, Ill., Wis., Minn.	Mont., Wyo., Neb., Dakotas.	Kan., Colo., Okla., Mo., Ark.	Texas, La., New Mex.	Ore., Idaho, Nev., Cal., Ariz.	Canadian Lines.	Grand Total.
Revenue freight cars owned	89,384	713,769	208,002	199,274	175,841	456,074	20,196	145,516	31,913	144,642	176,066	2,360,677
Average number of system cars on line	53,509	431,976	141,771	123,410	110,254	332,615	9,704	92,254	23,950	80,760	122,192	1,522,395
Railway-owned cars: Average foreign on line	44,453	259,201	91,193	73,900	55,400	107,426	9,975	45,428	17,804	35,809	36,419	777,008
Total railway-owned cars on line	97,962	691,177	232,964	197,310	165,654	440,041	19,679	137,682	41,754	116,569	158,611	2,299,403
Excess	8,578	*22,592	24,962	*1,964	*10,187	*16,033	*517	*7,834	9,841	*28,073	*17,455	*61,274
Per cent of cars on line to total owned:												
Home	60	61	68	62	63	73	48	63	75	56	69	64
Foreign	50	36	44	37	31	23	49	31	56	25	21	33
All railways	110	97	112	99	94	96	97	94	131	81	90	97
Private cars on line	3,784	30,583	9,076	5,664	9,757	14,390	1,916	7,492	5,726	9,749	2,524	100,661
Total, all cars on line	101,746	721,760	242,040	202,974	175,411	454,431	21,595	145,174	47,480	126,318	161,135	2,400,064
Per cent of cars in shop	7.89	7.91	11.82	8.91	9.79	6.11	6.16	10.28	7.31	7.07	5.45	8.14
No. of freight engines owned	1,446	11,100	3,118	3,520	2,878	7,381	502	2,922	853	2,935	2,619	39,274
Average cars on line per freight engine owned	70	65	78	58	61	62	43	50	56	39	62	61
Total freight-car mileage	72,772,750	480,927,947	132,179,058	155,047,871	131,198,552	301,223,708	25,567,048	96,191,262	35,794,152	121,652,610	104,665,816	1,657,220,774
Average miles per car per day	23.8	22.2	18.2	25.5	24.9	22.1	39.5	22.1	25.1	32.1	21.7	23.0
Per cent loaded mileage	63.2	46.2	55.9	61.8	66.6	68.2	71.8	65.8	64.4	69.0	74.1	60.2
Ton-miles of freight, including company freight	672,331,020	7,628,593,091	1,981,629,579	2,370,633,672	1,708,137,751	3,279,320,149	366,577,083	1,026,167,697	416,578,128	1,618,812,534	1,494,481,114	22,563,261,818
Average ton-miles, including company freight:												
Per car-mile	9.2	15.9	15.1	15.3	13.1	13.8	14.3	13.5	11.6	13.8	14.3	14.4
Per loaded car-mile	14.6	34.3	27.0	24.8	19.7	20.5	20.0	20.3	18.1	20.1	19.3	24.1
Per car per day	220	352	275	389	340	309	566	314	295	437	309	334
Gross freight earnings	$7,341,406	$46,735,315	$11,209,699	$14,035,915	$11,767,235	$30,144,951	$2,760,972	$17,273,218	$3,673,245	$17,424,051	$10,801,165	$173,167,172
Average daily earnings: Per car owned	$2.74	$2.17	$1.80	$2.35	$2.23	$2.20	$4.56	$3.89	$3.84	$4.02	$2.04	$2.44
Per railroad car on line	2.50	2.25	1.60	2.37	2.37	2.28	4.68	4.18	2.93	4.98	2.27	2.51
All cars on line	2.41	2.16	1.54	2.31	2.24	2.21	4.26	3.97	2.58	4.60	2.23	2.41

*Denotes deficiency.

Commission and Court News

INTERSTATE COMMERCE COMMISSION

The commission has given formal notice that it will make an investigation concerning the character of the service, physical condition of the equipment and property and financial history of the Cincinnati, Hamilton & Dayton.

The Interstate Commerce Commission has opened a branch office in St. Louis for inspectors and accountants working in the territory east of the western boundary of Colorado, north of the Gulf of Mexico and west of the eastern boundary of Tennessee.

The Sioux City Live Stock Exchange has filed a complaint with the Interstate Commerce Commission charging that Sioux City dealers are being discriminated against in favor of South St. Paul on shipments of cattle from North and South Dakota and Montana points.

Examiner Edgar Watkins began a hearing at Sioux Falls, S. D., on July 29, on proposed advances of two cents per hundred pounds on cattle and one cent per hundred pounds on sheep, from producing points to points on the Mississippi and Missouri rivers. A large number of representatives of various live stock exchanges and cattlemen's associations west of the Mississippi river appeared as witnesses to protest against the advance, which has been suspended by the commission.

Rates on Sectional Bookcases

Globe-Wernicke Company v. Baltimore & Ohio et al. Opinion by Commissioner Clements:

The commission finds that the present rating in the official classification of one and one-half times first class on sectional bookcases is not unreasonable nor discriminatory, and dismisses the complaint. (31 I. C. C., 274.)

Rates on Dust Collecting Systems

Dixie Manufacturing Company, Inc., v. Baltimore, Chesapeake & Atlantic et al. Opinion by the commission:

The commission finds that the official classification ratings on dust collector or arrester outfits is not unreasonable. Complaint dismissed. (31 I. C. C., 337.)

Rates on Box Shooks from Leavenworth, Wash.

Lamb-Davis Lumber Company v. Great Northern et al. Opinion by the commission:

The commission finds unreasonable a rate of 60 cents per 100 lb. on pine box shooks in carloads from Leavenworth, Wash., to Paonia, Hotchkiss and Austin, Col. A rate of 46 cents is prescribed for the future and reparation is awarded on that basis. (31 I. C. C., 341.)

Packing House Products from Iowa Points

Opinion by Commissioner Harlan:

The commission finds that the carriers have justified a proposed increase from 15 cents to 18½ cents in the rate on packing house products from Cedar Rapids and other points in Iowa to St. Paul and Minneapolis. The proposed rates are not unreasonable, while on the other hand they eliminate certain inconsistencies in the present rate structure. (31 I. C. C., 309.)

Cement Rates from Evansville, Pa., to Jersey City

Allentown Portland Cement Company v. Philadelphia & Reading et al. Opinion by Commissioner Clements:

The commission reaffirms its finding in the original report (27 I. C. C., 447) to the effect that defendants in maintaining or participating in rates on cement in carloads to eastern destinations, such as Baltimore, Philadelphia, New York and New England points, which are not higher from Evansville than the rates which they contemporaneously maintain to other mills in the Lehigh district, while refusing to participate in the same

relative adjustment from Evansville to Jersey City, thereby subjects Jersey City and its traffic to undue prejudice. (31 I. C. C., 277.)

Lumber Rates from Lake Charles and West Lake, La.

Opinion by Commissioner Daniels:

The commission finds that the carriers have justified a proposed increase in the rates on lumber from Lake Charles and West Lake, La., to Palacios, Port Lavaca, Aransas Pass, Portland, Rock Port and Corpus Christi, Tex. The present rate of 13¾ cents, originally made to meet water competition, is held to be hardly a reasonable charge for the service performed. Compared with the rates established by the carriers or the Texas commission's basis for lumber rates in this territory, it is abnormally low and beyond Houston the service is a branch line service performed in a country where the traffic is thin. (31 I. C. C., 258.)

Rates to Wichita, Kan.

Wichita Business Association v. Clinton & Oklahoma Western et al Opinion by the commission:

The commission finds that the class rates from Wichita, Kan., to a number of points in Oklahoma on the Clinton & Oklahoma Western are unreasonable to the extent that they exceed the so-called Kansas-Oklahoma one-line distance rates by more than certain prescribed differentials ranging from 8 cents per 100 lb. on class 1 to 2 cents on class E. Commodity rates on grain, feed and broom corn between Wichita, Kan., and points on the Clinton & Oklahoma Western are likewise found to be unreasonable and reasonable rates are prescribed. (31 I. C. C., 323.)

Rates on Coal to Beatrice, Neb.

Beatrice Commerce Club v. Chicago, Burlington & Quincy, et al. Opinion by the commission:

The commission finds that the rate on hard coal from Milwaukee, Wis., and Chicago and East St. Louis, Ill., the rates on soft coal from Chicago and Peoria, Ill., and the southern Illinois coal fields and those on coal from fields in Ohio, northern Missouri, southwestern Missouri, southeastern Kansas, northwestern Arkansas to Beatrice, Neb., are not unreasonable or prejudicial as compared with the lower rates to Lincoln, Neb., to which points Beatrice is intermediate via certain routes. The complaint is therefore dismissed and the carriers are relieved from the operation of the long and short haul rule of the fourth section in so far as the rates to Lincoln via routes through Beatrice are concerned. (31 I. C. C., 173.)

Switching at Galesburg, Ill.

Opinion by Commissioner Meyer:

Following the decision in *Buffalo, Rochester & Pittsburgh v. Pennsylvania Company* (29 I. C. C., 114), the commission finds that the Chicago, Burlington & Quincy in refusing to switch cars for the Rock Island Southern at Galesburg, Ill., as it does for the Atchison, Topeka & Santa Fe at that point, discriminates against the former road. It is therefore ordered that the Chicago, Burlington & Quincy remove this discrimination, either by terminating its present switching arrangement with the Santa Fe or by canceling a suspended tariff item proposing the elimination of the Rock Island Southern System from the switching arrangements at Galesburg. The commission does not find, however, that the so-called reciprocal switching charge of $2 is necessarily a just charge for the service demanded of the Burlington by the Rock Island Southern. (31 I. C. C., 294.)

Road Performing Switching Service Need Not Provide Cars

Wabash Sand & Gravel Company v. Vandalia et al. Opinion by the commission:

Complainant owning a sand and gravel pit on the Chicago, Terre Haute & Southeastern at Terre Haute, ships to points on the Vandalia, making use of a reciprocal switching arrangement between the two roads, but has difficulty in getting cars because in times of shortage both roads refuse to furnish them, each claiming that it is the duty of the other to do so. The commission finds that the Vandalia should supply the cars, it having in effect placed complainant's industry in the same position as industries on its own rails in providing for the absorption of the switching charge. The carrier should supply satisfactory cars, but in accordance with *Balfour, Guthrie & Co., v. O. W. R. R. & N.* (21 I. C. C., 539), if complainant is put to expense in cleaning or repairing equipment it cannot secure payment for such services. (31 I. C. C., 344.)

Joint Rates Between Rail and Water Lines

Decatur Navigation Company v. Louisville & Nashville et al. Opinion by Commissioner Daniels:

The complainant in this case requests that the commission direct the defendant to join in the publication of through routes and joint rates between certain Tennessee river landings and points on the line of defendants and its rail connections. Such through routes and joint rates are now published by defendant for shipment via the line of complainant's water competitor, the Tennessee River Navigation Company, but defendant has refused to grant the same privileges to complainant. The commission finds that a navigable river being a public highway, a responsible common carrier operating thereon is prima facie warranted in requesting the commission to require rail carrier, such as the defendant, to join in establishing through routes and joint rates between landings on the river and points on the rail carrier's lines. The refusal of the defendant to join in establishing such through routes from landings on the Tennessee river between Chattanooga and lock No. 6 is found to be unlawful and the defendants are required to join in the establishing of the requested through rates. (31 I. C. C., 281.)

Lumber Rates from Oregon and Washington to Eastern Points

Opinion by Commissioner Harlan:

The commission held in its original findings in this case that the Union Pacific might lawfully close the Wallula gateways for eastbound shipments of wool, but that it must continue the through routes applied to the lumber traffic moving from mills on other lines through the Silver Bow, Spokane and Butte gateways to the east over Union Pacific; and also the through routes by way of the Colorado gateway, through which rates are applied in connection with the other prairie lines on all traffic moving between points in Oregon and Washington on the one hand and the Missouri River and points east thereof on the other. On the ground that this ruling would have the effect of denying to the lines of the Union Pacific System the long haul on the traffic involved and because the connections that would ordinarily be entitled to the long haul as originating lines on westbound traffic had made no objection to this cancellation of gateways, the commission now rules that the through routes by way of the Colorado gateways may be cancelled, provided they are left open for the transportation of fruit and lumber, the shippers of which appear to be the only ones whose interests may be prejudiced. (31 I. C. C., 131.)

Lumber Rates from Southern Railway Points to Eastern Points

Opinion by Commissioner Harlan:

The tariffs involved in this investigation contain both increases and reductions in the rates on lumber from points on the Southern in North Carolina, South Carolina and Tennessee to (a) eastern port cities, (b) interior eastern points in Maryland, Pennsylvania, New York, Delaware, New Jersey and the New England States, (c) the Virginia cities and (d) Norfolk when for export. The territory of origin includes substantially the whole of the lumber producing district of western North Carolina, served by the Southern, and a considerable portion of western South Carolina and eastern Tennessee, a section largely given over to the production of lumber of the same general character and selling in the same market. The reason advanced for revising the lumber rates is to correct what were believed to be indefensible discrepancies in the present rates from the various sections of this producing territory. It was not the intention of the defendant to increase its rates for the purpose of obtaining larger revenues, but it appears that the advances are much more numerous than the reductions, the ratio being approximately 2½ to 1. There also appear to be a number of inaccuracies and other discrepancies. The commission is of the opinion that the Southern Railway has attempted to make a revision of its lumber rates along lines that are desirable and in the general public interest, but that the revision has serious defects. The revision attempted to establish different rates on the different grades of lumber based on value; the commission does not believe that this is justified. It therefore holds that the increased rates proposed have not been justified and it is

ordered that the tariffs under consideration be cancelled but without prejudice to the Southern Railway to present another plan of revision. (31 I. C. C., 244.)

Commodity Rates on Groceries, etc., from Western Points to Nashville

T. Cheek & Sons et al. v. Canadian Pacific et al. Opinion by Commissioner Hall:

The commission finds that the rates on canned salmon, canned goods, citrus and deciduous fruits, dried fruits and other like products from California terminals and from interior points in Arizona, California, Nevada, New Mexico, Oregon and Utah, and also points in British Columbia, Idaho, Montana, Oregon and Washington to Nashville are discriminatory as compared with the rates on the same commodities to Humboldt, Jackson, Milan, Memphis, Martin, Union City and Rives, Tenn.; Birmingham and Tuscaloosa, Ala.; Columbus, Paducah, Hopkinsville, Louisville, Lexington, Owensboro, Henderson, Elizabethtown and Princeton, Ky., and Evansville, Ind.; Cairo, Ill., and Cincinnati, Ohio. The rates to these specified points are those which apply alike to Missouri river and common points to Cincinnati and Detroit and common points and thence east to New York and common points. The rates to Nashville, however, are made by taking the rates to the Ohio or Mississippi crossing point, via which the transcontinental lines choose to make the through rate and adding thereto whatever local or proportional the southeastern lines accept as their division of the through rate. The complainants were compelled to present their complaint principally by the extension of the Cincinnati-Detroit basis to Birmingham and Tuscaloosa, but it happens that the Louisville & Nashville and the Nashville, Chattanooga & St. Louis did not concur in that extension and have since announced their intention of canceling their participation in the Cincinnati-Detroit basis to Paducah, Jackson, Humboldt, Milan, Hopkinsville and Elizabethtown, although in a former case it was held that the application of this basis to these cities did not constitute discrimination against Nashville by these two carriers.

It is also held, however, that the present rates to Nashville are unreasonable. The southeastern carriers have offered to accept as a fair division south or east of the river crossings out of the through rates to Nashville, certain so-called unpublished proportions which were named from Henderson, Ky., and Hickman, Ky., and which may be denominated as unavailable combination rates to Nashville. It is therefore held that the carload rates to Nashville upon the commodities involved should not exceed the lowest rates that can now be constructed, whether as published through rates, published combination rates or unavailable combination rates. It is found that certain published through rates were unreasonable to the extent that they exceeded published combination rates which were also available, and reparation is awarded to the extent of such excess. (31 I. C. C., 265.)

STATE COMMISSIONS

The Minnesota Railroad and Warehouse Commission has issued rules for the construction of joint rates on intrastate freight shipments, in accordance with the Cashman distance tariff law, which goes into effect on August 10.

The Oklahoma Corporation Commission in its annual report, urges legislation to give the commission power to regulate stock and bond issues for all public utilities whose property is wholly within the state. In case Congress fails to pass a law for the regulation of securities of interstate carriers, it recommends that Oklahoma pass a law similar to those of several other states.

The Illinois Railroad and Warehouse Commission has issued an order requiring storage warehouse companies, including cold-storage warehouses, to file schedules of their charges with the commission, holding that they are public utilities.

The Illinois Public Utilities Commission held a hearing in Chicago on July 28 on complaints of Elgin shippers that the express rates between Elgin and Chicago are so high as to be discriminatory in favor of the rates between Aurora and Chicago. Both cities are 37 miles from Chicago, and the difference in their rates arises from the location of the boundaries of the rate zones in eastern territory.

Railway Officers

Executive, Financial, Legal and Accounting

E. C. Deal has been appointed vice-president and chief engineer of the Carolina & Yadkin River, with headquarters at Greensboro, N. C., succeeding J. P. Clark, resigned.

E. A. Bynum, assistant general freight agent of the Mobile & Ohio, with headquarters at New Orleans, La., has been elected vice-president and general manager of the Texas City Terminal Company, of Texas City, Texas.

The following appointments are announced on the Texas & Pacific: A. J. Biard, assistant auditor; G. W. Danner, auditor of disbursements; D. W. Beddo, auditor of freight receipts; F. E. Stanberry, auditor of passenger receipts; A. A. Martin, freight claim agent; all with headquarters at Dallas, Tex.

President E. J. Chamberlin of the Grand Trunk and Grand Trunk Pacific, announces that owing to the death of M. M. Reynolds, vice-president in charge of finance and accounting, that position has been abolished. Frank Scott, treasurer, at Montreal, Que., has been appointed vice-president and treasurer in charge of all financial matters, and W. H. Ardley, general auditor at Montreal, has been appointed controller in charge of all accounting.

William R. Campbell, whose election as vice-president of the Susquehanna & New York, with headquarters at New York, has already been announced in these columns, was born on January 23, 1855, at Louisville, Ky., and was educated in the public schools of his native town. His first railway work was with the Chesapeake & Ohio Southwestern, now a part of the Illinois Central, in 1885. He was appointed assistant to the president of the Susquehanna & New York on January 13, 1908, and at the time of his recent election as vice-president of the same road, was also assistant to president of the Tionesta Valley and the Leetonia Railway. In 1889 Mr. Campbell went to the Louisville Board of Trade as secretary of the Transportation Committee, and since 1893, he has been in the service of the United States Leather Company and affiliated companies, first as freight and claim agent and then as traffic manager.

W. R. Campbell

Operating

The headquarters of John F. Tracy, trainmaster of the Northern Pacific, are at White Bear, Minn., instead of Minneapolis, as stated in our issue of July 31.

The Canadian Pacific announces that the following appointments have been made on the Alberta division, effective August 1: J. M. MacArthur, terminal trainmaster, with headquarters at Calgary, Alta.; R. Sinclair, trainmaster at Field, B. C.; C. E. Mansfield, chief train despatcher at Calgary, and W. E. Cline, chief train despatcher at Cranbrook, B. C.

D. Crombie has been appointed superintendent of transportation of the Canadian Northern, Eastern lines, with jurisdiction over transportation matters, with headquarters at Toronto, Ont. G. A. Hoag has been appointed superintendent of car service, and H. H. Smith, car service agent of the Canadian Northern Quebec, at Montreal, Que., has been appointed car accountant of the Cana-

dian Northern, Eastern lines, with jurisdiction over all lines east of Port Arthur, Ont., with headquarters at Toronto.

The Alberta division of the Canadian Pacific will in the future be operated in five districts, as follows: District 1 includes Medicine Hat, Calgary, Empress, Bassano, Suffield, Langdon, Irricana and Gleichen subdivisions, J. M. Cameron, superintendent, with headquarters at Medicine Hat, Alta. District 2 includes Lethbridge (including Dunmore terminal), Crow's Nest, Aldersyde, Macleod, Coutts, Cardston, Woolford and Foremost subdivisions, F. Walker, superintendent, with headquarters at Lethbridge. District 3 includes Calgary Terminals, Laggan and Red Deer subdivisions, P. F. Weisbrod, superintendent, with headquarters at Calgary. District 4 includes Edmonton (including Red Deer terminal), Hardisty, Lacombe, Coronation and Alberta Central subdivisions, J. A. MacGregor, superintendent, with headquarters at Edmonton. District 5 includes Cranbrook (including Crow's Nest terminal), Sirdar, Kingsgate, Kimberly, Waldo and Fort Steele subdivisions, A. C. Harshaw, superintendent, with headquarters at Cranbrook, B. C.

Rutledge Smith, general agent for the receivers of the Tennessee Central, whose appointment as superintendent, also, has been announced in these columns, was born on August 1, 1870, at Cookeville, Tenn., and was educated in the public schools at that place. He also received a training for civil engineer, and for a time was engaged in field work as a transitman. In 1887 he established the Cookeville *Press*, and has been owner and publisher of it ever since. Since 1901 also he has been manager of the Southern Press Association, and since 1897 chairman of the Tennessee Press Association. Mr. Smith was also assistant of public instruction of Tennessee from 1900 to 1906. In the latter year he became the cashier of the People's Bank at Cookeville, and one year later was appointed its president. He first entered railway service on March 6, 1911, when he was chosen industrial agent of the Tennessee Central. On March 1, 1913, he was appointed general agent for the receivers, and on July 1, 1914, was also appointed superintendent as above noted.

R. Smith

A. J. Hills, superintendent of the Canadian Northern Ontario, at Toronto, Ont., has been appointed general superintendent of the Ontario Grand division of the Canadian Northern, Eastern lines, with jurisdiction over the transportation, the maintenance of way and the mechanical departments, with headquarters at Toronto, Ont. The Ontario Grand division includes the Canadian Northern Ontario, the Central Ontario, the Bay of Quinte, the Irondale, Bancroft & Ottawa and the Brockville, Westport & North Western railways. George Collins, general manager of the Central Ontario and the Irondale, Bancroft & Ottawa, at Trenton, Ont., has been appointed superintendent of the Ottawa division, with headquarters at Trenton, and W. J. Curle, superintendent of the Brockville, Westport & North Western, at Brockville, has been appointed superintendent of the Toronto division of the Canadian Northern, with office at Toronto, both have jurisdiction over the transportation, the mechanical and the maintenance of way departments. R. S. Derbyshire has been appointed assistant superintendent of the Ottawa division, with office at Trenton. H. B. Sherwood, superintendent of the Bay of Quinte, at Napanee, Ont., has been appointed superintendent of the Ottawa division, with headquarters at Napanee. S. J. Kitchen has been appointed trainmaster, with office at Trenton. W. R. Kelly, trainmaster of the Canadian Northern Ontario, at Toronto, has been appointed assistant superintendent of the Toronto division of the Canadian Northern, with headquarters at Toronto, and P. H. Fox has been appointed chief despatcher, with office at Toronto.

Everett E. Cain, whose appointment as superintendent of the Chicago-Petosky division of the Pere Marquette, with headquarters at Grand Rapids, Mich., has been announced in these columns, was born February 14, 1867, at Dublin, Ind. He received a high school education and began railway work with the Wabash in 1887 as a telegraph operator, and from that year until 1903 was at different times operator for the Missouri Pacific, the St. Louis Southwestern and the Denver & Rio Grande. He then went with the St. Louis, Iron Mountain & Southern as a brakeman, and was promoted to train despatcher at Van Buren, Ark., in 1896. He was transferred to Little Rock, Ark., as chief despatcher in 1900, where he remained for a year. He was then out of service for two years, and in March, 1903, became chief clerk to the superintendent of transportation of the Missouri Pacific-Iron Mountain system. In December, 1904 he was appointed trainmaster on the Pere Marquette, with office at Detroit, Mich. In December, 1910, he went to the Cincinnati, Hamilton & Dayton as superintendent at Wellston, Ohio. He remained with that company until June 1, 1912, when he was appointed superintendent of the Toledo-Ludington division of the Pere Marquette, with headquarters at Saginaw. On July 1, 1914, he was transferred to Grand Rapids as superintendent of the Chicago-Petosky division, as above noted.

Traffic

C. R. Moffett has been appointed commercial agent of the Tennessee Central, with office at Knoxville, Tenn., vice A. P. Cooper, resigned to engage in other business.

C. A. Lahey, chief of the tariff bureau of the Chicago, Milwaukee & St. Paul, has been appointed assistant to the freight traffic manager, with headquarters at Chicago, and C. A. Butler succeeds Mr. Lahey.

John S. Brown, general freight agent of the northern and western lines of the Illinois Central, has been appointed manager of the transportation department of the Chicago Board of Trade, succeeding E. B. Boyd, resigned.

C. A. Morse, district freight agent of the Canadian Pacific at Fort William, Ont., has been appointed district freight agent, with office at London, succeeding H. A. Plow, promoted, and the position of H. C. McMullen, general live stock agent, with office at Calgary, Alta., has been abolished.

Engineering and Rolling Stock

Melvin S. Montgomery has been appointed road foreman of engines of the Northern Pacific at Staples, Minn.

P. A. Bliss, signal supervisor of the Tucson division of the Southern Pacific at Tucson, Ariz., has been transferred to the Salt Lake division. C. A. Veale succeeds Mr. Bliss.

The Canadian Pacific announces that the following appointments have been made on the Alberta division, effective August 1: W. J. Rennix, district master mechanic, with headquarters at Calgary, Alta.; G. Glasford, district master mechanic at Cranbrook, B. C.; R. C. Harris, resident engineer at Calgary; D. McTaggart, bridge and building master at Calgary, and T. J. Brown, resident engineer and bridge and building master, at Cranbrook.

T. R. McLeod, master mechanic of the Canadian Northern Ontario and the Bay of Quinte, at Toronto, Ont., has been appointed division master mechanic of the Ontario Grand division of the Canadian Northern, Eastern lines, with headquarters at Toronto; R. A. Miller has been appointed general foreman, and W. C. Moore has been appointed road foreman of engines of the Ottawa division, both with headquarters at Trenton, and J. W. Findlay has been appointed general foreman of the Toronto division, with headquarters at Parry Sound.

R. A. Baldwin has been appointed engineer maintenance of way of the Ontario Grand division of the Canadian Northern, Eastern lines, with headquarters at Toronto, Ont. J. D. Evans, chief engineer of the Central Ontario, at Trenton, has been appointed division engineer of the Ottawa division of the Canadian Northern. E. Myers, roadmaster of the Canadian Northern Ontario at Toronto, has been appointed roadmaster of the

Ottawa division of the Canadian Northern, and the following supervisors of track have been appointed: W. Walsh and D. McDonald, both with headquarters at Trenton, and O. Ogden, with headquarters at Ottawa, on the Ottawa division; E. Haystead, with headquarters at Toronto, and G. M. Elliott, with headquarters at Parry Sound on the Toronto division; W. H. See has been appointed supervisor of bridges and buildings at Toronto. See an item under Operating Officers.

Purchasing

L. C. Thomson, storekeeper of the Canadian Northern Ontario, at Toronto, Ont., has been appointed division storekeeper of the Ontario Grand division of the Canadian Northern, Eastern lines, with headquarters at Toronto.

OBITUARY

J. B. Sheldon, superintendent of telegraph of the Union Pacific, with office at Omaha, Neb., died at his home in that city on July 29, at the age of 53 years. Mr. Sheldon had been in the service of the company for 32 years and had held the position of superintendent of telegraph since 1888.

Robert Moran, master mechanic of the Louisville & Nashville, with office at Nashville, Tenn., was drowned while bathing at Santa Rosa Island, Fla., on July 31. He was born on February 10, 1857, at Wilmington, Del., and began railway work in November, 1870, as an apprentice in the machine shops of the Edgefield & Kentucky, at Edgefield, Tenn., and since that time he has been in the continuous service of its successor, the Louisville & Nashville and lines now forming part of that road. In December, 1890, he was appointed master mechanic at Bowling Green, Ky., and since February, 1900, was master mechanic at Nashville, Tenn.

William Barstow Strong, formerly from 1880 to 1889 president of the Atchison, Topeka & Santa Fe, died at Los Angeles, Cal., on August 3. He was born at Brownington, Orleans county, Vt., on May 16, 1837, and graduated from Bell's Business College, Chicago, in 1855. He began railway work as station agent and telegraph operator in March of the same year at Milton, Wis., and was later station agent at White Water and at Monroe, and then general western agent of the Southwestern division of the Chicago, Milwaukee & St. Paul at Janesville, Wis. From 1865 to 1867, he was assistant superintendent of the McGregor & Western, now a part of the Chicago, Milwaukee & St. Paul. He was then to 1870 general western agent of the Chicago & North Western, and from 1870, to 1872, was assistant general superintendent of the Chicago, Burlington & Quincy at Burlington, Iowa. In 1872 he was appointed assistant general superintendent of the consolidated Burlington & Missouri River and the Chicago, Burlington & Quincy at Chicago, and in 1874 became general superintendent of the Michigan Central at Chicago. The following year he was appointed general superintendent of the C. B. & Q., and from 1877 to 1880 was vice-president and general manager of the Atchison, Topeka & Santa Fe at Topeka, Kan. He was then president of the same road, with headquarters at Boston, Mass., until 1889, at which time he retired from active service.

Passenger Traffic in Greater Berlin.—An official report which has recently been published shows that in the calendar year 1913 there were 732,800,000 passengers carried by the street car lines and the combination subway and elevated system of Greater Berlin, as compared with 707,000,000 in 1912. Of these 732,800,000, 80,800,000 were carried on the elevated and subway lines. Of those transported on the surface lines 566,400,000 were handled by the Greater Berlin Street Railway Company and allied companies. The Berlin municipal street car line handled 26,900,000. The omnibus lines, both horse and motor, carried 170,400,000 as compared with 161,900,000 in 1912, and the elevated steam "city" and "belt" lines operated by the Prussian Railway Administration, 263,800,000, an increase over the 238,400,000 of the preceding year. The suburban trains of the railway administration carried in addition 131,800,000 persons as compared with 149,500,000 persons in 1912. Leaving the last out of consideration, the total movement of passengers in 1913 may be put at 1,167,000,000. The total population of the community served is about 4,000,000 people.

Equipment and Supplies

LOCOMOTIVE BUILDING

The Gould Southwestern has ordered one Mogul type locomotive from the Baldwin Locomotive Works.

The Grand Rapids & Northwestern has ordered a number of locomotives from the Baldwin Locomotive Works.

The Midland Pennsylvania has ordered one eight-wheel locomotive from the Baldwin Locomotive Works.

The Georgia Railroad is reported to be in the market for 8 Mikado type locomotives. This item has not been confirmed.

The Scott Lumber Company, Bennettsville, S. C., has ordered one Columbia type locomotive from the Baldwin Locomotive Works.

The Cleveland, Cincinnati, Chicago & St. Louis is said to be preparing plans for the purchase of 5 Pacific type locomotives. This item has not been confirmed.

The Atlantic Coast Line.—An item in the *Railway Age Gazette* of July 24 to the effect that this company is in the market for a number of Mountain and Pacific type locomotives is denied.

The San Diego & Arizona has ordered one Consolidation freight locomotive from the American Locomotive Company. This locomotive will have 22 by 30 in. cylinders, 57 in. driving wheels, a total weight in working order of 212,000 lb. and a steam pressure of 200 lb.

CAR BUILDING

The Delaware, Lackawanna & Western has ordered 500 40-ton gondola cars from the Pressed Steel Car Company.

The Georgia Southern & Florida is said to be contemplating the purchase of 15 coaches. This item has not been confirmed.

The Erie has ordered 600 gondola cars, divided equally between the American Car & Foundry Company, the Pressed Steel Car Company and the Standard Steel Car Company.

The Baltimore & Ohio is reported to be in the market for 1,000 hopper and 29 passenger cars for the Cincinnati, Hamilton & Dayton, in addition to the 1,000 box cars previously noted.

The Southern Pacific is reported as interested in the purchase of 250 miscellaneous cars for a number of industrial roads operating over its lines. This is in addition to the order for 4,600 cars now pending.

New York Municipal Railways.—The New York Public Service, First District, has authorized this company to order 100 steel cars for operation in the subways that the company will operate in the dual system. Another order of 100 cars placed some time ago will be ready for delivery in December.

IRON AND STEEL

The Duluth, Missabe & Northern has ordered 251 tons of steel from the American Bridge Company for a connecting trestle supporting a trimmer's house between ore docks 4 and 5 at Duluth, Minn.

The Illinois Central has contracted with the Jones & Laughlin Steel Company, Pittsburgh, Pa., for a large tonnage of punched channels for repairing cars. This work will be done from time to time, extending over a number of years.

SIGNALING

The Baltimore & Ohio has contracted with the Union Switch & Signal Company for the installation of a type "F" electric interlocking plant at the Calumet river draw bridge near Chicago. The machine will have a 29-lever frame; 18 working levers, 4 spare levers and 7 spare spaces.

The Indianapolis Railway & Lighting Company, a 600-volt direct current interurban line, has contracted with the Union Switch & Signal Company for the installation of alternating current automatic block signals between Pit and Junction, 7.2 miles in Indiana. There will be eight model "13" electric light signals installed on the TDB system, which will permit two trains to follow each other between turnouts, but will prevent opposing movements. Vane relays will be used on the line circuits and galvanometer relays on track circuits.

The New York State Public Service Commission for the First district announces that it has approved a contract to be made by the New York Municipal Railway Corporation with the Federal Signal Company for the installation of automatic block signals in the Centre street loop subway. The Federal Signal Company was the lowest bidder for this work. The Union Switch & Signal Company protested to the commission, alleging that the Federal Company could not meet the requirements of the specifications without infringing on its patents. Commissioner Robert C. Wood held hearings in regard to this, but in view of possible delay that might ensue the commission determined to approve of the award of the contract to the Federal, subject to its giving assurances of indemnity against patent claims. The Centre street loop is a part of the first section of the tri-borough subway system of New York City. This contract covers 2.1 miles of double track automatic block signaling and three interlockings; and includes automatic stops. As direct current is used for propulsion the signal apparatus must have alternating current track circuits. The Federal Signal Company proposes to use apparatus of its own design and manufacture throughout.

Automatic Signal on the Western Maryland

The Western Maryland has contracted with the Union Switch & Signal Company for the installation of automatic block signals on the line between Cumberland and Big Pool, 60 miles, single track. The system used will be the "TDB," which allows trains to follow each other between stations, but for opposing movements provides a positive block from siding to siding. The signals will be style "S" three-position, upper quadrant. There are already isolated block signal installations for the protection of five tunnels on this 60-mile stretch. With these there will be a total of 108 signals and 34 switch indicators.

Panama Canal Transferred.—A railway paper published in India states that the following recently appeared in an Indian examination paper: "The Panama Canal is being cut from Delhi to Bombay in order to facilitate the speedy passage home of persons going on short leave from the new capital of India."

A Spanish Car Building Plant.—The annual report for 1913 of the Spanish Metallic Construction Company, of Madrid, shows that the company's business for the year totaled $2,888,000, an increase of $449,100 over 1912. The company has five plants and the number of men employed is 1,800 as against 1,650 in 1912. The chief factory of the five is at Beasain, province of Guipuscoa. This plant alone built during the year 1,250 flat cars and five first class passenger cars for the Northern Railway; 1,215 freight cars of various kinds, and 43 first-class passenger cars for the Madrid Saragossa & Alicante Railway; 4 first-class and 3 third-class passenger cars for the Oviedo-Hendaye Railway, besides a number of cars of various kinds for companies and individuals. This plant has a capacity of 3,000 freight and 200 passenger cars per year.

German Railroad Agricultural Rates.—With a view to the encouragement of agriculture, the German state railways carry stable manure and similar soil fertilizing materials at 20 per cent. less than the usual tariff. These rates are based upon a special tariff known as the Notstands-Tarif (expediency tariff) and are 20 per cent. lower than the prices which would be charged for hauling manure and similar products intended for manufacturing purposes. Expressed in terms commonly used in the United States the special rate for transporting the products mentioned averages per mile about $0.64 for each ton hauled. The following are the rates per metric ton (2,204.6 pounds) charged by Prussian railroads for hauling stable manure between Berlin and certain well-known points: Berlin to Breslau, 230 miles, $1.49; Berlin to Konigsberg, 367 miles, $2.25; Berlin to Frankfort-on-Main, 336 miles, $2.11; Berlin to Dresden, 100 miles, $0.89.

Supply Trade News

The Apollo Steel Company, Apollo, Pa., has appointed Theodore Geissmann & Company, Inc., Chicago, Ill., as its district sales agents in the central west.

The Christy steel roofs have been specified for the 500 freight cars recently ordered by the Chicago Great Western from the American Car & Foundry Company.

Sidney G. Johnson has been elected a vice-president and director of the General Railway Signal Company, Rochester, N. Y., with headquarters at 55 Liberty street, New York.

J. S. Hobson has been appointed acting general sales manager of the Union Switch & Signal Company, and C. E. Denny, assistant general sales manager. Both will have office at Swissvale, Pa.

The Protective Signal Manufacturing Company, Denver, Colo., has appointed William R. Garton & Company, 299 Broadway, New York, its general sales agents and advisory engineers for the United States.

M. H. Loughridge, formerly with the New York, Westchester & Boston, and at one time on the engineering staff of the Union Switch & Signal Company, has been appointed office manager in the New York office of the Federal Signal Company, New York.

The Terry Steam Turbine Company, Hartford, Conn., has appointed Fidanque Bros. & Sons of New York and Panama, with main office at 15 Whitehall street, New York, its representatives for Panama and the Canal Zone. It also announces that on August 1 their Cleveland office, in charge of L. G. Finlay, was moved to 503 Union building.

William E. Clark, for many years in charge of outside track inspection of the Rail Joint Company, New York, died at the home of his son in Charlestown, N. H., on July 5, after an illness of only one week. Mr. Clark was born in Manchester, N. H., on November 5, 1847. During the Civil War, he enlisted in the navy at the age of 16, and served for three years, participating in the capture of Fort Fisher in January, 1865. Soon after the war he became engaged in the business of railroad bridge building and later served for nearly 25 years as a roadmaster on the Connecticut division of the Boston & Maine. Mr. Clark became associated with the Rail Joint Company about 1897, and had held the position of representative in charge of outside track inspection for many years.

A. H. Ackermann, vice-president and general manager of the United States Light & Heating Company, Niagara Falls, N. Y., prior to the receivership, has been appointed general manager, and the entire staff of salesmen, engineers, etc., have been retained in their former capacities. Mr. Ackermann has issued the following statement: "The action recently sustained in the appointment of the receivers for the property of the company was a necessary step to conserve the assets to the benefit of all. With assets of $3 for every $1 of debt, the company is amply stable, and the court's direction to continue the business is the last proof necessary to reassure the buying public. There are already under way plans for broad financing, and with the return of general prosperity in the country, the USL, more aggressive than ever before, intends to secure its own full share of the business and to continue the manufacture and sale of its special electrical products."

TRADE PUBLICATIONS

Derails.—The Hays Track Appliance Company, Richmond, Ind., has issued a folder illustrating the Hayes derail.

Gate Valves.—The National Tube Company, Pittsburgh, Pa., has recently issued bulletin No. 13-A, descriptive of N. T. C. iron body brass mounted wedge gate valves.

Steam Hose Couplers.—The Gold Car Heating & Lighting Company, New York, has recently issued a circular descriptive of the company's latest type steam hose coupler No. 804 S.

Air Compressors.—The Chicago Pneumatic Tool Company, Chicago, Ill., has issued bulletin No. 34, descriptive of its class M Chicago pneumatic steam and power driven enclosed compressors.

Conveyor Scales.—The Electric Weighing Company, New York, has recently issued bulletin No. 8, illustrating and describing Messiter conveyor scales and certain other Messiter electric specialties.

Engines and Outfits.—The Novo Engine Company, Lansing, Mich., has issued a folder devoted to illustrations and the description of the "Novo" engine and the various uses for which it is adapted.

Locomotive Valve Gear.—The Pilliod Company, New York, has recently issued a very attractive booklet containing views of a number of locomotives on various roads which have specified Baker valve gear for use on their motive power equipment.

Cranes.—The Whiting Foundry Equipment Company, Harvey, Ill., has issued catalog No. 110, meant to describe and illustrate some of the latest features of Whiting crane construction. The booklet contains a large number of photographs, nearly one-half of these showing typical installations of various sorts.

Brake Rods.—An eight page booklet has been issued by the Schaefer Equipment Company, Pittsburgh, Pa. It describes the solid forged truck-lever connections which are manufactured by this company. These rods are formed from heavy sheet steel without welds, the ends being drop forged to form reinforced jaws and holes.

Winches and Winding Drums.—The Sprague Electric Works of the General Electric Company, New York, has issued bulletin No. 48,901, descriptive of Sprague electric winches and winding drums. The catalog contains a number of views showing how the winches may be used to advantage in freight yards, locomotive repair shops, ferry slips, etc.

Hammers.—The David Maydole Hammer Company, Norwich, N. Y., has recently issued a 1914 catalogue of Maydole hammers. The catalogue contains 64 pages and is printed in four languages, English, French, German and Spanish. It includes illustrations of the several types of hammer and gives specifications concerning each one of them.

Adjustable Hub Plates.—The Smith Locomotive Adjustable Hub Plate Company, Pittsburg, Kan., has issued a 12-page pamphlet, descriptive of its adjustable hub plate. This device is so designed that a heavy grease behind the plate, applied through a grease hole with screw pressure from the outside of the driving wheel, acts as a cushion behind the plate. The plate may be adjusted to any position necessary to take up the lateral play, by increasing the pressure on the grease.

Steel Sash and Partitions.—The David Lupton's Sons Company, Philadelphia, Pa., has recently issued catalogue No. 8 descriptive of the various Lupton products for light and ventilation. The book is 9 in. by 12 in. in size and contains 84 pages. It describes in detail the various products made by the company such as Lupton standard construction and special type steel sash, Lupton steel partitions, Lupton steel tube doors and jambs, Pond continuous sash, Pond truss, the Pond operating device, etc. Views are given showing the construction of the products and of the various buildings on which they have been installed.

The Exposition at San Francisco.—The Panama-Pacific International Exposition Company has recently issued a remarkable booklet describing in full detail the plans for the exposition which is to be held at San Francisco in 1915. The booklet is remarkably well done. It is divided into a number of short chapters headed, respectively: The Event; The Celebration; San Francisco, the Exposition City, and California, the Hostess. Illustrations are given showing the various sections of the Panama Canal, many of the buildings which have thus far been erected on the site of the exposition, the business section of San Francisco and some of the more interesting features in the country around about. Perhaps the most unique thing about the booklet is the section containing a number of color studies of the exposition city showing a panoramic view of the completed layout and some of the better buildings which will be erected.

Railway Construction

Canadian Pacific—The Kaslo sub-division of the British Columbia division has been opened for business from Kaslo, B. C., to Parapet, the junction point with the Nakusp subdivision, 25.6 miles.

Denver & Salt Lake.—See this company under financial news.

Detroit, Pontiac & Owosso (Electric).—Permission has been granted this company to issue $3,300,000 of bonds to secure funds for building the line. The company was incorporated recently with $50,000 capital, and plans to build from Pontiac, Mich., northwest via Clarkston and Fenton to Owosso, about 55 miles. Dr. Oliver H. Lau, Detroit, Mich., is the principal promoter.

Erie & Toronto.—See Toronto, Hamilton & Buffalo.

Great Falls Western.—This company, with a capital of $1,000,000, recently filed articles of incorporation in Montana. The plans call for building from a point on the Chicago, Milwaukee & St. Paul, in section 30, township 21, north range 1, east of the principal meridian of Montana in Cascade county, in a general southwesterly and westerly direction through the counties of Cascade, Lewis, Clark and Powell, to a point on the Big Blackfoot Railway in section 30, township 15 north, range 13 west, of said meridian in Powell county, about 115 miles. A number of branch lines and extensions are also projected. The main line is to be built over the route surveyed more than a year ago, and it is expected that construction work will be started in the near future. The incorporators include C. A. Goodnow, assistant to president of the Chicago, Milwaukee & St. Paul, Chicago, Ill.; J. D. MacVickar, J. O'Grady and P. H. Scanlan, Great Falls, and C. L. Whiting, Lewistown.

Montana Roads. (Electric).—According to press reports, plans are being made for building a 150-mile electric line in Montana. The projected route is west from Bozeman across Gallatin valley and following Madison valley south to the west entrance of Yellowstone National Park. E. W. Dawes, Bozeman, and C. L. Loomis, Kansas City, Mo., are said to be interested.

Moultrie Southwestern.—An officer writes that the plans call for building a 22-mile to connect Moultrie, Ga., with Meigs and Hansell or Ochlochnee, passing through Funston. The company will develop a new town 12 miles southwest of Moultrie and the prospects of carrying out the work are good, but it has not yet been decided when contracts will be let. Track has been laid on five miles. The company expects to develop a traffic in lumber, cotton, naval stores, fruits, etc. W. E. Aycock, Moultrie, Ga., may be addressed. (July 17, p. 148.)

Nashville, Shiloh & Corinth.—Elections have been held and bonds aggregating $740,000 have been voted in aid of this project. The city of Nashville and Davidson county will be asked in the near future to vote on a bond issue and it is said that this additional issue of bonds will insure the building of the line. The company was organized about a year ago by residents of Corinth, Miss., to build from Corinth, northeasterly to the Tennessee river, thence via Savannah, Tenn., to Nashville about 160 miles. The line may eventually be extended from Corinth, Miss., southwest. A. W. Jones, a capitalist of Augusta, Ga., and associates have agreed to build the line as soon as the bonds are voted. Clopton Thomas, secretary of the Business Men's Club, Corinth, Miss., may be addressed. (April 24, p. 966.)

New York Subways.—Bids are wanted on August 21 by the New York Public Service Commission, First district, for the construction of Section No. 3 of Route No. 33. This section is a part of the extension of the East river tunnel from Whitehall street, in the borough of Manhattan to Montague street, borough of Brooklyn. Bids are also wanted on the same date for the supplying of more special work for the Fourth avenue subway, Brooklyn. A contract was let recently for the construction of Section No. 5 of Routes Nos. 4 and 36 of the Broadway subway in Fifty-ninth and Sixtieth streets, includ-

ing the construction of stations at Fifth avenue and at Lexington avenue in the borough of Manhattan, to the Degnon Contracting Company for $2,819,511, and a contract was also let for the construction of station finish at the six stations on the extension of the Fourth avenue subway from Forty-third to Eighty-sixth streets, Brooklyn.

North Carolina Roads (Electric).—A franchise has been granted to T. J. Markham, J. E. Commander and D. E. Williams, of Elizabeth City, N. C., to build an interurban line from Wades Point and Listers pier, in the lower part of Pasquotank county, north via Elizabeth City, N. C., and South Mills to Norfolk, Va., about 75 miles.

Oregon Short Line.—The Idaho Northern branch has been extended from Donnelly, Idaho, west to Lakeport, 13.8 miles.

Toronto, Hamilton & Buffalo.—Under the name of the Erie & Ontario a company has been incorporated in Canada with $500,000 and headquarters at Hamilton, Ont., to build from Port Maitland on Lake Erie, Ont., north about 20 miles, to Smithville on the T. H. & B.; also to build from Port Maitland east to Port Colborne an additional 20 miles. Surveys are now being made. J. N. Beckley, Rochester, N. Y., president of the T. H. & B., is also president of the new company.

RAILWAY STRUCTURES

Charleston, S. C.—The Southern Railway is planning to erect an extensive system of coal handling piers on a site which was purchased for this purpose about a year ago. The necessary funds have been appropriated for the work and the engineers have already submitted their first report.

Dyersburg, Tenn.—An officer of the Illinois Central writes that the company recently started work on the construction of a small mechanical terminal at Dyersburg, Tenn., together with a yard at that place. The total cost of the improvements will be about $100,000. The buildings will consist of a four-stall roundhouse and boiler house, together with an 85-ft. turntable equipped with electric tractor, all buildings to be of frame construction. The railroad company is doing the grading and track laying, and the construction of the buildings will be let by contract. (July 31, page 228.)

Macon, Ga.—The railroads interested in the construction of the Union station at Macon have been granted an extension of time to August 12 to file complete plans of the new structure. (October 24, p. 806.)

Metropolis, Ill.—The Paducah & Illinois has awarded the contract for the superstructure of its bridge over the Ohio river at Metropolis, Ill., amounting to about 18,000 tons of steel, to the American Bridge Company. The contract for the grading work will probably be let some time this week.

Norfolk, Va.—The Seaboard Air Line recently opened bids, it is said, for building a two-story addition to the general office building at Norfolk.

North Philadelphia, Pa.—Bids were received on August 4, by the Pennsylvania Railroad for improvements to be made at the North Philadelphia station.

Pennsylvania.—Permission has been granted by the Pennsylvania State Water Supply Commission to build bridges for the following railroad companies: Pennsylvania Railroad over Sinnemahoning creek, Cameron county; East Broad Top Railroad & Coal Company over Aughwick creek at Aughwick, and over Blacklog creek near Orbisonia; Pittsburg, Cincinnati, Chicago & St. Louis over streams near Burgettstown and Nobles-town, and to the Lancaster & Quarryville over Mill creek, Lancaster county.

Raleigh, N. C.—An officer writes that the Biscoe, N. C., shops of the Norfolk Southern have been discontinued and that all the machinery has been removed to the company's Glenwood yard shops at Raleigh. It is not proposed, however, to erect large shops at this point. The company has constructed a six stall engine house, equipped with drop pits, and connected with a new machine shop, 40 by 90 ft. in size, a woodworking shop 30 by 50 ft., an oil house and small storehouse and a 300-ton coaling station and an ash pit. The total expenditure has not exceeded $30,000.

Railway Financial News

Altus, Roswell, Lubbock & El Paso.—Control of this road has been sold by Edward Kennedy and associates to J. M. West, E. C. Noble and associates of Houston, Tex.

Chicago, Peoria & St. Louis.—This company was put in the hands of receivers under application of the Bankers Trust Company of New York as trustee for $2,000,000 bonds on which interest was in default.

Chicago, Rock Island & Pacific.—N. L. Amster, who claims to be a holder of collateral trust railroad company fours, is asking to communicate with other holders of these bonds looking toward independent action.

Denver & Salt Lake.—After conference between Newman Erb and various officers of the railroad and contractors a statement was given out with regard to the probable action of the company following on the decision of the Colorado Supreme Court which held that the city of Denver could not guarantee the tunnel bonds. This statement said in part, "It was decided to build the tunnel. The only question is whether to force the recall of the Supreme Court decision or to organize a separate company and build the tunnel. The majority of the board of directors are opposed to the recall on account of expense and time involved. If a tunnel company is organized there will be an opportunity for Salt Lake people to join in the organization of it. President Erb and associates will subscribe for one-third of the stock, and Denver people will take at least one-third of it. It is proposed that the tunnel company lease the tunnel to all railroads wishing to use it on a royalty basis of approximately fifteen cents per ton for freight and fifty cents per passenger."

Three surveys have been made. The one receiving the greatest approval is from Craig, Colo., following the White river to Jensen, which is about twelve miles from Vernal, then along the Duchesne river to the head of Daniels canyon through Heber and Probo canyon, and from there to Salt Lake.

New York, New Haven & Hartford.—John L. Billard has resigned as a director. Mr. Billard's counsel says that the resignation could be made now because the Interstate Commerce Commission had finished their investigation and it was proper because a committee of New Haven directors were investigating the relations of the Billard Company with the New Haven.

Texas & Pacific.—Stockholders have approved a contract with the St. Louis, Iron Mountain & Southern under which the Iron Mountain is given trackage rights over the Texas & Pacific into New Orleans. The Iron Mountain also acquires joint proprietary rights with the Texas & Pacific in the Texas & Pacific's terminals and the terminals of the Trans-Mississippi Terminal & Warehouse Company in New Orleans. The Trans-Mississippi Terminal & Warehouse Company has bought seventeen blocks on the water-front and proposes to sell $7,000,000 bonds guaranteed jointly by the Texas & Pacific and the Iron Mountain.

Toledo, St. Louis & Western.—No interest was paid on the series A and series B 4 per cent. collateral trust bonds due on August 1. A protective committee has been formed consisting of Edwin G. Merrill, chairman; R. Walter Leigh, A. B. Morton and Robert Walker. Bondholders are asked to deposit their bonds with the Union Trust Company, New York.

Pensions for Railway Employees in India.—The East Indian Railway is providing a sum of two lakhs of rupees ($64,866) in its budget for next year for pensions to be paid on retirement to the subordinate staff who have rendered efficient and faithful service. It has also sanctioned a grant of training fees to daughters of senior subordinate employees, to enable them to be trained for nurses in recognized hospitals in India.

ANNUAL REPORT

BROOKLYN RAPID TRANSIT CO.

REPORT OF THE BOARD OF DIRECTORS TO THE STOCKHOLDERS.

FOR YEAR ENDING JUNE 30, 1914.

85 Clinton Street,
BROOKLYN, N. Y., July 28, 1914.

A comparison of the financial results of the system for the year ending June 30, 1914, is affected by two special influences: one being the inclusion of the statistics of operation of the Coney Island and Brooklyn Railroad Company for the last six months of the fiscal year, and the other being the conversion into stock of the greater portion of the Brooklyn Rapid Transit Company's First Refunding Gold Mortgage Bonds.

As a result of these influences the passenger earnings show an abnormal increase, and the fixed charges (even after making provision for the interest on the cost of Coney Island and Brooklyn Railroad Company's shares) reflect a substantial decrease.

As shown in the last Annual Report $4,177,000 par value of the Refunding Mortgage Four Per Cent. Bonds had been converted into stock prior to June 30, 1913. The conversion privilege expired on July 1, 1914, and the total number of bonds converted was $29,619,000, leaving outstanding in the hands of the public $3,459,000, and owned by the companies of the system $18,714,000. The increase of stock by reason of the conversion of bonds was $29,619,000, making the total capital stock on July 1, 1914, $74,520,000.

The operating results for the year show a surplus of $5,315,704.86 after paying $553,826.68 of interest on Refunding Bonds, which have now been converted into stock. With this interest saved the surplus earnings would have been equivalent to 7.87 per cent. on the stock if the issued stock on July 1, 1914, after conversion, namely, $74,520,000, had been outstanding during the year.

In common with the experience of other public service corporations higher wages and increased cost of materials are reflected in the operating expenses. Of the total increase for the year, namely, $1,161,096.77 (9.05 per cent.), $580,697.87 is in trainmen's wages and expense directly connected with car operation, and $457,305.64 in maintenance. Damages show a decrease of $61,206.64 (over 10 per cent.), in spite of heavier traffic. Other expenses are relatively less than the increase in business, except appropriations in connection with employees' welfare work, hereinafter referred to, which show a marked increase.

Dividends at the rate of 6 per cent. per annum have been paid on the stock outstanding from time to time during the fiscal year.

A summary of the financial results is given in the following table:

COMPARATIVE STATEMENT OF THE RESULTS OF THE OPERATIONS OF THE BROOKLYN RAPID TRANSIT SYSTEM FOR YEARS ENDING JUNE 30, 1914 AND 1913.

	1914	1913	Increase or Decrease.
Gross earnings from operation	$25,558,249.60	$24,152,288.09	+$1,405,961.51
Operating expenses	13,994,552.66	12,833,455.89	+ 1,161,096.77
Net earnings from operation	11,563,696.94	11,318,832.20	+ 244,864.74
Income from other sources	451,771.65	339,946.88	+ 111,824.77
Total income	12,015,468.59	11,658,779.08	+ 356,689.51
Less taxes and fixed charges	6,699,763.73	7,161,851.41	— 462,087.68
Net income	5,315,704.86	4,496,927.67	+ 818,777.19
Surplus at beginning of year	7,904,606.63	5,863,812.80	+ 2,040,793.83
Coney Island & Brooklyn R. R. Co.'s surplus at time of acquisition	506,625.76	.....	+ 506,625.76
Total	13,726,937.25	10,360,740.47	+ 3,366,196.78
Other credits to surplus during year:			
Miscellaneous items	30,653.36	7,483.39	+ 23,169.47
Settlement of B'klyn City R. R. Co.'s suit (see statement elsewhere)	582,566.72	.....	+ 582,566.72
Sale of easement South B'klyn R'y Co.	738,986.59	.....	+ 738,986.59
Total	15,079,143.92	10,368,224.36	+ 4,710,919.56
Of this amount there has been appropriated:			
Accounts written off	2,315.30	28,513.60	— 26,198.30
Adjustment of taxes prior years	10,801.78	*116,255.73	+ 127,057.51
Adjustment of expenses prior years	*948.67	66.68	— 1,015.35
Supercession and depreciation	174,339.01	60,522.83	+ 113,816.18
Amount set aside as reserve	1,500,000.00	50,000.00	+ 1,450,000.00
Dividend on B. R. T. Co.'s stock outstanding	3,660,048.00	2,440,770.35	+ 1,219,277.65
Total appropriations	5,346,555.42	2,463,617.73	+ 2,882,937.69
Balance sheet surplus	$9,732,588.50	$7,904,606.63	+ 1,827,981.87

*Credits.

No Refunding Mortgage Bonds under the mortgage of July 1, 1902, have been sold during the year, funds for the purchase of the Coney Island and Brooklyn Railroad Company's stock and for other capital charges (other than rapid transit construction) having been obtained from the proceeds of temporary notes. The outstanding bills payable on June 30, 1914, aggregating $3,451,604.73, were, in spite of these requirements, only $701,604.73 in excess of the amount outstanding on June 30, of the preceding year.

INCREASE IN NUMBER OF STOCKHOLDERS.

On June 9, 1913, the date of closing the books for the dividend payable July 1 of that year, the number of stockholders was 3,709. On the same date of 1914 there were 6,319, an increase of 2,610, or over 70 per cent. This increase is accounted for partly on account of the conversion of bonds into stock and partly on account of wider distribution of the company's shares.

ACQUISITION OF THE CONEY ISLAND & BROOKLYN RAILROAD COMPANY.

The Public Service Commission having finally given its approval, the Coney Island & Gravesend Railway Company (all of whose stock is owned by Brooklyn Rapid Transit Company) acquired on January 15, 1914, 26,370 shares of the Coney Island & Brooklyn Railroad Company at a cost to it of $2,637,000, which amount was obtained by the sale at par to the Brooklyn Rapid Transit Company of certificates of indebtedness, payable on demand. In addition the Brooklyn Rapid Transit Company was obliged to pay to the vendors of the stock the sum of $75,030.32 on account of the delay of the Public Service Commission in giving its approval, the terms of the option providing that, if it were exercised, interest should be paid on the purchase price from the date of the option, less any dividend paid in the meanwhile by the Coney Island & Brooklyn Railroad Company. A dividend of 6 per cent. having been paid by the latter company during the interim the interest charge above referred to was consequently reduced to the sum of $75,030.32. It will be necessary to expend considerable money in bringing up the property of the company to the standard of the remainder of the Brooklyn Rapid Transit system, and this work is now proceeding. At the same time unified operation is producing economy in various directions, while improving facilities and service.

SETTLEMENT OF THE BROOKLYN CITY RAILROAD SUIT.

On March 3, 1910, the Brooklyn Heights Railroad Company, lessee of the Brooklyn City Railroad Company, obtained judgment in the Supreme Court of the State of New York against the lessor company for $3,356,938.53 in an action brought to recover monies which the Heights Company claimed should have been expended by the lessor in fulfillment of the terms of the lease of February 14, 1893. The Appellate Division reduced this judgment by excluding interest figured therein, leaving the amount of the modified judgment $1,740,258.38. Both parties to the litigation appealed to the Court of Appeals, and before the appeal was argued a settlement was agreed upon for $1,650,000. Of this amount $900,000 was paid in cash by the Brooklyn City Railroad Company to the Heights Company on November 1, 1913, and the remaining $750,000, with interest thereon at the rate of 5 per cent. per annum from November 1, 1913, is being paid in installments of $50,000 each upon the first days of January, April, July and October of each year. The amount due on June 30, 1914, was $550,000.

Of the total amount of recovery it was agreed that the sum of $858,000 be applied to the principal, and the remainder, $792,000, to interest thereon. The principal amount ($858,000) has, therefore, been credited by the Heights Company to Brooklyn City Railroad Construction Account, and $582,566.72, representing the interest after deducting the expense of litigation, has been credited to the Profit and Loss Account of the Heights Company.

OVER HALF A MILLION PASSENGERS PER DAY REQUIRED TO PAY TAXES.

The burden of taxation continues to increase. It cripples and restricts our ability to furnish the best facilities and service. For the fiscal year the taxes paid by the system were at the rate of over $4,800 per day. Inasmuch as the net return per passenger was less than one cent, it required the transportation of over 540,000 passengers each day to yield profit enough to pay our tax bills. The amount which we paid to the city alone was more than sufficient to defray the entire expense for the year of many of the departments of city government, and upon the basis of the per capita tax for Brooklyn for 1913 was equivalent to the tax bill of nearly 78,000 persons. Capitalized at 5 per cent. our annual tax bills would permit an expenditure of over $35,000,000 for added improvements, facilities and extensions. Yet each time we apply to the city government for permission to furnish tracks which will give transportation where none now exists, or relieve transportation where it is now congested, there are short-sighted public officials who erroneously think their duty to the city and to the people requires the imposition of additional tax burdens, making the same property subject to double and even treble taxation.

ADDITIONS, IMPROVEMENTS AND MAINTENANCE.

The policy of maintaining the property of the system in good condition has continued. Our schedule of track and paving renewals on surface lines for the current year is the largest in the history of rail transportation in Brooklyn. Last years' schedule was the largest on record up to that time, covering thirty-nine miles of track, but this year's schedule covers over forty-four miles. The expenditures for maintenance of equipment are also the largest on record. The expenditures during the fiscal year for maintenance alone of way and structure and of equipment were $4,337,637.35, an increase of $457,305.64 over similar expenditures for the preceding fiscal year. Renewals of track and paving are chargeable to maintenance, except to the extent that additions and improvements to property are involved.

The construction charges (outside of those made for rapid transit additions and extensions under contract with the city) aggregated $1,543,315.66 and are classified in detail elsewhere.

Among the principal maintenance and construction expenditures during the fiscal year (other than on rapid transit lines elsewhere referred to) are the following:

The 20,000 K. W. Turbo Generator Unit alluded to in the last annual report as contracted for has been put in service in the Williamsburg power station, making the total capacity of the station 90,000 K. W.

The Tompkins avenue and Myrtle avenue sub-stations have been enlarged to permit installation of additional equipment. During the year contract was made with the General Electric Company for three 3,000 K. W. Rotaries, two of which have been delivered and installed.

Since January last the Coney Island & Brooklyn Railroad Company having become affiliated with the system, power for the lines of that company has been supplied from other stations of the system, permitting the shutting down of the Ninth street power station and the Sanford street substation of that company.

There were removed during the year 22.14 miles of overhead feeders.

Trolley wire to the extent of 75.75 miles was renewed and 2.47 miles of high tension cable were installed.

Two thousand one hundred and forty-eight trolley poles were repainted, 473 reinforced and 497 reset.

On the elevated lines renewals were made as follows:

52,312 lineal feet of rail,
1,313 lineal feet of steel guard rails,
34 switches,
32 frogs,
2 crossings,
15,086 ties,
37,411 lineal feet of timber guard rail,
20,450 tie plates and
61,118 lineal feet of 2 x 6 foot-walk.

On the surface lines 198 pieces of special work were installed, repaired or renewed; 115,592 feet of single track was relaid with standard 7 in. 105 lb. rail; 130,524 sq. yd. of improved granite block pavement on concrete have been laid, and 2,000 sq. yd. on sand foundation, in addition to which the city laid at the expense of our companies 41,123 sq. yd. of improved paving.

Track drains were installed at thirteen locations.

A double-track extension was constructed of the tracks in Roebling street, from Division avenue to Lee avenue, measuring approximately 400 feet of track.

20,000 lineal feet of elevated structure was repainted.

On the Brighton Beach line approximately 12,000 feet of iron fence was repainted; also the steel work of 31 bridges between Franklin and Neptune avenues.

Column bases on the Broadway elevated line, from Alabama avenue to Cypress Hills, were repainted.

Much work was done on the various buildings of the system, involving not only ordinary repairs and repainting, but improvements intended to reduce fire risk.

Eighty-nine new centre entrance passenger cars were completed and placed in service; eleven additional cars of the same type having been placed in service during the preceding fiscal year.

1,130 complete air-brake equipments were purchased, of which 669 have been installed on semi-convertible and closed surface passenger cars.

482 partial air-brake equipments have been purchased, of which 282 have been installed on surface convertible passenger cars.

1,918 improved geared hand brakes have been purchased to supplement air brakes, of which 1,453 have been installed.

Fifty pairs of new trucks have replaced a like number of old style interior frames.

559 pairs of improved design maximum traction truck frames have been purchased for installation under cars which are being equipped with air brakes.

Two 55-ton electric locomotives were purchased; also one 15-ton electric locomotive crane and 26 air dump cars.

Two cars have been constructed for transporting rails through city streets, and one steam railroad box car was purchased and converted into a flat car.

On the surface division 66 single truck closed passenger cars, 211 double truck closed passenger cars, 390 semi-convertible cars, 190 double truck open cars, 281 convertible cars and 9 mail cars have been repaired and revarnished.

Seventy-five plows and sweepers were repaired.

190 service cars and 1,357 damaged passenger cars were repaired.

331 passenger cars were equipped with W. H. 3-pt. resistance.

1,164 cars were equipped with wheel guard chains.

In 88 convertible cars rattan seating was replaced with wooden seats and in 45 semi-convertible cars longitudinal seats were substituted for Chamberlin chairs.

On the elevated division 38 cars have been repaired and repainted and additional circuit of five lights installed; 549 motor and trailer passenger cars have been repaired and revarnished; 200 motor cars have been equipped with automatic trip cocks; 934 cars have been equipped with fire extinguishers, and 55 damaged passenger cars and 11 service cars have been repaired.

New machinery has been installed in the shops for the better performance of work and devices have been installed for the protection of employees.

INTERFERENCE OF CITY IMPROVEMENTS WITH TRAFFIC.

On at least ten of the surface lines car service has been materially interrupted or diverted by reason of the operations of contractors for the city in constructing sewers. The expense to which the Company will be subjected by reason of these improvements, to say nothing of loss of earnings, is approximately $248,000.

FREIGHT BUSINESS.

The constant demand on the part of manufacturers and shippers for freight service is somewhat embarrassing to the Company. In certain sections of our territory, and especially upon what were formerly steam railroad tracks, freight can be handled without interference of passenger business, and except by our tracks it would be impossible in these sections to furnish freight service by rail.

The business during the past year yielded a gross revenue of $497,569.16, an increase over the preceding year of $126,716.22.

PROGRESS OF WORK ON RAPID TRANSIT LINES UNDER CONTRACTS WITH THE CITY.

The New York Municipal Railway Corporation has prosecuted as vigorously as conditions would permit the work of construction and equipment of rapid transit lines required under its contracts with the city dated March 19, 1913.

At the request of the Public Service Commission and as part of its contribution to cost of city-owned lines that company has undertaken the completion of the four tracks in the Centre Street Loop (two of which were placed in operation on August 4, 1913), the reconstruction of the Fourth avenue subway between Thirty-sixth and Thirty-eighth streets and the construction of the connecting tracks between Fourth and Tenth avenues. By the use of the two tracks in the Centre Street Loop, express trains of the Cypress Hills line, formerly operated via Lexington avenue, have been diverted via Broadway into the loop, thus shortening the running time between Cypress Hills and Chambers street, Manhattan, by approximately ten minutes. The most marked effect of operation through the loop has been the relief thus afforded to traffic over the Brooklyn Bridge, tens of thousands of passengers being daily diverted to the Williamsburg Bridge.

In addition to the construction work undertaken for the city the Company has, in discharge of its own obligations under the city contracts, progressed as follows:

SEA BEACH LINE.—Contract was let on October 6, 1913, for reconstruction as a four-track depressed railroad between Fourth avenue and Eighty-sixth street. The work is now rapidly proceeding and it seems likely that the section between Fourth avenue and New Utrecht avenue will be completed ready for operation by January 1 next, and the remaining section, between New Utrecht avenue and Eighty-sixth street, by May 1 next. Under additional contracts new highway bridges over the right of way between Fourth and Eleventh avenues are being provided.

BROADWAY-MYRTLE AVENUE CONNECTION.—This improvement was contracted for on July 8, 1913, and operation will begin about July 30, 1914. It permits of through trains from the Myrtle avenue elevated and new Lutheran Cemetery lines over the Broadway structure and Williamsburg Bridge into the Centre Street Loop, and obviates change of cars at Broadway and Myrtle avenue to about 30,000 passengers daily.

LUTHERAN CEMETERY LINE.—This involves in effect an extension of the Myrtle avenue elevated line from Ridgewood to Lutheran Cemetery. The work is divided into three contracts, one of which, namely, that of August 25, 1913, for steel structure from Ridgewood to Fresh Pond road, was completed near the end of the fiscal year. Another contract, involving a short continuance of the elevated structure, rearrangement of yard tracks, interlocking plant and the erection of despcher's office and trainmen's building near Fresh Pond road, was entered into on February 27, 1914, and will soon be completed. The remaining contract is for station buildings required on this line.

LIBERTY AVENUE ELEVATED EXTENSION.—Consents of property owners having been completed, contract was let on February 9, 1914, for the steel structure. A considerable amount of work has been performed.

JAMAICA AVENUE ELEVATED EXTENSION.—Practically all the necessary consents of property owners have been acquired and plans are being perfected preparatory to letting contract. The proper construction of this line, however, may require some changes in the street, as to which the city has yet taken no action.

ADDITIONAL TRACKS ON EXISTING ELEVATED LINES.—Consents of property owners have been obtained on Fulton street, Broadway and Myrtle avenue. Contract for the Fulton street third tracking between Nostrand avenue and Sackman street has been entered into. Contract for the steel required for the third tracking of the Broadway line between Havemeyer street and Myrtle avenue is awaiting the approval of the Public Service Commission.

CAR EQUIPMENT.—Contracts were entered into for the construction of one hundred steel subway cars, completely equipped according to best modern designs. The contracts for both car bodies and equipment give an option on additional orders up to six hundred cars, and such an order for one hundred cars is awaiting the approval of the Public Service Commission. The delivery of the first one hundred cars is promised prior to December 1, 1914.

MISCELLANEOUS WORK.—Preparatory to entering into the above contracts much preliminary work was necessary in the making of plans, purchase of real estate, acquisition of easements and the approval of all by the Public Service Commission. The extension of power facilities in connection with the operation of the Centre Street Loop and the proposed operation of the Fourth avenue subway has been partially provided for, contracts having been let for new sub-stations and additional equipment. A contract for complete interlocking and signal equipments for the Centre Street Loop is awaiting approval of the Public Service Commission. Plans are rapidly being perfected for the remaining improvements which the company has undertaken to make.

The city on its part is proceeding with the construction of subway and elevated lines which are to be operated in conjunction with our existing lines as extended and improved.

The New York Municipal Railway Corporation's expenditures for construction and equipment to June 30, 1914, under the city contracts were as follows:

On account of contribution to city-owned lines	$8,230,256.39
On account of equipment of city-owned lines	1,647,982.49
On account of additions, extensions, improvements of existing railroads	4,798,868.27
Undistributed	593,486.70
Total	$15,270,593.85

TEMPORARY OPERATION OF RAPID TRANSIT LINES UNDER CITY CONTRACTS.

Two tracks in the Centre Street Loop were, under order of the Public Service Commission, placed in operation on August 4, 1913, and pursuant to the terms of the contract with the city, dated March 19, 1913, the pooling of earnings from these new tracks and from the existing lines of the New York Consolidated Railroad Company then became effective. Eleven months (lacking three days) of such operation are reflected in the figures given below.

The contract with the city provides as to these jointly operated lines that after deducting operating expenses, taxes and provision for depreciation the net revenue is to be applied as follows:

1. To the lessee, $3,500,000 per year as representing the net earnings of the existing railroads which are to form part of the new rapid transit system. Out of this reservation the lessee is to pay interest charges on capital investments in the existing railroads prior to March 19, 1913.

2. To the lessee an amount equivalent to 6 per cent. per annum on its new investment in construction and equipment prior to the beginning of permanent operation, and thereafter interest and 1 per cent. sinking fund.

3. To the city interest and 1 per cent. sinking fund on its investment in cost of construction.

Any surplus remaining after making provision for a moderate contingent reserve fund is to be divided equally between the lessee and the city.

Of course, the operation of the two tracks in the Centre Street Loop has merely extended further into Manhattan service heretofore rendered as far as the Williamsburg Bridge Terminal, and has not yielded a material amount of additional revenue, although it has increased the expense of operation.

Consequently during this period of nearly eleven months the operation has failed to provide the company's preferentials by $219,687.46, and has also failed to provide the city's charges on the cost of construction of property placed in operation during this period by $310,060.48, leaving a total deficit both in the company's preferentials and the city's charges of $529,747.94.

The deficit in the company's preferentials is cumulative and is to be made good from future net income before payment of the city's interest and sinking fund charges, but under the provisions of the contract the deficits in the city's charges during temporary operation is to be added to the cost of construction of the city-owned lines, thereby swelling the amount upon which interest will hereafter have to be earned. It seems quite likely that the deficits above referred to will continue (in lessening degree, however) until new lines of greater earning capacity than the Centre Street Loop and the Fourth avenue subway are placed in operation. The cost of these two lines was not justified by their probable earning capacity, and it was only by merging their operation into that of a larger system that the city will eventually be able to make them self-supporting. It is, therefore, extremely essential both for the city's interest and our own that all the new lines should be constructed and placed in operation as speedily as possible.

The details of results from this temporary operation are as follows:

RESULT OF OPERATIONS OF NEW YORK CONSOLIDATED RAILROAD COMPANY, LESSEE, UNDER THE PROVISIONS OF CONTRACT NO. 4 DATED MARCH 19, 1913, BETWEEN THE NEW YORK MUNICIPAL RAILWAY CORPORATION AND THE CITY OF NEW YORK.

		For the period Aug. 4, 1913, to June 30, 1914.
Revenue		$7,830,990.51
Passenger revenue	$7,653,755.84	
Chartered cars and misc. transp. revenue.	1,234.92	
Advertising	65,849.17	
Other car and station privileges	50,225.42	
Rent of buildings and other property	26,486.08	
Rent of tracks and terminals	33,150.65	
Miscellaneous	288.43	
	$7,830,990.51	
Deductions		$8,050,677.97
Rentals	$83,428.55	
Taxes	$35,053.41	
Operating expenses exclusive of maintenance	3,060,943.02	
Maintenance fund	940,645.01	
Depreciation fund	235,161.24	
Proportion of company's preferentials	3,195,446.74	
	$8,050,677.97	
Deficit* in Company's Preferentials		$219,687.46
Interest† Paid by City on Its Cost of Construction of Property Placed in Operation Plus Sinking Fund at Rate of 1 Per Cent. per Annum		310,060.48
Total Deficit		529,747.94

*To be made good from future net income before payment of City's interest and Sinking Fund charges.

†Deficits in City's charges during temporary operations to be added to the Cost of Constructions of City-Owned Lines.

EMPLOYEES' WELFARE WORK.

The Company has continued on a more liberal scale its policy of improving the conditions under which its employees work, involving provision for club houses, social diversions, pensions, medical services and sick and death benefits not reached by the work of the Employees' Benefit Association. For these purposes during the past year, in addition to charges for improvement of club rooms, the companies of the system have expended $69,365.

The system of compulsory medical inspection and free medical attendance for employees excused on account of illness, affecting nearly 10,000 men in the operating department, completed its first year December 31, 1913. A comparison of records of time lost on account of illness for the entire year as to the surface lines, and for the year, exclusive of Sundays and holidays, as to the elevated lines, indicated a reduction of time lost on account of illness of approximately 24 per cent. over the year ended December 31, 1912.

This reduction means greater efficiency for the working force and unbroken earning capacity for the men. The operation of the compulsory medical inspection system has been welcomed by operating officials and received with apparent favor by the uniformed employees subject to its provisions. The medical inspection bureau having this service in charge is supported entirely by the company and the service is rendered without cost to the employees.

The existence of the medical inspection bureau has enabled the company to meet in a satisfactory way the medical requirements of the Workmen's Compensation Law which became effective on July 1, 1914. Instead of being obliged to make hasty and untried arrangements with outside physicians to care for employees injured in the course of their employment as required by the law, the company is in a position to have such attendance provided by its own staff and without any new relationships between employees and physicians.

The medical inspection bureau at present is organized with a chief Inspecting Physician and five assistants. The medical work of the employment branch of the operating department and the periodical re-examination of motormen has been brought under the supervision of the bureau; systematic first-aid instruction is being given to employees in all departments of the company and special studies are being undertaken along several new lines which it is believed will be effective in materially raising the already high physical standard of our operating force.

SAFETY CAMPAIGN.

The public safety campaign, experimentally undertaken by the Company for the spring and summer school sessions of the year 1913, produced such a satisfactory response that the campaign was continued on a greatly enlarged scale beginning with the fall term of the schools last year.

It appeared also that the activities of the company in this direction could be greatly assisted by co-operation with representative citizens, so as to carry the safety work outside the limits of the public schools and to lay a foundation for organized safety activity which might ultimately extend to all branches of industry in the territory in which the lines of the company are operated.

Accordingly, an invitation was extended to a number of individuals representing the city administration, the borough administration, the schools, the churches, the bar, the bench, the banking and insurance communities, department stores and industrial enterprises, to organize, with the co-operation of the company, a Brooklyn Committee of Public Safety. The committee completed its organization in November, 1913, and in January the Board of Education of the City of New York issued to this committee the authority to conduct safety education in the Brooklyn public schools. The co-operation of the parochial schools was also obtained in large measure and the work of teaching safety to children was extended to a variety of other institutions.

To conduct this work, the company organized a Bureau of Public Safety with appropriate staff, and in the school year just closed this Bureau has given instruction in 179 public schools and 26 parochial schools, reaching 261,976 children. Ten charitable institutions were visited one or more times for safety instruction, as were three church institutions and several large industrial establishments. Twenty-three parents' organizations have been addressed and a variety of miscellaneous lectures given, including moving picture safety lectures in city parks during the present summer.

The extent of this work is indicated in the distribution of 672,000 safety blotters and in 8,100 safety calendars, which were supplied for every public school classroom in Brooklyn.

Many other cities throughout the country have sought suggestions and advice in organizing public safety work, material from the Brooklyn campaign having gone to over sixty cities in the United States and foreign countries.

In addition to affording patronage and directive advice for the safety work in the public schools, the Brooklyn Committee of Public Safety has accomplished a great deal in awakening the public to the necessity of more careful attention to the problem of public safety. The Brooklyn Rapid Transit Company, which has a larger stake in the public safety of the territory in which it operates than any other single enterprise, has taken a double satisfaction in giving impetus to a fine movement while at the same time reducing its own hazards of operation through the public streets.

INCREASE OF TRANSFER PRIVILEGES.

Under order of the Public Service Commission a new transfer system went into effect on June 1, 1914, whereby the total number of transfer points in the territory in which the surface railroads operate was increased from 721 to 1,008. The full effect of this order it is as yet too soon to estimate. The passenger earnings of the companies affected fell off during the month $67,827. How much of this falling off was due to bad weather, how much to business diverted to the elevated lines, how much to business depression and how much to the great increase in transfer privileges it is impossible to determine. In accepting the order the companies have reserved all their legal rights and will apply for a modification or repeal of the order if the burden imposed thereby should prove unreasonable.

INSURANCE RESERVE FUND.

With a view to finally insuring its own fire risks the companies of the system have gradually been accumulating an Insurance Reserve Fund, which on June 30, 1914, aggregated $599,197.19.

REFUNDING MORTGAGE FOUR PER CENT. BONDS.

Authenticated at July 1, 1913	$51,062,000.00
Issued during year	730,000.00
	$51,792,000.00
Converted into stock to June 30, 1914	29,619,000.00
Net authenticated and outstanding	$22,173,000.00
In hands of the public	$3,459,000.00
In possession of the B. R. T. System	18,714,000.00

As follows:

*Collateral to $40,000,000.00 6 yr. 5 per cent. notes	$10,000,000.00	
Collateral to bills payable	4,568,000.00	
In treasury B. R. T.	2,135,000.00	
In treasury N. E. R. R.	1,046,000.00	
Deposited with City of New York by the N. E. R. R. Co.	15,000.00	
Deposited with trustee of the Nassau Electric Railroad Consolidated mortgage	700,000.00	
Guaranty fund Brooklyn City Railroad lease	250,000.00	
	$18,714,000.00	

Detailed statements of operation, statistics and consolidated balance sheet are appended hereto.

Respectfully submitted by order of the Board of Directors.

T. S. WILLIAMS,
President.

*$301,000 par value of these notes have been converted into New York Municipal Railway Corporation's five per cent. first mortgage bonds, as permitted, prior to January 1, 1916, by the terms of the trust agreement.

Railway Age Gazette

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WE GUARANTEE, that of this issue 8,900 copies were printed; that of these 8,900 copies, 7,431 were mailed to regular paid subscribers to the weekly edition, 250 were provided for counter and news companies' sales, 1,111 were mailed to advertisers, exchanges and correspondents, and 108 were provided for samples and office use; that the total copies printed this year to date were 308,600, an average of 9,352 copies a week.

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Contents

*Illustrated.

Professor Marburg's reply, on another page, to the criticisms of the American Society for Testing Materials, which appeared in our issue of July 10, is deserving of most careful consideration. As one who has been connected with the society from its very inception, and as a most important factor in its development and up-building, the facts which he presents for consideration cannot but carry conviction. A canvas of a considerable number of railway men who are actively identified with the committee work of the society indicates that it is doing a work which is deserving of the support and appreciation of all those who are interested in developing and standardizing the specifications of the various materials which are used by the railways. No opportunity is being overlooked by those in charge of the society to so adjust and revise its methods of procedure as to insure the very best results in the effort to develop and perfect standard specifications. Reference was made in the above mentioned editorial, and also in Professor Marburg's letter, to the Havre de Grace bridge paint tests. There can be no question as to the value of the data thus far obtained from these tests in assisting the paint chemist in his task of selecting the best paint for various purposes. These results would, however, be greatly enhanced by additional information concerning the ingredients used in mixing the paints and information as to the manner of their mixing. The paints which were applied for test were chemically analyzed and these analyses have been published, but those familiar with paint chemistry realize that such analyses cannot show just what ingredients were used in mixing the paints, or indicate how the mixture was made.

American Society for Testing Materials

We publish on another page a letter from a man who specialized in university on economics, and is now engaged in railway work, who expresses regret that there are not more professors in our universities who "come in contact with the actual problems of the present day," instead of showing themselves up and proceeding "to work out the problems by theory." Few persons who have lived in close contact with practical business affairs, and also read the literature dealing with these affairs which emanates from the schools, have failed to feel a similar regret. In the field of railway economics, for example, there are several university professors who really know their subject, but there is a larger number who are far from knowing it. Seldom has there been a more pitiful disclosure of the ignorance of men who think themselves wise than the discussion of the subject, "The Control of Public Service Corporations," at the meeting of the American Economic Association in Minneapolis last December. The trouble with most of the economists who treat matters of this kind is that they have never had any of the hard, practical experience in earning their livings as managers or employees of business concerns which is absolutely essential to give a man the atmosphere of commercial and industrial life; to show him what can and what cannot be done with human nature, and to convey to him in the most impressive manner information regarding the risks of loss that are taken and the losses that are actually incurred in business, as well as the opportunities for gain and the gains that are actually made. There has been a remarkable development of colleges of business administration within recent years. Several of them are doing excellent work in the field of railway economics. But the thing most needed to make valuable the work in this field done by many of them is to teach the professors their business by bringing them into contact with, and giving them a real knowledge of, the railway business.

The Economists and Business Problems

The disastrous butting collision near Tipton Ford, Mo., August 5, reported last week, page 255, is said to have been due to disregard of a despatcher's order by the southbound train, which had run about one mile beyond the appointed meeting station. The trains were both running at good speed and the southbound train, consisting of a single gasolene motor car, was almost instantly enveloped in flames from burning gasolene. Of 77 persons in this car only five escaped injury; and 47 were killed or fatally injured. The three members of the crew of this car were killed. The chief lesson of the collision—that nothing less absolute than the block system affords adequate protection for passengers—can scarcely need repeating for readers of the *Railway Age Gazette*. An officer of the road is quoted as saying that this is the first time since the introduction of gasolene motor cars

The Tipton Ford Collision

on railroads that there has been a collision in which fatalities were due to the type of car; that is to say, in which gasolene has caught fire and passengers have been burned to death; and such cars have been in use 15 years. Quite true, no doubt. But that is a very deceptive statement and it may afford a false comfort. For the first ten years of this period the number of cars in use was very small. The great majority of them are used on lines of light traffic. Increasing use may make the liability to collision in the next five years, twenty or fifty or more times as great as in the last five. For the hundredth time we are warned that the thing to do is to prevent collisions, not merely mitigate their effects. To the extent that a gasolene engine is more terrible than a steam boiler and its firebox, this horror is a more vivid warning than have been former collisions. And the use of the block system on single track, as a safeguard against butting as well as rear collisions, is no longer an experiment—though the reluctance of some roads to adopt it would seem to indicate doubts of its availability. The simple manual system, properly managed, is, no doubt, superior to the "time-table and train-order" system; the simple manual with despatchers' supervision has made a great reputation for safety on the Erie and the Northern Pacific; the controlled manual has proved its reliability on the Pennsylvania; and the virtues of the electric train staff are known everywhere.

WHY APPEAL TO THE RAILWAYS?

WHEN the great war in Europe began this country was threatened with a strike of all the engineers and firemen on the western railways. The President of the United States appealed to the committee representing the employees and to the committee representing the roads to avert the peril. Why the government felt free to appeal to the employees in the name of patriotism and the public welfare is easy to understand. But did it have any right to feel free to appeal on these grounds to the managers of the railways? In railway wage arbitrations conducted under federal law the arbitration boards have without quibbling given the employees every single cent to which they have believed them entitled.

But just before this appeal was made to the railways to prevent a strike the Interstate Commerce Commission had rendered an opinion holding that the railways throughout the east needed larger revenues, but at the same time refusing to allow them to make anywhere near as large advances in their rates as their situation demanded.

The Sherman anti-trust law applies to both combinations of labor and combinations of capital. The government has studiously refrained from enforcing this law against combinations of labor, and it is now engaged in modifying it so that it will not apply to them. Through the Interstate Commerce Commission the government has condemned the railways for not introducing economies in their operations which cannot be introduced except by joint action of the carriers, and then by enforcing the Sherman law has prevented, and still prevents, the roads from taking the joint action which, in effect, the Interstate Commerce Commission commands them to take.

The courts have issued injunctions to prevent violations of law by both combinations of labor and railway corporations. Congress is now engaged in passing legislation which will prevent the courts from effectively using the process of injunction against labor, while leaving that process to be used in its full force against capital, including railway capital.

A short time ago a government commission reported that the compensation paid to the railways for carrying the mails is unremunerative. Promptly there was introduced in Congress a bill not to increase, but to further reduce the mail pay of the railways.

And yet, when a great strike threatened the government appealed to labor and to the railways alike, and labor showed its appreciation of what the government has been, and is, doing for it by refusing to concede anything, while the railways showed their usual disposition to turn the other cheek by withdrawing all of the demands they had made on their employees and accepting a one-sided plan of arbitration.

The railway managers did right. By the same token the leaders of labor did wrong. How is the government going to show in the future its appreciation of the very different attitudes assumed at this time of crisis and peril by organized railway labor and by the managers of the railways?

FREDERIC A. DELANO

THE railway service of America loses and the public service gains, by the retirement of Frederic A. Delano from the presidency of the Chicago, Indianapolis & Louisville Railway to become a member and vice-governor of the federal reserve board. Mr. Delano's railway career has been unique in some ways. He has never been the head of one of the larger railway properties. Neither the Wabash nor the Monon, of both of which he has been president, ranks among the really great systems. Yet for years Mr. Delano has taken rank among the foremost leaders of the railways of this country. That he has never been president of one of the great properties may be because he has not wanted to be. That he has been recognized, both inside and outside the railway business, as a leader in his field has been because he has possessed and exercised qualities of character and intellect which would have gained him eminence in almost any line of professional or business endeavor.

The attractions of his personality are such that he has been as popular with those whom he has had to oppose as with those with whom he has fought side by side. A graduate of Harvard University, he has always been a student in the broadest and truest sense. Beginning his railway work as a machinist's apprentice, becoming a mechanical expert, serving for some time as a superintendent of motive power, and being before this a superintendent of terminals and afterward a general manager, he never allowed his interest in the technique of transportation to absorb all his energies, but so applied himself to the study of the economic side of the transportation business as to become recognized as one of the leading railway economists of the country. A successful executive, he has been also a railway statesman, who has thoroughly understood and fully appreciated the delicate and important relationship which the railway business bears to the public, and the consequent necessity of managing the railways with due regard for the public's rights and susceptibilities, and of educating the public regarding the rights and needs of the railways. Courageous in criticising bad and advocating good regulation he has been equally courageous in defending good and criticising bad railway management.

Mr. Delano's keen interest and absorbing work in the railway business have never prevented him from taking a keen interest in economies and public affairs in the broader sense. The appreciation in which he has been held by at least two presidents of the United States is illustrated by the fact that President Taft offered him the ministry to China and membership on the Interstate Commerce Commission; that President Taft also nominated him for membership on the industrial commission; that his nomination to this commission not having been confirmed, President Wilson renominated him to it; and that now President Wilson has appointed him a member and vice-governor of the federal reserve board.

There is no higher minded or abler class of business or professional men in America than the officers of our railways. There are numerous men among them who could take into the service of the different departments of the government experience and talents which would be infinitely valuable to the government and the public. It is unfortunate for the government that so few of them have ever been taken into its service. Possibly, however, this has not been entirely the fault of the government, but has been partly due to the fact that few railway men have shown the interest and taken the active part in civic affairs that Mr. Delano has.

In accepting a government appointment, obviously Mr. Delano makes a heavy sacrifice, financially and otherwise. The government of this country would be a great deal better in the long run if there were taken into its business more men who, like Mr. Delano, are willing to make financial sacrifices in order to perform a public service and a public duty. How strangely reluctant the country usually has been to accept the self-sacrificing services of such men; and how strangely willing to accept the services of men who offer themselves merely to get more of the loaves and fishes than any private employer considers them worth!

PULL TOGETHER

In its decision in the Eastern rate advance case the Interstate Commerce Commission, while authorizing only a small part of the increases in rates sought by the railways, suggested a number of plans by which it believes the railways could increase their revenues. Railway men do not take much stock in the commission's suggestions. They regard them as makeshifts intended to justify the commission in refusing substantial advances, or academic theorizing, which could not have proceeded from a body of men whose members had had practical experience in railway operation, or practical experience in any walk of life in which they were obliged to handle men and regularly meet pay rolls. Whether the railway officers are right or not in their attitude, it must be clear to them as practical men that it is their duty to their companies to get together and pull together in an honest and determined effort to carry out all the suggestions made by the commission which are at all practical.

The commission has broadly intimated that it believes that the passenger rates in eastern territory are too low. The railways reply that they cannot raise them because of state legislation. But the state laws do not prevent them from raising the interstate passenger fares. If they should raise the interstate passenger fares the result would be a discrimination against interstate commerce similar to that which the Interstate Commerce Commission, and later the Supreme Court, condemned in the Shreveport case. The discrimination would consist not in the interstate rates being too high, but in the state rates being too low. Would not the creation of such a situation empower and practically compel the Interstate Commerce Commission to nullify the state passenger fare laws? Should not the eastern lines get together at once and take whatever steps they can in the direction of enabling the Interstate Commerce Commission to co-operate with them in making advances of both state and interstate passenger fares?

The commission shows that it believes that many freight rates throughout eastern territory are relatively too low, and are in fact unremunerative. It gives in its opinion a list of the average earnings per car mile from 30 commodities moving in large quantities, and adds the significant comment "that they disclosed many rates yielding barely enough revenue to pay for the use of the equipment." No regulating body in its right mind would hold that rates were reasonable which barely covered the cost of using the equipment, and therefore the commission's comments on this subject seem to be a direct invitation to the roads to make advances in certain rates.

The commission criticizes the roads for rendering some terminal services for actually less than cost and for paying allowances to shippers for rendering services which the shippers should render for themselves. When the carriers have filed tariffs covering matters of this sort they usually have been suspended, but it is evident that if they are persevering they will ultimately be able to act upon the commission's suggestions in some way that will increase their revenues.

There are two unanswerable arguments in favor of the railways trying to carry out the commission's views. The first is that by doing so they will secure some additional revenue, and although this may not be as large as the commission thinks, whatever it is, it will be worth having. The second unanswerable argument in favor of trying to carry out the commission's suggestions is that unless the roads do so, they will never again be able to present a petition for more or less general advances in rates with any hope whatever of success. The commission seems to believe that by adopting certain methods which it indicates the roads can secure all necessary increases in their revenues. If the roads can get the necessary increases in their revenues by the means which the commission suggests, then there will be no need for resorting to other means; and they will never be in any position to show the commission that they cannot get them by the methods the commission suggests until they have made a vigorous effort, in good faith, to do so.

One of the main reasons why the railways in all parts of the country have made rather poor progress in the past in solving the problems with which they have been confronted, and especially the rate problems, is that they often have failed to pull together. One road has had one kind of traffic that it has wished to "protect," another has had a large shipper or class of shippers that it has wished to "protect," another has had one or more communities that it has wished to "protect." Instead, therefore, of pulling together they have pulled apart and mutually cut each other's throats. In the endeavor of each of them to get some advantage, fair or unfair, the interests of all have been sacrificed. If there ever was a time for that sort of thing it is now past. The developments in the immediate future will show whether the policies of some railways are dominated by petty men who cannot see beyond the ends of their noses, or whether the roads as a whole are dominated by men whom the mistakes of past experience have taught how to deal with present conditions.

SHOP PAINT FOR STEEL BRIDGES

Specifications for steel railway bridges usually require the application of a coat of oil or paint to the steel in the erecting shop. The following typical clause is from the American Railway Engineering Association's 1910 Specifications: "Steel work, before leaving the shop, shall be thoroughly cleaned and given one good coating of pure linseed oil, or such paint as may be called for, well worked into all joints and open spaces." The use of oil is not favored by many engineers, although it is still used to a limited extent. It is generally considered necessary to adhere to the practice of shop painting in order to preserve the steel from corrosion during the period before it is erected and painted in the field. But this opinion is not universal, as proved notably by the Pittsburgh & Lake Erie practice in handling the large structures on its new terminal line, the Lake Erie & Eastern, at Youngstown, Ohio, referred to elsewhere in this issue. A considerable amount of structural steel has been erected without being given any shop coat of paint.

A limited amount of highway and minor railway bridge work has also been handled in this way; but the size and importance of the Lake Erie & Eastern structures, and the length of time elapsing between rolling and painting, amounting to a maximum of about two years, make this a significant instance in railway practice.

The two principal reasons advanced in favor of dispensing with shop painting, are the difficulty of securing a satisfactory application in the shop and the tendency for the rolling scale to become loose after the steel has received the usual shop and field coats of paint, in which case the paint is removed when the scale comes off. Several factors affect adversely the quality of shop painting. The surface of the steel is usually in poor condition to receive paint. Oil and grease are accumulated during fabrication, and when the material is handled in an open yard, dirt and moisture are especially likely to be present. In addition, little attention is paid to weather conditions, which are often unfavorable for satisfactory painting. The work is usually

done by unskilled laborers, often with little supervision and scant inspection. The quality of the paint is also likely to be poor, either because an inferior grade of paint is furnished or the workmen add elements to make it cover more or spread easily.

The scale that covers the surface of steel when it comes from the rolling mill is known to be the cause of many of the defects that appear, even when the steel has been painted according to the best practice. Moisture may get through pin holes or other defects in the coats of paint and set up corrosion between the scale and the metal. This process loosens large pieces of scale which fall off and, of course, take the paint off with them. This condition can frequently be seen on structural steel. If the steel has been stored for a time before fabrication, a part of the rolling scale will be displaced in handling the pieces, and this is especially the case with structures requiring a large amount of shop work, particularly punching and riveting. Even after fabrication, a great deal of the mill scale still adheres to the steel, and it is this part that it is sought to remove by exposure to the weather without paint.

Engineers who have followed the practice of dispensing with shop painting for structural steel building material have been well satisfied with the results, although in such work the steel is usually erected within six months of the time of rolling and sometimes much sooner. It is subsequently enclosed so that the preservation of the steel is a much less difficult matter than on bridges and other exposed structures. A highway bridge, erected at Dubuque, Ia., in 1900, was not painted until after erection, some four to five months after the steel was rolled. The steel had acquired a thin coat of red rust which was removed by wire brushes, leaving a much better surface for the application of the paint than would have been possible in the shop, and at the same time eliminating the rolling scale. The engineer in charge of that work regards the quality of the painting on that bridge as the best ever secured in his experience. A much better coating of the steel can undoubtedly be obtained in field painting than in the shop on account of the superior skill of the men employed in this work, the ability to clean the surface well, to wait for favorable weather conditions, and to inspect the work competently.

Some men may agree that small structures, such as plate girders, signal bridges or highway structures, whose erection would usually follow closely after the ordering of the material, may be given the first coat of paint in the field with good results, but will hesitate to let steel in large structures, which may be held from one to two years, or even longer, before erection, go from the shop unpainted. It would be impossible to fix any limit to the age of steel beyond which it would be of doubtful expediency to let it go unpainted. The condition of the metal at a given age depends on a large number of factors, including the condition under which it has been stored, the climate, etc., so that one lot of material might lose materially in weight and show objectionable rust scales, when another lot of the same age that had been exposed less, would have the rolling scale removed, but would show only a red rust that could easily be removed and would leave little doubt as to the ability of a good coat of paint to stop corrosion.

In addition to the question of the degree of protection afforded by shop painting or field painting, the ultimate cost must be taken into consideration. There is no doubt that the cleaning required on the Lake Erie & Eastern structures is expensive, and, in view of the thorough manner in which this work is being undertaken, it is conceded that the cost of the three coats and the one cleaning will exceed that of one shop coat, a superficial field cleaning and two additional coats of paint. Time alone will determine the life of the paint, but there seems little question that it will be increased. The Pittsburgh & Lake Erie engineers are to be commended for taking a step so much in advance of current practice, and the outcome will be watched with interest.

NEW BOOKS

The Railway Library for 1913. Compiled and edited by Slason Thompson, director of the Bureau of Railway News and Statistics, Chicago. 469 pages, 5 in. by 7 in., bound in cloth. Published by the author, Chicago. Price 50 cents.

This is the fifth annual issue of "The Railway Library," the first of which was issued in 1909, and, like the previous edition, it brings together selections from the noteworthy addresses and papers of the year relating to railway subjects. As in former issues, the concluding chapter consists of the annual statistical report of the Bureau of Railway News and Statistics for 1913, in which is presented the latest information in regard to American and foreign railways, the space devoted to the latter being greatly increased. The general rule has been to restrict the selection of articles to matter first given to the public in the year 1913, but the date of publication enables the inclusion of several articles of the current year. As in previous editions, the plan governing the selection of material has been to place in permanent form an outline of the principal railway problems of the day, as expressed in public reports and in the utterances of railway authorities, including practical railway men, members of railway regulating bodies, and economists, which have appeared in the form of addresses or in periodicals, and which might not otherwise be readily available to those who may be interested.

The volume opens with a brief summary of "Fifty Years of British Railways," abstracted from the Jubilee Number of the London *Railway News* for the purpose of presenting a comparison of the problems that have confronted railway builders in the United States and Great Britain. Railway conditions as they exist at the present time are outlined in the testimony of President Samuel Rea of the Pennsylvania Railroad before the Interstate Commerce Commission in the advanced rate case. Immediately following is a group of papers presenting the same situation from several different angles, including papers by B. H. Meyer of the Interstate Commerce Commission on "Certain Considerations in Rate-Making," and "Prices and the Raising of Rates," by Clement Colson of the French Institute.

Then follows a series of articles relating to the nationalization of railways, treated from the historical, political and economic points of view. This group includes the concluding chapter of Samuel O. Dunn's recent work on "Government Ownership of Railways," and an exhaustive synopsis of Prof. W. J. Cunningham's "Analysis of the State Railways of Prussia-Hesse," and an article on the Belgian railways by M. A. Pierrard, director of the Belgian Marine Administration. Papers devoted to the labor situation include an address on "Mediation and Arbitration" by Seth Low, president of the National Civic Federation; an article on "Labor Unions and the Railroads" by J. O. Fagan; an address on "Workmen's Compensation" by Frank V. Whiting, general claims attorney, New York Central Lines, and an article on the Sunset Lines Strike from the *Railway Age Gazette*. The trespassing problem is dealt with in an article on "A Nation's Neglect" by Marcus A. Dow, general safety agent, New York Central Lines, and the various questions involved in the valuation of railroads are discussed in an address by C. A. Prouty, director of valuation for the Interstate Commerce Commission.

Other articles include an article on the apportionment of expenses to suburban traffic on the Southern Pacific electric suburban service in Alameda county, reprinted from the *Railway Age Gazette;* "Are Increased Trainloads Practicable," by Charles F. Speare, from the *Railway Age Gazette;* "Fair Pay for Carrying the Mails," by Ralph Peters, chairman of the Committee on Railway Mail Pay of the American Railway Association; "The Ohio Floods in 1913," by Lewis S. Bigelow; "The New Haven Situation," by Howard Elliott; "Canals and Railways," by W. M. Acworth, and "War Time Railroading in Mexico," by Major Charles Hine.

Letters to the Editor

BUSINESS PROBLEMS AND THE ECONOMISTS

Philadelphia, Pa., July 12, 1914.

To the Editor of the Railway Age Gazette:

The article, "Methods of Railway Taxation in Michigan," by Prof. Friday, in your issue of June 12, 1914, was read by me with a great deal of interest.

It was my good fortune to graduate from the University of Michigan, and to know personally both Prof. Friday and Prof. Adams, and know both of them very well, both in and out of the class-room.

All that Prof. Friday has said is perfectly true, and the railroad situation in the state of Michigan is a serious one at the present time. I do not mean to say that it has all been brought about by legislation and taxation. That would be going too far. But certainly the taxation method at present employed in that state does not seem fair, to put it mildly.

Men in our state universities can do a great deal, if they choose, to help mold public opinion. I think that holds truer in the West than here in the East. I only regret that there are not more men in our universities like Prof. Friday and Prof. Adams —I mean men who engage in outside work, who come in contact with the actual problems of the present day; not men who shut themselves up and proceed to work out the problems by theory. Modern business problems cannot be solved that way. I have realized this, because since my graduation I have become engaged in railway work and I have found very little of the theoretical in it.

Charles E. Fisher.

THE ROCK ISLAND'S MOTION PICTURES

Chicago, July 3, 1914.

To the Editor of the Railway Age Gazette:

I have read with interest your notes, printed June 26, concerning motion pictures, and their use on the Pacific Electric Railway for the instruction of employees. L. F. Shedd, general safety supervisor of the Rock Island, has used motion pictures for some time. The Rock Island Lines Safety Bureau was organized August 1, 1912, and a reel of motion pictures for instruction in "safety first" and "prevent injury" was made use of very early in the campaign. This reel has been shown before upwards of 25,000 persons, including railroad employees and their families, city officers and the general public.

The pictures were taken at Rock Island yards and stations, and therefore have a very direct home interest for Rock Island employees; but they have also been used some by other roads. Dangers are illustrated in a real way, yet nothing gruesome is shown; no loss of life or limb and no shedding of blood. Many of the subjects are those with which your readers are already familiar, from photographs which have been published broadcast. For example, getting on to the front of a moving switch engine; this is shown in actual movement instead of a dead picture such as must be used in giving instructions by circular. The companion picture to this is one showing a man boarding the foot board while the engine is at a standstill. Companion pictures are in like manner shown to represent the dangers of hanging on the side of a freight car, where the man strikes a low switch stand; passing between freight cars while they are in motion to loosen a coupling pin; kicking a drawbar into position while cars are moving towards the train man; grabbing the handhold on the front end of an approaching car and riding there, with feet on the brake beam; car inspectors nearly injured by reason of having failed to use the blue flag; jacking up a car and taking out the trucks, leaving the body resting on the jacks as its only support; moving a string of freight cars over a street crossing with no one on the leading car; passenger attempting to board a moving train; scenes in the car shops, etc.

Mr. Shedd has been very successful in getting the families of employees interested; and not only these families, but their neighbors, the general public. In many towns, the mayor has acted as presiding officer, opening the public meeting.

There is no question of the value of this kind of instruction. As you have suggested, in your editorial, it is very desirable, if not necessary to have other and entertaining features in connection with lectures on motion pictures. One good plan is to get a committee of employees actively interested in the entertainment features. At one of the Rock Island shops there is an excellent glee club, which has done good service in the way of entertainment. Even in small places, where the formation of a glee club is not, perhaps, practicable, individuals who can sing, or speak, or play musical instruments, can increase the interest. Local talent is always well appreciated.

G. E. M.

AMERICAN SOCIETY FOR TESTING MATERIALS

Philadelphia, Pa., July 20, 1914.

To the Editor of the Railway Age Gazette:

The reference to the recent annual meeting of the American Society for Testing Materials, held at Atlantic City, N. J., June 30-July 3, as well as the editorial relative to the Society in your issue of July 10, are both calculated, in my judgment, to convey impressions that are not only erroneous but unfair to the Society.

Your brief review of the annual meeting contains the following statement with reference to the discussion following my paper on "A Critical Review of the Procedure Governing the Adoption of Standards":

> Attention was called in the first place to the low estimate in which many of the specifications of the Society were held by the users of materials on the ground that they were voted upon by men who had no knowledge or experience to guide them in their decision.

I wish to challenge the correctness of the sweeping statement that many of the specifications of the Society are held in low estimate by the users of materials. Permit me to say that in my long and active connection with the Society extending over a period of 16 years, I hear for the first time objections to its standard specifications based on the ground here alleged, namely, that the value of specifications should be judged, not on their intrinsic merits, but on the fact that as a final act in their adoption, the proposed standards are referred to letter ballot of the Society at large, and therefore to the vote of a group of individuals of whom many are not qualified to pass expert judgment on a given specification.

The wisdom of adhering to the present policy, by which specifications are finally subjected to letter ballot of the Society, is concededly debatable, and this question was, as a matter of fact, submitted for discussion in open meeting at the recent convention. This was done, however, with no thought that the continuance or discontinuance of this feature of the procedure might serve to raise or lower the high estimate which now attaches to the standards promulgated by the Society, under a system so elaborate that its description in detail would prove wearisome to your readers. Suffice it to say, briefly, that this system provides that proposed specifications are first voted on by the sub-committee with which they originate; second, by the parent committee by which they are reviewed; third, by letter ballot of the entire parent committee; fourth, at the annual meeting of the Society; and, fifth, by letter ballot of the Society at large. To refer a proposed specification to letter ballot requires a two-thirds vote of those voting at the annual meeting.

In that connection permit me to quote the following statement from your editorial:

> Piazza talk sometimes is a far better indication of what men are really thinking than the discussion on the floor, and at Atlantic City last week there was more than one hint thrown out that the committee reports are getting to be dominated by the manufacturing interests. This may or may not be true, and one can only be convinced one way or the other by a careful consideration of the reports in the fullest detail. But the point is that there should be no suspicion of such a thing.

It is indeed surprising that a journal of your standing should give space in an editorial, and on so shadowy a basis as

"piazza talk," to a statement which strikes at the very root of the principles on which the Society must stand or fall. That the charge is fundamentally unfair can be best shown by the following presentation of facts and figures, which, except as to the analysis of the vote between producers and consumers in the accompanying table, were all available in printed form at the recent annual meeting of the Society.

In my own paper I called attention to the fact that on 27 of the 28 technical committees dealing with matters having a commercial bearing, "the non-producers outnumbered the producers, and, on the average, in the proportion of seven to four." Committee A-1 on Standard Specifications for Steel, whose work you criticised, consists of 71 non-producers and 37 producers. In my paper, previously referred to, it is stated that according to the records of this committee "the total attendance at the seven meetings held since January, 1913, was 251, divided in the proportion of 158 to 93 as to consumers and producers, respectively." On this committee many of the leading railroads are represented by able and aggressive men who would promptly withdraw from the committee if any ground whatever existed for the charge advanced in your editorial. In further answer to that charge I adduce below, in tabular form, a detailed analysis of the vote of this committee on each subject recommended for action by the Society at the recent annual meeting, from which you will note that with the single exception of the proposed revision of the standard specifications for steel rails, than which there is perhaps no subject on which it would be more difficult to harmonize conflicting opinion, the vote of the committee on every item is one of substantial unanimity.

Analysis of Vote of Committee A-1 on Standard Specifications for Steel

Membership: Consumers, 71; Producers, 37; Total, 108

Proposed Standard Specifications; New and Revised.	For adoption			Against adoption			Not voting		
Revisions in present standard specifications:	C.	P.	T.	C.	P.	T.	C.	P.	T.
Low carbon steel splice bars	37	20	57	4	0	4	12	9	21
Medium carbon steel splice bars	36	20	56	6	0	6	11	9	20
High carbon steel splice bars	36	20	56	6	0	6	11	9	20
Extra high carbon steel splice bars	36	20	56	6	0	6	11	9	20
Structural steel for bridges	42	23	65	1	0	1	10	6	16
Structural nickel steel	42	18	60	1	0	1	10	11	21
Structural steel for buildings	42	23	65	0	0	0	11	6	17
Shapes, mill plates and bars	37	23	60	1	0	1	13	6	21
Billet steel reinforcement bars	39	21	60	0	0	0	14	8	22
Carbon steel car and tender axles	35	22	57	2	1	3	16	6	22
Cold rolled steel axles	33	19	52	0	0	0	20	10	30
Proposed revised standard specifications to supersede present standard specifications:									
Carbon steel rails	29	18	47	12	2	14	12	9	21
Carbon steel and alloy steel forgings	42	24	66	1	0	1	10	5	15
Quenched and tempered forgings	37	21	58	1	1	2	15	7	22
Carbon steel forgings for locomotives	37	25	62	0	0	0	16	4	20
Proposed new standard specifications and methods:									
Structural steel for cars	39	23	62	2	1	3	12	5	17
Carbon steel bars for springs	36	21	57	3	2	5	14	6	20
Chemical analysis for plain carbon steel	41	26	67	0	0	0	12	3	15
Miscelloneous:									
Recommendations relative to fracture	47	27	74	1	0	1	5	2	7

Votes cast, 82; not voting, 26; total, 108.

Note.—C. = consumer; P. = producer; T. = total.

While the above table is limited to the records of a single committee, I wish to point out that the analysis of the vote of every committee on such matters as were recommended for action by the Society, and on the report as a whole, is recorded in its printed report, and that all matters on which favorable action was taken at the recent annual meeting of the Society were recommended with substantial unanimity on the part of the committees concerned. This circumstance, in connection with the consideration of the published personnel of the committees, should serve as a definite and conclusive answer to any unwarranted inference from your allusion to "piazza talk."

Your editorial further stated that "there are some of the specifications that have been referred to letter ballot at this meeting that appear to be useless," and, as an example, you single out the specifications for cast iron for use in locomotive cylinders. In commenting on this you say:

It is doubtful if the few large locomotive builders of the country would allow their methods of foundry practice to be modified by the specifications of the Society, nor is it conceivable that any railroad making its own cylinders would consider itself bound to use these specifications for its own work simply because it has been adopted as a standard by this Society.

In reply it may be said that the proposed revision of these specifications, recommended at the recent annual meeting, was made at the joint desire and with the direct co-operation of representatives of leading locomotive builders and railroad interests because it was felt by both parties concerned that a proper specification for this class of material did not exist. Since these specifications have been revised in accordance with the joint wishes of makers and purchasers of locomotives, it is to be anticipated that they will be widely used.

In your editorial reference to the Electric Railway Association in the matter of heat-treated axles as applied to motor axles of electrically driven cars, you state in substance that the negative action in this matter was inconsistent with the action in the case of steel springs for automobiles, and with the recognition accorded to the Master Car Builders' Association in connection with the discussion of another matter on the floor. Permit me to point out that the two cases—the one relating to springs and the other to axles—are wholly different in that the requirements for springs for automobiles differ essentially from those for springs for railway cars, whereas in the case of axles the requirements of the leading railways in connection with their electrically driven cars are practically identical with those of the constituent companies of the Electric Railway Association. In the case of the railways the same engineers are in responsible charge of the purchase of axles for both steam and electric motor cars. The numerous representatives of the railway interests on Committee A-1 were unanimously of the opinion that the specifications recommended for adoption on the part of the American Society for Testing Materials would insure a better product than those proposed by the Electric Railway Association. In the letter ballot of Committee A-1 on these proposed standard specifications only two negative ballots were cast, as noted in the above table.

The unfair attitude of the editorial is further evidenced in the regret "that there are not more papers giving the results of the personal research work of the members. Many of them are engaged in work of this character all of the time and it is regrettable that more of it does not come to the light of day at these meetings." In reply it is only necessary to call attention to the fact that no fewer than 32 papers of this character, aggregating 409 printed pages, were presented at the recent meeting. In explanation of the supposed paucity of material of this kind you suggested in your editorial, that "men do not like to present the results of their work in which they are vitally interested to a meeting in which their own presentation must be limited to a few minutes and the discussion thereon to seconds." Without dwelling on the manifest exaggeration of this statement, I shall content myself by reaffirming that the complaint is directed against something which has no existence, and that the value of verbal, as distinguished from written discussion, has its distinct limitations irrespective of the time element. The writer of the editorial appears further to have lost sight of the vast amount of research work conducted by the technical committees as an essential basis of their recommendations, and other research work done under their auspices solely with a view of promoting knowledge within their respective fields.

The general unfairness of the editorial lies, however, not merely in that which was said, but, in no less an important degree, in that which was left unsaid. As a single example attention may well be called to the valuable report of 125 pages on the part of Committee D-1 on Preservative Coatings for Structural Materials, which both your review and your editorial criticise in the allusion to the Havre de Grace and Atlantic City paint tests.

Edgar Marburg,
Secretary-Treasurer.

Railroad Development in the Philippine Islands

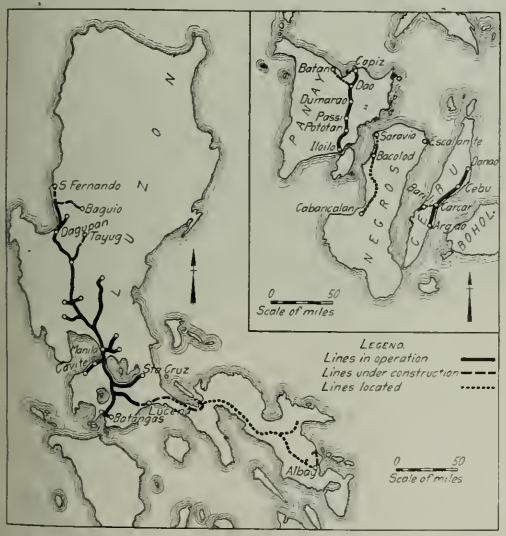
A Discussion of the History, Engineering Features, Organization and Traffic Problems of These Roads

By C. H. Farnham

Formerly Chief Engineer, Cebu Division, Philippine Railway Company

The question of transportation was one of the most difficult problems with which the American military forces had to cope in their early campaigns in the Philippine Islands. There was hardly a road that was better than a rough trail. There was one line of railroad running from Manila north to Dagupan, on the Island of Luzon, and this road was partially destroyed by the Filipinos in their retreat before the American advance. It was rebuilt as fast as the American forces took possession, and was operated by soldiers as a military railroad for the use of the army in its campaign. Thus almost from the first, American influence began to be felt in the railroad development of the Islands.

This first railroad in the Philippine Islands was called the Manila & Dagupan, and was built and owned by an English company under a concession from the Spanish government. It was first operated in 1892. It is the oriental gage, (3 ft. 6 in.), and 122 miles in length. The country through which it runs is



Map of Railroad Lines in the Philippine Islands

a great alluvial plain, with numerous rivers and swamps and is densely populated, and one of the richest rice growing sections in the islands. The construction is light for the greater part of the line, although there are several fairly expensive bridges, the one crossing the Rio Grande de Pampanga at Calumpit having cost $500,000. A section, several miles in length, in the Province of Tarlac, is subject to bad washouts during the rainy season, and must have cost a considerable amount in repairs since the line was first built. This condition is caused by the overflow of the Tarlac river.

Before American occupation the equipment was all English, consisting of the old style compartment coaches for passengers, small goods vans, and light engines. The operating force consisted of a few Englishmen in charge of departments, and in the head office at Manila. All train crews, section gangs, shop crews, station agents, telegraph operators, and the greater part of the clerical force, were Filipinos. All of these natives had been trained by an English manager and his assistants, who had been sent out from England to build and operate the road. Business was none too brisk, and the road just about managed to keep its head above water. It never paid a dividend. When the Spanish war broke out in 1898, followed by the Filipino insurrection in 1899, the road was put entirely out of business. Much of its property was destroyed, and from 1899 to 1901 it was operated as a military railroad by the United States army.

Under the army, the line was repaired and put in shape so that trains could be run; rolling stock was repaired, and new engines and cars were brought from the United States, this being the first American equipment introduced into the islands. The operating forces were American soldiers, and some civilians picked up in Manila. As soon as a measure of law and order was restored along the line, and while yet under the military control, a considerable amount of commercial business was done. Finally in 1901, the line was turned over to the English company and was again operated by it in much the same manner as before.

This was the railroad situation in the islands in 1901, when the civil government was established, and it remained practically unchanged until 1905. There were several small branch lines built by the Manila & Dagupan under concessions granted by the Philippine government. This company also improved its main lines, bought new rolling stock, rebuilt some of its stations and gradually increased its business from year to year.

Among the first things to which the new civil government devoted its attention was the improvement of the means of transportation. To this end it started a road building program. The question of railroads was also taken up very early, but it was a much less pressing and a far greater financial question than the building of ordinary highways.

Under an act of the United States Congress, approved July 1, 1902, the Philippine government was authorized to grant concessions for railways and under an act dated February 6, 1905, it was allowed to guarantee the interest on bonds issued for the construction of railroads. Acting under the authority of these laws, the Bureau of Insular Affairs at Washington, on June 12, 1905, advertised for bids to build certain railroad lines in the Philippine Islands. The lines advertised were located as follows:

Island of	Luzon	833 miles
"	Panay	100 "
"	Negros	100 "
"	Cebu	95 "
"	Layte	55 "
"	Samar	50 "

Several bids were received by the bureau, but as they all departed materially from the terms of the proposal, they were rejected.

New proposals were advertised by the bureau on December 20, 1905. These modified the conditions in many ways, and allowed more latitude to prospective bidders. To this second proposal two bids were submitted, one by Speyer & Co. for certain lines on the Island of Luzon, and the other by a group of New York financiers headed by William Salomon & Co., and including among others, J. G. White & Co., Cornelius Vanderbilt and Charles M. Swift, who proposed to build the lines on Panay, Negros and Cebu. The proposals were accepted by the bureau, and resulted in the formation of two railroad companies. The Manila Railroad Co. took over the concessions granted for the

lines on the Island of Luzon. The Philippine Railway Company received the concessions for the building of lines on the Islands of Panay, Negros and Cebu.

THE MANILA RAILROAD COMPANY

The Manila Railroad Company was organized under the laws of New Jersey in 1906, and took over the concessions granted to Speyer & Co. This company also acquired control of the old Manila & Dagupan line, thus placing all the lines on the Island of Luzon under one management. As a matter of fact, the English owners of the old line are largely interested in the new company, and the same management that operated the old Manila & Dagupan line now operates the new lines, so that it is really but an expansion of the old company.

The lines that this company operates and is building are divided into two main divisions, based upon the fact that some of them have the interest on their bonds guaranteed by the Philippine government in the same manner as the Philippine Railway Company lines, and that others have not this guarantee. It was at first intended to build all the lines without the guarantee, but a modification was made in 1910, and part of them were placed on the guarantee basis.

The Northern, or unguaranteed lines, consist of the old Manila & Dagupan of 122 miles; several small branches built under concessions from the Philippine government prior to 1905, totaling 95 miles; and new extensions from Dagupan to San Fernando de Union and Camp One, also three branches in Pampanga and Tarlac provinces, with a total of 137 miles. This makes a total of 354 miles in this division. All of these lines are either in complete operation or are under construction, with the exception of one small branch of 20 miles in Pampanga province. About 27 miles are under construction, mostly on branch lines. There is also a line under construction from the Dagupan-San Fernando de Union line to Baguio, the summer capital. While this line is physically a part of the Northern Division, it is a guaranteed line, and is included in that division. At present the route used to reach Baguio is by railroad as far as Camp One, and then by stage over the famous Benguet road. All of these lines are through one of the best sections of the islands, and have a large and comparatively prosperous population to serve. They are doing an increasing business from year to year, and really form the backbone of the whole Luzon system.

The Southern, or guaranteed lines, consist of all lines south of Manila and the Baguio Line. The main line south runs from Manila to Albay at the southern point of the Island of Luzon, a distance of 355 miles. At present this line is complete and in operation as far as Lucena, a distance of 88 miles from Manila. The Batangas, Cavite and Santa Cruz branches are all completed and in operation, with a total of 88 miles. The Baguio line of 25 miles and 95 miles of the main line south, are under construction at the present time. This makes a total of 468 miles in the southern lines, of which 176 miles are completed and in operation, 120 miles are under construction, and 172 miles have not yet been put under construction.

The following is a statement of the proposed construction and completed mileage:

	Northern Lines	Southern Lines	All Lines
Completed	306.6 miles	176.1 miles	482.7 miles
Under construction	26.8 "	120.5 "	147.3 "
Const. not commenced	20.9 "	171.9 "	192.8 "
Totals	354.3 "	468.5 "	822.8 "

The lines already built and in operation have done a very good business and their future ought to show a substantial increase. They are in a populous and rich country, and are all within a short distance of Manila, a city of 235,000 inhabitants and the commercial metropolis of the Archipelago. During 1912, about 40 miles of line was completed and placed in operation. In 1913 less than 20 miles was opened. The company expects to complete all lines by 1918. This gives four years in which to complete 340.5 miles, or 85 miles per year, and while this is greater progress than has been made during the past two years, it is not impossible.

The lines are all the standard (Oriental) gage—3 ft. 6 in. with 2 per cent. grades and 8 deg. curves on most of the lines. None of the lines built so far comprises heavy work. Sixty pound rail and native hard wood and Australian ties are used. Native contractors were employed quite extensively on this construction. They proved fairly successful on grading, but did not do very well on other parts of the work, and most of the other construction was done by day labor.

The Baguio line, now under construction, has three rack sections. It runs through a very mountainous country, and reaches an elevation of about 5,000 ft. When completed, it will furnish rail communication between Manila and Baguio. Baguio is in the high tablelands of Benguet, and is a cool, healthful resort, much frequented in the hot season from May to July. Benguet is also quite a mining country, with rail communication to the coast and this industry ought to make rapid advances.

The remainder of the main line south will, when completed, furnish an all-rail route from Manila to the great hemp producing regions of Albay, but it will have to compete with the present water route. The intervening country between Albay and Lucena is not developed, and will furnish little business. It

Constructing a 13,000 yd. Fill on the Island of Cebu

looks as though the road will have to develop it and build up a local traffic. It may take years to do this, but eventually this whole section ought to pay as well as any of the lines.

The lines in operation have 20 locomotives, 47 passenger cars, 324 freight cars and 49 work cars per 100 miles.

THE PHILIPPINE RAILWAY COMPANY

The Philippine Railway Company was incorporated in 1906, under the laws of the state of Connecticut. It owns and operates 73 miles on the Island of Panay and 60 miles on the Island of Cebu. These lines have been built in accordance with the terms of the concession granted the original syndicate and later transferred to the company. In addition to the above, there was included in the original concession 22 miles of branch line on the Island of Panay, and 100 miles on the Island of Negros, also an optional branch line of 35 miles on the Island of Cebu. The construction of these various lines has been either abandoned, or indefinitely postponed with the consent of the government.

Under the terms of the concession granted this railway by the Philippine government, the interest on the 4 per cent. gold bonds is guaranteed for a period of 30 years. It fixes the tax rate at ½ per cent. of the gross receipts for a period of 30 years, and 1½ per cent. for 50 years thereafter. The company is allowed to issue bonds for 95 per cent. of the cost of construction.

On April 29, 1906, the first party of engineers, consisting of

50 men, sailed from Seattle to begin the surveys for this line. They arrived at Manila on June 10, and all were in the field by June 20. Surveys were begun on the Islands of Panay, Negros and Cebu at the same time. Practically all that was determined by the concession was the terminals of the different lines. There were very few maps available, and even these were very inaccurate. The locating engineers had to get for themselves a great deal of information that is generally derived from government maps, reports, etc., in a more civilized country.

As fast as possible the preliminary lines were run, and the final location determined, and run in on the ground, and submitted to the government for approval. By November, 1906, enough of the line had been located on the Islands of Panay and Cebu, to begin construction, and the first sod was turned by Governor-General Smith at Cebu in November, 1906.

A Bridge with Enlarged Foundations on Soft Mud Foundation

As finally located, the lines presented no remarkable engineering features, and involved fairly heavy construction for a new line in a new country. The standards of construction were fairly high, but met with the approval of the government. The lines were located and constructed with a view to getting as low a cost of maintenance and operation as possible. This increased the first cost considerably, and therefore the fixed charges. One of the determining factors was that there was no provision for a future increase of bonded indebtedness, and consequently it was necessary to get everything in under the original bonds or probably not at all. In consequence it was a very complete piece of construction, in fact much more complete than is the case with most roads in similar country.

The islands upon which these lines are located are a part of the Visayan group, and lie 300 to 500 miles south of Manila. The Island of Panay has an area of 4,611 square miles, and a population of 743,646. Tributary to the railroad is a population of 135,000, or 3,500 per mile, with a density of 198 per square mile. Iloilo is the southern terminus of the line of this large island. It is the great sugar port of the Philippines, and is a large commercial center. It has a population of 45,000. There is a protected roadstead, and the Iloilo river has been dredged to 24 ft. as far as the railway terminal.

The line runs from Iloilo in a northerly direction, through the central portion of the island, to the town of Capiz on the north shore. From Iloilo to Passi, the line traverses a wide alluvial plain. This is a rich country, and formerly all of the low lands were cultivated, but owing to the loss of work animals by an epidemic, only about 15 per cent. of the best land is being tilled at the present time. From Passi to Dumarao, the line passes over a range of hills which form the divide between the plain of South Panay and the North plain or valley of the Panay river. Very little of the country has been cultivated, but all admits of cultivation, and will be eventually.

In the valley of the Panay river are located the great rice fields. From Dumarao to Capiz, the line passes through this valley which is subject to heavy floods, and in order to keep the tracks above water, very heavy and expensive embankments were made. The whole construction from Passi to Capiz is heavy work both in bridging and grading. It was originally intended to build a line from Dao to Batan on the north coast of Panay, but it was indefinitely postponed, and will probably be abandoned.

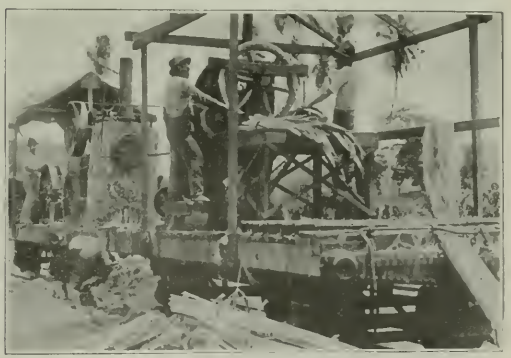
The Island of Negros has an area of 4,481 square miles, and a population of 460,775, of which 249,000 are tributary to the projected railroad between Savaia and Cabancalan, or an average of 3,720 per mile of road with a density of 180 per square mile.

The general topography of the country consists of a heavy mountain range along the east coast and in the southern portion. This slopes down into a flat coastal plain on the west, which is the great sugar producing region of the Philippines. The proposed line runs through this section from north to south, and from one to twelve miles from the coast.

In all this part of Negros, there is no seaport, and the plans as finally worked out, provided a pier and breakwater protection at Bacolod with a water transportation line between this point and Iloilo, which lies 20 miles across the Guimaras straits.

A line was projected around the north coast of the island from Saravia to Escalente, but detailed surveys proved it to be too expensive, and the country so poor, that it was abandoned with the consent of the government. The line south has been indefinitely postponed, and while it may be built in the future, it will probably not be before the lines already built show better returns than at present.

This whole section of Negros is naturally very rich, and with modern methods of cultivation and manufacture, can produce as large a yield of sugar as anywhere in the world, but the sugar industry is fully 50 years behind the times. It is only very recently that a modern central was built at San Carlos on the east coast, while there is room for at least two on the west coast, but there must be a change in the methods of cultivation and that may mean years of education. There is no reason why this island should not be as rich in sugar as Hawaii or Cuba, and when this time comes, the proposed line, and many additional miles will be built.



A Maguay Stripping Machine Provided by the Railway to Clean Fibre for the Natives Without Charge

Cebu is a long, narrow island, about 1,762 square miles in area, the center of which consists of a series of mountainous ridges skirted by a more or less flat coastal plain upon which the greater part of its people live. This coastal plain is highly cultivated as are many of the hills. The population is 592,000, or

about one-eleventh of the Philippine Archipelago. The population tributary to the railway is 309,500, or about 5,158 per mile of road. The density of population along the line of railway is about 515 per square mile. Cebu, the capital and principal city, is the oldest city in the islands, and is the great hemp shipping port of the southern group. Most of this hemp, however, does not originate on the Island of Cebu, but is brought from the neighboring islands for grading, baling and shipment to Europe and the United States. Cebu has a modern port recently built by the government. Steamers drawing 25 ft. of water can lie at this dock and discharge. The railway line connects with this dock.

The line on Cebu is located between Danao, 20 miles north of Cebu, and Argao, 40 miles south. It runs through the populous towns of the coast and along the rich coastal plain, which is from three to six miles wide. This plain is cut by numerous streams and ridges, and parts of the line required fairly heavy grading and bridging.

A line was located from Carcar, 23 miles south of Cebu, across the island to Barili on the west coast. This was an optional line under the concession, but was not built, and it will have to wait until the development of the country will show that such a line will pay.

CONSTRUCTION PROBLEMS

The labor question was the greatest problem that had to be solved in the construction of these lines. The problem of location and design of the various structures, while possessing many new and novel features, was one that admitted of fairly easy solution by the same methods that are used in this country. When a line of railroad is to be built in the United States, it is the general rule to prepare plans, estimates and specifications and then advertise for bids, and to finally contract for the work to be done by one or more contractors. These contractors have the necessary plant, superintendents, and experience gained by many years of similar work. Such a procedure was out of the question in the Philippines. There were no contractors, except a few small firms in Manila and some of the larger towns, and none of these firms possessed the plant, capital or men to undertake a contract of such magnitude. There was not a body of experienced construction men in the Islands from which to draw superintendents, foremen and mechanics. The company decided, that under these circumstances, the best results would be obtained by employing a responsible contracting company to take entire charge of all the engineering and construction work, thus placing all work under one head, and giving this company the greatest latitude in which to meet new conditions as they might arise. J. G. White & Co. of New York was therefore given the contract. This company had handled work all over the world, and had built the Manila Railroad & Light Company. In the construction of this electric line, they had done some very excellent work with native labor, and thus had some experience to help them in this new undertaking.

The organization was finally worked out with a vice-president and chief engineer of the railway company with headquarters at Manila; a chief engineer of J. G. White & Co., with headquarters at Iloilo, and division engineers at Cebu and Iloilo. The Philippine government was represented by the supervising railway expert, who had under him inspecting engineers at Iloilo and Cebu.

All plans had to be approved by the government and all work was subject to inspection. All accounts were audited and approved by the government. Preliminary bond issues were made for each 20 mile section of line opened for traffic, and final issue was made upon its completion and approval of the government.

The division engineers at Cebu and Iloilo had entire charge of all engineering, construction and operation, and reported to the chief engineer at Iloilo. The native workmen were paid daily by a pay check that was redeemable in cash by the company once a week. These checks soon passed as currency among the trades people along the line. The white foremen, mechanics and clerks were paid monthly.

At first a contract was made to feed all native laborers and also to run boarding houses for foremen, mechanics, etc., but this was found to be unsatisfactory in many ways, and was revoked. Native workmen were then fed only in out-of-the-way places, where it was impossible for them to secure food from a nearby settlement. The company furnished good, substantial board to its foremen for $25 per month. This board cost the company $30, but even at this loss, it paid to feed the men well, and keep them contented.

At Cebu and Iloilo, there was maintained a complete hospital, with doctors, nurses and all modern appliances, and at various times small temporary hospitals were maintained on the work as needed. The surgeons not only took care of the sick and injured, but made frequent inspections of all camps and quarters, and drew up rules and regulations for camp hygiene, which were strictly enforced.

When construction work was first started, there were very few natives on either island, who had ever seen a railroad, much less knew anything about the construction of one. There had been some little road building by the government, and J. G. White & Co. had a contract for certain port improvements at Iloilo and Cebu. This, however, was about all the construction

Typical Second Class Station at Sebonga Showing Passing Siding and Block Signal

work done, and from there a certain number of experienced native foremen could be obtained. For the greater part of the labor, it was necessary to depend upon the natives of the Southern Islands, while white superintendents and foremen were mostly picked up in Manila, and quite a number were sent out from New York. Most of the men picked up in the islands were a rough lot, including many ex-soldiers, but they generally spoke the native language, and understood how to handle the Filipino laborer and were acclimated.

The native laborers had to be taught everything, including how to handle a pick and shovel and to wheel a wheelbarrow, but they were willing as a rule and showed steady development. In this same way, gangs had to be taught track work, concrete work, steel erection, in fact, everything that had to be done in order to build a modern railroad. At first it was very discouraging, and unit costs were very high, even with 25 cents per day for labor. It required so much supervision which was expensive, and not very efficient. At the end of a year there was marked improvement, and as the force became more experienced and better organized, unit costs went lower and lower, until they compared favorably with similar work in the United States. Gradually the natives learned the work, and in time a number of native foremen were developed who replaced some of the lower grade of white foremen. Some few really first-class native foremen were developed by the close of the

construction period. At one time there were employed on the Cebu line about 5,000 natives and 250 white men. Fully as large a force was employed on the Panay line when the force was at its maximum.

MATERIALS

All materials, tools and supplies had to be shipped in, as the islands on which the lines were built furnished nothing but the gravel and sand used for ballast and concrete. Native hardwood ties were shipped from neighboring islands, mostly from Mindanao. These ties cost $1 each by the time they were in the track. Ties cut from first group timber are very durable and have a life of 25 or 30 years, but it is very difficult to distinguish the woods grown in the islands, and consequently, many inferior ties would get in, in spite of careful inspection. Many of

A Regular Passenger Train at Cebu Station

these ties would not last over a year or two. All ties had to be bored, as the wood was too hard to take a spike. Lumber was shipped from mills on the islands of Negros and Mindanao, and it was not very satisfactory for temporary construction purposes, such as trestles, forms, etc. All such lumber was manufactured from a native soft wood. It could not compare with Oregon fir for the same class of work, and a great deal of Oregon fir was shipped from the United States. The native hard woods were satisfactory but expensive for finish and car construction.

Gravel for ballast and concrete was obtained by dredging from stream beds. It was a good gravel, and made good ballast and concrete. Cement was obtained from the Green Island Cement Company, Hong Kong, China. Steel and concrete were used for all bridges and culverts. Reinforced concrete was used for all station buildings, roundhouses, train sheds, machine shops, storehouses, and, in fact, all building construction. An up-to-date, well equipped machine shop, with foundry, was built at Iloilo, and a smaller but complete shop was built at Cebu.

Seventy pound rail was laid at first, but most of the lines were laid with 60 lb. steel. Ample yard tracks and sidings were provided and turntables, water stations, roundhouses and trainsheds, were erected at all terminal points. At all order points standard train order two position signals operated by pipe connections from the station were provided. In fact, all the construction was planned to obtain as low a cost of operation and maintenance as possible. All structures were plain but permanent. The maximum grade was 1 per cent., except a short section of 1½ per cent. on the Panay line. The maximum curve of all lines was 6 deg.

All the material, tools and equipment from the United States had to be ordered a year in advance of the needs. In consequence of this, a very large supply of everything needed had to be carried in the storehouses at Iloilo and Cebu. Even with the best of care and forethought, things were constantly needed that were not on hand and not to be had in the local markets. Such needs were largely supplied from the company's shops at Iloilo and Cebu. These shops were quite extensive during the construction period. And here everything from a locomotive to office furniture was built, including all the derricks, pile-drivers, gravel diggers, and many other necessary items of construction plant. All kinds of rolling stock was built with the exception of the running gear, which was sent from the United States. While supplying many pressing needs, the shops were at the same time training a force of Filipinos to do this necessary work when the lines went into commercial operation.

As fast as a 20-mile section was completed, it was put in operation, and so very early (September, 1907, on Cebu) it became necessary to organize an operating force. At first white engineers were brought from the United States, with whom were placed native firemen. At first all conductors and many brakemen were Americans, but soon all brakemen were replaced by natives. A trainmaster was in charge of all train movements, reporting to the division engineer. He had a white despatcher with a native assistant. From the first the telephone was used for the transmission of all orders. As fast as stations were opened for commercial traffic, station agents were installed, and trained by a traveling agent, who reported to the chief clerk Thus, during the progress of the construction work, there was being trained a force of natives that would be able to take over the work of operating the lines when the construction forces should leave.

OPERATING ORGANIZATION

As the track was laid, section gangs were put on under the charge of an experienced native foreman. These men worked under the direction of the general foreman of track, and had the advantage of a constant training for several years under good American track men. As the construction work drew to a close, many of the white engineers, foremen and mechanics had been replaced by natives, and the whole operating force was gradually brought down to as economical a basis as possible with safe and efficient operation.

The organization of the permanent operating force included the vice-president and chief engineer, who is the chief rep-

Passenger Station and Office Building at Cebu

resentative of the company in the islands, with an office in Manila, and the general superintendent in general charge of all operation, with office at Iloilo. Maintenance of way is in charge of an American roadmaster on each island, with Filipino section gangs of a foreman and two men to each five miles of track. Maintenance of equipment is under a master mechanic, with headquarters at Iloilo. A division foreman of machinery is in local charge at Cebu.

In the shops a few American foremen still remain, but most of the mechanics are Japanese, Chinese and Filipinos. The Filipinos are fast replacing the Japanese and Chinese. The enginemen are all Filipinos with an American traveling engineer in charge. Transportation is in charge of a superintendent on each island who is an American. Trainmen, agents, operators

and despatchers are all natives, and they are proving very efficient. Traffic is in charge of a traffic agent to whom the station agents report, as also do the Filipino traveling, freight and industrial agents. Clerical and accounting matters are under the auditor at Iloilo.

Great efforts are being made to build up agricultural production and to introduce new industries. The native traveling freight and industrial agents, under the direction of the traffic agent are all the time working with this object in view. The railway company has distributed some 4,500,000 Maguay plants in Cebu, which were furnished by the government. To encourage Maguay production, a fiber cleaning machine has been mounted on a flat car and is run to various points along the line where the fiber is cleaned for the natives without charge. Seed corn of a superior grade was purchased by the railway company in the United States, and distribution for the purpose of increasing the production per acre. High grade rice is imported and distributed to increase the production of this staple. Encouragement is being given to people to open up sugar plantations along the line in Panay. Through the native agents the people along the line are kept informed of the prices of their products, and markets are found for them if need be.

During the past few years the railway company has worked in conjunction with the government in helping the farmers grow their crops more scientifically. The railway maintains several experimental plants along its lines, and in this way instructs the farmer how to increase his production. The company also provides for a market bulletin which is placed at each station along its lines. In this way the farmer is in constant touch with the outside market. This innovation has brought good results.

Along these lines there are over 600,000 people, and thousands of acres of the richest agricultural land that is producing but a small part of its possible output. The people are very poor, have been very much oppressed, and afflicted in the past, and are but a few generations removed from savagery. At present they merely scratch a meager existence from the soil, but with the security and justice of a strong American administration, with the education that an excellent public school system is giving them, and with the civilizing factor of the modern railroad, they are improving from year to year. The time will come when they will be a much richer and more intelligent people than at present. One of the greatest factors that are helping toward that desired end, is the American railroad, and when that time comes it will reap its reward.

SOME VIEWS ON THE RATE CASE DECISION

President Ripley, of the Santa Fe, has written to the Traffic World a letter on the decision of the Interstate Commerce Commission in the Eastern rate advance case, in the course of which he says:

"It does not require 40 or 50 pages of printed matter to justify the trivial advance that is granted. Everybody who knows anything about it knows that the merchandise rates in central traffic territory are ridiculous, and that the requested 5 per cent is only a fraction of what the advance ought to be. It would not be difficult in that territory to pick out thousands of shipments the freight charges on which are not equal to the actual warehouse cost of loading and unloading, making no allowance either for hauling or interest on plant. The reasons for this are partly chargeable to the railroads, but largely also to the various 'regulatory' bodies.

"Nor did it require so much space to tell us that the passenger business is not profitable—we knew that already—but in fairness should it not also be stated that there has been a theory advanced by our rulers, and to some extent accepted, to the effect that the transportation of individuals freely and at minimum cost is a public necessity and a service which ought not to be expected to pay its full share of operating expenses? Our respected postmaster-general says that the United States mail is such an integral portion of the state, and of such necessity that it ought not to pay on the basis of other business, but so far as transportation is concerned, should be done at less profit than other business. The commission neglects to point out any way by which passenger rates may be advanced in view of the prevalence of statute rates in the states.

"The talk about various methods of saving in expenses is platitudinous but unconvincing to those of us who are 'in it.' If there is dishonesty in purchases or improper connection between business enterprises and railroad directorates it is just like any other kind of dishonesty, and should be punished accordingly, but it is not claimed that such charges are of general application—as a matter of fact, they can safely be denied as applying to any considerable number of carriers.

"As to free transportation, I have long been known as a radical, and, personally, I don't care how soon it is abolished, root and branch, but the figures given in the report as to the magnitude of the losses it causes are 'just piffle'; most of the deadhead mileage is that of employees on company business—much of the remainder is that of persons who in the absence of the free pass would not travel at all—and the amount of free transportation given to those who would otherwise pay fare is negligible.

"The whole document brings forcibly to my mind the saying of our old friend, Sancho Panza:

> Whether the rock hit the pitcher or the pitcher hit the rock is all one to the pitcher.

"Here are a lot of railroads unable to live on present rates, to whom the relief is admittedly inadequate, and the commission, after 14 months and an expenditure of money totally out of proportion to the importance of the case, gives them a fraction of the fraction they asked for, accompanied by a sermon upon other and unrelated matters, which are either impossible of remedy or unimportant. Verily, 'the mountain has labored and brought forth a mouse.'"

The Chicago Herald of August 10 publishes a forcible interview with a Chicago business man whose name is withheld, but who is evidently somebody with a very full understanding of railway matters. As the interview evidently expresses the views of many business men it is well worth republishing despite the fact that the name of its author is withheld. The interview is as follows:

"Commissioner Daniels' views, coming as they do from the commissioner thought to represent most clearly the attitude of the administration, present one of the two rays of light from a thoroughly unsatisfactory decision. The other is the unqualified admission even by the majority that 'upon the facts set forth we are of the opinion that the net operating income and the net corporate income of the railroads in official classification territory, taken as a whole, are smaller than is demanded in the interests of both the general public and the railroads.'

"Greatest encouragement in Mr. Daniels' stand, which was supported by Commisioner McChord, lies in the fact that it may portend a change in the attitude of future commissioners, and that where need of greater revenue is shown the lawful regulators of railways will have the courage to mete out justice in higher rates instead of catering to supposed popular opinion by flat denial as in the past or by petty quibbling as in the present decision.

"If the public comprehended the evasive pettifogging by which the commerce commission avoided granting sorely needed relief to all the petitioning railways, forcing continuance of earnings which the commission itself pronounces against the best interest of public and railways alike, it would rise and demand a speedy change of attitude.

"One of the pieces of advice given the roads as to how they may increase the revenue denied them is to advance passenger rates, since passenger service has been proved to be highly unprofitable. 'Existing statutes in Ohio, Indiana, Illinois and Michigan,' says the commission, 'may be obstacles to the raising of passenger fares in those states. But we are confident that if these statutory fares are shown to be unduly burdensome to the

carriers the people of those great states will cheerfully acquiesce in reasonable increases.'

"Despite the visions of the water pitcher and flag-draped platform raised by 'the people of those great states,' we all know how cheerfully and promptly this relief will come. The roads have spent millions in all the two-cent states in vain proof that the rate is unprofitable. Commissioner Daniels hits the nail on the head by declaring 'the suggestion that they should add to their revenues by advancing their passenger rates is of little force in view of the fact that they are powerless to adopt it.'

"Other recommendations by the commission are as visionary. Time after time it commends the roads for steadily advancing efficiency, for the 'advance in the art of railroading,' for the 'ability of operating officials' in keeping down operating ratios in the face of great odds and concludes by saying, 'We may justly feel proud of the development of our transportation system.' Yet it tells the roads to go out and get their needed revenue by 'the introduction of additional economies in operation and further advances in efficiency.'

"It reproves the roads for spending $4,000,000 in the solicitation of freight and passenger traffic in one year, telling them to cut expenses there. In other words, the commission's preposterous remedy is 'If your business is not paying call in your salesmen and stop seeking it!' Why didn't the commission go to the heart of the problem and recommend the advisability of allowing pooling, such as has been adopted in England?

"In demanding that revenues be increased by abolition of various free services which have grown up with commerce, the commission is trying to lift itself by its own bootstraps, thinking to secure revenue but save the public from contributing it. With industry paying for these services, provided the proposed charges for them withstand the onslaught of state commissions, costs of production must be raised and the consumer must pay in the end as surely as if the added cost were in higher freight rates, while established industry must be seriously disturbed in the bargain.

"The roads are told to expedite freight and relieve terminals by establishing schedules for freight trains, yet I believe any railroad man will tell you that any attempt at schedules for freight trains destroys possibilities for the great economies won by heavy train loads. In other words, to get maximum use of motive power the train must move when tonnage is there. Average movement and loading of cars should be increased, says the decision, but we all know the shipper himself in holding the car at each end of the journey and in his partial loading of the car is one of the greatest factors in cutting car efficiency. The roads have tried often in vain to secure higher minimum car loads, shorter free time or more stringent demurrage charges.

"As to mail pay, in which the official figures show a deficiency, the commission makes no recommendation, as 'it may be assumed that if the compensation for the service is found to be unjust to the carriers relief will promptly be afforded.' Apropos of this the Bourne Senate committee has recommended an increase in mail pay for the railroads, and the railroads are working might and main to starve off an actual cut in pay provided by the Moon bill.

"There are many other suggestions as to how to run the railroads on less money. But the Interstate Commerce Commission, created to secure equality and justice between carriers and the public in rates and practices, steps beyond its proper field when it aspires to tell the operating officials of railroads how to run their own business. Swamped with other duties, this ambitious board would teach the managers of 250,000 miles of railway how to operate their trains. Yet not one has ever sat in an official chair, not one has been asked to accept the presidency of a railroad, and only one, I believe, as brakeman and conductor, has ever worked for a railroad.

"Commissioner Daniels presents hope for relief for this condition when he says: 'This commission is not constituted by law a board of general managers of the railroads of the country, and the assumption of tendering suggestions as to management ought never to delay or postpone the settlement of a plain matter of law and fact involved in an application for advanced rates.'"

George A. Post, president of the Railway Business Association, has issued a statement discussing the decision, in which he says:

"Disappointment over the denial by the Interstate Commerce Commission of rate advances to the Eastern Trunk Lines in the face of the finding that they need more income, is softened somewhat by the temperate tone of the decision and by several important steps forward which are taken by the commission in attitude towards the carriers."

Continuing, Mr. Post makes eight points regarding the opinion, of which the following is a summary:

1. Railway managers are frankly acknowledged to have shown sound judgment when they gave warning in 1908-1910 of an impending decline in net income.

2. Railway income in official classification territory is definitely pronounced too low.

3. Jurisdiction and obligation to consider railway earnings, income and credit in regulating rates are explicitly assumed by the commission.

4. To permit suitable rewards for foresight in promotion and efficiency in management is unreservedly declared wise public policy.

5. Roads of a region are granted advances notwithstanding that some of them have been criticized for their conduct.

6. Increase of passenger rates, very difficult to effect in the past, obtains the prestige of federal approval.

7. Necessity for proceeding to the immediate solution of income problems without waiting for collateral inquiries is recognized.

8. Clear and definite standards are set up by which carriers may hereafter gage their financial condition and determine whether the showing will be regarded by the commission as requiring remedies from that body.

The banking house of Thompson, Towle & Company has made the following estimates as to the amount of direct benefit which will be derived by various roads from the decision:

	Estimated benefits from rate increase based on 1913 fiscal year freight revenue (000 omitted)	Per cent increase	Earnings on common or capital stk., year ended June 30, 1913	Increase earnings per share stock
Ann Arbor R. R.	$45	3.23	¶3.38	¶1.12
†Baltimore & Ohio	1,085	1.55	7.25	0.71
Bessemer & Lake Erie	75	0.88	453.6	15.0
§Central Indiana Ry	5	2.87	def.	.....
†*Chesapeake & Ohio	67	0.24	5.25	0.11
†Chicago & Alton	198	2.00	def.	.....
Chicago & Eastern Illinois	357	3.00	def.	.....
Chicago & Erie R. R.	132	3.13	def.	.....
‡Chicago, Indiana & Southern	124	2.94	¶3.56	0.68
Chicago, Indiana & Louisville	193	4.11	3.20	1.84
Chicago, Terre Haute & S. E.	40	2.38	.....	.....
Cincinnati, Hamilton & Dayton	238	3.22	def.	.....
‡Cincinnati North. R.	32	2.80	1.23	1.07
‡Cleve., Cin., Chicago & St. L.	844	3.65	0.75	1.79
Detroit & Mackinac	34	4.01	9.71	1.70
Detroit, Toledo & Ironton	20	1.50	def.	.....
Elgin, Joliet & Eastern	316	2.55	25.0	3.16
†Erie R. R.	435	0.98	4.26	0.39
§Grand Rapids & Indiana	113	3.45	2.88	1.95
Grand Trunk Western	206	4.31	def.	2.92
Hocking Valley Ry.	70	1.10	17.4	0.64
†Illinois Central R. R.	845	2.0	6.02	0.77
†Kanawha & Michigan	15	0.52	11.17	0.17
‡Lake Erie & Western	194	4.00	¶1.7	¶1.64
‡Lake Shore & Michigan So.	1,214	3.08	34.9	2.45
‡Michigan Central	936	3.05	17.6	5.00
‡N. Y., C. & St. L.	427	4.01	5.3	3.05
§Pennsylvania Company	1,121	2.21	13.1	1.41
Peoria & Eastern	96	3.67	def.	0.29
Pere Marquette	468	3.99	def.	.....
§Pittsburgh, Cincinnati & St. L.	1,034	3.29	3.66	2.78
‡Pittsburgh & Lake Erie	315	1.79	27.1	1.05
†Toledo & Ohio Central	53	1.12	13.1	0.91
Toledo, Peoria & Western	24	2.92	0.9	0.59
Toledo, St. Louis & Western	138	3.71	¶0.86	¶1.38
§Vandalia R. R.	162	2.10	5.30	1.18
Wabash R. R.	751	3.45	.....	.....
Wheeling & Lake Erie	111	1.64	.....	.....

¶Preferred stock.
†Part of mileage only in C. F. A. territory.
*Based on report of Chesapeake & Ohio of Indiana for 1911 fiscal year.
§Pennsylvania Lines West.
‡New York Central Lines.

"SEE AMERICA FIRST"—A LESSON OF THE WAR*

By James Keeley,
Editor of the Chicago Herald.

For days every paper has been filled with stories of American citizens stranded in Europe. The Herald has printed literally yards of such narratives, so there is no need for me to go into detail. What I want to do is to point the moral and the way to keep in America at least some part of the $200,000,000 that is spent yearly by those who go to foreign shores.

In the last few years the slogan "See America First" has been used by foresighted advertising men and railroads, and I think the results have been excellent. Gentlemen, this European cataclysm gives America a chance to cash in on the pioneer work of those who first proclaimed the sanity and sense of investigating the beauties and wonders of our own country. It is a fair estimate that of the 100,000 touring Americans now marooned in Europe, not a tenth have seen all the worth-while sights of their own country.

A trip to Europe in time of peace is undoubtedly enjoyable, but there are just as enjoyable trips in America. There are things in Europe well worth seeing, but there are as many things worth seeing in America. A vacation spent in America means that the tourist is close to home, that he may reach his fireside in a short time in case of necessity. Wars, it is true, do not happen every day, but they may happen, and they have always been more probable in Europe. There are other things besides wars which may make a quick return home desirable. A quick return from Europe, even in time of peace, is not always possible. Transatlantic steamer accommodations are limited—our railroad accommodations are practically unlimited.

Americans of means are not to be discouraged from seeing the world. It is a liberal education. But the foundation of such an education should be a personal acquaintance with their own country which too often is lacking.

In seeing America there is hardly any conceivable catastrophe that could produce a despatch similar to the one in the papers of yesterday, which told of two cattle trains filled with American tourists fleeing from the French capital to a seaport, with the forlorn hope that they might somehow or other get a chance to look the Goddess of Liberty in the eye.

Many a man counted himself fortunate if he had a little bit of straw to rest on, while, so the narrative runs, millionaires and their families seemed supremely happy if they could preempt a few square inches of a hard wooden bench on which to sit. Imagine, if you can, these foreign travel fiends carrying their belongings wrapped in sheets and pillow cases, and also picture to yourselves the globe trotter wearing two suits of clothes at one and the same time, not to keep him warm, but in order to have a change and incidentally, in order to save what personal property he could. You've never heard of cattle trains in the Grand Canyon country, in Yellowstone Park, in the Glacier National Park, in California, in the Rockies, in Florida, and you never will.

Haven't you advertising gentlemen a mission to drive home the fact, and isn't this the psychological time to drive the fact home that America is well worth seeing—that its beauties equal those of any spot on the face of the earth; that its natural wonders are not surpassed by those of any land on any continent? Millions and millions of dollars have been spent every year by those who felt that they were not fashionable unless they took a trip to Europe. The Europeans get us coming, going, and there. They get the greater per cent of the money for going and coming, and you know that they don't overlook an opportunity to get whatever they can while you're there.

Once upon a time there was a First ward gentleman—in politics—and he was connected with the coroner's office. He was known among his intimates as "First Search"—that is, he had the right and prerogative of making the initial examination of the clothes of unfortunates who were murdered, who committed suicide, or who met sudden death in any form. It seems to me that the average European who caters to tourists not only should be called "First Search," but "Last Search." It is of record, or, at least, there is a tradition that once in a while "First Search" overlooked something, but I know of no authenticated instance where a foreign hotelkeeper or shopkeeper committed such a faux pas.

*Extract from an address to the Chicago Advertising Association, Chicago, August 7.

AMERICAN ROADS EARN LESS ON NEW CAPITAL THAN FOREIGN ROADS

The Bureau of Railway News and Statistics has issued the following:

"Although railroads of the United States added a far smaller amount to capital per mile between 1910 and 1912 than any of the three principal railroad countries of Europe, so great was the burden of increased expenses on revenues that they totally failed to keep abreast of the foreign systems in return on the investment. This is in spite of the fact that our own railways made by far the largest increase, both actual and relative, in operated mileage.

"In the two years ended with 1912, for which comparisons for all four countries are now possible, United States railways added 3.7 per cent. to mileage on an addition of 5.2 per cent. to capital. In contrast with this showing, Germany's government roads added 6.4 per cent. to capital to make an addition of only 2.5 per cent. to mileage, while France, to expand by but 0.9 per cent. in mileage, added 4.5 per cent. to capital, and England, adding only 0.4 per cent. to mileage, expanded capital 1.5 per cent.

"The effect of this economical outlay of new capital on American roads is shown partly in the per mile comparisons. United States railways in 1912 were capitalized only 1.4 per cent. higher per mile than in 1910, while German roads were 3.9 per cent. higher and French railways were 3.4 per cent. higher. Though English roads show a smaller relative increase per mile than our own, this is because their capital per mile already is so excessively high, their 1.1 per cent. representing more than three times our own 1.4 per cent. in actual figures.

"It is in the absolute increase of capital per mile, however, that the moderation of American capitalization becomes most apparent, for while the United States in the two years was adding a paltry $878 per mile, England was adding $2,784, Germany $4,245 and France almost $4,500 per mile.

"Yet with all the advantage of moderate capitalization United States railways were so pressed between the millstones of sluggish revenue and rising expenses (spending 8.2 per cent. more to do 3.3 per cent. more business) that the ratio of net to investment was 10.8 per cent. smaller in 1912 than in 1910 (while with taxes included the loss is 12.5 per cent.). Germany, despite its excessive capital expenditure aided by gigantic increases in traffic, and rates rigidly maintained in the face of public demands for reductions, displayed a ratio of income to capital 10.3 per cent. larger in 1912 than in 1910. England's ratio fell 1.1 per cent., while that for France declined 3.7 per cent."

Abyssinian Railway.—It is expected that the Abyssinian Railway will reach the capital of Addis Abeba in February of next year. It is reported that the railway has already been completed to kilometer 312 (reckoned from Diredana) and kilometer 621 from Djibuti. But, as there is a scarcity of camels for the transport of materials from the terminus to the site of construction, the work is frequently interrupted, particularly in the mountainous district, where many bridges have to be erected and cuts made. Nevertheless, the section to the Modjo river, which is 73 kilometers from Addis Abeba, will presumably be finished next November, and as the roadbed from Modjo to Addis Abeba is now nearing completion, the first train is expected in the latter place at the beginning of February.

Building a Modern Terminal Road at Youngstown, Ohio

The Lake Erie & Eastern Is Completing a New Line 8 3-4 Miles Long Involving Very Heavy Work

The Lake Erie & Eastern, which is owned jointly by the Pittsburgh & Lake Erie and the Lake Shore & Michigan Southern is building a new line nearly 8¾ miles long from Struthers, Ohio, about 4½ miles south of Youngstown, on the main line of the P. & L. E., northwesterly through the city of Youngstown, following the Mahoning river, to a connection with the Pennsylvania lines at Girard. In order to secure the desired location for this line it was necessary to purchase considerable right of way in well developed residential and industrial sections of the city, to separate grades at all crossings of streets and satisfy all public and private claims resulting from the work, to handle a large amount of excavation and embankment under difficult circumstances, and to build three long structures crossing the Mahoning river and three railways.

Map of the Lake Erie & Eastern from Struthers, Ohio, to Girard

GENERAL

The immediate advantage which will result upon the completion of the section now under construction will be to reach a number of important industries now operating along the river and the sites of prospective industries which may be developed in this district. The largest industries on the new line are the Republic Iron & Steel Company, the Carnegie Steel Company and the Brier Hill Steel Company.

The second and more remote advantage of the line is that it can be made to form a part of a proposed direct freight connection to be controlled by the New York Central Lines between Youngstown and Cleveland. The northern section of this line, known as the Lake Erie & Pittsburgh, extending from the outskirts of Cleveland to Brady's Lake Junction, about 28 miles, has been in operation since the latter part of 1911. It was built as a joint enterprise of the Lake Shore and the Pennsylvania, although the latter has not availed itself of its privilege of operating over it. Through freight between western points and Youngstown is now handled by the New York Central system over the L. E. & P. between Cleveland and Brady's Lake Junction, thence on the Pennsylvania to Ravenna and on the B. & O. from Ravenna to Youngstown. It is the intention ultimately to connect the southern end of the L. E. & P. with the present northern terminal of the L. E. & E., which will require the construction of nearly 40 miles of road. This line may handle freight traffic only in view of the present satisfactory operating agreement with the Erie, which covers the New York Central Lines' passenger service between Youngstown and Cleveland. The new L. E. & E., as constructed at present, will serve as the terminal and transfer line of the New York Central Lines in the Youngstown district.

The new road has a maximum grade of 0.3 per cent. in both directions, which will also be the standard on the proposed line to the west. The line will ultimately have four tracks, and all masonry structures are being built to carry a four-track roadway. Provision is being made in many cases in the foundations of the steel structures, which are being built for only two tracks, to widen them to carry four tracks, as soon as this is desirable.

Exclusive of the crossing of the Mahoning river at Struthers,

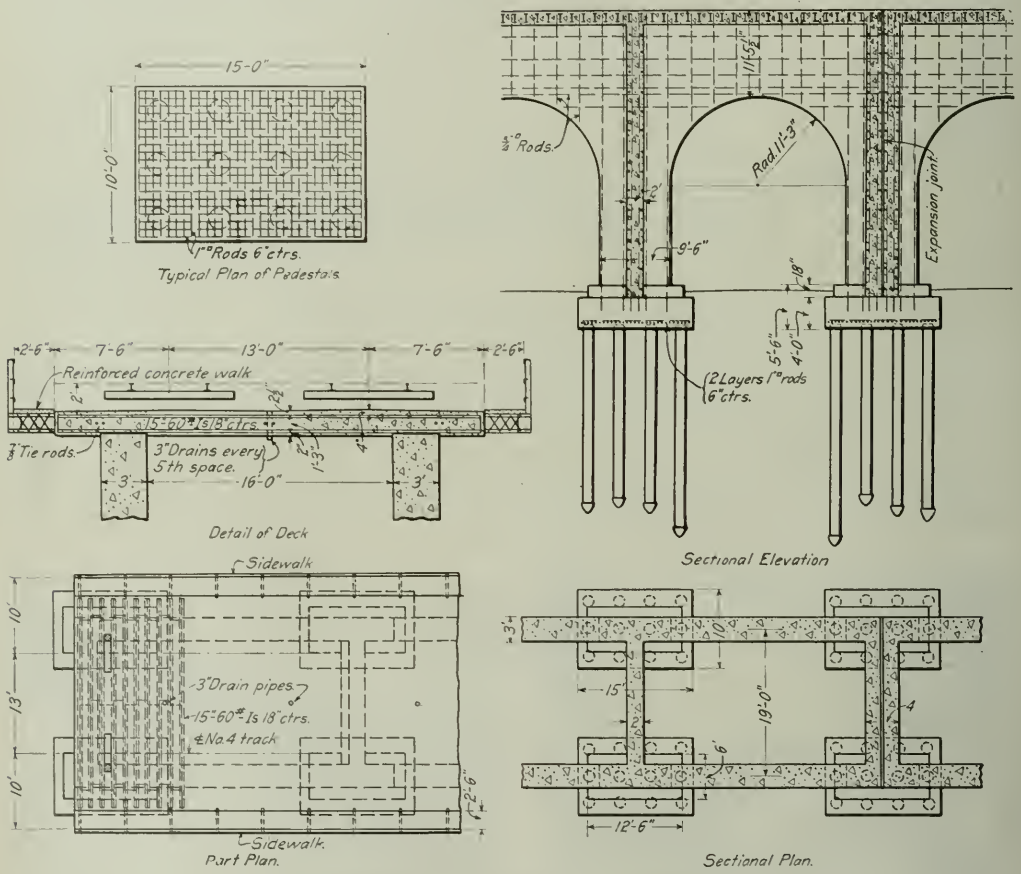
One of the Typical Concrete Arch Bridges Over Streets

The River and Heavy Truss Spans of Crossing No. 1

immediately adjacent to the main line connection, all of the important bridges on the new line are located on the north half of the work, beginning with the Cedar street concrete arch subway. Six other subways of this type and one steel girder under-crossing were required at various points along the line, and two streets and one footway are carried over the new tracks. Three large bridges, known as Crossings Nos. 1, 2 and 3, are required to span the Mahoning river and the tracks of the B. & O., the Erie and the Pennsylvania which parallel the river around two long bends. The last structure, known as Crossing No. 4, spans four tracks of the Pennsylvania and one track connecting the L. E. & E. with the Brier Hill Steel Company's yard. All bridges were designed for Coopers E-60 loadments along lines parallel to the track, preventing undue overloading on any sections of the barrel. The contractor used steel centers in placing all of these arches.

In the section between Cedar street and Crossing No. 1, two old street bridges carrying South avenue and Market street, respectively, over the river are to be remodeled slightly in order to provide clearances for the new line under the approaches on the west bank. In the case of the Market street bridge, new girders will be clamped alongside the old approach trusses and supported on new piers adjacent to the new tracks in order to allow enough of the lower members of the old trusses to be cut out to provide the necessary clearance.

Crossing No. 1, built for double track, the longest bridge on



Details of the Reinforced Concrete Trestle Used in Crossings No. 1 and No. 3

ing and the New York Central Lines' 1910 specifications for steel railroad bridges were used. The work involved the placing of about 80,000 cu. yd. of concrete masonry and between 8,000 and 9,000 tons of steel.

STREET BRIDGES AND CROSSING NO. 1

Taking up the structures in the order named above, the first is the group of seven four-track concrete arch subways, all located south of Crossing No. 1. The spans vary from 18 ft. to 85 ft. 6 in. All of the arches are heavily reinforced, and as most of the streets are crossed at a skew, the rings were placed in sections to insure the loads being transmitted to the abutthe line, has a total length of 1,926 ft., comprising 106 ft. of reinforced concrete viaduct, three through-girder spans over the main line of the Baltimore & Ohio, 317 ft. of concrete viaduct, a three-span, deck girder crossing of a highway, eight deck girder spans crossing the river, and two through-truss spans, each 192 ft. long, over the tracks of the B. & O., the Erie and the Pennsylvania. The material near the surface north of the river consisted of cinder fill, mud, sand and gravel, requiring the use of piles under practically all foundations south of the river piers and on one pier north of the river. The river piers are founded on shale rock.

Simplex concrete piles, from 19 ft. to 25 ft. in length, were

used in these footings, this type of pile being chosen on account of the larger bearing surface provided by the enlarged point as compared with designs in which the entire shaft is tapered. Since the conditions were such that the piles had to be driven through soft material to gravel, the whole area of the Simplex pile is made available for carrying load, while a tapering pile would have little frictional resistance in the soft overlying strata and would have to depend for its bearing power largely on the area of its point, which is much less than the Simplex

A Portion of the Concrete Trestle in Crossing No. 1. Concrete Deck Slab Has Not Yet Been Placed

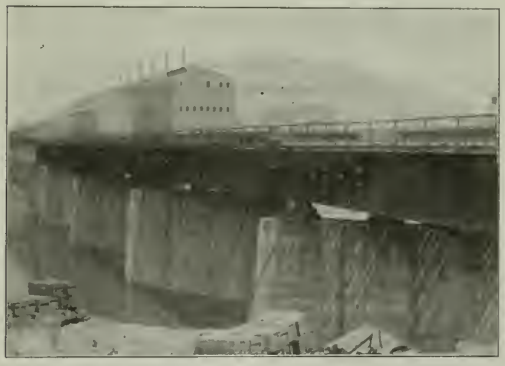
point. The footing designs contemplated the use of 16-in. Simplex piles, capable of sustaining safely a load of 40 tons each. It was specified for this work that all casings must be driven before any piles were cast. The difficulty of handling the work by this method led the contractor to offer to substitute an inserted octagonal pre-molded pile in the 16-in. casings to prevent damage from driving of other casings, the surrounding space between the inserted pile and the cases being filled with grout. This proposition was accepted, as it resulted in piles

Crossing No. 2

capable of carrying 50 tons safely at no greater cost per ton carried. A test pile showed its ability to carry considerably more than the assumed load without damage.

All of the steel superstructure is of heavy rigid construction. The floor beams in the through-girder spans are 30-in., 200-lb. Bethlehem I-beams, spaced 4 ft. center to center, with a longitudinal center distributing girder, 12-in., 55-lb., I-beam stringers under the rails and six 12-in., 21½-lb. I-beam stiffeners in addition to the stringers between each pair of floor beams. Lateral bracing is provided by double diagonals under the floor beams, which are riveted to gusset plates under the main girders and the center distributing girder, and are attached by clips to the under side of one of the floor beams near the center of the length of each lateral. The floor on the deck girder spans consists of transverse I-beams encased in concrete, the same as on the concrete viaduct, which will be explained in more detail in that connection.

The concrete viaduct is carried on bents spaced 32 ft. center to center. A typical bent consists of two reinforced concrete columns 9 ft. 6 in. by 3 ft., connected by a 2-ft. concrete web wall, resting on two pedestals 10 ft. by 15 ft. in area, covering the heads of 12 concrete piles and reinforced over the heads of the piles by two layers of one-inch rods spaced 6 in. center to center. The distance between the inner faces of the columns is 16 ft. Longitudinal girders of reinforced concrete, 3 ft. thick and varying in depth to form a semi-circular arch of 11 ft. 3 in. radius, connect these columns. All reinforcement above the foundation consists of ¾-in. square rods. Across these walls are laid 15-in. 60-lb. I-beams, spaced 18 in. center to center, connected by ⅞-in. tie rods to distribute the load and increase the stiffness. These beams are encased in concrete with a minimum depth of 1 ft. 7½ in. The thickness of concrete over the I-beams is increased 1½ in. along the center line of each track for drainage, a 3-in. drain pipe being provided midway between tracks in every fifth space between I-beams. The design of the deck provides for about 6½ in. of ballast under the tie.



A Portion of Crossing No. 3

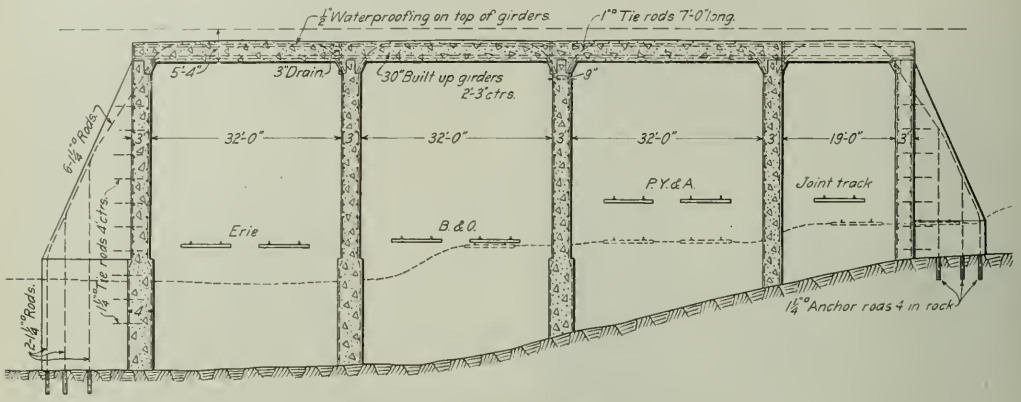
A light latticed girder is attached to the end of every fifth I-beam to support a reinforced concrete walk along each side of the structure. This walk is protected by a hand-rail built up of vertical angle posts with three angle rails. Expansion joints filled with heavy roofing felt are provided in the viaduct over every third bent. In order to protect the expansion joint from the ballast, steel cover plates are used, resting on the upper surface of the concrete. As it is impossible to connect the two I-beams on opposite sides of an expansion joint with the usual tie rods, two channels placed back to back are substituted for the I-beams at these points in order to strengthen and stiffen the floor. Asphalt waterproofing is used on the deck.

OTHER BRIDGES

The under-crossing at Manning avenue, just north of Crossing No. 1, is a single span through-plate girder structure, with a solid deck of transverse I-beams encased in concrete. The overhead foot bridge and the two overhead street bridges between Crossing No. 1 and No. 2 are of steel girder construction, designed to span four tracks. The street bridges have solid concrete decks carrying the paving, and the street approaches are on a grade of 6 to 7 per cent.

Crossing No. 2 is built for double track and consists of three

spans, one a 165-ft. double-track, through-riveted truss, over the B. & O., the Erie and the Pennsylvania, and two 175-ft. trusses over the river. The south abutment has its foundation in gravel, the two piers are carried to shale rock, and the north abutment footing is in slag. A maximum bearing pressure of four tons per sq. ft. was used in the design of these footings. The heavy loading used in the design of the trusses requires heavy sections for all members, a rigid structure being secured



Cross-section of the Skew Structure at the North End of Crossing No. 3

by inserting sub-diagonals and verticals to reduce the panel length. Two heavy fender girders are provided along both trusses to take the shock of a derailed car or locomotive and to reduce the damage to the truss members. Blast plates are attached under the lower chords over the center line of each of the tracks on the lower level and under all transverse members and portal bracing over the tracks across the bridge. The bearings are raised higher than usual and ample room is provided on all sides of the grillages and roller nests for inspection.

Crossing No. 3 has a total length of about 1,635 ft., consisting of six 90-ft. deck girder spans over the river, 195 ft. of concrete viaduct, one 80-ft. deck girder span over a skewed

Crossing No. 4 With a Portion of the Deck Laid

street, 67 ft. of concrete viaduct and 758 ft. of a special type of reinforced concrete structure, designed to carry four tracks over the seven tracks of the Erie, the B. & O. and the Pennsylvania. This portion of the structure is one of the most interesting features of the entire work.

All foundations under this bridge are carried to rock, which is from 15 ft. to 20 ft. below the surface. The sections of concrete viaduct are of practically the same design as those described above. The special design at the north end was necessitated by the fact that the new line crosses the old tracks at an angle little more than 14 deg. The structure consists of thin reinforced concrete walls between each pair of tracks on the lower level supporting a solid deck of transverse I-beams encased in concrete. On account of the flat angle of the crossing and the provision for a four-track roadway over the structure, the walls are very long, the combined lengths totaling 2,270 ft. The entire wall, which is 3 ft. thick, is carried down to rock where it is near the surface, and in places where this would have required an excessive amount of masonry, pedestals 4 ft. by 12 ft. were used to support the wall at intervals varying from 21 ft. 9 in. to 27 ft. center to center. Expansion joints are spaced from 50 to 65 ft. apart. The exterior walls on both sides are buttressed in order to give lateral stability to the deck, these buttresses being placed about 65 ft. center to center. These buttresses are 3 ft. 6 in. thick and extend back a distance of 18 ft. from the inner face of the wall. The deck consists of 30-in. built-up girders, laid at right angles to the walls and spaced 2 ft. 3 in. center to center. These beams are con-

A Retaining Wall Built of Large Pieces of Open Hearth Slag Called "Ciscos"

tinuous, requiring reinforcement at the points of contra-flexure. A ½-in. layer of waterproofing was placed over the tops of the beams and a minimum thickness of 4 in. of concrete over the waterproofing. The surface of the concrete was crowned to 6 in. over the center line of each bay for drainage. The concrete encasing the girders was tied in to the concrete walls by thick key walls at the top of each supporting wall and by 7-ft. tie rods

extending up from the walls into the deck slabs. Provision is made for 10 in. of ballast under the ties.

Crossing No. 4 carries the four new tracks over four tracks of the Pennsylvania, and one L. E. & E. connecting track with the Brier Hill Steel Company, the structure being of the same type as the north end of Crossing No. 3, just described.

An interesting experiment is being tried in the painting of the steel superstructures of these bridges, which, it is hoped, will give better satisfaction than the usual practice. In order to eliminate the rolling scale, which is so frequently the cause of defects which develop after the bridge is painted, starting serious corrosion, no shop coat of paint was applied, and the fabricated material was allowed to stand without paint until after its erection, the total time since rolling amounting to nearly two years in some cases. The surface rusting which resulted has loosened the rolling scale so that it can now be scratched off very readily. The bridges after being completely erected are now being cleaned with chisels and wire brushes and dusted with large paint brushes before applying two coats of paint. It is the expectation to allow them to stand two years or more after this painting and then spot paint any defects that have developed before applying the third coat. In order to secure the best co-operation of paint manufacturers, the large structures have been divided into ten sections, each of which is assigned to a company which has previously demonstrated that its product and the method of application which it recommends

General View of the Side Hill Excavation Above the B. & O. Tracks

can be relied upon to give reasonably good satisfaction. The wishes of each manufacturer in the method of applying his paint are followed as closely as possible in order to give a good comparison of the merits of the various paints, in addition to testing the advantage of painting on the metal instead of on the scale.

GRADING

The excavation quantities on the new line total about 900,000 cu. yd., all of which is used in embankment, and, in addition to this, about 250,000 cu. yd. of slag and refuse is being disposed of in the fills. In common with other roads serving the steel mills, the P. & L. E. has large amounts of mill refuse to handle and the excess of embankment over excavation was in reality an advantage. In some places the excavation was used to make a narrow fill in order to lay a construction track from which slag could be dumped. The width of fill varies considerably, although it is never less than the standard two-track width. In many places it is wide enough for four tracks, and in some cases has been extended over all available land in order to dispose of refuse material. The side hill cut, north of the South avenue bridge, required very careful handling in order to prevent the blocking of traffic on the B. & O., which occupies a lower bench between the new line and the river. A short section of reinforced concrete retaining wall was built at the end of this cut to retain the new fill above the B. & O.

Opposite the works of the Carnegie Steel Company, between Crossings No. 2 and No. 3, a heavy fill was made along the river with a width sufficient to carry six tracks. A retaining wall was built along the river bank of large regular pieces of refuse from the mills known as "ciscos." These pieces are formed of refuse from open hearth furnaces, which is allowed to cool in molds to make it easy to handle. The wall was built up with a 1:4 batter by a locomotive crane, and hot slag was then dumped behind the wall, filling the crevices between the ciscos and solidifying it into a hard mass. The hot slag fill was carried up to 4 ft. below subgrade, the surface layer being made with granulated slag to serve as a cushion under the track.

The general contract for all work south of Cedar street was let to H. T. & R. L. Culbertson, Cleveland, Ohio. McKelvey-Hine, Pittsburgh, Pa., was the contractor on the section extending from Cedar street to the south end of Crossing No. 1, and also for Crossing No. 4. The Duquesne Contracting Company, Pittsburgh, had the contract for the section between the south end of Crossing No. 1 and the north end of Crossing No. 3. The McClintic-Marshall Construction Company, Pittsburgh, fabricated and erected the superstructures of all steel bridges. Albert Lucius, New York, is the designing and consulting bridge engineer. This work is being carried out under the direction of J. A. Atwood, chief engineer of the Pittsburgh & Lake Erie; A. R. Raymer, assistant chief engineer, and F. J. Nannah, assistant engineer in direct charge of the work. The work was started in May, 1912, and at times the progress has necessarily been slow on account of the delays incident to building through a well-developed section of the city. It is expected, however, that the line will be ready for service this fall.

ADJUSTING PERSONAL INJURY CLAIMS*

By H. B. Hull
Chief Claim Agent, Illinois Central.

I know but one rule that may be safely followed in the adjustment of personal injury claims, that negotiations should be conducted upon the high plane of openness and fairness. In adjusting a claim, it is of paramount importance that every word and act of the claim agent's should be such as to withstand at any time the closest scrutiny under the light of day. A railroad company, with its property constantly exposed and subject to attack, must for its protection and defense rely upon its own reputation for fair dealing with its employees, patrons and the public. The deportment of its claim agents, who are constantly in touch with the public, has much to do with placing the reputation of a railway company. If they go about their work inspired by high and honorable resolutions, their efforts will not only be rewarded as they go along, but will assist most materially in establishing for their company a good name, which is the most valuable asset a railway company can have and which, when once enthroned, is as immutable as virtue and truth.

Assume, for instance, that you have a seriously injured person at some hamlet upon your line, far removed from the influences which are always antagonistic to the company in the handling of its claims, and that he is unadvised of his rights and imbued with an abiding faith in the fairness of the company and willing to trust his case in the hands of the claim agent, and that you have it in your power to go to that man and conclude him in an inadequate settlement, and thus save your company a substantial sum of money in that particular case. I affirm that it would not only be unconscionable to overreach that claimant, but that it would also be unprofitable to your company. The dust of the community would scarcely be off your feet till the doctor, the banker and the prominent citizen would get together on the street corner and discuss the result of your visit and the entire community would soon be condemning your railroad, and properly so. Almost in the twinkling of an eye you had encompassed enough to cause your company to be hated and despised in the community where the settlement was made, and to render it certain no more settlements could be made there. A corporation

*Address at the twenty-fifth annual convention of the National Association of Railway Claim Agents, St. Paul, Minn., May 21, 1914.

can only act through its agents, and unless their acts are scrupulously correct it deserves to be condemned.

Contrast the situation which I have attempted to describe with what might have happened had you gone to the injured man in a kindly way and explained that you were representing the railroad and that if he were uncertain as to his rights, that he had best call in two or three of his friends upon whom he would ordinarily rely for advice in a business transaction, and ask them to assist him in arriving at a conclusion as to what would be a proper sum for him to accept in compromise of his claim. In my humble opinion, the railroad gains much in closing a compromise in this manner. It not only satisfies the injured man, but it satisfies his friends and acquaintances, the doctor, the banker and the prominent citizen, who immediately become a potent influence in a community against personal injury litigation.

The claim agent who makes a settlement for the smallest sum is not always the best claim agent. He invariably has many "knockers" on his territory and lots of litigation against his company, whereas the claim agent who exercises good judgment in determining the proper amount to pay has everybody helping him with his cases, and besides, he smooths the way for a pleasant relationship between his company and its neighbors in other and perhaps more important matters. I believe there is as much danger of paying too little as there is in paying too much in cases where the injured person is friendly and inclined to permit the claim agent to name the amount. The art of the business is in being able to survey a situation and decide upon a fair and proper sum to pay. Settlement should be upon a basis so fair as to stand four square to all the winds that blow. But the friendly cases are in the minority, and growing fewer all the time.

In handling the other class of cases, where the claimant is unreasonable and has been listening to the siren song of the damage suit lawyer and his agent, who, before they are employed, are always against a compromise at any figure, I believe the best method is to locate the influences that would naturally control the injured person and work through that source. There is a key to every situation. The difficulty is in finding it.

It is almost unbelievable to what extent the damage suit lawyer and his agents are able to poison the mind of the injured person against the claim agent and the company. No matter how good intentioned you may be toward the injured person, no matter if you be willing to pay more than could be recovered net at the end of a lawsuit after months, if not years, of waiting, it is an uphill job at best to dislodge in his mind the glittering hope of drawing the prize held out to him as an inducement to sue, but it is well to keep on trying and not give up. The claim agent who is easily discouraged and quails in the presence of difficulty is not made of the right kind of stuff to do successful claim work in this day and age. If he perseveres he will succeed oftener than he fails. The claim agent must be able to tell the injured person of settlements he has made that were fair and just and satisfactory to all parties concerned. He must also be able to tell something about cases the damage lawyers will not talk about, the litigated cases that terminated disastrously to injured persons.

A railroad corporation should pay an injured person, in a liability case, about what he could recover net to himself at the end of a lawsuit, figured on the best information obtainable, and only attempt to save attorney's fees and court costs in adjusting claims of serious injury. Twenty-five per cent. of the total paid out by the average railroad in a year and charged to the personal injury account is waste; that is, it goes to the payment of court costs, witness fees and into the pockets of the damage suit lawyer and his organization. If we could save that for the railroads, it would be considerable and would fully satisfy them, and besides, what a blessing it would be to the injured people and their families, if we could only make them see it. Our mission, as I view it, is to starve out the damage suit lawyer and put him out of business. His sinister shadow falls across the pathway of nearly every unfortunate with a claim against a corporation, and he is doing as much in this country today to array employee against employer and stimulate unrest and discontent as any other factor, and why? Simply that he may use the cripple as a vehicle to enrich himself, and with what result? In the cases he is fortunate enough to win, he takes out of the sums recovered his dividends and the expenses ranging from 33⅓ to 50 per cent. He then has no further interest in the cripples and they are cast out into the world with perhaps a few thousand dollars at best and no capacity for taking care of it, and, as a rule, they invest it in some little business and the inevitable happens. They are the familiar fellows you see on the street corners in all of the large cities of the land.

The policy of railroads is to take care of maimed employees in positions which they can fill, wherever it is possible to do so, and this is done entirely separate and apart from any settlement that is made. I would estimate that 75 per cent. of maimed employees who do not sue are provided with positions which, in most instances, they hold as long as they live, clinging to their employers, like the ivy to the oak, for succor and support, and these men usually get about as much net out of their claims as if they had sued, and oftentimes more, but the damage suit lawyer does not get his, and there is the rub.

I am an optimist and can see signs of the dawn of a brighter day for the railroads and their injured employees. There never was a time in our history when railroad managements were so thoroughly alive to the situation as they are today. They are accustoming themselves to think of the distress of human life and how to relieve it. Evidence of this is seen in the pensioning of old employees, in the building and equipping of hospitals, in the liberal sums they are willing to pay in compromise of bona fide personal injury cases, in the sincere efforts that are made to provide the maimed with employment where left free to work the matter out, and in many other ways. They are approaching this matter upon a basis of humanity and sympathy, seeking the good and comfort of the unfortunates for whom they feel a sense of responsibility, a deep-rooted interest born of sympathy. Under these conditions we should not have much difficulty in adjusting our personal injury claims, especially with employees. In our fight to protect injured employees and prevent them from being literally torn away from their employers, their real friends, by self-serving damage suit lawyers and their agents, already drunk with success, and greedy for more coin of the realm, we should stand upon the broad foundation of justice and righteousness between man and man and let it be known far and wide and back it up by sincerity of purpose in our every act. I sympathize, of course, with the poor fellows who are lured away through the subtle methods of the trickster, but after all, good comes out of it in that others are able to profit by the sad experience of unfortunates who are willing to turn against a friend and faithful employer anxious to do a good part by them.

We have still another class of personal injury claims to deal with, the most difficult of all to handle. I refer to the fraudulent claims. In nearly all of these cases the claimants have some bodily infirmity which they try to capitalize by palming it off on the railroad as having resulted from an accident. They invariably select a time and place to pull off the "accident" under circumstances which would render the railroad liable in damages if an injury occurred. They have little difficulty in finding doctors who are willing to be fooled for a stipulated contingent fee. Frequently the desirability of adjusting claims of this character is suggested in order to reduce an uncertainty to a certainty and save the costs of litigation, but the difficulty is, where one of these fraudulent claims is adjusted, the effect is to stimulate more claims, and instead of making progress through such a policy, we actually slip the other way. We make two blades of grass grow where but one grew before, but it is the wrong kind of grass. If we do not settle the game is played to the limit, there is a trial, and sometimes the railroad is mulcted in damages, but oftener the fraud is exposed before the goal is reached. Whatever the result, I am convinced it is wise to

exploit this class of cases before the public as much as possible. If we compromise them as a mere matter of temporary expediency, the railroad becomes a party to the fraud. If a robbery is to be perpetrated, let someone else be responsible for it.

The fact that railroads will at times capitulate and buy their peace by adjusting fraudulent claims, I verily believe, is responsible for as many "railway spines" and "nervous wrecks" as are collisions and derailments. A street railway company in a certain southern city adopted a policy of settling all claims and keeping out of court. Fraudulent claims increased at an alarming rate. The policy was changed and all frivolous and fraudulent claims were fought out to the end. There were so many suits that nearly all the qualified jurors sat upon some of these cases and became educated to look for the fraud and injustice of the litigation and the result was that the juries put an end to the system. They almost carried it to the other extreme and it became difficult for a man with a bona fide case to get justice. All cases were looked upon with suspicion and the honest claimant suffered from the odium cast upon him by the crook.

If the railroads of this country, acting in concert, should adopt a policy of fighting all fraudulent, suspicious and frivolous cases, they could in time educate the people just as did the street railway company in the city referred to. It would be the same proposition except on a larger scale. Our difficulty now is that we too often submit to wrong and injustice in order to gain a temporary advantage. We lose the benefit and effect that would flow from exploiting all the cases that lack merit. We should take up the time of the court and its machinery, and of juries, in trying this class of cases. Too often the suggestion is made to the claim department: "We can settle that case for less than it will cost to try it. Why not?" The fact that a plaintiff is willing to do that is a confession of lack of merit in the claim. If the claim department submits and the claim is paid, the curtain is drawn and the public never knows anything about the transaction. We should make a painstaking effort to separate the wheat from the chaff. If railroads did not pay out so much money to those not entitled to it, they would have more to pay to those that are entitled to it, and if the courts and juries had an opportunity to know the situation as it is, they would help us make the division, but so long as railroads do not take advantage of the opportunity which is theirs, they will never know. I feel that meritorious claims should be adjusted at reasonable, even liberal figures, but that all frivolous, fraudulent and suspicious cases should be resisted and advertised to the fullest extent. By persistently carrying out such a policy, the public would eventually understand it was unnecessary to sue a railroad in order to get justice.

In many instances there has been a disposition on the part of interested persons to give out unreliable information relative to the amounts recovered in personal injury lawsuits and injured persons frequently confront claim agents with this false information. In one case which Mr. Failing handled, a death case of non-liability, in which he offered to pay a substantial sum, suit was filed and there was a verdict for $20,000. This was written up in the newspapers and advertised quite extensively. Later on the case was settled with the attorneys representing the plaintiff for one-half the amount he had originally offered direct to the beneficiary. Of course, there was no publication of the closing transaction, and claimants confronted him so often with the newspaper story of the verdict rendered by the jury that he found it necessary to photograph the newspaper clipping and the release for the amount that was actually paid, which was effective in convincing claimants of what really did happen to the case. We have had a few cases on our line where injured persons recovered damages at the end of the law and later accepted employment as runners for damage suit lawyers. One of the arguments they used in soliciting cases was what they had been able to accomplish through litigation of their own claims. We discovered that they were distorting the facts. One man in particular, who had recovered $5,200 in St. Paul for the loss of a leg, was reporting it around to injured employees that he secured $8,000. We found it necessary to obtain certified copies of the judgment of $5,200 which was affirmed by the Supreme Court and distribute them in the community where this man had given out the false information. We have pursued the same course in a number of other cases.

It is true that the publication of large verdicts at initial trials creates a wrong impression in the public mind, and especially upon the minds of prospective claimants. Also, men who get upon juries read these reports and are doubtless influenced by them to some extent in arriving at their verdicts, but I do not know of any way this situation can be remedied, except where these reports are mentioned by claimants in the course of negotiations for settlement, and in those instances Mr. Failing's scheme of photographing the release and the newspaper report, I think, is good, as well as the other plan of securing certified copies of judgments for distribution.

"Keeping injured persons in line for settlement" is not an easy task. Here is where close co-operation between the claims agent and other departments of the service fits in best. On the railroad which I have the honor to represent (and I think the same is true of all other lines) the practice is to take just as good care of an injured person as it is possible to do—furnish the best of surgical treatment, nursing and hospital service, and when he is sufficiently recovered to be able to talk business, and inclined to do so, to go to him and have a heart to heart talk about his case and request him to hold himself free to deal direct with the company when he is ready to consider the matter of adjusting his claim, explaining, also, that in case of his failure to reach an agreement he would be left upon just as high ground to pursue another course, should he desire to do so, as he was upon in the beginning. It does not require much intelligence for one to understand that a compromise is preferable to a lawsuit and our reasonable request, freighted with so much importance for the weal or woe of the injured person, is usually granted cheerfully by claimants of ordinary intelligence, and always by those of higher mentality. The weak-minded, those who are not able to think for themselves, are the ones most likely to fall a willing prey into the outstretched arms of the damage suit shark, for they can be handled by him like clay in the potter's hands. In many of these cases suit is filed without affording the company an opportunity for a hearing. Nobody ever heard of a business man, or a man of affairs, suing an individual, or a corporation, without first rendering a bill and making at least a reasonable effort to collect it; nobody ever heard of a lawyer sending an agent to a man of brains for the purpose of trying to induce him to file a suit in advance of exhausting every effort to effect a friendly settlement. The business of the damage suit scavenger thrives among the weak and drooping, and how to hold that unfortunate class in line for settlement is, indeed, a problem.

A STATE RAILWAY OFFICER ON GOVERNMENT OWNERSHIP

President Ripley of the Santa Fe recently contributed to the Saturday Evening Post an article on government ownership of railways, in reply to one by former Governor Stubbs of Kansas, which appeared in an earlier issue of the same paper. As a result, Mr. Ripley has received numerous letters discussing government ownership from people all over the world. One of the most interesting of these is from an Englishman who has had actual experience as an officer of a state railway. The following is his letter, excepting for some slight modifications which have been made to conceal the writer's identity and thereby save him from any embarrassment that might possibly result from his frank comments:

"For the past seven years I have held the post of assistant to the general manager of a small colonial railway, owned and operated by the government, and have also been employed in the

United States for three years; in addition to this American methods were the model far more than European ones in the operation of the line. Having always followed railway affairs in the principal countries with great interest it appears that the bait which attracts the public in all lands to advocate government ownership is the hope that the railway service will be run at a loss to the government, or, in other words, so that those using the railway may do so at the expense of those who do not.

"The public were continually making the following demands:

"(1) That *all* rates, both freight and passenger, should be reduced to the figure considered reasonable by themselves.

"(2) That all services should be much improved in every way, not only as to class of accommodation required, but also to the extent of removing necessary regulations, such as demurrage, storage charges on unconsigned or uncollected goods, insurance charges for valuable goods and most other necessary regulations for the protection of the interests of the concern.

"(3) That all rates should be on the ton-mile basis for all articles when this would be favorable to a particular district when compared with the existing rates to some other district, but vice versa when more advantageous; this quite irrespective of the physical characteristics of two sections of the line, etc.

"(4) Perpetual agitation for branch lines into unremunerative districts, very largely for the reason that some other parish had a branch line—the line of argument advanced as regards navy dockyards in the United States.

"These same arguments are further used by the politicians for their own purposes to which they add the cry that all railway employees are underpaid.

"Add to this the opinion held by most government employees that the government's dollar bill is only worth about 80 cents in equivalent work, and that they are of inalienable right entitled to many concessions which they would not expect with a first class company, and it is evident that that much abused ideal 'efficiency' becomes unattainable under such conditions.

"I quite admit that the concern of which I have had experience is microscopic in magnitude compared with any large company, but the point of view of mankind as to desiring something at the other fellow's expense is universal.

"Aside from the impossibility of comparing railway operations in one country with those in another except on very general lines it has always seemed to me that no comparisons of rates could be made unless the differences in the value of money in the corresponding countries was also taken into account. Taking passenger fares, for example, the following rough tabulation will illustrate the point:

Country.	Av. rate per mile. Cents	Av. laborer's wage per day	Miles possible to travel for one day's wage. Miles
United States	2	$1.50	75
England	2 (3rd cl.)	.75	37.5
Germany	1 (4th cl.)	.50	50
British India	0.5 (3rd cl.)	.08	16

"The usual statement by 'popular' writers and many others is that the rate in England and the United States is the same, whereas traveling for a laborer is twice as cheap in the United States as in England. I do not advance these figures as exact, but only to illustrate the necessity of a common unit of comparison."

New Docks for Melbourne.—The Melbourne Harbor Trust has approved a scheme for the construction of four docks on the Yarra costing nearly $30,000,000.

The Hohenzollern Canal of Germany.—On June 17, the German Emperor opened for service the Hohenzollern Canal, joining the rivers Oder and Spree and bringing Berlin into water communication with Stettin on the Baltic sea 150 miles away. The completion of this canal, the history of which dates back to 1669, marks an epoch in the development of German inland waterways that radiate in every direction and solve the problem of chief transportation in Germany.

AMERICAN SIGNAL PRACTICE COMPARED WITH BRITISH*

While the Pennsylvania Railroad generally uses white for clear, green for caution, and red for stop, it has on some small parts of its line followed the practice in vogue on a majority of the mileage in the states and Canada, viz., green for clear, yellow for caution, red for stop. Our use of white for clear is illogical and almost indefensible; your use of red for caution in your distant signals is equally pernicious; and yet we both are in a quandary for a remedy. Our own management feels that the yellow is not sufficiently distinctive, especially in the pall of smoke hanging over our Pittsburgh and other steel centers; while your fog conditions are certainly as bad and probably worse. Our glass makers are working to develop a better yellow, and some of us have worked unsuccessfully on a combination of lights. Your use of red in the fish-tail signal has one advantage—with home and distant signals on one mast you have two reds for stop; we have red over green, or red over yellow, as the case may be, and you will readily see the complications involved, but which are eliminated by the use of the three position signal.

The promoters of the flashlight are making great claims for it, but it has not met with much favor. It has been suggested that we might use red for stop, green for caution, and a flashing white for proceed. This is a possible solution.

It may be possible to develop a position signal for the high running signals, formed of white lights only and available for day and night use. This is another possible solution worth looking into. But, meanwhile, pending the development of these two propositions, it seems to me that, with all its defects, yellow offers the only remedy; and the fact that so many roads are using it with good results goes far to confirm this view.

We are about to electrify our four-track line for local travel in the vicinity of Philadelphia. We are to use an overhead trolley and are now developing a light signal for day as well as night use; it takes about 15 watts per lamp, and is so powerful that it must be reduced at night. If we use it, it will probably be arranged so the lights can be turned down, in sections, from each interlocking cabin. In case of fog at night, they can be turned up to the same intensity as in daylight. A recent demonstration in the fog, in daylight, showed lights visible 2,500 ft. away, while the signal blade could be only dimly discerned at 1,500 ft. This, therefore, has possibilities; but it does not solve the color problem.

We are hearing much about audible signals and the wonderful developments of them in England. We may come to them in time, but, as in our automatic system, a distance signal becomes a home as soon as a train passes it, and continues as such until the train passes out of the block, the problem is complicated. Further, as our tracks are not policed as yours are, it is necessary for our drivers to watch the track constantly, and I doubt the advisability of substituting an audible for a visible signal with our conditions.

In busy places we use the track circuit; approach locking, electric switch locking and route locking, and go much further than you in safeguarding the signalman from making mistakes. A logical sequel is the automatic stop or train control system. As one of our prominent signal engineers remarked, "We try to make our signaling fool-proof; the English eliminate the fool." From recent occurrences it would appear that our attempts are, in some cases, futile, and that your elimination is, perhaps, incomplete.

Many of our signal engineers came from England. Much of our original apparatus was furnished from the same source. The result is a signal system combining English conservatism with American radicalism, which is standing well the test of time. The combination is a strong one.

*From a paper by A. H. Rudd, read in May, 1914, before the Institute of Railway Signal Engineers (England).

Pennsylvania Railroad X-25 Steel Box Car

Wood Is Used Only for the Floor and Lining; the 3-32 in. Roof Sheets Are Spot Welded to the Carlines

Following the lines of eventually having all of its freight cars of the all-steel type, a car, the framing of which can be used practically without change for either box, stock or refrigerator cars, was designed in the mechanical engineer's office of the Pennsylvania Railroad in 1912 and a large number have since been built. The most recent design of box car, which is designated as class X-25, is constructed entirely of steel with the exception of a wooden floor and ⅞ in. wooden lining. This car, when mounted on arch bar trucks with 5½ in. by 10 in. journals, weighs 49,100 lb.

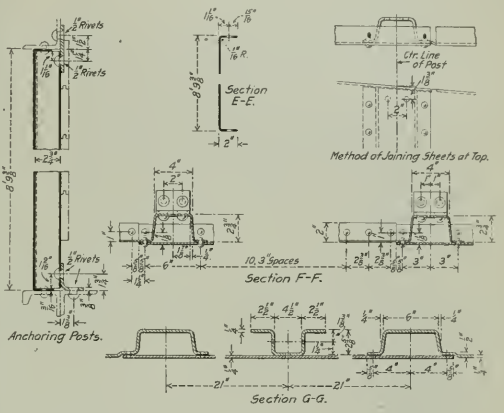
The underframe is of the type in which the weight of the superstructure and lading is transferred to the center sills by means of two crossbearers or cantilevers and the end sills. The center girder has a minimum section area between the rear fol-

End View of the Pennsylvania Steel Box Car

lower stops of 34 sq. in. and is built up of two ⅜ in. fish belly type pressed U or channel shaped sections, 20 in. deep between the crossbearers and with 4 in. flanges top and bottom, the channels being spaced 12⅞ in. back to back and tapering to 11 in. at a point 22 11/16 in. back of the center plate. There is a ⅜ in. by 26 in. top cover plate riveted the full length of the center sills, and a 4 in. by 4 in. by 9/16 in. angle riveted to the bottom of each sill on the inside and extending between the back draft lugs, which are incorporated in the center plate reinforcing casting.

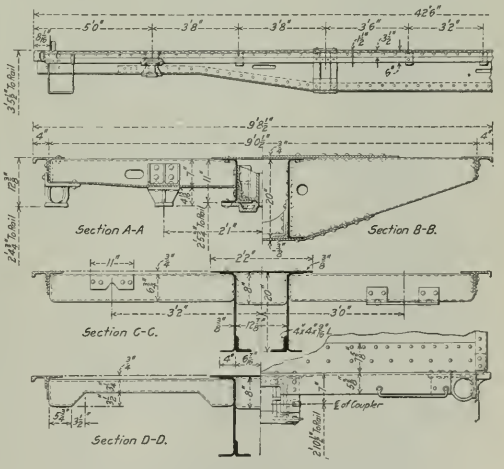
The center construction is also reinforced at each end by a cast steel striking plate and front draft lugs combined, and there are also a steel casting above the center plate, a cast steel spreader at each point of connection between the crossbearers and the center sills, and pressed spreaders between all intermediate diaphragms. The crossbearers are composed of two dished diaphragms, ⅜ in. thick and having 3½ in. flanges. These are set 5 in. apart and have 12 in. by ⅜ in. top and bottom cover plates extending across the center sills and riveted to the crossbearer flanges. The crossbearers are riveted to the center sill and the bottom member of the side truss.

The body bolster is composed of a diaphragm ⅜ in. thick, 7



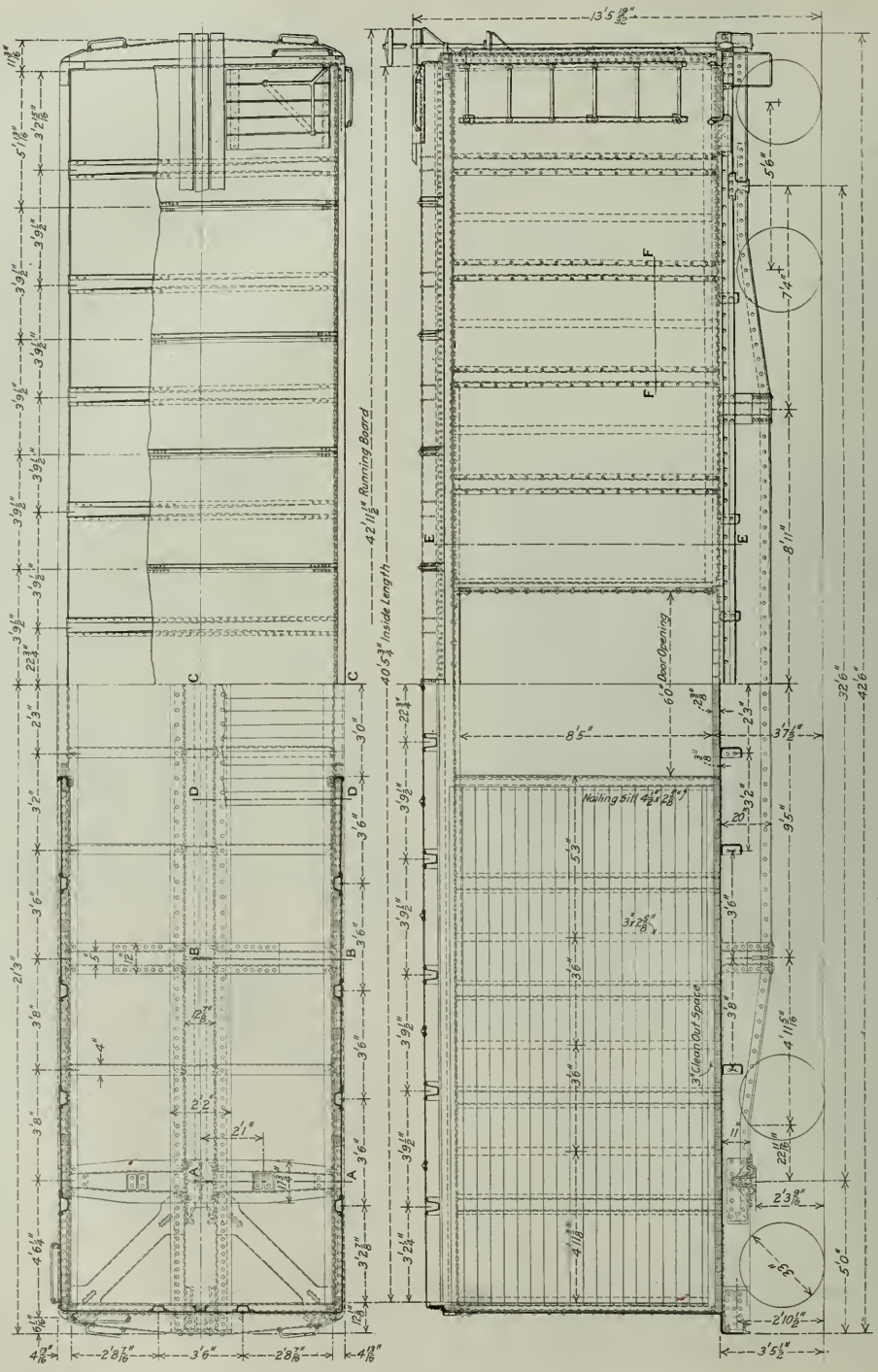
Structural Details; References Are to the General Drawing

in. deep, 7⅜ in. between vertical walls and riveted to the center sills and side truss. This member has to take care of the side bearing thrust only and does not carry any of the load. Above the side bearing, which is a steel casting, a cast steel reinforcing block, and at the extreme end is a combined roping iron and



Arrangement of the Underframe and Details

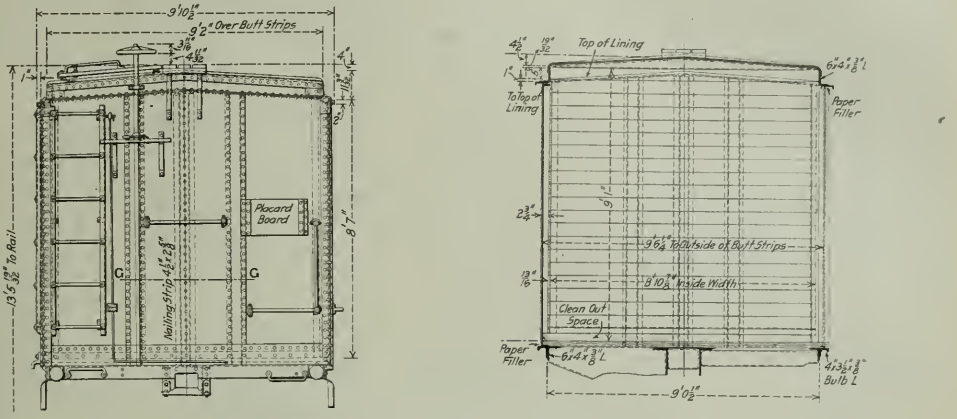
jacking casting. The drop forged center plate is secured to the flanges of the center sills, as well as the center plate reinforcing casting, which extends back towards the center of the car 9 in.



General Arrangement of the Pennsylvania Steel Box Car

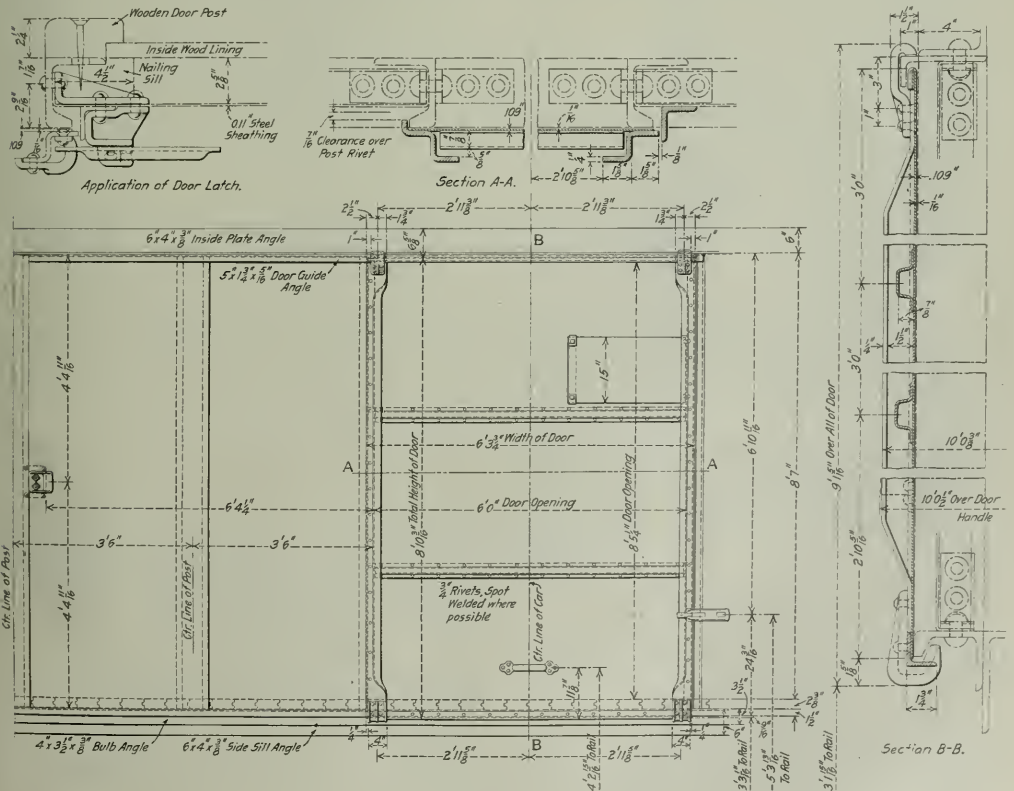
from the center line of the center plate, and reinforces the center sills.

There are six intermediate diaphragms on either side of the car, four of which are located between the crossbearers and one midway between the crossbearer and body bolster at either end of the car. They are 6¾ in. deep and ⅜ in. thick and do not carry any of the load, as their top flanges are ¾ in. below the bottom of the floor, but simply act as stiffeners for the bottom member of the side truss, and as supports for the brake rigging.



End Elevation and Cross Sections of Pennsylvania Box Car

The end sill consists of a Z-shaped plate ⅜ in. in thickness, which extends the entire width of the car, binding the side and end construction together. It is 5 in. below the top of the center

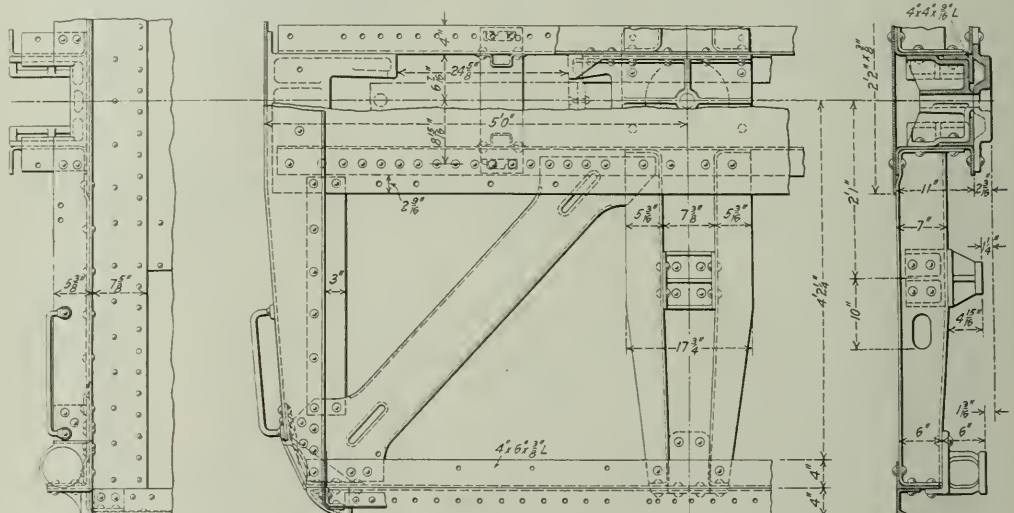


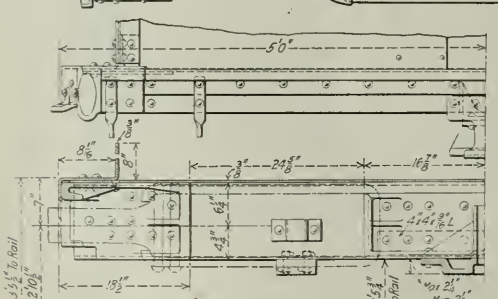
Side Door of the Pennsylvania Steel Box Car

sills and is flanged inward for a distance of 8 7/16 in. at the center, narrowing somewhat toward either side. The back vertical leg, which is 8 in. high, forms a connection for the end construction. The end sill is secured to the striking plate and at either end to a cast steel push-pole pocket and corner casting, which are in turn riveted together and secured to the bottom member of the side truss and to the diagonal brace, while the top vertical leg of the end sill is riveted to the end sheets the entire width of the car.

The diagonal braces are of U-shape section, 8 in. wide and ⅜ in. thick, with 2½ in. flanges pointing downward. They are flattened at both ends, being fastened to the top flange of the center sills at one end and to the push-pole pocket and the bottom member of the side truss at the other end.

The side sill, or bottom member of the side truss, runs continuously between the end sills and is composed of a 4 in. by 6 in. by ⅜ in. angle and a 4 in. by 3½ in. by ⅜ in. bulb angle, which are riveted together back to back. The short leg of the angle points towards the center of the car and the long leg of the bulb points outward, both legs being in the same horizontal plane as the center sill cover plate.





Arrangement of the End Sill and Corner Construction

SUPERSTRUCTURE

In designing the car efforts were made to provide as great a protection as possible for the lading in case of accident or rough usage, and to reduce, as far as possible, the number of parts. The superstructure was designed with an outside shell composed of a series of ⅛ in. sheets for the side, and ¼ in. sheets for the ends, in which the posts are pressed integral. A U-shape post is pressed into one end of each sheet and is overlapped by the adjacent sheet, which acts as a cover plate for the post and gives a smooth surface on the outside of the car. The post portion of the sheet is 2¾ in. deep and 4 in. wide at the back. The sides of the car are composed of ten sheets each, which have a 2 in. flange, top and bottom, by means of which they are secured to the bulb angle of the side sill and to the 6 in. by 4 in. by ⅜ in. eave angle or side plate at the top.

The end construction is similar to that of the sides, each end being composed of three sheets, the two nearest the sides of the car containing the depression which forms the post. Where the central sheet overlaps these, they are depressed ¼ in., making the outside face perfectly smooth so that it may fit down snugly behind the end sill. The middle sheet has an additional U-shape stiffener at the center, 2⅝ in. deep, 9½ in. wide and ¼ in. thick, extending vertically from the end sill to the eave angle. The side door posts are made up of 4 in. by 3½ in. by ⅜ in. bulb angles.

The side and end sheets are tied together by a cover plate, L-shape in section and ¼ in. thick. This is capped top and bottom by suitable castings, which finish off the corners, and at the same time act as a connection between the side and eave angles and the side and end sills. To the side and end sheets, midway between the posts, vertical nailing strips are secured, to which the lining is nailed in a horizontal position.

The carlines are of the bathtub or U-type, being spaced 3 ft. 9½ in. apart, resting on the 6 in. vertical leg of a side eave angle and extending downward from the side a sufficient distance to be securely riveted. The 3/32 in. steel roof sheets are continuous across the car, being spot welded to the carlines, which are located in their center. This allows the butt joint to come midway between the carlines, with the exception of the end roof sheets, which, because of the position of the last carline, must cover one and one-half spaces.

The roof sheets are flanged down on the vertical leg of the side and end eave angles 2½ in. and are secured to them by ⅜ in. rivets spaced 4¾ in apart. Between the roof sheets and the eave angles are 3/16 in. washers, through which the rivets are driven. This construction allows for a slight ventilation and yet is small enough to keep out anything which might cause damage to the lading. The roof sheets are fastened together by an outside and inside strip, the outside strip being 2½ in. wide and 3/32 in. thick and pressed up in the center ⅞ in., which adds to the stiffness of the structure. The inside strip is 2½ in. wide and

3/16 in. thick. These strips are continuous across the car and are riveted to the roof sheets with ¼ in. rivets spaced 1½ in. apart. To insure a perfectly water-tight joint, tar paper is placed between the outside butt strip and the roof sheets. The end and side eave construction is the same, except that there is no ventilation at the end.

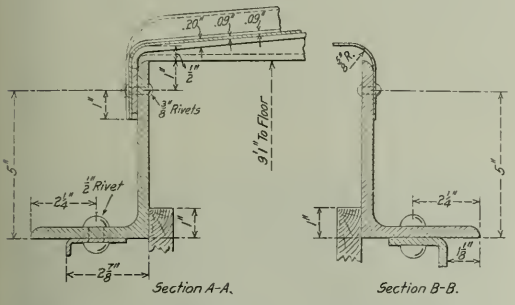
The 13/16 in. pine inside lining is nailed to vertical nailing strips, conveniently spaced around the sides and ends. The lining extends to within 3 in. of the floor. There is an air space back of the lining which allows for ventilation, and also facilitates cleaning. The application of a triangular grain strip around the edge of the floor, next to the side sheets, allows all foreign matter to work its way out from behind the lining.

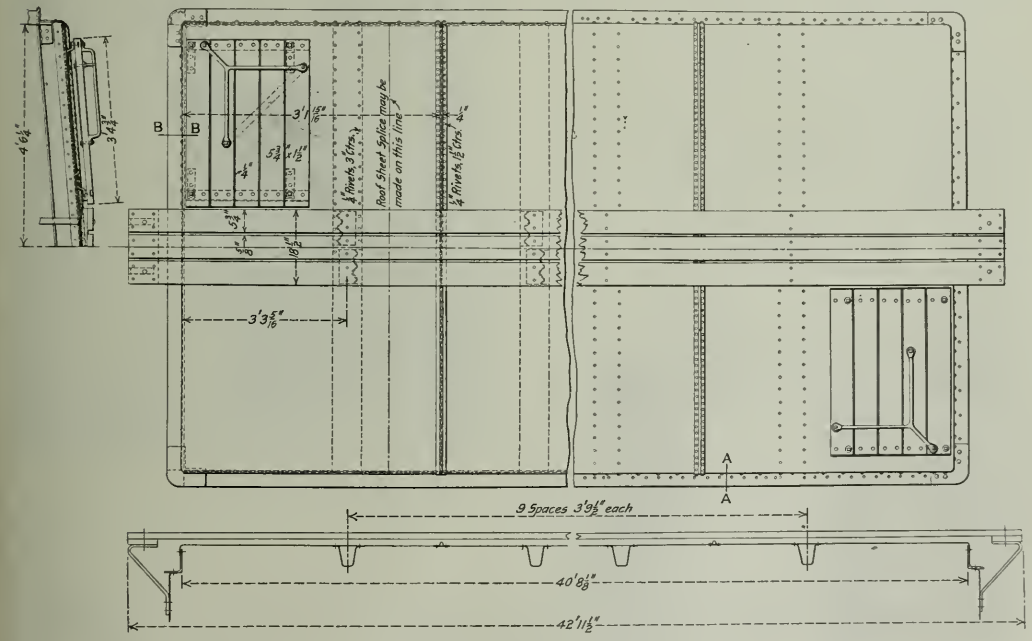
A new feature in this car is the manner in which the safety appliances are secured. All grab irons are fastened to castings by means of a slotted hole in the face, which permits the removal of the grab iron bolt, and thus the renewal of the grab irons without disturbing the inside lining. A like provision is made for the side door stop.

The car is equipped with outside hung doors, supported at the top by hangers at both corners. A 5 in. by 1¾ in. by 5/16 in. angle acts as a top guide rail and weather strip, the short leg being turned down over the face of the door. The door is made of .109 open hearth steel, with two vertical Z-shape edge stiffeners, which are flattened out, top and bottom, supporting the door hanger and door guide castings. The rear stiffener laps over the door post, and the front one butts against a 2 in. by 2 in. by ¼ in. angle riveted to the side sheets and projecting slightly beyond the door, thus forming a weather strip, front and back. There are two horizontal U-shape sections pressed in the end of the top and intermediate door sheets, which overlap the adjacent sheets, forming a stiffener across the door. At the bottom of the door is a 1¾ in. by 1¾ in. by ¼ in. stiffening angle, which runs continuously between the vertical stiffeners. The inside of the door is perfectly smooth, all rivets being countersunk. A clearance of 1/16 in. is allowed for the door to clear the door post. The floor is extended through the door opening, flush with the door post, and is supported by the bulb angle of the side sill.

The following are the leading dimensions and data:

Length over end sills	42 ft. 6 in.
Inside length	40 ft. 5 in.
Inside width	8 ft. 10 in.
Inside height	9 ft. 1 in.
Height top of rail to top of floor	3 ft. 7½ in.
Height at eaves	12 ft. 10 in.
Width at eaves	9 ft. 2 in.
Capacity	100,000 lb.
Cubical capacity	2,343 cu. ft.
Weight	49,100 lb.





Arrangement and Details of the Roof

BUSINESS OF THE SUEZ CANAL.—Suez Canal receipts during 1914 showed an increase up to the end of May of $436,000 compared with the like period in 1913.

GRAIN ELEVATORS IN THE BALKAN STATES.—A new grain elevator which is soon to be opened for public use in Constanza, Roumania, will be the third elevator in that port to be owned and operated by the government. The capacity of the other two is 1,252,352 bu. each, but the only other elevators in the country are at Bralia and Galatz, on the Danube. These two elevators have respective capacity of 1,071,418 bu., and 982,086 bu.

LOYALTY, AS VIEWED BY AN EMPLOYEE

[From Sunset-Central Bulletin.*]

Harmonious relations existing among foremen create a harmonious relation among the men; the spirit of good will and brotherly feeling is contagious. . . . Is there any other business on earth that needs something to encourage the men it employs more than a railroad company? No, not one; for the simple reason railroad companies are criticized, blackguarded, persecuted and unfavorably censored without just cause more than any other enterprise on earth. They are a target shot at from every conceivable angle and with every kind of ammunition. It is a natural consequence that men who hear this unmerited criticism on every hand should enter the company's service with their minds embittered by such unwholesome suggestions; and in spite of the pay they receive and the treatment they are accorded, it takes many a year to purge this venom and antagonism from their minds.

The railroad companies of these United States lose hundreds of thousands of dollars every year through "soldiering," negligence and carelessness, emanating from a spirit of unloyalty which is an inheritance born of malice and handed down from one generation to another. The only antidote the stockholders can employ to overcome these adverse influences is by reaching their subordinate employees through the avenues of their presidents, managers, superintendents and the foremen they employ; and if there is any missing link of co-operation and harmony, from the president to the firing line, the chain is broken and the good influences which are so essential are lost.

COMBINED COAT, HAT AND UMBRELLA HOOK

A novel combined coat, hat and umbrella hook, or holder, unique in that the things it holds may be held securely under lock and key is shown in the illustrations. The device is the design of C. L. Bundy of Kingsland, N. J., and is primarily intended for use in shops or offices, although it can also be used in restaurants, barber shops and similar places. Fig. 1 illustrates the holder closed and empty in its natural position. The key has to be turned before the hook can be opened to the position shown in Fig. 2. The person who wishes to hang up his hat and coat, and his umbrella also, first places the coat on the hook portion projecting from the bottom of the holder. The absence of the hanger or strap on the neck of the garment is no detriment, as the knob which fits into the hole at the end of the hook is small enough not to pinch the coat and cut the cloth. The next step is to place the umbrella in that one of the holes in the horizontal bar which is best fitted to its size and then to place the hat on the smaller bar which extends to the front. The holder may then be shut and the key withdrawn; the three articles will be securely fastened as shown in Fig. 3.

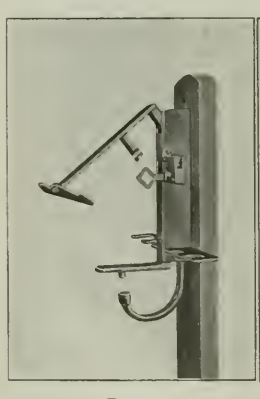


Fig. 1

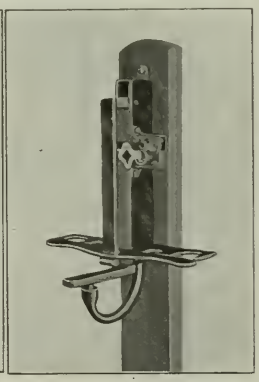


Fig. 2

Combined Coat, Hat and Umbrella Hook Shown Open and Closed

The holder is made of malleable iron and with the exclusion of the lock, is made of three essential pieces of metal, the main body and the two horizontal bars making up one piece, the hook a second, and the clamp which is hinged to the latter in the body of the holder the third. The lock may be as simple or complex as is necessary; it is so devised, however, that the key can be withdrawn only when the hook is shut. The holder has certain advantages as compared to a locker, in that it is cleaner and cheaper and occupies less space. Lockers have a tendency to accumulate waste, old papers and similar things, and it is, necessary, therefore, to exercise careful supervision over the care that is exercised in this respect, or else periodically clean them out.

Fig. 3—The Hook Holding Coat, Hat and Umbrella

The hooks may also be used advantageously in offices, barber shops, railroad dining and lunch rooms. In such cases it may be desirable to have them made of brass, or nickel-plated or lacquered to suit the scheme of design of the room in which they are placed. The polished malleable iron hook costs about $1.25.

*From an article on "Co-operation and Harmony," by Bennette Wilson, Engine Despatcher, Southern Pacific Company.

Chinese Railway Extension.—It is stated with regard to the Ningpo-Hangchow section of the Shanghai-Hangchow-Ningpo Railway that the laying of the rails was completed and opened for traffic in December, 1913, as far as Pakwan, a distance of 53 miles from Ningpo. The rails (85 lb. to the yard) were procured from the Hangyang iron works and America. The daily revenue from both passenger and freight traffic between Ningpo and Pakwan, is estimated to vary between $700 and $1,000. The extent of construction is not of great moment, and its growth has barely influenced the trade in any way. It is rumored that the nationalization of this section through purchase by the Chinese government from the shareholders is contemplated, the question for decision being one of terms alone.

General News Department

The Conference Committee of Managers of the Western roads has selected W. L. Park, vice-president of the Illinois Central, and H. E. Byram, vice-president of the Chicago, Burlington & Quincy, as arbitrators in the enginemen's and firemen's wage controversy.

The United States Steel Corporation reports that the unfilled orders on its books July 31 amounted to 4,158,589 tons, an increase of 125,732 tons over the amount recorded on June 30. As compared with July 31 last year, there is a decrease of 1,240,767 tons.

The new cut-off line of the Southern Pacific from Eureka on the Houston & Texas Central to Stella on the Galveston, Harrisburg & San Antonio, nine miles long, has been put in operation. By the cut-off through freight between North Texas points and the port of Galveston can be expedited materially, as it need not pass through Houston.

The lower house of Congress, on Tuesday of this week passed the Moon Bill, providing for a readjustment of the rates for payment for transportation of the mails by railroad. This bill also contains a number of provisions relating to postmasters, their pay and their rules, and probably will be the subject of disagreement between the Senate and the House.

A standard dining car of the Chicago, Burlington & Quincy has been selected by the state pure food commissioner of Nebraska to demonstrate the proper method of serving food on dining cars, at the state fair to be held in Lincoln, September 7 to 11. All meals will be served to the fair visitors, who will be allowed to inspect the kitchen and see how the work is conducted.

The St. Joseph & Grand Island, which has taken off the one passenger train daily which it ran between Kansas City and St. Joseph, will, on September 1, abandon the freight service also on that section of its line. This will make St. Joseph, 61 miles north of Kansas City, the eastern terminus of the road. Between St. Joseph and Grand Island, 252 miles, the company runs two passenger trains each way, one in the night and one in the day time.

That part of the National Railways of Mexico which has been operated as a military railroad is to be surrendered to the old operating company, E. N. Brown, president. The revival of business of all kinds in Monterey, Saltillo, Torreon and other places in Constitutionalist territory has resulted in an urgent demand that the Laredo gateway be reopened. The war in Europe makes Mexico dependent upon the United States for important supplies, including many food products and machinery; and a heavy traffic between Mexico and the United States is expected quickly to develop by reason of the closing of many European ports, as soon as railroad facilities can be obtained.

The Public Utilities Commission of Illinois has announced that it will carry on an active campaign to reduce the danger to the public at highway grade crossings throughout the state. The most important factor in this campaign is the attempt to secure the arrest of all trespassers and to this end instructions will be issued by the commission, with the consent of the governor, to all municipal and railroad authorities to arrest all trespassers. A systematic effort will be made to educate the public as to the danger of grade crossings and to teach wayfarers to heed the warning signs. An inspection of all grade crossings throughout the state is being made, with the object of ordering better protection for dangerous crossings.

In a paper on the Compound Articulated Locomotive, presented by Anatole Mallet, originator of the Mallet type of locomotive, before the Institution of Mechanical Engineers at the Paris meeting, held in July, an original method of comparing the weight of locomotives with the weight of rail was mentioned. Mr. Mallet showed that in 1829, engines weighing five tons ran on rails of 34.2 lb. per yard, which was equal to 327 times the weight of rail per yard. In 1846, engines weighing 22 tons ran on rails of 70.52 lb. per yard, which is 700 times the weight of rail per yard. In 1880, 56-ton engines ran on rails of 84.6 lb. per yard, which is 1,480 times the weight of rail per yard. In 1911, engines weighing 96 tons ran on 96.77 lb. rails, which is 2,220 times the weight of rail per yard, and in the United States a Mallet engine with 10 coupled axles weighing 245 tons, adhesive weight, ran on 111 lb. rails, which is 4,950 times the weight of rail per yard.

Alaskan Railway Surveys

The Alaskan Engineering Commission now has a number of locating parties in the field running preliminary surveys from Portage Bay, Alaska, to Fairbanks, and also along the line of the Alaska Northern from Seward to the end of the constructed line at mile 72. A party is also running a line from Chitina on the Copper River Railroad, to the Matinuska coal fields. Considerable information is also in hand regarding other possible routes from the seacoast to the interior, but much of the data collected have been secured on reconnaissance surveys only. Some of these other routes will undoubtedly be investigated next year. The present surveys are being made to secure estimates of the probable cost of building the various lines. It is expected that about 600 miles of these surveys will be completed this summer.

Good Results of Safety Campaign on the Santa Fe

The following table, which has been prepared by Isaiah Hale, commissioner of safety of the Atchison, Topeka & Santa Fe, shows the number of personal injuries among employees of this road during the fiscal years ending June 30, 1913, and June 30, 1914. The employees are divided according to the classification in the personal injury record which is as follows: "A," train, engine and switching service; "B," warehouse and storehouse departments; "C," track and bridge and building departments; "D," shops and roundhouses; "E," other employees; "F," total employees. In connection with this report it is fair to note that during the last year a number of minor injuries were reported and recorded of a class of which no record was made in former years, so that as a matter of fact the result of the campaign for safety has been greater than indicated below.

	"A"		"B"		"C"		"D"		"E"		"F"	
	k	i	k	i	k	i	k	i	k	i	k	i
1913	40	2,321	2	889	43	3,469	11	6,092	7	650	103	13,421
1914	28	2,047	1	837	26	3,101	5	5,318	6	826	66	12,107
Decrease	12	274	1	52	17	368	6	774	1	176*	37	1,314
Per cent.	30	11¾	50	6	39	10½	54	12¾	14	25*	36	10—

*Increase.

Protest Against Enginemen's Wage Increase

A petition signed by about 250 men, employees of the various railroads entering Wichita, Kan., in the capacities of clerks, ticket sellers, employees of the freight department, baggage handlers, ushers, and others, has been sent to President Wilson at Washington, protesting against any further increase in the wages of locomotive engineers in the western territory, until such time as the other 90 per cent of railroad employees are better paid. It is declared that the petition is not in any way directed against, or intended to oppose organized labor. Continuing the petitioners say:

"Knowing as we do that railway managers of the country are continually confronted by an increase in operating expense on one side, and on the other hand by lack of power to increase their earnings, we realize that any further increase granted the engineers, who, we believe, are already well paid, would not only lessen our chances for better wages, but would necessitate a reduction of railway employees, or a reduction of some sort in order to meet the enforced deficit which will be caused by the increase asked by the engineers."

The petition then goes on to show that locomotive runners in Kansas earn anywhere from $200 to $300 per month, while their working hours, including all their overtime, would not total as much as those of the nine and ten-hour employees who earn from one-sixth to one-fourth of this amount.

The petition closes by saying "the engineers are already getting

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF JUNE, 1914

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses					Net operating revenue (or deficit).	Outside operations, net.	Taxes.	Operating income (or loss).	Increase (or decr.) comp. with last year.
		Freight.	Passenger.	Total. inc. misc.	Maintenance: Way and structures.	Maintenance: Of equipment.	Traffic.	Transportation.	General.	Total.					
Atlanta & West Point	93	$47,641	$40,780	$104,899	$11,466	$21,918	$5,409	$27,589	$4,375	$70,757	$34,142	—$1,270	$7,125	$25,747	$23,752
Baltimore & Ohio—System	4,478	5,943,129	1,352,361	7,801,303	1,460,788	1,452,402	165,496	3,001,243	199,677	6,279,606	1,521,697	—$1,159	135,522	1,335,016	—638,206
Belt Ry. Co. of Chicago	21	.....	.....	257,276	26,357	22,017	1,435	80,119	5,685	135,613	121,663	.....	12,113	109,550	20,382
Bingham & Garfield	37	145,953	4,710	150,928	17,521	24,285	860	20,417	2,985	66,068	84,860	.....	2,913	81,947	62,405
Buffalo & Susquehanna R. R. Corporation	253	93,745	6,408	104,101	28,729	32,132	994	34,065	5,787	101,707	2,394	.....	2,600	—206	.....
Buffalo & Susquehanna Ry.	91	14,455	6,496	23,293	6,109	8,647	418	12,523	3,321	31,018	—7,725	—32	1,900	—9,657	7,357
Butte, Anaconda & Pacific	90	101,806	12,482	124,074	15,194	24,502	658	34,859	3,550	78,763	45,301	.....	2,500	42,811	3,674
Chicago & Eastern Illinois	1,282	789,107	238,618	1,126,621	136,424	274,926	23,791	417,105	39,902	892,148	234,473	—2,418	56,900	175,155	—159,975
Chicago Great Western	1,496	797,013	265,213	1,158,123	173,306	206,521	53,680	410,662	34,186	878,355	279,768	4,018	51,222	232,564	—65,421
Chicago, Milwaukee & St. Paul	9,690	5,266,622	1,766,767	7,671,406	1,124,710	943,910	151,724	2,738,017	159,356	5,117,717	2,553,689	54,499	354,224	2,253,964	192,024
Colorado & Southern	1,127	430,762	119,764	593,787	90,283	71,106	12,798	188,985	22,454	385,626	208,161	—1,600	27,846	178,715	53,076
Delaware & Hudson Co.—R. R. Dept	881	1,637,701	259,359	1,965,164	141,167	298,260	27,669	703,758	67,198	1,238,052	727,112	—4,274	56,250	666,588	—34,678
Denver & Rio Grande	2,585	1,299,654	402,153	1,790,633	300,400	319,672	43,368	519,942	52,879	1,236,261	554,372	—1,712	60,543	492,117	150,571
Denver & Salt Lake	255	97,339	34,966	137,465	20,787	18,527	3,417	40,569	5,538	88,838	48,627	.....	Cr. +8,913	57,540	32,850
Duluth, South Shore & Atlantic	627	162,001	90,705	269,951	96,023	37,394	8,734	101,300	14,640	258,091	11,860	666	29,408	—16,882	81,717
Duluth, Winnipeg & Pacific	181	107,270	17,906	127,300	33,320	36,267	2,349	43,065	5,752	120,753	6,547	.....	6,868	—321	—39,295
Fort Worth & Denver City	454	196,101	114,419	331,104	39,893	42,451	6,775	129,710	15,703	234,532	96,572	—1,013	12,920	82,639	52,789
Georgia	307	147,878	72,672	238,157	27,067	38,544	13,232	103,068	9,157	191,068	47,089	.....	7,213	39,876	46,987
Grand Rapids & Indiana	575	245,891	155,574	436,264	59,180	75,094	10,706	183,868	17,017	345,865	90,399	—489	24,221	65,689	28,866
Great Northern	7,803	4,393,801	1,293,502	6,111,373	1,640,078	713,070	114,466	1,648,301	121,046	4,236,961	1,874,412	38,536	439,947	1,473,001	—514,334
Gulf & Ship Island	308	107,714	29,472	147,131	20,618	32,268	3,173	43,523	9,205	108,787	38,344	152	7,415	31,081	—10,265
Gulf, Colorado & Santa Fe	1,596	675,543	251,367	1,002,785	115,687	182,449	31,451	411,407	42,921	783,915	218,870	.....	34,767	184,103	82,119
Hocking Valley	352	357,619	70,240	476,936	41,240	89,669	8,306	168,175	14,243	321,633	155,303	.....	13,136	142,167	—125,108
Long Island	398	300,866	906,691	1,357,184	136,281	133,297	12,706	487,679	34,259	804,222	552,962	7,768	63,484	497,246	46,455
Midland Valley	380	73,126	39,898	119,845	17,244	21,335	2,082	40,513	6,024	87,198	32,647	.....	6,835	25,812	33,684
Minneapolis & St. Louis	1,586	571,528	164,392	786,899	109,182	139,230	17,779	286,746	18,730	571,667	215,232	—85	36,399	178,748	32,355
Minneapolis, St. Paul & Sault Ste. Marie	4,102	1,496,993	547,383	2,193,093	361,664	356,217	73,260	738,173	57,584	1,586,898	606,195	11,617	98,702	519,110	—76,443
Missouri, Kansas & Texas System	3,865	1,430,327	714,421	2,312,027	249,348	330,954	61,933	843,278	96,014	1,581,527	730,500	—10,260	111,416	608,824	285,943
Monongahela	67	91,381	2,272	95,757	17,464	6,074	280	22,136	2,098	48,052	47,705	.....	2,100	45,605	—26,016
Nevada Northern	165	126,591	11,455	141,863	26,818	19,548	646	25,064	5,690	77,766	64,097	.....	Cr. +2,371	66,468	3,255
New York Central & Hudson River	3,757	5,165,330	3,210,791	9,466,040	1,344,231	1,564,123	154,771	3,107,037	264,690	6,434,852	3,031,188	3,226	560,136	2,474,278	382,527
New York, Ontario & Western	566	624,953	142,746	809,706	105,301	81,622	10,389	294,513	16,784	508,609	301,097	—1,543	25,762	273,792	11,730
New York, Philadelphia & Norfolk	112	291,264	42,710	362,150	31,613	65,889	3,593	158,317	13,938	273,350	88,800	.....	11,050	77,750	—28,433
Northern Central	472	753,168	212,178	1,037,299	141,255	210,079	14,362	500,085	28,984	895,465	141,834	1,295	37,047	106,082	17,104
Northwestern Pacific	401	124,776	218,684	363,540	51,761	38,046	5,043	118,700	15,395	228,945	134,595	.....	15,559	119,036	8,108
Oregon Short Line	2,120	1,157,937	445,455	1,746,679	249,840	198,743	40,416	407,710	52,611	949,320	797,359	—1,648	115,202	680,509	—87,697
Oregon-Washington R. R. & Nav. Co	1,915	800,888	446,586	1,338,733	178,013	142,510	43,784	426,274	70,506	861,587	477,146	3,539	74,695	405,990	42,749
Pecos & Northern Texas	570	137,616	36,497	185,440	33,393	33,463	2,625	75,675	5,513	150,669	34,771	.....	5,703	29,068	—4,494
Pennsylvania *Company*	1,750	3,638,266	862,400	5,053,211	666,278	842,268	81,814	1,660,732	186,214	3,437,306	1,615,905	—1,617	274,125	1,340,163	—15,139
Pennsylvania *Railroad*	4,084	10,039,572	3,163,448	14,261,298	1,870,639	2,696,745	166,615	4,887,815	374,881	9,996,695	4,364,603	—83,499	613,073	3,568,031	—296,875
Pere Marquette	2,322	793,132	317,677	1,242,867	392,737	195,098	33,789	527,000	48,660	1,197,284	45,583	898	62,911	—16,430	—14,121
Philadelphia, Baltimore & Washington	717	942,975	672,439	1,810,512	262,908	335,791	26,368	725,463	50,501	1,401,031	409,481	.....	56,234	353,247	32,802
Pittsburgh, Cincinnati, Chic. & St. Louis	1,472	2,198,174	718,854	3,313,415	458,487	630,903	64,771	1,153,974	115,695	2,423,830	889,585	—1,065	163,629	724,891	352,745
Rutland	468	177,729	96,739	316,153	48,917	41,396	9,055	128,904	8,459	236,731	79,422	—55	16,344	63,023	18,435
St. Joseph & Grand Island	319	88,623	26,850	126,426	24,034	10,963	4,885	50,285	16,923	107,090	19,336	29	7,048	12,317	5,908
St. Louis & San Francisco	4,742	2,068,695	949,170	3,250,564	553,454	580,897	76,702	1,100,429	91,954	2,403,436	847,128	.....	117,040	730,088	—533,507
St. Louis, Brownsville & Mexico	518	103,242	67,227	185,331	48,763	28,965	6,900	76,678	12,593	173,899	11,432	.....	4,972	6,460	16,897
St. Louis Merchants' Bridge Terminal	9	.....	423	169,930	29,624	6,870	780	77,861	6,059	121,194	48,736	.....	6,250	42,486	15,054
St. Louis, San Francisco & Texas	244	54,828	29,502	89,966	29,724	17,058	2,291	52,943	4,087	106,103	—16,137	.....	1,476	—17,613	—30,930
St. Louis Southwestern	943	433,946	107,375	573,456	58,325	105,617	25,426	169,744	24,633	383,745	189,711	—1,264	32,076	156,371	—34,176
St. Louis Southwestern of Texas	811	176,529	82,134	283,604	55,598	76,005	11,216	143,252	17,480	303,551	—19,947	—498	15,500	—35,945	—7,942
San Antonio & Aransas Pass	724	190,621	101,930	311,663	57,296	44,914	6,396	161,526	12,769	282,901	28,762	.....	8,563	20,199	25,393
San Pedro, Los Angeles & Salt Lake	1,132	590,536	272,285	899,584	121,118	120,918	33,781	282,278	19,804	578,399	321,185	—768	52,902	267,515	—45,162
Southern	7,010	3,225,311	1,512,279	5,166,593	674,757	1,036,907	197,423	2,032,824	206,641	4,148,552	1,018,041	—20,012	224,857	773,172	—416,071
*Panhandle & Santa Fe Railway Company	179	84,974	17,209	107,320	15,170	22,619	1,492	38,656	4,211	82,148	25,172	.....	2,969	22,203	—7,674
Southern Pacific Co.	6,493	4,961,147	2,458,367	7,973,864	942,368	1,017,827	177,180	2,301,692	205,020	4,644,087	3,329,777	—81,705	523,636	2,724,436	—409,798
Tennessee Central	294	93,845	37,226	139,660	39,754	20,162	5,739	48,415	7,341	121,411	18,249	.....	7,046	11,203	—19,624
Terminal R. R. Ass'n of St. Louis	34	.....	198	210,998	31,472	13,288	982	76,863	5,813	128,418	82,580	12,399	27,104	67,875	11,225
Texas & Pacific	1,885	813,666	363,179	1,271,425	123,134	262,323	47,742	589,913	43,518	1,066,630	204,795	—22,415	88,800	93,580	176,362
Toledo, St. Louis & Western	451	334,327	34,465	396,220	35,974	38,135	20,280	132,974	8,408	235,780	160,440	.....	19,536	140,904	56,435
Trinity & Brazos Valley	463	91,078	40,542	140,071	40,432	22,696	9,373	63,709	10,783	146,993	6,922	.....	4,900	—11,822	89,806
Ulster & Delaware	129	72,013	35,397	113,053	12,009	11,735	1,403	41,787	8,904	78,838	34,215	35	2,629	31,551	—1,887
Union R. R. of Baltimore	9	112,824	21,732	136,431	13,159	.....	.....	4,624	2,361	20,144	116,287	.....	6,180	110,107	—7,044
Vandalia	910	591,524	207,506	893,860	131,246	180,383	23,665	335,200	34,684	705,178	188,682	.....	32,291	156,391	63,061
Virginia & Southwestern	240	139,863	13,654	159,038	20,360	35,289	2,007	43,993	4,379	106,028	53,010	.....	6,832	46,178	10,039
Wabash	2,515	1,539,638	608,883	2,337,655	469,224	446,774	99,763	1,052,783	72,765	2,141,309	196,346	—2,619	99,192	94,535	—270,110
West Jersey & Seashore	356	150,444	401,408	584,933	82,404	76,048	10,555	215,669	13,357	398,033	186,900	—2,220	26,960	157,720	26,057
Western Pacific	943	372,438	124,932	511,439	129,429	56,107	30,185	143,341	20,111	379,173	132,266	—2,103	13,420	116,743	—18,502
Western Ry. of Alabama	133	51,239	44,060	108,871	21,653	28,297	5,967	26,963	5,398	88,278	20,293	—77	5,008	15,208	18,332
Wheeling & Lake Erie	459	440,310	47,148	536,409	64,066	79,539	7,691	181,404	22,169	354,869	181,540	107	29,152	152,281	84,845

*Succeeded Southern Kansas of Texas on June 5, 1914.

REVENUES AND EXPENSES OF RAILWAYS

TWELVE MONTHS OF FISCAL YEAR ENDING JUNE 30, 1914

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses					Net operating revenue (or deficit).	Outside operations, net.	Taxes.	Operating income (or loss).	Increase (or decr.) comp. with last year.
		Freight.	Passenger.	Total. inc. misc.	Maintenance: Way and structures.	Maintenance: Of equipment.	Traffic.	Transportation.	General.	Total.					
Atlanta & West Point	93	$642,663	$493,459	$1,277,668	$176,163	$267,804	$62,893	$400,962	$54,984	$962,806	$314,862	—$63	$82,911	$231,888	—$8,687
Baltimore & Ohio—System	4,478	75,784,287	15,893,721	97,411,441	12,207,191	16,681,986	2,151,887	38,699,493	2,314,335	72,054,892	25,356,549	—885,246	3,226,466	21,244,837	—2,696,441
Belt Ry. Co. of Chicago	21	.....	.....	3,064,677	290,484	308,743	8,050	1,192,456	77,547	1,877,280	1,187,397	.....	121,533	1,065,864	4,083
Bingham & Garfield	27	1,712,682	54,139	1,775,538	128,376	236,830	10,383	267,889	29,207	672,685	1,102,853	.....	35,456	1,067,397	453,615
*Buffalo & Susquehanna R. R. Corp	253	613,818	40,204	675,823	140,518	206,064	7,206	253,433	38,942	646,163	29,660	.....	15,600	14,060	.....
Buffalo & Susquehanna Ry	91	363,416	97,881	492,920	105,942	216,661	6,308	222,637	34,796	586,344	—93,424	—179	19,500	—113,103	57,099
Butte, Anaconda & Pacific	90	1,223,258	148,541	1,495,391	178,578	259,565	7,651	513,448	45,651	1,004,893	490,498	.....	30,755	459,743	228,616
Chicago & Eastern Illinois	1,283	11,324,292	2,963,222	15,544,286	2,242,580	4,062,880	286,408	5,909,591	467,552	12,969,011	2,575,275	—28,139	630,500	1,916,636	—776,253
Chicago Great Western	1,496	9,943,575	3,205,992	14,260,522	2,024,458	2,367,235	577,744	5,478,497	433,234	10,831,168	3,429,354	—3,249	499,082	2,927,023	—376,328
Chicago, Milwaukee & St. Paul	9,696	65,266,420	18,961,225	91,782,691	10,704,519	13,112,978	1,799,610	33,960,581	1,752,373	61,330,061	30,452,630	260,483	4,106,557	26,606,556	—944,447
Colorado & Southern	1,127	5,619,585	1,472,630	7,608,129	1,071,696	1,380,398	129,454	2,738,654	261,971	5,582,173	2,025,956	—10,114	397,543	1,618,299	—639,321
Delaware & Hudson Co.—R. R. Dept	881	19,123,445	3,116,624	23,090,060	1,758,090	3,635,231	325,503	8,782,377	808,579	15,309,780	7,780,280	—14,334	660,607	7,105,339	—1,560,843
Denver & Rio Grande	2,583	17,058,080	5,077,408	23,167,051	3,393,968	4,245,325	497,432	7,249,241	632,230	16,018,196	7,148,855	—16,148	1,009,143	6,123,564	—326,996
Denver & Salt Lake	238	817,055	338,110	1,215,361	224,175	202,190	23,986	411,674	54,786	916,811	298,550	.....	36,588	261,962	35,596
Duluth, South Shore & Atlantic	627	2,091,597	1,104,471	3,412,575	795,084	431,058	105,707	1,294,558	137,590	2,763,997	648,578	4,655	247,443	405,790	—67,598
Duluth, Winnipeg & Pacific	181	1,435,365	276,885	1,743,894	290,007	341,458	25,939	652,272	68,894	1,378,570	365,324	.....	87,721	277,603	—120,727
Fort Worth & Denver City	454	3,034,451	1,449,709	4,738,723	585,874	713,339	85,139	1,960,636	188,673	3,533,661	1,205,062	—6,842	182,073	1,016,147	—434,441
Georgia	307	2,165,985	922,739	3,327,444	334,462	573,517	143,357	1,474,621	106,116	2,632,073	695,371	.....	37,261	658,110	335,976
Grand Rapids & Indiana	575	3,266,527	1,858,900	5,538,484	756,011	902,258	145,781	2,429,768	192,284	4,426,102	1,112,382	—5,979	289,710	816,693	—47,842
Great Northern	7,780	55,025,016	15,224,463	75,441,366	12,705,906	9,825,353	1,360,564	21,195,668	1,431,782	46,519,273	28,922,093	159,250	4,790,572	24,290,771	—4,379,805
Gulf & Ship Island	308	1,476,019	398,111	1,995,766	269,260	402,411	35,474	564,516	104,182	1,375,843	619,923	350	89,917	530,356	—124,597
Gulf, Colorado & Santa Fe	1,596	9,063,145	3,002,053	12,882,258	2,016,922	2,090,266	318,582	5,126,731	407,232	9,959,733	2,922,525	.....	583,331	2,339,194	—696,715
Hocking Valley	352	5,601,382	910,311	7,021,145	668,455	1,460,653	107,576	2,391,640	175,422	4,803,746	2,217,399	.....	451,137	1,766,262	—589,638
Long Island	398	3,396,181	7,901,926	12,625,291	1,568,047	1,443,972	172,149	5,521,806	337,798	9,043,772	3,581,519	2,901	774,733	2,809,687	—272,804
Midland Valley	380	1,043,000	486,053	1,617,566	359,079	308,143	29,002	572,357	75,370	1,343,951	273,615	1,014	78,983	195,646	14,216
Minneapolis & St. Louis	1,586	7,142,498	1,920,273	9,620,884	1,300,283	1,415,997	214,126	3,721,029	240,378	6,891,813	2,729,071	—537	410,361	2,318,173	—324,258
Minneapolis, St. Paul & Sault Ste. Marie	4,003	20,372,247	6,664,869	28,775,634	3,593,529	4,441,761	661,636	9,601,472	643,540	18,941,938	9,833,696	118,268	1,182,367	8,769,597	—2,931,584
Missouri, Kansas & Texas System	3,825	20,228,337	9,105,242	31,521,188	4,560,038	3,908,858	737,766	12,245,766	1,217,009	22,669,657	8,851,531	—107,977	1,499,521	7,244,033	—950,285
Monongahela	67	1,371,112	32,970	1,426,965	181,230	82,465	4,862	299,737	26,019	594,313	832,652	.....	27,200	805,452	—171,580
Nevada Northern	165	1,572,285	147,310	1,761,197	220,955	236,025	5,591	402,610	60,527	935,708	835,489	.....	81,242	754,247	—15,458
New York Central & Hudson River	3,754	65,219,132	34,974,165	112,705,211	16,064,579	22,394,718	2,133,695	42,154,292	2,971,059	85,718,343	26,986,868	—264,709	6,206,869	20,515,290	—4,540,822
New York, Ontario & Western	566	6,883,721	1,709,369	9,040,812	1,272,562	1,564,090	124,204	3,531,879	200,188	6,692,923	2,347,889	—27,467	238,562	2,081,860	—610,038
New York, Philadelphia & Norfolk	112	3,030,331	512,834	3,812,826	336,569	803,245	57,088	1,734,661	169,184	3,100,747	712,079	.....	105,550	606,529	—235,585
Northern Central	472	9,721,700	2,513,260	13,124,536	1,709,423	2,949,234	198,012	6,502,946	335,456	11,695,071	1,429,465	8,624	485,485	952,604	—522,339
Northwestern Pacific	401	1,434,809	2,039,742	3,745,805	586,859	509,277	49,902	1,358,020	149,301	2,653,359	1,092,446	.....	182,852	909,594	—52,681
Oregon Short Line	2,069	15,557,631	4,971,573	22,005,594	2,760,862	2,762,538	438,296	5,560,143	646,109	12,167,948	9,837,646	—34,062	1,516,784	8,286,800	—864,065
Oregon-Washington R. R. & Nav. Co	1,915	11,050,311	4,937,434	17,227,641	2,410,891	2,051,503	577,322	5,962,364	723,159	11,725,239	5,502,402	—52,093	1,298,818	4,151,491	—545,622
Pecos & Northern Texas	511	1,806,641	452,932	2,396,037	261,325	437,098	33,023	773,463	79,427	1,584,336	811,701	.....	88,524	723,177	—22,450
Pennsylvania *Company*	1,750	44,645,619	10,140,433	60,779,683	8,503,754	11,484,168	1,040,841	23,090,702	1,588,695	45,708,160	15,071,523	—107,948	3,284,867	11,678,708	—2,599,907
Pennsylvania *Railroad*	4,084	128,255,509	37,797,207	178,963,562	23,663,160	36,762,225	2,436,088	66,647,866	4,540,509	134,049,848	44,913,714	—1,778,769	7,352,502	35,782,443	—3,578,575
Pere Marquette	2,322	11,044,099	3,912,093	16,431,939	2,979,122	6,265,461	411,910	7,250,494	519,136	17,426,123	—994,184	—124,793	643,168	—1,762,145	—4,750,586
Philadelphia, Baltimore & Washington	717	10,132,245	8,347,057	20,656,989	3,205,080	3,857,078	378,470	9,107,227	561,952	17,109,807	3,547,182	.....	656,326	2,890,856	—493,694
Pittsburgh, Cincinnati, Chic. & St. Louis	1,472	28,568,636	8,772,624	42,096,662	6,157,331	8,558,896	865,876	16,578,818	1,040,865	33,201,786	8,894,876	—8,875	1,906,194	6,979,807	—853,970
Rutland	468	1,987,024	1,234,252	3,714,789	439,237	682,136	109,664	1,513,947	80,333	2,825,317	889,472	176	207,081	682,567	48,579
St. Joseph & Grand Island	319	1,129,677	347,504	1,610,060	326,115	240,915	60,181	696,054	83,808	1,407,073	202,987	21	86,482	116,526	49,599
St. Louis & San Francisco	4,742	28,654,454	10,830,575	42,458,880	7,225,913	7,091,885	879,028	14,671,587	1,205,297	31,073,710	11,385,170	.....	1,415,349	9,969,821	—3,406,021
St. Louis, Brownsville & Mexico	518	1,571,407	871,210	2,660,633	592,927	292,475	60,903	1,027,516	134,123	2,107,944	552,689	.....	88,701	463,988	—55,597
St. Louis Merchants' Bridge Terminal	9	.....	4,117	1,921,263	362,182	123,825	8,816	1,040,211	75,034	1,610,068	311,195	.....	73,150	238,045	—131,980
St. Louis, San Francisco & Texas	244	1,017,488	373,837	1,480,211	329,414	238,363	29,385	658,314	66,431	1,321,907	158,304	.....	18,368	139,936	—124,838
St. Louis Southwestern	924	6,316,085	1,451,255	8,212,255	814,739	1,510,546	346,840	2,145,011	343,754	5,160,890	3,051,365	—15,473	389,625	2,646,267	—720,313
St. Louis Southwestern of Texas	811	2,979,058	1,210,296	4,532,300	1,105,296	1,125,155	158,962	1,971,717	245,697	4,606,827	—74,527	—3,261	212,262	—290,050	—523,286
San Antonio & Aransas Pass	724	3,048,094	1,336,104	4,648,197	1,025,608	724,607	76,818	2,013,659	144,064	3,984,756	663,441	.....	160,563	502,878	—691,025
San Pedro, Los Angeles & Salt Lake	1,133	6,908,013	3,013,609	10,626,703	1,294,935	1,735,944	382,877	3,575,299	225,921	7,214,976	3,411,727	—35,329	532,484	2,843,914	—125,957
Southern	7,033	45,077,048	19,004,783	69,533,697	9,098,912	11,974,090	2,243,556	25,051,780	2,202,836	50,571,174	18,962,523	27,824	2,679,389	16,310,958	—1,544,757
†Panhandle & Santa Fe Railway Company	179	1,102,550	187,260	1,350,819	149,310	269,585	18,596	429,266	44,896	911,653	439,166	.....	45,011	394,155	—141,294
Southern Pacific Co	6,457	55,182,071	30,018,598	92,038,088	10,734,461	13,043,383	1,917,808	26,569,458	2,726,030	54,991,140	37,046,948	886,999	5,325,670	32,608,277	—5,158,621
Tennessee Central	294	1,172,923	436,547	1,707,337	336,986	205,029	68,998	600,585	87,651	1,299,249	408,090	.....	53,763	354,327	—40,139
Terminal R. R. Ass'n of St. Louis	34	.....	2,459	2,811,293	464,720	221,939	11,188	1,107,200	68,376	1,873,483	937,810	99,991	335,811	701,990	—183,604
Texas & Pacific	1,885	12,712,344	4,671,610	18,652,685	2,215,514	2,976,734	460,219	8,064,579	520,961	14,238,007	4,414,678	—62,536	757,341	3,594,801	1,022,655
Toledo, St. Louis & Western	451	3,922,725	369,455	4,588,121	469,619	592,935	201,139	1,764,263	110,190	3,138,146	1,449,975	.....	204,837	1,245,138	—10,266
Trinity & Brazos Valley	463	1,666,816	528,311	2,302,679	621,234	355,063	119,529	1,145,854	144,822	2,386,502	—83,823	.....	66,167	149,990	—287,176
Ulster & Delaware	129	668,831	351,014	1,076,217	141,306	148,014	21,787	471,687	52,693	835,487	240,730	409	40,129	201,010	—70,809
Union R. R. of Baltimore	9	1,336,627	273,304	1,633,774	174,009	.....	7,622	59,080	30,598	271,309	1,362,465	.....	72,161	1,290,304	—210,359
Vandalia	910	7,577,513	2,501,330	11,255,235	1,455,383	2,267,312	312,596	4,535,437	271,471	8,842,199	2,413,036	.....	381,864	2,031,172	—88,690
Virginia & Southwestern	240	1,702,575	181,152	1,939,104	269,328	472,966	26,149	554,322	48,102	1,370,867	568,237	.....	77,410	490,827	11,729
Wabash	2,515	20,199,493	7,201,974	30,022,495	4,028,044	5,640,347	1,032,850	12,865,693	836,899	24,403,833	5,618,662	55,780	1,044,309	4,518,573	—1,596,649
West Jersey & Seashore	356	1,805,289	4,196,500	6,397,732	1,010,154	1,015,881	182,450	2,727,427	161,963	5,097,875	1,299,857	—39,603	316,850	943,404	—126,115
Western Pacific	939	4,675,940	1,253,731	6,099,573	1,348,591	796,729	337,901	2,213,716	298,954	4,995,891	1,103,682	27,153	379,250	697,270	—707,792
Western Ry. of Alabama	133	817,671	550,379	1,485,849	266,751	297,883	75,344	423,086	68,287	1,131,351	354,498	—223	59,673	294,602	—2,842
Wheeling & Lake Erie	459	6,544,900	621,034	7,637,345	997,393	1,279,200	110,180	2,662,895	224,873	5,274,541	2,362,804	—1,040	365,831	1,995,933	412,625

*Figures shown here are for period January 1 to June 30, 1914. †Succeeded Southern Kansas Railway Company of Texas on June 5, 1914.

more than their share of the railroads' earnings, as compared to other employees, and we heartily commend the action of the general managers of the roads involved in opposing any further increase for engineers under the present conditions."

MEETINGS AND CONVENTIONS

The following list gives names of secretaries, dates of next or regular meetings, and places of meeting.

Air Brake Association.—F. M. Nellis, 53 State St., Boston, Mass. Next convention, May 4-7, 1915, Hotel Sherman, Chicago.

American Association of Demurrage Officers.—A. G. Thomason, Demurrage Commissioner, Boston, Mass. Annual convention in April.

American Association of Dining Car Superintendents.—H. C. Boardman, D. L. & W., Hoboken, N. J. Next convention, October 22-24, Washington, D. C.

American Association of Freight Agents.—R. O. Wells, Illinois Central, East St. Louis, Ill. Annual meeting, May 21-24, 1915, Richmond, Va.

American Association of General Passenger and Ticket Agents.—W. C. Hope, C. R. R. of N. J., 143 Liberty St., New York. Annual meeting, September 15-16, Boston, Mass.

American Association of Railroad Superintendents.—E. H. Harman, Room 101, Union Station, St. Louis, Mo. Next convention, August 20-21, New York.

American Electric Railway Association.—E. B. Burritt, 29 W. 39th St., New York. Annual convention, October 12-16, Atlantic City, N. J.

American Electric Railway Manufacturers' Association.—H. G. McConnaughy, 165 Broadway, New York. Meetings with American Electric Railway Association.

American Railway Association.—W. F. Allen, 75 Church St., New York. Semi-annual meeting, November 18, Chicago.

American Railway Bridge and Building Association.—C. A. Lichty, C. & N. W., Chicago. Next convention, October 20-22, 1914, Los Angeles, Cal.

American Railway Engineering Association.—E. H. Fritch, 900 S. Michigan Ave., Chicago. Next convention, March 16-18, 1915, Chicago.

American Railway Master Mechanics' Association.—J. W. Taylor, 1112 Karpen Bldg., Chicago. Annual meeting, June, 1915.

American Railway Tool Foremen's Association.—A. R. Davis, Central of Georgia, Macon, Ga. Annual meeting, July, 1915.

American Society for Testing Materials.—Prof. E. Marburg, University of Pennsylvania, Philadelphia, Pa.

American Society of Civil Engineers.—Chas. W. Hunt, 220 W. 57th St., New York. Regular meetings, 1st and 3d Wednesday in month, except, June, July and August, 220 W. 57th St., New York.

American Society of Engineering Contractors.—J. R. Wemlinger, 11 Broadway, New York. Regular meetings, 2d Thursday in month, at 2 P. M., 11 Broadway, New York.

American Society of Mechanical Engineers.—Calvin W. Rice, 29 W. 39th St., New York. Annual meeting, December 1-4, 1914, New York.

American Wood Preservers' Association.—F. J. Angier, B. & O., Mt. Royal Sta., Baltimore, Md. Next convention, January 19-21, 1915 Chicago.

Association of American Railway Accounting Officers.—E. R. Woodson, 1300 Pennsylvania Ave., N. W., Washington, D. C. Annual convention, April 28, 1915, Atlanta, Ga.

Association of Manufacturers of Chilled Car Wheels.—George W. Lyndon, 1214 McCormick Bldg., Chicago. Annual meeting, second Tuesday in October, New York.

Association of Railway Claim Agents.—C. W. Egan, B. & O., Baltimore, Md. Annual meeting, 3rd week in May, 1915, Galveston, Tex.

Association of Railway Electrical Engineers.—Jos. A. Andreucetti, C. & N. W., Room 411, C. & N. W. Sta., Chicago. Annual convention, October 26-30, 1914, Chicago.

Association of Railway Telegraph Superintendents.—P. W. Drew, Soo Line, 112 West Adams St., Chicago. Annual meeting, June 22-25, Rochester, N. Y.

Association of Transportation and Car Accounting Officers.—G. P. Conard, 75 Church St., New York. Next meeting, December 8-9, 1914, Richmond, Va.

Bridge and Building Supply Men's Association.—L. D. Mitchell, Detroit Graphite Co., Chicago, Ill. Meetings with American Railway Bridge and Building Association.

Canadian Railway Club.—James Powell, Grand Trunk, P. O. Box 7, St. Lambert (near Montreal), Que. Regular meetings, 2d Tuesday in month, except June, July and August, Windsor Hotel, Montreal, Que.

Canadian Society of Civil Engineers.—Clement H. McLeod, 176 Mansfield St., Montreal, Que. Regular meetings, 1st Thursday in October, November, December, February, March and April. Annual meeting, January, Montreal.

Car Foremen's Association of Chicago.—Aaron Kline, 841 Lawler Ave., Chicago. Regular meetings, 2d Monday in month, except July and August, Lytton Bldg., Chicago.

Central Railway Club.—H. D. Vought, 95 Liberty St., New York. Regular meetings, 2d Friday in January, May, September and November. Annual meeting, 2d Thursday in March, Hotel Statler, Buffalo, N. Y.

Civil Engineers' Society of St. Paul.—Edw. J. Dugan, P. O. Box 654, St. Paul, Minn.; Regular meetings, 2d Monday, except June, July, August and September, Old State Capitol Bldg., St. Paul.

Engineers' Society of Pennsylvania.—Edw. R. Dasher, Box 75, Harrisburg, Pa. Regular meetings, 1st Friday after 10th of each month, except July and August, 31 So. Front St., Harrisburg, Pa.

Engineers' Society of Western Pennsylvania.—Elmer K. Hiles, Oliver Bldg., Pittsburgh, Pa. Regular meetings, 1st and 3d Tuesday, Pittsburgh.

Freight Claim Association.—Warren P. Taylor, R. F. & P., Richmond, Va. Annual meeting, June 16, 1915, Chicago.

General Superintendents' Association of Chicago.—A. M. Hunter, 321 Grand Central Station, Chicago. Regular meetings, Wednesday preceding 3d Thursday in month, Room 1856, Transportation Bldg., Chicago.

International Railway Congress.—Executive Committee, 11, Rue de Louvain, Brussels, Belgium. Next convention, June 23 to July 6, 1915, Berlin.

International Railway Fuel Association.—C. G. Hall, C. & E. I., 922 McCormick Bldg., Chicago. Annual meeting, May 17-20, 1915, Chicago.

International Railway General Foremen's Association.—Wm. Hall, 829 W. Broadway, Winona, Minn. Next convention, July 14-17, 1915, Sherman House, Chicago.

International Railroad Master Blacksmiths' Association.—A. L. Woodworth, Lima, Ohio. Next convention, August 18-20, Hotel Wisconsin, Milwaukee, Wis.

Maintenance of Way & Master Painters' Association of the United States and Canada.—T. I. Goodwin, C. R. I. & P., Eldon, Mo. Next convention, November 17-19, 1914, Detroit, Mich.

Master Boiler Makers' Association.—Harry D. Vought, 95 Liberty St., New York. Annual convention, May, 1915.

Master Car & Locomotive Painters' Association of the United States and Canada.—A. P. Dane, B. & M., Reading, Mass. Next convention, September 8-11, Nashville, Tenn.

Master Car Builders' Association.—J. W. Taylor, 1112 Karpen Bldg., Chicago. Annual meeting, June, 1915.

National Railway Appliances Association.—Bruce V. Crandall, 537 So. Dearborn St., Chicago. Next convention, March 15-19, 1915, Chicago.

New England Railroad Club.—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass. Regular meetings, 2d Tuesday in month, except June, July, August and September, Boston.

New York Railroad Club.—Harry D. Vought, 95 Liberty St., New York. Regular meetings, 3d Friday in month, except June, July and August, 29 W. 39th St., New York.

Niagara Frontier Car Men's Association.—E. Frankenberger, 623 Brisbane Bldg., Buffalo, N. Y. Meetings monthly.

Peoria Association of Railroad Officers.—M. W. Rotchford, Union Station, Peoria, Ill. Regular meetings, 2d Thursday in month, Jefferson Hotel, Peoria.

Railroad Club of Kansas City.—C. Manlove, 1008 Walnut St., Kansas City, Mo. Regular meetings, 3d Friday in month, Kansas City.

Railroad Master Tinners, Coppersmiths and Pipefitters' Association.—U. G. Thompson, C. & E. I., Danville, Ill. Annual meeting, May, 1915.

Railway Business Association.—Frank W. Noxon, 30 Church St., New York. Annual meeting, December 10, 1914, Waldorf-Astoria Hotel, New York.

Railway Club of Pittsburgh.—J. B. Anderson, Room 207, P. R. R. Sta., Pittsburgh, Pa. Regular meetings, 4th Friday in month, except June, July and August, Monongahela House, Pittsburgh.

Railway Electrical Supply Manufacturers' Association.—J. Scribner. 1021 Monadnock Block, Chicago. Meetings with Association of Railway Electrical Engineers.

Railway Fire Protection Association.—C. B. Edwards, Fire Ins. Agt., Mobile & Ohio, Mobile, Ala. Annual meeting, October 6, 1914, Washington, D. C.

Railway Signal Association.—C. C. Rosenberg, Times Bldg., Bethlehem, Pa. Annual meeting, September 22-24, 1914, Bluff Point, N. Y.

Railway Storekeepers' Association.—J. P. Murphy, L. S. & M. S., Box C, Collinwood, Ohio. Annual meeting, May, 1915.

Railway Supply Manufacturers' Association.—J. D. Conway, 2136 Oliver Bldg., Pittsburgh, Pa. Meetings with M. C. B. and M. M. Associations.

Railway Telegraph & Telephone Appliance Association.—G. A. Nelson, 50 Church St., New York. Meetings with Association of Railway Telegraph Superintendents.

Richmond Railroad Club.—F. O. Robinson, C. & O., Richmond, Va. Regular meetings, 2d Monday in month, except June, July and August.

Roadmasters' and Maintenance of Way Association.—L. C. Ryan, C. & N. W., Sterling, Ill. Next convention, September 8-10, 1914, Chicago.

St. Louis Railway Club.—B. W. Frauenthal, Union Station, St. Louis, Mo. Regular meetings, 2d Friday in month, except June, July and August, St. Louis.

Salt Lake City Transportation Club.—R. E. Rowland, Hotel Utah Bldg., Salt Lake City, Utah. Regular meetings, 1st Saturday of each month, Salt Lake City.

Signal Appliance Association.—F. W. Edmunds, 3868 Park Ave., New York. Meeting with annual convention Railway Signal Association.

Society of Railway Financial Officers.—Carl Nyquist, C. R. I. & P., La Salle St. Sta., Chicago. Annual meeting, September 15-17, Hotel Aspinwall, Lenox, Mass.

Southern Association of Car Service Officers.—E. W. Sandwich, A. & W. P. Ry., Atlanta, Ga.

Southern & Southwestern Railway Club.—A. J. Merrill, Grant Bldg., Atlanta, Ga. Regular meetings, 3d Thursday, January, March, May, July, September, November, 10 A. M., Candler Bldg., Atlanta.

Toledo Transportation Club.—J. S. Marks, Agent, Interstate Despatch, Toledo, Ohio. Regular meetings, 1st Saturday in month, Boody House, Toledo.

Track Supply Association.—W. C. Kidd, Ramapo Iron Works, Hillsburn, N. Y. Meetings with Roadmasters' and Maintenance of Way Association.

Traffic Club of Chicago.—W. H. Wharton, La Salle Hotel, Chicago.

Traffic Club of New York.—C. A. Swope, 291 Broadway, New York. Regular meetings, last Tuesday in month, except June, July and August, Waldorf-Astoria, New York.

Traffic Club of Pittsburgh.—D. L. Wells, Erie R. R., Pittsburgh, Pa. Meetings bimonthly, Pittsburgh. Annual meeting, 2d Monday in June.

Traffic Club of St. Louis.—A. F. Versen, Mercantile Library Bldg., St. Louis, Mo. Annual meeting in November. Noonday meetings October to May.

Train Despatchers' Association of America.—J. F. Mackie, 7122 Stewart Ave., Chicago. Annual meeting, June 15, 1915, Minneapolis, Minn.

Transportation Club of Detroit.—W. R. Hurley, Superintendent's office, L. S. & M. S., Detroit, Mich. Meetings monthly, Normandie Hotel, Detroit.

Traveling Engineers' Association.—W. O. Thompson, N. Y. C. & H. R., East Buffalo, N. Y. Next meeting, September 15-18, Hotel Sherman, Chicago.

Utah Society of Engineers.—Frank W. Moore, Newhouse Bldg., Salt Lake City, Utah. Regular meetings, 3d Friday in month, except July and August, Consolidated Music Hall, Salt Lake City.

Western Canada Railway Club.—W. H. Rosevear, P. O. Box 1707, Winnipeg, Man. Regular meetings, 2d Monday, except June, July and August, Winnipeg.

Western Railway Club.—J. W. Taylor, 1112 Karpen Bldg., Chicago. Regular meetings, 3d Tuesday in month, except June, July and August, Karpen Bldg., Chicago.

Western Society of Engineers.—J. H. Warder, 1735 Monadnock Block, Chicago. Regular meetings, 1st Monday in month, except January, July and August, Chicago. Extra meetings, except in July and August, generally on other Monday evenings.

Traffic News

It has been announced informally in Washington that the Panama Canal will be open tomorrow, August 15, for the passage of vessels not needing more than 30 ft. of water.

The railroads belonging to the Western Passenger Association have decided to make no more special excursion rates locally in states where two-cent fares are fixed by statute. This decision was reached after the receipt of an application for special rates to the Wisconsin State Fair.

The Pennsylvania Railroad announced last week that its agent at Liverpool had been instructed to provide Americans in England, marooned on account of the war, with money for their immediate needs. The railroad will cash letters of credit, or if passengers are without funds will accept their own obligations. Prospective passengers are to be informed also that the Pennsylvania will carry them to their destinations on their arrival at New York or Philadelphia. The other principal trunk line railroads, after a conference in New York City, telegraphed to the London Relief Committee, that all the lines would afford similar accommodations to passengers arriving at New York.

Car Surpluses and Shortages

Arthur Hale, chairman of the committee on relations between railroads of the American Railway Association, in presenting statistical bulletin No. 173, giving a summary of car surpluses and shortages by groups from April 1, 1913, to August 1, 1914, says: The total surplus on August 1, 1914, was 198,998 cars; on July 15, 1914, 228,384 cars, and on August 1, 1913, 69,716 cars.

The total surplus has decreased approximately 29,000 cars in the past two weeks, and stands at 198,998, the highest figure for this season of the year since 1909.

The box car surplus decreased approximately 13,600 cars, the largest part of which decrease is in the grain states and on the Pacific coast. There is a heavy increase in surplus box cars on the Canadian roads. The difficulty in securing vessels for export shipment has doubtless contributed in tying up a large number of cars at the ports.

The total shortage on August 1, 1914, was 2,333 cars; on July 15, 1914, 1,843 cars, and on August 1, 1913, 11,261 cars.

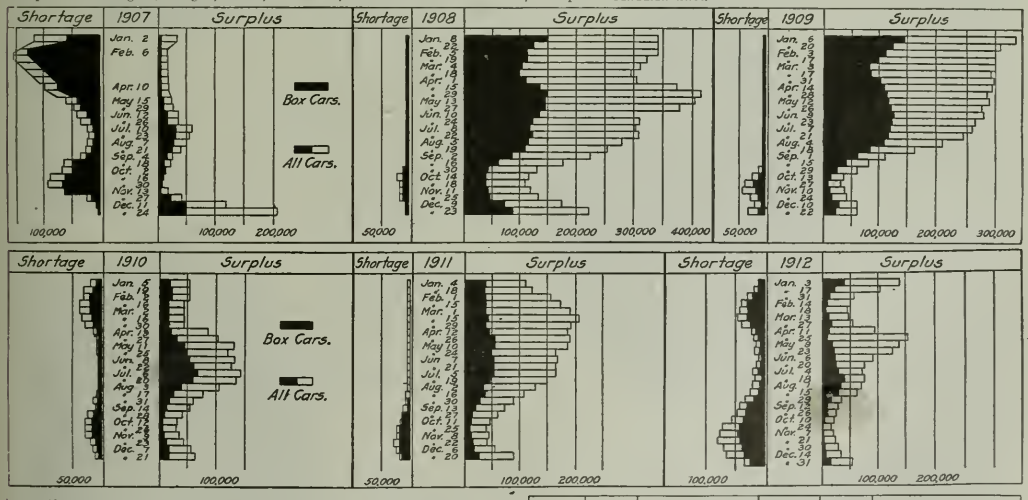
The shortage of 2,333 cars is about 500 greater than on July 15, but this shortage is trifling in any one group.

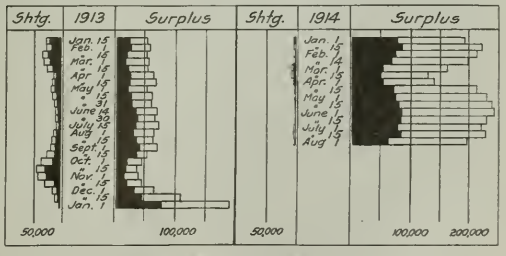
The accompanying table gives car surplus and shortage figures by groups for the last period covered in the report and the diagram shows total bi-weekly surpluses and shortages from 1907 to 1914.

CAR SURPLUSES AND SHORTAGES

Date	No. of roads.	Surpluses Box.	Flat.	Coal, gondola and hopper.	Other kinds.	Total.	Shortages Box.	Flat.	Coal, gondola and hopper.	Other kinds.	Total.
Group *1.—August 1, 1914	7	1,639	481	1,281	642	4,043	0	0	0	14	14
" 2.— " 1, 1914	30	2,972	187	17,718	7,601	28,478	0	6	0	0	6
" 3.— " 1, 1914	32	2,969	579	41,557	3,950	49,055	149	57	0	423	629
" 4.— " 1, 1914	11	4,368	807	5,447	1,264	11,886	50	0	0	0	50
" 5.— " 1, 1914	22	1,400	418	3,965	2,407	8,190	214	14	0	30	258
" 6.— " 1, 1914	28	17,665	1,258	6,135	6,251	31,309	446	135	0	100	681
" 7.— " 1, 1914	4	2,460	63	984	1,059	4,566	0	0	0	50	50
" 8.— " 1, 1914	16	5,749	244	1,807	3,410	11,210	293	0	82	0	375
" 9.— " 1, 1914	14	824	75	275	809	1,983	6	8	28	12	54
" 10.— " 1, 1914	19	7,554	1,310	3,115	8,316	20,295	129	66	0	21	216
" 11.— " 1, 1914	5	24,771	543	0	3,669	27,983	0	0	0	0	0
Total	188	72,371	5,965	82,284	38,378	198,998	1,287	286	110	650	2,333

*Group 1 is composed of New England lines; Group 2—New York, New Jersey, Delaware, Maryland and Eastern Pennsylvania lines; Group 3—Ohio, Indiana, Michigan and Western Pennsylvania lines; Group 4—West Virginia, Virginia, North and South Carolina lines; Group 5—Kentucky, Tennessee, Mississippi, Alabama, Georgia and Florida lines; Group 6—Iowa, Illinois, Wisconsin and Minnesota lines; Group 7—Montana, Wyoming, Nebraska, North Dakota and South Dakota lines; Group 8—Kansas, Colorado, Missouri, Arkansas and Oklahoma lines; Group 9—Texas, Louisiana and New Mexico lines; Group 10—Washington, Oregon, Idaho, California, Nevada and Arizona lines; Group 11—Canadian lines.





Car Surpluses and Shortages, 1907 to 1914

Commission and Court News

INTERSTATE COMMERCE COMMISSION

Rates on Paper to Muskogee, Okla.

Phoenix Printing Company et al. v. Missouri, Kansas & Texas et al. Opinion by Commissioner McChord:

The commission finds that the rates on news print paper from Minnesota mills and Wisconsin mills to Muskogee, Okla., are unreasonable as compared with the rates to Kansas City, Mo., and various other points in Missouri and Kansas and in western trunk line territory. Giving Muskogee the same rate per ton-mile as Joplin, Mo., the total rate to Muskogee would be about 35 cents per 100 lb., instead of 46 cents, the present rate. It is, therefore, held that the rate to Muskogee should not exceed 35 cents from the Minnesota mills or 34 cents from the Wisconsin mills, and reparation is awarded for the difference in the case of certain shipments. (31 I. C. C., 289.)

Rail and Water Rates to Bowling Green, Ky.

Bowling Green Business Men's Protective Association of Bowling Green, Ky., v. Evansville & Bowling Green Packet Company et al. Opinion by Commissioner McChord:

The commission finds that the rail line carriers should establish through routes and joint rates from St. Louis, Chicago, Detroit, Indianapolis, Pittsburgh, Cleveland, Syracuse and New York via Evansville, Ind., to Bowling Green in connection with the Evansville & Bowling Green Packet Company, observing as nearly as possible the custom that rail and water rates should be lower than all rail rates. The defendants are to submit to the commission within sixty days a tentative scale of joint through rates showing the manner and form in which the same are to be established. (31 I. C. C., 301.)

Rates on Blackstrap Molasses

Louisiana Sugar Planters' Association v. Illinois Central et al. Opinion by Commissioner Clements:

It is alleged that a rate on molasses of 21 cents per 100 lb. from New Orleans and other Louisiana points to St. Louis and East St. Louis is discriminatory as compared with a special import rate of 15 cents on blackstrap molasses from New Orleans and certain other Louisiana points in the immediate vicinity of that point to the same points of destination, the latter rate being restricted in its application as follows: "Molasses, blackstrap, low grade, in tank cars (when imported from foreign countries, including insular possessions of the United States, unloaded into storage tanks and reshipped from storage tanks or transferred direct from vessel to tank cars), estimated weight 11.7 lb. per gallon, agreed to be of value of 8 cents or less per gallon, c. l. minimum weight capacity of tank."

The commission finds that there may properly be some difference between the import rate and the domestic rate on blackstrap molasses, but it believes that in this case the difference between the rates on the two kinds of shipments is too great and that any greater difference than three cents per 100 lb. between the import rate and the domestic rate from New Orleans to St. Louis and East St. Louis is discriminatory against the domestic product; it also holds that the usual relation should be maintained between the rates to St. Louis and East St. Louis and the rates to the other destinations involved. The commission also concludes, in view of the very small risk of loss or damage in the transportation of blackstrap molasses in tank cars, etc., that the difference of six cents between the unconditional rate on imported blackstrap and the special rate based on agreed value is unreasonable and that the difference ought not to be more than two cents per 100 lb. If imported blackstrap is to take a special rate based on agreed value, domestic blackstrap is equally entitled to such a special rate. A special rate on domestic blackstrap should bear the same relation to the unconditional rate on domestic blackstrap that the special rate on the imported product bears to the unconditional rate. (31 I. C. C., 311.)

STATE COMMISSIONS

Discrimination by Use of Private Cars

In an opinion by Commissioner Johnson, handed down August 6, the Pennsylvania Public Service Commission holds it to be unlawful and inequitable for the rate to be lower on coal shipped in producers' cars than when shipped in cars belonging to the carrier.

The opinion is on a complaint filed by the Pennsylvania Rubber Company and others against the Pennsylvania Railroad and concerning the rates on coal from Penn, Biddle, Irwin and Hahntown to Jeannette and Grapeville.

Most of the rates which were put into effect by the carrier on June 1, 1914, and which were very much higher than former rates (in shippers' cars) are declared reasonable and the service performed for the rates charged is characterized as a line haul instead of a switching movement.

The opinion says that the granting of a special rate on coal when moved in shippers' cars enables certain buyers of coal mined at the collieries of the Westmoreland Coal Company to obtain an advantage in rates that other buyers at the same collieries could not secure. The owners of the collieries, who have the power to determine whether private cars or railroad cars shall be used, can decide who shall enjoy the lower rate, and who shall not. The opinion also declares that in determining whether particular rates are reasonable, and especially in deciding whether particular rates are unjustly discriminatory or unduly preferential, it is discretionary with the commission whether a valuation of any or all of the property of a public service company shall be made; and, if the commission decides that a valuation is necessary, the statute prescribes what the commission *may*, not what it *must* consider, in arriving at a fair valuation.

A railroad company is entitled to receive from its entire business a fair return upon a reasonable value of the property which at the time is being used for the public, but this broad question does not necessarily arise in deciding whether the particular rate applying to but one commodity or to but few articles is unjustly discriminatory or preferential. The commission adds that if a valuation were required to decide upon every complaint regarding local rates or fares, the state would be powerless to afford effective relief to complainants.

The commission thinks that the rate to Grapeville and Biddle should not be higher than the rate to Jeannette, and orders a reduction from 25 cents to 20 cents a ton; and the rate of 30 cents a ton from Hahntown to Jeannette is reduced to 25 cents a ton. The rates of 15 cents a ton from Penn to Jeannette and Grapeville and 20 cents a ton from Biddle to Jeannette are held to be reasonable.

All of the rates in question are for very short distances; so short that it was claimed that switching rates ought to apply. The low rate of $2.50 per car was made years ago, when cars were much smaller than now. The distance being very short, the car-service at the loading point (on shipper's premises) and at the delivering point (on consignees' premises) was, of course, worth much more than the car-service during the time the car was in motion, a fact which apparently may be taken as a partial explanation of the very low transportation rate.

COURT NEWS

Railroad Not Responsible for Avalanche

The Supreme Court of the State of Washington holds that the snowslide at Wellington, in that state, on March 1, 1910, when two Great Northern trains were carried down the mountainside and wrecked and 92 persons were killed, was caused by an act of Providence. This is the ruling of the court in the case of William Topping, of Ashland, Ohio, by his guardian, against the Great Northern Railway. The jury in the lower court allowed the boy $20,000 damages for the death of his father, who was killed in the wreck, but the Supreme Court says that the railroad cannot be held responsible, and the lower court is reversed.

Grain Elevators in Russia.—The Russian Imperial Senate has approved the construction of 58 grain elevators in the Cossack provinces of the North Caucasus.

Railway Officers

Executive, Financial, Legal and Accounting

Howard Elliott, chairman of the board of directors of the New York, New Haven & Hartford, with headquarters at Boston, Mass., has been elected also president, succeeding James H. Hustis, resigned to become president of the Boston & Maine.

Frank Scott, whose appointment as vice-president and treasurer in charge of all financial matters of the Grand Trunk and the Grand Trunk Pacific, with headquarters at Montreal, Que., has already been announced in these columns, was born on December 24, 1862, at Montreal, Que. He began railway work in 1879, as a clerk in the audit department of the Grand Trunk, and from 1881 to 1890 was successively clerk and chief clerk in the treasurer's office of that road. In 1891 he was appointed secretary of the audit board and purchasing committee, and from 1893, to 1900, was assistant treasurer of the same road. He was appointed treasurer of the Grand Trunk in 1901, and in 1906, became treasurer also of Grand Trunk Pacific, which position he held at the time of his recent appointment as vice-president and treasurer of the same roads as above noted. Mr. Scott is also a member of the board of directors of the Grand Trunk Pacific, and is a past president of the Society of Railway Financial Officers of America.

F. Scott

Walter Hardman Ardley, who has been appointed controller in charge of all accounting of the Grand Trunk and the Grand Trunk Pacific, with headquarters at Montreal, Que., has already been announced in these columns, was born on April 24, 1858, in London, Eng., and was educated in the City of London College. He began railway work on November 5, 1884, as a clerk in the general auditor's office of the Grand Trunk and has been in the continuous service of that road ever since. In November, 1893, he was appointed chief clerk and general bookkeeper, and from December, 1907, to the following August was auditor of disbursements. He then served for four months as acting general auditor, and on December 31, 1908, was appointed general auditor of the Grand Trunk and the Grand Trunk Pacific, which position he held at the time of his recent appointment as controller of the same roads, as above noted. Mr. Ardley was recently chosen a member of the board of directors of the Grand Trunk Pacific.

W. H. Ardley

The following are appointed officers of the receivers of the Chicago, Peoria, & St. Louis, effective August 1: W. C. Hurts, general manager; H. W. Berger, auditor; F. J. Wilson, treasurer, and P. B. Warren, general counsel; all with headquarters at Springfield, Ill.

Frederic A. Delano, president of the Chicago, Indianapolis & Louisville, has resigned to accept an appointment on the Federal Reserve Board. He will be vice-governor of the board and will have headquarters at Washington, D. C. A portrait and sketch of Mr. Delano were published in the *Railway Age Gazette* of January 2, 1914, page 29.

William C. Tomkins, formerly secretary to vice-president of the Grand Trunk and the Grand Trunk Pacific at Montreal, Que., has been appointed assistant to vice-president of both roads; James A. Yates, chief clerk to the treasurer, has been appointed assistant treasurer, and G. R. Martin has been appointed assistant auditor of disbursements, all with headquarters at Montreal.

Operating

W. S. Hall, trainmaster of the Canadian Pacific, at Cranbrook, B. C., has been appointed trainmaster, with office at Red Deer, Alta., and C. W. Fisher, trainmaster at Strathcona, has been appointed chief train despatcher, with headquarters at Edmonton.

Traffic

W. McN. Knapp has been appointed traveling freight agent of the Central of Georgia, with headquarters at Savannah, Ga.

Guy H. May has been appointed traveling passenger agent of the Tennessee Central, with headquarters at Knoxville, Tenn.

S. G. Lutz, traffic manager of the Minneapolis & St. Louis at Minneapolis, Minn., has been appointed general traffic manager of the Chicago & Alton, with headquarters at Chicago. Mr. Lutz was born December 8, 1868, in Illinois and was graduated from Western College, Toledo, Ohio, in 1887. He began railway work in November, 1890, as a stenographer in the traffic department of the Iowa Central, and subsequently filled various clerical positions until September, 1894, when he became chief clerk in the freight traffic department. From January, 1898, to April, 1904, he was assistant general freight agent of that road, and was then until December, 1908, assistant general freight agent of the Minneapolis & St. Louis. He was freight traffic manager of both roads from December, 1908, to December, 1909, when he was appointed general freight agent of those roads and the Chicago & Alton and the Toledo, St. Louis & Western at Chicago. In November, 1910, Mr. Lutz was made traffic manager of the Minneapolis & St. Louis, which absorbed the Iowa Central, which position he resigned on August 1 to become general traffic manager of the Chicago & Alton, as above noted.

S. G. Lutz

George M. Henry has been appointed general passenger agent of the Detroit, Toledo & Ironton, with office at Detroit, Mich.

F. W. Lyons has been appointed commercial agent of the Lehigh Valley, with headquarters at Hazleton, Pa., succeeding H. E. Dengler, transferred.

H. A. Fidler, traffic manager of the Big Sandy & Kentucky River at Ashland, Ky., has been appointed assistant general freight agent of the Detroit, Toledo & Ironton, with headquarters at Ironton, Ohio.

F. B. Townsend, assistant general freight agent of the Minneapolis & St. Louis, has been appointed traffic manager, with headquarters at Minneapolis, Minn., succeeding S. G. Lutz, resigned. A. B. Cutts, assistant traffic manager, has been appointed general passenger agent, and D. M. Denison, assistant general freight agent, has been appointed general freight agent, both with headquarters at Minneapolis.

Purchasing

W. G. Phelps, the new purchasing agent of the Pennsylvania Lines West of Pittsburgh, with headquarters at Pittsburgh, Pa., was born at La Porte, Ind., and was educated in the public and private schools of his native town and of Valparaiso. From 1877, to 1884, Mr. Phelps was telegraph operator and agent on the Vandalia Railroad, and then left the service of that company. On November 5, 1888, he returned to the service of the Vandalia as a clerk in the general freight office at St. Louis, Mo. He was appointed chief clerk to the fourth vice-president of the Pennsylvania Lines West of Pittsburgh on June 9, 1901, and was promoted to assistant purchasing agent on January 1, 1913, with headquarters at Pittsburgh, which position he held at the time of his appointment on June 1 as purchasing agent of the same road, as above noted.

W. G. Phelps

Engineering and Rolling Stock

T. E. White has been appointed supervisor of track, District No. 1, of the Louisiana & Arkansas, with headquarters at Minden, La., succeeding J. T. Cherry, resigned.

Alonzo G. Kinyon, whose appointment as superintendent of locomotive operation of the Seaboard Air Line has been announced in these columns, was born at Amboy, Ill., on July 12, 1867. He entered railway service in 1888 as a fireman on the Chicago, Milwaukee & St. Paul, later becoming an engineman. A few months before he left the service in 1901 he entered the railway department of the International Correspondence Schools and was respectively compound locomotive instructor, air brake instructor, and combustion and fuel economy instructor. He resigned in 1905 to engage in other business, but in 1906 returned to railway work as road foreman of engines on the Southern Railway, where he remained until June 1, 1907. In November, 1910, he was appointed special instructor of fuel economy of the Buffalo, Rochester & Pittsburgh, but left about one year later to become superintendent of combustion and fuel economy instruction with the International Correspondence Schools. On March 1, 1911, Mr. Kinyon entered the railway supply field as chief traveling engineer of the Hanna Locomotive Stoker Company, Cincinnati, Ohio. On April 1, 1912, however, he left to accept a similar position with the Westinghouse Air Brake Company, in connection with the Street stoker. This position was abolished about one year later, whereupon he became locomotive fuel engineer of the Clinchfield Fuel Company, Spartanburg, S. C., with which company he remained until July 1, when he took up his present work.

A. G. Kinyon

J. E. Epler, assistant to the general manager of the Chicago & Eatsern Illinois, has been appointed superintendent of motive power, with headquarters at Danville, Ill., to succeed J. H. Tinker, resigned, and the former office is abolished.

A. J. Ironsides, district master mechanic on the Manitoba division of the Canadian Pacific, at Saskatoon, Sask., has been appointed district master mechanic of the Alberta division. C. Flint has been appointed resident engineer, and H. Marshall, bridge and building master at Saskatoon, Sask., has been appointed bridge and building master, all with headquarters at Edmonton, Alta.

OBITUARY

Edward P. Amory, secretary of the Western Railroad Association, at Chicago, was found murdered in his office in Chicago on August 12.

Jacob C. Miller, formerly master mechanic of the Eastern district of the Chicago, Milwaukee & St. Paul, died suddenly on July 25, at his summer camp on Tomahawk Lake, Minocqua, Wis., from apoplexy, aged 61 years. He retired from active railway service February 1, 1910, since which time he had been living at Maywood, Ill.

William Henry Chambers, controller of the Florida East Coast, with office at St. Augustine, Fla., died recently in London, Eng. Mr. Chambers was born on September 25, 1852, at Dublin, Ireland, and began railway work in 1871, as a clerk in the freight department of the London & North-Western, and afterwards was assistant ticket agent at Dublin of the same road. Previous to 1887, he was claim clerk of the Savannah, Florida & Western, now a part of the Atlantic Coast Line, at Jacksonville, Fla. He was subsequently, for about a year, auditor of the St. Augustine & Palatka, now a part of the Florida East Coast, and from 1888, to 1892, was chief clerk and cashier of the Jacksonville, St. Augustine & Halifax River. He was then to January, 1901, auditor, and since that time was controller of the same road and its successor, the Florida East Coast.

D. M. Philbin, formerly general superintendent of the Lake district of the Great Northern and president of the Lake Superior Terminal & Transfer Railway, died in Duluth, Minn., August 6, aged 57 years. Mr. Philbin had been in railway service since 1874. From 1890 to 1893 he was superintendent of the Duluth, South Shore & Atlantic and the following three years was general manager of the Duluth, Missabe & Northern. He was then general superintendent of the Duluth & Winnipeg until June, 1898, when he became second vice-president of the Eastern Railway of Minnesota, of which road he also was superintendent from June, 1898, to April, 1903. On the latter date he was appointed assistant general superintendent of the Great Northern, and in 1906 he became general superintendent of the Lake district, which position he resigned December 31, 1913, on account of ill health.

James Thomas Byrne, until recently vice-president and superintendent of the Texas & Gulf, with office at Longview, Tex., died on August 7, at Temple, Tex. He was born on February 26, 1865, and received a common school education. He began railway work on August 1, 1880, as an axman on an engineering corps of the Chicago & North Western. He was then consecutively laborer, section foreman, and steel gang foreman on the same road, and brakeman, fireman, conductor and telegraph operator on the Missouri Pacific and the St. Louis, Iron Mountain & Southern. He then served as telegraph operator on various roads until his appointment in November, 1887, as trainmaster's clerk on the Gulf, Colorado & Santa Fe. He was then consecutively train despatcher, chief train despatcher, trainmaster and assistant trainmaster on the same road, until August, 1908, when he was elected vice-president and superintendent of the Texas & Gulf.

Equipment and Supplies

LOCOMOTIVE BUILDING

The Cleveland, Cincinnati, Chicago & St. Louis is reported in the market for a number of switching locomotives in addition to the five Pacific type locomotives noted in the *Railway Age Gazette* of August 7.

The South Dakota Central has ordered two Consolidation locomotives from the American Locomotive Company. These locomotives will have 20 by 24 in. cylinders, 51 in. driving wheels, a total weight in working order of 138,000 lb., and a steam pressure of 180 lb.

The Chicago, Milwaukee & St. Paul has ordered 20 superheater Mikado type freight locomotives from the American Locomotive Company. These locomotives will have 26 by 30 in. cylinders, 63 in. driving wheels, a total weight in working order of 275,000 lb., and a steam pressure of 185 lb.

The Chicago Junction has ordered two superheater six-wheel switching locomotives from the American Locomotive Company. These locomotives will have 20 by 26 in. cylinders, 51 in. driving wheels, a total weight in working order of 149,000 lb., and a steam pressure of 180 lb. The company also has an option on three additional locomotives.

CAR BUILDING

The Southern Pacific has suspended indefinitely its inquiry for cars noted in a recent issue of the *Railway Age Gazette*

The Northwestern Pacific is in the market for 11 coaches and 3 mail and express, 4 baggage, 3 smoking and 4 chair cars.

The Pennsylvania Railroad is reported to have ordered 60 gondola cars from its Altoona shops for the Cumberland Valley. This item has not been confirmed.

IRON AND STEEL

The San Diego & Arizona has ordered 1,200 tons of material for a viaduct from the Llewellyn Iron Works, San Francisco.

The Paducah & Illinois has ordered 18,000 tons of steel from the American Bridge Company, for its new bridge at Metropolis, Ill.

Railway Extension in Asiatic Turkey.—The Bagdad Railway Company is a German syndicate which holds the concession for the construction of a railway from Konieh across Turkey in Asia to the Persian Gulf, a distance of 1,250 miles. The Bagdad Railway, which it is constructing, is now nearly completed except for a gap in the section crossing the Taurus mountains. It will undoubtedly be in full operation within two years. The concession is very liberal. It provides for a 99-year lease; a division of the line into 12 sections; the payment to the company of an annuity of 11,000 francs per kilometer to provide for interest on and redemption of the bonds issued for construction and 4,500 francs for operation when the line is completed. The capitalized value for each of the 12 sections as originally defined was to 54,000,000 francs, and Turkish 4 per cent. bonds were to be issued to the company before it had started work on any given section. These bonds, although not worth their nominal value, have nevertheless yielded enough to enable the company not only to meet its expenses, but also to make a fair profit. The company has also received very extensive rights in addition to those named above. It has, for instance, the power to construct a whole network of railways, including branches to Aleppo and Urfah, from Bagdad to Khanakin on the Persian frontier, to Marash, to Aintab, to Biredjik, to Mardin, to Arbil, from El Badieh to Hit and finally all the lines connecting the principal railway with the Mediterranean, limited only in space on the north by Mersina and on the south by Tripoli-in-Syria.

Supply Trade News

J. M. Hopkins, president of the Camel Company, Chicago, has accepted appointment as an executive member of the Railway Business Association.

Virgil G. Bogue, civil and consulting engineer, 15 William street, New York, has completed his engineering undertakings in the west, and announces that his office remains as heretofore at the above address.

W. H. Cadwallader, whose appointment to the position of general manager of the Union Switch & Signal Company has been announced in these columns, was born at Pittsburgh, Pa., in 1876. When he was three years old, however, his parents moved to the suburb of Wilkinsburg, which has been his home ever since. Mr. Cadwallader entered the service of the Union Switch & Signal Company as a blue-printer in 1891. In February, 1892, he was made a messenger in the office of the superintendent of works and later became a clerk in that office and in the general manager's office. In 1901, when the specification department was created, he was placed in charge of it. Later he was placed in charge of the estimating department, and in 1912 was made assistant general manager, which is the position he leaves to assume his new duties as general manager as above noted.

W. H. Cadwallader

J. S. Hobson, whose appointment as acting general sales manager of the Union Switch & Signal Company has been announced in these columns, entered railway service in 1884 as a railway apprentice in the shops of the Great Southern & Western Railway of Ireland. He came to this country in 1889 and served as locomotive machinist, draftsman and signal inspector, respectively, on the Chicago, Burlington & Quincy. In January, 1892, he became construction foreman for the Union Switch & Signal Company in the Chicago district, and in 1895 was appointed supervisor of electric signals for the Michigan Central at Detroit. In October, 1897, he was appointed to the new position of signal engineer of the Atchison, Topeka & Santa Fe, and remained in that position until he re-entered the service of the Union Switch & Signal Company in January, 1901, as assistant engineer. He later became assistant general manager and Western manager, and leaves the latter position to take up his new duties as acting general sales manager.

J. S. Hobson

Charles Eugene Denney, whose appointment to the position of assistant general sales manager of the Union Switch & Signal Company, has been announced in these columns, returns to the company after an absence of nine years, during which time he has been engaged in railway service. Mr. Denney was born October 18, 1879, at Washington, D. C. He attended Pennsylvania State College from 1896 to 1899, and in October of the latter year entered the service of the Union Switch and Signal Company. He remained with the company until May 15, 1905, when he left to become assistant signal engineer on the Lake Shore & Michigan Southern. On June 1, 1902, he became signal engineer of the same road, and retained that position until in October, 1913, he was appointed special engineer on the staff of the vice-president of the New York Central Lines West, with headquarters at Chicago. For a time beginning June 1, 1912, Mr. Denney was also signal engineer of the Lake Erie & Western.

C. E. Denney

The Railway Utility Company, Chicago, Ill., has recently received orders for utility ventilators to be used on cars for the following companies: Union Pacific, 107 cars; Missouri Pacific, 85 cars; New Orleans Railways Company, 50 cars, and the Chicago Surface Lines, 228 cars.

On the 21 Mikado type locomotives recently ordered from the Lima Locomotive Corporation by the Southern Pacific, vanadium steel has been specified for the frames, driving axles, main and side rods, piston rods, and main crank pins. All the forgings will be heat treated to give physical properties in conformity with the specifications recommended at the recent convention of the Master Mechanics' Association, by the committee on the Use of Special Alloy and Heat-Treated Steels in Locomotive Construction. The driving axles will be hollow bored.

TRADE PUBLICATIONS

Oil Engines.—The Chicago Pneumatic Tool Company, Chicago, has issued Bulletin No. 34 W., dated July, 1914, descriptive of Class A-O Giant fuel oil engines.

Portable Cranes.—The Canton Foundry & Machine Company, Canton, Ohio, has issued a catalogue descriptive of its portable floor cranes and hoists. The catalogue contains a number of views of the various hoists and shows wherein they are specifically adapted for the work for which they are intended.

Ball Bearings.—The Hess-Bright Manufacturing Company, Philadelphia, Pa., has issued a 28-page booklet aiming to show the advantages that its ball bearings have over the product of other manufacturers. The booklet contains a number of views of the ball bearings themselves and of machines in which they are used.

Steel Pipe.—Bulletin No. 10-C, recently issued by the National Tube Company, Pittsburgh, Pa., contains a paper entitled "The Relative Corrosion of Iron and Steel Pipe as Found in Service," written by William H. Walker, professor at the Massachusetts Institute of Technology, after an exhaustive investigation into the relative life of service pipes which had been in continuous service for a considerable number of years. Mr. Walker arrived at the conclusion, that "These results again demonstrate that, taken on the average, there is no difference in the corrosion of iron and steel pipe." The booklet also contains three other articles on the subject of corrosion, by F. N. Speller, metallurgical engineer of the National Tube Company.

Railway Construction

Alabama Great Southern.—An officer writes that contracts for the construction of 21.8 miles of double track have just been let to M. M. Elkan, Macon, Ga., as follows: Meridian, Miss., to Russell, 6.3 miles; York to Toomsuba, 15.5; the work to be carried out will consist of the construction of parallel track on present grade. The line to be double tracked is used by trains of both the Alabama Great Southern and the Southern Railway.

Alabama, Tennessee & Northern.—According to press reports this company is planning to build a 25-mile extension north from Reform, Ala., to connect with the St. Louis & San Francisco and the Illinois Central.

Canadian Northern.—A contract is reported let to A. L. McKay, Estevan, Sask., for grading work on a branch from Bienfait west to Estevan.

The Sturgeon River sub-division of the Western division has been extended from Edam, Sask., west to Turtleford, 17.4 miles.

The general location plans of the Canadian Northern branch from mileage 222 on the main line from Victoria to Duncan Bay, Sayword district on Vancouver Island, 8.2 miles, have been approved by the minister of railways for British Columbia.

Fairmount & Veblen.—An officer writes that work is now under way grading a section of 10 miles on the extension from Veblen, S. Dak., southwest to Webster 40 miles. The contract for this work was let last May to H. A. Whittier, Northfield, Minn. (May 8, p. 1055.)

Fort Worth-Denton Interurban.—An officer writes that the Stone & Webster Management Association, Boston, Mass., is working out the engineering details and preparing plans for the proposed interurban line which it will build and operate from Fort Worth, Tex., north to Denton, about 35 miles. A committee of citizens in accordance with an arrangement with the company is proceeding to obtain the necessary rights of way and franchises. (July 17, p. 148.)

Janesville & Madison Traction.—An officer writes that a grading contract has been given to M. M. Doran, Madison, Wis., for work on a section of the line, and contracts for track laying and bridge work including a 550-ft. steel bridge, also some trestles, will be let early in 1915. The plans call for building from Janesville, Wis., north via Indian Ford, Edgerton, Albion, Stoughton, along the shore of Lake Kegonsa, MacFarland, Edwards Park on Lake Waubesa, and along Lake Monona drive to Fair Oaks, thence to Madison. Most of the right of way is along public highways, and the company proposes to use gas-electric cars to operate this line. (July 31, p. 227.)

Louisville & Nashville.—The Lewisburg and Northern division has been opened for business from Brentwood, Tenn., south to North Athens, Ala., 93 miles.

New York Subways.—The New York Public Service Commission, First district, will ask for bids on September 11 for the construction of Routes Nos. 43 and 26, the diagonal station at Forty-second street connecting the Lexington avenue subway with the existing subway at the Grand Central station. This contract extends from points in Park avenue near Thirty-eighth and Forty-first streets northerly to the north line of Forty-second street. Also, on a lower level easterly under Forty-second street to about 100 ft. east of Lexington avenue to a connection with the Steinway tunnel. The construction of the line from Forty-second street under the property of the New York Central will be carried on under an agreement with that company.

Paducah & Illinois.—This company has awarded a contract for the grading on its line from a point opposite Metropolis, Ill., to Paducah, a distance of 13 miles, to Morris, Shepard & Dougherty, St. Paul, Minn. The total yardage is estimated as 1,500,000 cu. yd.

St. Andrews Bay Railway & Terminal Company.—A contract has been given to J. M. Willis, St. Andrews, Fla., for

building four miles of railroad for this company. The contractor wants to sublet several thousand cubic yards of grading. E. L. Woods, St. Andrews, is chief engineer of the railroad.

Sutherlin, Coos Bay & Eastern.—This company, which was organized early this year, has been incorporated in Oregon with a $500,000 capital, and headquarters at Sutherlin, Ore. The plans call for building a line from Sutherlin east about 27 miles to a tract of timber at the head of Calapooya creek and eventually an extension further east, also to build west from Sutherlin to Coos Bay. George H. Glynn, A. Stark and Charles E. Lemon, all of Sutherlin, are incorporators. (June 19, p. 1565.)

Suwanee River & White Springs.—An officer writes regarding the report that financial arrangements have been made to build a line from Live Oak, Fla., east to White Springs, that a company is now at work on the line, which is to have a total length of 20 miles. Track has already been laid on five miles, and bids are wanted for building a steel bridge. J. B. Barton, president, Live Oak, Fla.

RAILWAY STRUCTURES

Albuquerque, N. M.—The Atchison, Topeka & Santa Fe has awarded a contract for the building of a new reinforced concrete engine house at Albuquerque, to Henry Bennett & Sons, Topeka, Kan. The estimated cost is $100,000. Plans are also being made for additional improvements at this point.

East Chattanooga, Tenn.—A contract has been given by the Southern Railway to D. F. Brandon, Chattanooga, Tenn., for building a combined freight and passenger station at East Chattanooga, to replace the building destroyed by fire on July 15. The new building will be of frame construction with tin shingle roof. It will have separate white and colored waiting rooms and office and freight room.

Hartford, Conn.—The New York, New Haven & Hartford will ask for bids in about two weeks for rebuilding the passenger station at Hartford, to repair the damage caused by fire.

Jamaica, N. Y.—The New York Public Service Commission First district has ordered the Long Island Railroad to build a new passenger station on the southerly side of South street at Jamaica, on the Old Southern division of the road. The new station is to be ready for use by November 1 next.

La Grange, Ga.—The Macon & Birmingham will at once let a contract, it is said, for building a new passenger station at La Grange, to replace the old structure which was recently destroyed by fire.

North Philadelphia, Pa.—An officer of the Pennsylvania Railroad writes that the contract for the improvements at the North Philadelphia station was let on August 6, to the Keystone State Construction Company, Philadelphia. The work includes remodeling the basement and train floors of the present station so that the basement floor, which is on a level with the new passenger tunnel built under the tracks and leading to the island platforms, will become the main floor of the station where the new ticket office, baggage room, newsstand, telegraph and telephone facilities and the lobby will be located. The upper floor, which is the present train floor, will consist of a waiting room, toilet rooms and lunch room. The street approaches to the station will be regraded to the lower level instead of to the present train floor. Work on a new boiler house is about finished, so that the boilers and the machinery can be removed from the present station. The company expects that work on the improvements will be completed this year. (August 7, p. 269.)

Pocatello, Idaho.—The Oregon Short Line has awarded a contract for the building of a new passenger station at Pocatello, Idaho, to Lynch-Cannon Engineering Company of Salt Lake. The cost is estimated at $150,000.

Richmond, Va.—The Southern Railway has given contracts to the John T. Wilson Company, Richmond, Va., for building the new freight house at Richmond, also for building the combined freight and passenger station at South Richmond. (June 26, p. 1607.)

Spartanburg, S. C.—An officer of the Piedmont & Northern writes that a contract has been given to J. A. Jones, Charlotte, N. C., to build a brick warehouse 100 ft. by 140 ft., and this work is now under way. The cost of the new structure, which is to have three stories, will be $40,000. (July 31, p. 228.)

Railway Financial News

Colusa & Lake.—This company has discontinued passenger service and will run freight trains only. At a recent meeting of the directors the reports showed the passenger and mail service was being operated at a loss, while the freight business was profitable. The state railroad commission was notified and granted permission to discontinue the service. The road connects with the Southern Pacific at Colusa Junction about 50 miles north of Sacramento, Cal. It will maintain an irregular freight service between Colusa and Sites to take care of grain shipments from the foothill section and merchandise shipments for Colusa and Sites.

Denver & Rio Grande.—See Western Pacific.

International & Great Northern.—On the application of the Central Trust Company of New York, the United States District Court at Houston, Texas, has appointed James A. Baker, of Houston, Texas, and Cecil Lyon, of Sherman, Texas, receivers. This action was taken by a committee of noteholders in order to forestall any possibility of similar action in the state courts inasmuch as it was desired to keep the property under supervision of the Federal Court. The notes on which the action was taken amount to $11,000,000, secured by an issue of $13,000,000 first refunding mortgage bonds held by the Central Trust Company.

A statement by Thomas J. Freeman, president of the road, said it was impossible to meet either interest or principal of the notes due August 1, and as there was no market for the bonds a default resulted. The road operates about 1,100 miles of line, all in Texas.

Alexander J. Hemphill, president of the Guaranty Trust Company, New York, and chairman of a committee of bankers which was working for an extension of the notes, to be made conditional on an option for taking control of the property away from the Goulds, is quoted as saying that the plan to extend the notes will not be abandoned. A new agreement will be prepared calling for deposits. Following a meeting of the Hemphill committee a statement was issued to the effect that, in view of the receivership, the committee ought to be clothed with such additional powers as will enable it to act for the noteholders in any situation that may arise. The committee, representing a majority in amount of the notes, has constituted itself a protective committee, with the broader powers which the changed conditions have made necessary. Holders of the notes are requested to deposit their notes at once with the Guaranty Trust Company.

The $11,000,000 notes now defaulted were sold to bankers in 1911 as part of a reorganization plan for raising working capital to take the road out of receivership. The property was sold under foreclosure June 13, 1911, the newly formed company taking possession three months later.

Lake Shore & Michigan Southern.—See New York Central.

Missouri Pacific.—The attempt of the management to get funds in Europe having failed the road will begin a policy of retrenchment. President Bush has just returned from a trip to Europe. Even though war had not been declared, he said there would have been slight hope of floating American railway securities in Europe. Accordingly, arrangements for the expenditure next year of $4,000,000 on improvements have been dropped.

See Western Pacific and also International & Great Northern.

New York Central.—The minority stockholders of the Lake Shore & Michigan Southern who, unsuccessfully, brought suit in the Federal court in Michigan to prevent a consolidation of the Lake Shore & Michigan Southern with the New York Central & Hudson River last week entered suit in the Federal District Court in New York. An equity suit was filed through the law firm of Cadwalader, Wickersham & Taft, to enjoin the merger. It is alleged that since the Central secured control of the Lake Shore in 1898, the management has juggled its books so as to keep the minority stockholders in ignorance of the actual earnings. Since 1897, it is alleged, $187,000,000 of the earn-

ings of the road which should have gone to the payment of dividends has instead been devoted to expenditures which ought to have been charged to capital account. The plaintiffs in the suit are Annie L. DeKoven and Cecil Barnes, of Chicago, as trustees under the will of John DeKoven, who owned 500 shares of Lake Shore stock. Other minority stockholders join in the suit with them. They say that the property of their road is more valuable than that of the Central and that the consolidation was undertaken to aid the Central in its costly undertakings in connection with the construction of the new terminal in New York.

New York, New Haven & Hartford.—The directors of this company have come to an agreement with the United States Department of Justice by which the government will withdraw its suit for the dissolution of the company; the principal feature of which appears to be a clause intended to shorten the time to be allowed for the company to make some disposition of its Boston & Maine shares. Next January, when the Massachusetts legislature meets, the directors will have an opportunity to try to secure a modification of the law of that state which restricts the market for these shares.

The directors ratified the new agreement August 11. Under its terms the road passes its title to the Boston & Maine to trustees, who will endeavor to sell the same within one year, and the department agrees to drop its suit. A statement issued by President Hustis says:

"In pursuance of the hope expressed in the statement of July 22 that a way might still be found to accomplish the peaceful dissolution of the properties, an agreement has been reached, which is substantially a renewal of the original agreement between the attorney general and the company in all respects except as to the Boston & Maine stock, and is in accordance with the vote of the stockholders at New Haven, April 21, authorizing a settlement with the government.

"The members of the board highly appreciated the courtesy of the attorney general and his co-operation in their endeavor to solve the problem without inflicting unnecessary loss upon the shareholders and to effect a rehabilitation of the property in the interest of the public."

By the terms of the agreement a stipulation will be filed in the United States Court in New York City, in which the New Haven will agree to transfer its title to its Boston & Maine stock to a board of trustees, headed by former Chief Justice Marcus P. Knowlton, of the Supreme Judicial Court of Massachusetts, these trustees to have all the power of owners of the stock in disposing of the same within one year, it being understood that on the presentation of reasonable ground for delay in selling, further time may be granted by the court.

It is agreed that any questions of law involved in the sale of the Boston & Maine stock shall be submitted to the courts. This leaves the way open for the New Haven to attack the constitutionality of the law, by which the state of Massachusetts retains a perpetual option on the Boston & Maine, in the event that the legislature at its next session, in January, does not satisfactorily amend the law.

The stocks of the Connecticut trolley companies are to be transferred to a board of trustees, headed by Judge Walter C. Noyes, of New London, which is to dispose of the roads before July 1, 1919.

The Rhode Island trolley roads are to be transferred to a board headed by Rathbon Gardner, of Providence, with instructions to sell the same by July 1, 1919.

The minority stock of the Eastern Steamship Company is to be disposed of before July 1, 1917.

The Berkshire trolley lines are to be sold within five years from July 1, 1914.

The question of retaining the Sound Steamship lines is to be decided by the Interstate Commerce Commission, in accordance with the provisions of the Panama Canal act.

It is further understood, but not made a part of the stipulation, that the Department of Justice will view with approval any act of the legislature of Massachusetts that will tend to make easier the sale of the Boston & Maine, which, by the terms of the law enacted at the last session of that legislature, is made subject to a perpetual option to the state of Massachusetts.

Howard Elliott, who is now president, as well as chairman of the board, is expected to be at the New York office of the company on August 17. It is said that Mr. Elliott has greatly profited by his rest in the woods. He had worked ten months without as much as a Sunday off.

Credit for reaching an amicable settlement appears to be given to President Wilson, who, though he authorized the filing of the dissolution suit, seems to have taken effective action to check the litigation.

Particular prominence is given in the press despatches, especially in the yellow journals, to the fact that the present agreement will not prevent the attorney-general from prosecuting individual directors for any criminal acts that they may have committed; and one paper says proceedings of this kind will be begun in the courts in two weeks; but there is no reliable evidence that anything is being done. No call has yet been issued for a special grand jury to consider the case, and the law requires ten days' notice to jurymen.

President Hustis, in a second statement, said:

"An erroneous impression seems to have gone forth that the company has yielded in its settlement concerning the time limit.

"The agreement between the attorney-general and the representatives of this company of March 21, which was ratified by the stockholders, provided that the company should have two and one-half years from July 1, 1914, to complete the sale, but, for good cause shown, the time may be extended by the United States District Court.

"The arrangement just agreed to provides that the company shall have until January 1, 1917, to dispose of the stock, unless, for good cause, the court grants additional time.

"But if by July 1, 1915, the New Haven company and the Massachusetts legislature agree on terms on which this control shall be parted with, satisfactory to the United States and approved by the court, such plan shall be adopted by order of the court."

Oklahoma Central Railroad Company.—This is the name of the new corporation which has been chartered in Oklahoma to take over the Oklahoma Central Railway, sold, on July 31, by order of the court. The new company has an office at Muskogee, and the incorporators are H. A. Gibson, R. D. Long, William M. Cutlip and J. A. Lathum. Muskogee is 100 miles from the nearest point on the Oklahoma Central, and is 50 miles from Tulsa, the nearest point on the Atchison, Topeka & Santa Fe.

Pennsylvania.—The lease of the Northern Central went into effect August 1, and the Pennsylvania Railroad Company now operates all lines formerly operated by the Northern Central Railway Company. The Erie division of the Pennsylvania Railroad and the Northern Central Railway have been consolidated under the name of Central division—Pennsylvania Railroad Company. Until further notice the subdivisions and branch roads included under the Erie division of the Pennsylvania Railroad and the Northern Central Railway will continue to be operated as subdivisions and branch roads of the new Central division. The name of the former Central division of the Philadelphia, Baltimore & Washington has been changed to Media division. All of the lines embraced in the new Central division were already operated under a single general superintendent.

Western Pacific.—The directors of the Denver & Rio Grande have voted to pay the semi-annual interest of 2½ per cent. on the first mortgage bonds of the Western Pacific, notwithstanding that the earnings of the road have not been sufficient to meet the entire amount. The deficit will be made up by the Denver & Rio Grande. The interest will fall due September 1. The directors add: "If the Denver & Rio Grande is to continue its support of the Western Pacific some plan of readjustment of Western Pacific finances and the relation of Denver & Rio Grande thereto must be devised which will be acceptable to the holders of the Western Pacific first mortgage bonds, and a call for the deposit of these bonds will be put forth at an early date by a committee of responsible bankers looking to the adoption of a plan which will at once lighten the burden which the Denver & Rio Grande is now carrying, to place the financial structure of the system upon a basis of recognized solvency and credit, and, as far as may be practicable, provide means for the development of the Western Pacific.

"The payment of interest, which will fall due on September 1, 1914, has been decided upon in order to give time to prepare, submit and consider the proposed plan. Money is already assured for the payment of the interest."

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WE GUARANTEE, that of this issue (the monthly Engineering & Maintenance Edition) 10,900 copies were printed; that of those 10,900 copies, 7,435 were mailed to regular paid subscribers to the weekly edition, 1,898 to subscribers who get the Engineering & Maintenance Edition only, 250 were provided for counter and news companies' sales, 1,111 were mailed to advertisers, exchanges and correspondents, and 206 were provided for samples and office use; that the total copies printed this year to date were 319,500, an average of 9,397 copies a week.

Volume 57 August 21, 1914 Number 8

Contents

*Illustrated.

Instructive Strike on a State Railway

Some months ago a bad strike took place on the government railways of South Africa. The government suppressed it by armed force. In doing so it was supported by public opinion. Only now has the *Railway Age Gazette* been able to get an article presenting somewhat fully the facts about this strike. It is considered worth while to publish it even at this late day, because it may have a lesson for the people of this country, and especially for railway officers and employees. The advocates of government ownership of railways persistently represent this policy as a remedy for strikes. The strike in South Africa was but one of numerous examples which state railways have afforded that public ownership is not a preventive of strikes. It also furnishes an example of the way in which labor unions and strikes are likely to be dealt with on government railways. The railway employees who read the story are hardly likely to find in it an argument from their standpoint in favor of state ownership. It illustrates the facts, as other incidents of a similar character have illustrated them, first, that public ownership is not a preventive of strikes, and, second, that when strikes do come on state railways they are much more likely to be short-lived than on private railways because public sentiment and the government are almost certain to take a determined stand against the strikers.

Abuse of the Parcel Post

As an incident of the European war, and the upheaval in the American money market, fifty-seven tons of gold was sent by parcel post from the Mint in Philadelphia to the Sub-treasury in New York. This trick of the government to get railroad transportation for nothing is not new, for ten carloads of gold were sent by registered mail, several years ago, from San Francisco to New York. A railroad president who was accused of padding the mails, during the weighing period, on his small road in Iowa, a few years ago, was indicted in court as a criminal and, we believe was punished; but it is difficult to see any great difference between his act and this one of the government. Sending big bags of gold by parcel post is legal, apparently; and so was the sending of tons of grain last year in Colorado, and of fruit in New Mexico; but everybody must admit that it is glaringly illegitimate. A postmaster in West Virginia has gone these fellows one better; it is related that he sent four barrels of flour by parcel post and thereby raised his office from fourth class to third, and secured an increase in his annual salary! These incidents, small in themselves, all combine to reinforce the demand that Congress take hold of the mail-pay question and settle it on a rational basis. The petty policies of the postoffice department are highly discreditable.

Varied Parcel-Post Philanthropies

Though Uncle Sam is by no means generous in his payments to the railways for handling the mails and the parcels, he is far from stingy with some of the contractors who operate star routes. This is strikingly illustrated by an incident of which the *Railway Age Gazette* has just learned the details. A certain contractor has the mail star route between Holbrook and Snowflake, Ariz. Recently this representative of the government bought 10,000 lb. of barley at Mesa, Ariz., on the Arizona Eastern, and shipped it by parcel post via Holbrook to Snowflake. The barley cost him 95 cents per 100 lb. at Mesa. The postage on it from Mesa to Snowflake was $1.08 per 100 lb. Therefore, laid down at Snowflake the barley cost him $2.03 per 100 lb. For transporting the barley via parcel post from Holbrook to Snokflake the contractor received from Uncle Sam $2.25 per 100 lb., or 22 cents per 100 lb. more than the cost of the barley plus the postage on it to Snowflake. In other words, in effect Uncle Sam

made this enterprising mail contractor a present of the barley and also of the transportation of it and, in addition, gave him 22 cents for accepting his Uncle's beneficence. His 10,000 lb. of barley laid down at Snowflake cost him just $22 less than nothing. The person who furnished the foregoing information added, "This fellow seems to have a good business head on him and no doubt will go into the business of retailing barley at Snowflake quite heavily. He is said to be figuring also on shipping baled hay in 50-lb. packages by parcel post." The distance by rail, Mesa to Holbrook is 340 miles; Holbrook to Snowflake, 30 miles. Which means that the contractor gets 22 cents per 100 lb. more than the cost of the barley, plus the postage on it, for hauling it 30 miles out of a total haul of 370 miles, the railway furnishing the other 340 miles of the transportation! We concur in the opinion that "this fellow seems to have a good business head on him." But how about the heads of the statesmen and postoffice department officers who have made this extraordinary transaction possible? Meantime, government officers will continue to send out from Washington long lectures on the inefficient and wasteful way in which the railways of the United States are managed!

German Criticism of State Railroads

Nowhere else has nationalization of railways been so extensively adopted as in Germany. Nowhere else, as is conceded by both the advocates and opponents of government ownership, has the management of state railways been so efficient. But even in Germany satisfaction with the results of government ownership is far from unanimous. A recent letter from a Berlin correspondent to the Springfield (Mass.) *Republican*, which we publish elsewhere, reviews numerous serious complaints which are being made in Germany against the state railways, and especially against the best of them, those of Prussia-Hesse. It is being charged that the Prussian railways have too many officers and employees, that their freight rates are kept too high in order to yield large sums to the public treasury; that rates are so adjusted as unfairly to discriminate between different classes of business concerns; and that government ownership has not remedied or prevented but aggravated the evils of monopoly, because the state railroads constitute a monopoly more powerful and arbitrary than any practicable combination of private corporations. A great evil on the German state railways, to which this correspondent does not refer, is the chronic and severe shortage of cars in seasons of heavy traffic movement. The criticisms of their railways being made by German economists and business men may not all be justified, but they refute the statement so often made by advocates of government ownership in this country that the results of nationalization in Germany give the "greatest satisfaction."

THE PRACTICAL MINIMUM GRADE

THEORETICALLY, the point at which an increase in expenditure to secure a lower grade, and thereby a reduced cost of transportation, ceases to be justified because of a disproportionate increase in fixed charges, is capable of accurate determination. Practically, the assumptions which must be made regarding the amount of traffic and other primary considerations are so largely a matter of judgment that the opinions of different railroad men vary widely. At no period in our railway development has this subject received so much attention, or have such large expenditures been made to secure low grades, as during the past few years. It is therefore highly important that the elements of uncertainty be reduced to the minimum. Many men seriously question whether some of the heavy expenditures now being made are justified, in view of the traffic to be handled now or to be reasonably expected in the future, and whether the fixed charges are not being increased unwisely to secure a low transportation cost.

This question was brought up in the recent investigation of and report on the construction of the National Transcontinental Railway by the government in Canada. On this line ruling grades of 0.4 per cent. eastbound and 0.6 per cent. westbound were adopted, resulting in heavy expenditures for construction, although it will undoubtedly be many years before the freight traffic will amount to over two or three trainloads each way daily. The increased expenditures necessary to secure these low grades through a country now largely a wilderness have been severely criticized. Other conspicuous examples of low grade lines constructed at heavy cost in recent years are the Spokane, Portland & Seattle, from Spokane to Portland; the Virginian and the Carolina, Clinchfield & Ohio, from the coal fields in West Virginia to the Atlantic seaboard; and the new line of the Erie between Meadville, Pa., and Corry, where the adoption of a 0.2 per cent. grade made necessary very heavy work. An instructive contrast in the ideas of different railroad men on this subject is afforded by the construction of the Spokane, Portland & Seattle and the new line of the Oregon-Washington Railroad & Navigation Company, between Spokane and the Columbia river, which is now being completed. The latter line is built generally parallel to the Spokane, Portland & Seattle, with a ruling grade of 0.6 per cent., as compared with a 0.4 per cent. grade on the North Bank road.

The advocates of these low-grade lines point to the low resulting transportation cost as a justification of their policy. On the Carolina, Clinchfield & Ohio, for instance, the transportation ratio for the fiscal year ending June 30, 1913, was only 17 per cent. It is not necessary to emphasize the importance of a low transportation ratio to the successful operation of a railway, or the fact that this becomes increasingly important as the amount of traffic increases. It is, therefore, generally recognized that it is entirely proper and advisable to anticipate the probable increases in traffic which may reasonably be expected within the next few years when planning on any improvements. It is also recognized that it is more expensive to reduce grades under traffic than when originally constructing a line.

On the other hand, it requires a heavy traffic to enable the reduced transportation cost to offset the heavy fixed charges on many of these low-grade lines, and it is difficult to determine how some of them, with two or three trains daily, vindicate the expenditures made. For example, the North Bank road, which was one of the early low-grade lines constructed through a heavy country, has failed to earn its fixed charges for the last three years, although it has now been in operation over six years. A careful estimate made previous to the authorization of a very expensive piece of grade reduction recently on a line handling a dense traffic, showed that even with this heavy traffic the improvement could be justified only in the light of the increased traffic expected a considerable time in the future.

The mere fact that a low-grade line earns a fair return on a large investment is not necessarily a vindication of the expenditure, for it is conceivable that the operation of more trains on a line constructed with heavier grades and at a reduced cost, would result in even greater profits in excess of interest charges. Another influence which must be considered at the present time is that of electrification. The electric operation of freight lines, especially on heavy grades, has not been developed far enough in this country to enable one to determine definitely what this method of operation will accomplish. But electrification must be considered as a possible alternative to low-grades in the near future. While transportation costs can be reduced by the reduction of grades at any time, the fixed charges are permanent.

It is not the intention here to criticize low-grade lines in themselves, but to raise for serious consideration the question whether grades are not sometimes being reduced below the economical limit for handling either the present traffic or that which may be expected in the near future. No one will deny the economy of a low-grade line, or will question the advisability of securing low grades, where this can be done at a reasonable expenditure. But it would seem that the advisability of the heavy expenditures which are being made on some lines are open to question.

AN EMERGENCY ADVANCE IN FREIGHT RATES?

A MOVEMENT has been started by J. S. Bache & Co., members of the New York Stock Exchange, for an immediate and substantial advance in freight rates as a means of dealing with the emergency confronting the American railway industry as a result of the war in Europe. We publish elsewhere a letter which this firm has sent to 32,000 bankers throughout the United States, urging them to petition Congress to pass a resolution requesting the Interstate Commerce Commission to revise its recent decision in the eastern rate advance case and to promptly grant further and adequate advances in rates to all the railroads.

It is impossible accurately to appraise the position in which the war has put the railways and other business concerns of this country, or to foresee what future developments in respect to them will be. There are, however, certain salient facts regarding the railway industry which should be given careful consideration by the public, by Congress and by the commission.

The people of Europe have invested large sums in the securities of American business concerns. A very large majority of these investments have been made in the securities of American railways, and only a relatively small part of them in the securities of American industrials. From the time when war began to be seriously threatened until the stock exchanges were closed European investors dumped American securities, and especially railway securities, on the markets as fast as they could, the purpose being to take as much gold from this country to Europe as possible. The effect was rapidly to drive down the prices of American securities, and especially of American railway securities. How low our railway securities would have gone under this hammering if the stock exchanges had not been closed when they were nobody can tell.

The closing of the stock exchanges arrested the flood of railway securities coming home. But the war abroad destroyed the foreign market for American railway securities; and the closing of the stock exchanges has temporarily destroyed their home market. It may be that in a relatively short time the home market for them will be reopened; but the foreign market will not exist again until the war is over.

This means that the demand for American railway securities has been heavily reduced. If the supply of a thing offered in the market continues undiminished while the demand for it is thus curtailed, there can be but one result. That is, a great decline in its price. If, therefore, the prices at which American railway securities can be sold are not to be heavily reduced—and they were already very low when the war began—either the supply of them offered for sale must be curtailed, or by some means the demand for them must be stimulated.

It is easy to foresee the consequence of a reduction of the supply of securities issued. New securities must be sold to raise capital for new construction and permanent improvements, and a reduction in the supply of them put on the market must result in a proportionate reduction in the amount of expenditures for permanent improvements and new construction.

Assuming that it is not desirable that the amount of capital raised by railways for permanent improvements and new construction shall be reduced, how can the demand for their securities be maintained where a sufficient supply of them can be sold to raise the needed capital? There is but one way in which that can be done, and that is by so increasing the rates and net earnings of the railways as to enable them to pay rates of interest on their bonds and rates of dividend on their stocks which will make them attractive to a larger class of American investors.

Before the European war began it was conceded by all persons familiar with business conditions that the main thing needed to revive our industry and commerce was a renewal of railway development. The situation of the railways certainly has not been improved by the destruction of the foreign market for their securities and by the enormous reduction in their export traffic. Is it not desirable, for the general commercial and industrial welfare, that some energetic and far-reaching action be taken to strengthen the position of American railways, and thereby the position of American business generally? If the general of an army knew there were various weak places in his lines, but that there was one very important place which was the weakest and most vulnerable of all, would he not regard it as the part of wisdom to devote himself first of all to strengthening that place? And if the weakest place of all in the lines of American business is the condition of the railways, is it not the part of wisdom to devote ourselves at once to strengthening their position?

NEW BOOKS

Influence Diagrams for the Determination of Maximum Moments in Trusses and Beams. By Malverd A. Howe, Professor of Civil Engineering, Rose Polytechnic Institute. Size 6 in. by 9 in., 65 pages, 42 illustrations, bound in cloth. Published by John Wiley & Sons, Inc., New York. Price, $1.25.

The method of applying influence lines in analyzing trusses, arches and beams, is made clear in this little book, recently issued. The author begins by stating the single simple rule for drawing the influence diagram for all ordinary trusses, and follows this with numerous examples covering all cases for simple trusses. He then shows that the influence diagram for continuous trusses, cantilever trusses, arches and beams are based upon the same general diagram as is drawn for simple trusses. These diagrams are applicable without any computation. The diagrams shown in the book are constructed for moments, but the same rules can be used in drawing diagrams to indicate stresses or areas of truss members.

Terminal Facilities of North Pacific Ports. Compiled and edited by Welford Beaton. Size 5 x 7 in., 336 pages, cloth binding. Published by Terminal Publishing Company, 309 Burke Building, Seattle, Wash. Price $2.

Although this book is primarily intended for the steamship owner or shipper of goods by sea it is of great value to the railroad man who finds it necessary to have a good idea of the peculiarities and advantages of the Pacific coast ports from San Diego, Cal., to Nome, Alaska. The book contains most detailed information concerning the essential features of each of the ports considered, including the regulations governing the entrance of ships, the depth of water in the harbor and approaches, the wharfage, pilotage, storage and other charges assessed against either the ship or the cargo, the piers, the boat lines operating from the port, etc. In addition there are also lists of the American consuls stationed in foreign countries, list of consuls of other countries stationed at the Pacific ports, customs regulations, comparative tables of foreign monetary and other standards and much other useful and necessary information of that character. It is the intention of the editors to publish the book annually.

Air Brake Association. Proceedings of the 1914 convention. Illustrated, 242 pages. 6 in. by 9 in. Published by the association. F. M. Nellis, 53 State street, Boston, Mass., secretary. Price $2.

The Air Brake Association has made a record this year in placing the bound volume of the twenty-first annual convention in the hands of the members about two months after the convention met. This year's report includes addresses by H. H. Vaughan, assistant to vice-president, Canadian Pacific, and W. A. Garrett, formerly chief executive officer of the Pere Marquette, together with papers on Air Hose, Caboose Air Gage and Conductor's Valve, Electro-Pneumatic Signal System for Passenger Trains, Modern Train Building, and the report of the committee on Recommended Practice. Other subjects discussed were the Clasp Type of Foundation Brake Gear for Heavy Passenger Equipment Cars, and One Hundred Per Cent. Efficiency of Air Brakes. A tribute to George Westinghouse is also included in the proceedings. By prompt action of the executive committee immediately following the convention in Detroit, the secretary has been able to include in these proceedings the list of subjects selected and the committees appointed to report at the twenty-second annual convention, which will be held in Chicago, May 4-7, 1915.

Letters to the Editor

A PENNY SAVED IS AS GOOD AS A PENNY EARNED

New York, August 4, 1914.

To the Editor of the Railway Age Gazette:

The recent decision of the Interstate Commerce Commission advising economies in the railway field will warrant me in suggesting a means of saving which I adopted in Mexico in 1902. In that year, while superintendent of construction for the National Railways, the change of gage of that line was under way, and we were short of freight cars. Standard gage box cars had been received with a marked capacity of 80,000 lb., the cars weighing 36,000 lb. Flat cars received at the same time were marked, capacity 80,000 lb., and tare 32,000 lb.; or 4,000 lb. difference between the two. Trucks, journals, axles, wheels, trussing and all parts below the decks of the cars were identical. I took advantage of the difference and loaded the flat cars to 84,000 lb. regularly.

Since then I have had charge of two roads in operation and found the same error carried out in their equipment. I changed this, and on one of those lines increased the average load handled nearly one ton per car.

What is true of flat cars is true of gondolas, coal and ore cars; and, while it is true that there are few items other than rails, heavy machinery and sometimes timber that will load a flat car to capacity, this is not true of coal, ore and other such commodities.

I examined the cars of one of the big lines entering New York a few days since and noted that the same error still persists. It is obvious that there is no stress on tracks, bridges or any other railway structure which differs on account of whether the weight above center bearings is part of the paying or of the non-paying load.

H. M. Taylor.

A CRITICISM OF RAILWAY COST ACCOUNTING

Baltimore, Md., August 2, 1914.

To the Editor of the Railway Age Gazette:

Referring to editorials and articles in your issues for July 24 and 31 on the division of expenses between passenger and freight service, I desire to call attention to a fundamental defect in the process.

What would be thought of a farmer who had five bins, into the first of which he miscellaneously dumped his wheat, oats, barley and corn; into the second, potatoes, carrots, onions and beets; into the third, apples, peaches, pears and plums; into the fourth, cherries, currants, blackberries and gooseberries; into the fifth, beans, peas, squashes and cucumbers? How difficult it would be to determine the quantity of each, and what amount of labor would be necessary to sort them out for market or for use!

Yet this is practically what is now done in railroad accounting, even to the mixing of passenger, freight, material and labor.

No cost accounting can be had until recourse is had to its fundamental basis, namely, a separation of its different particulars.

Material and labor are two entirely distinct and separate elements, in cost, of which a knowledge is necessary. Separation at the outset of any expense is simple and easy; separation after heterogeneous items have been combined is difficult and costly.

Properly designed and used requisitions for material, permit of such sortings and resortings as will give knowledge to any desired refinement. Work tickets, or service cards, will do the same for all labor.

Itemized items of this kind analyze themselves; being separately tabulated, the aggregates furnish the knowledge upon which correct judgments may be based.

No analysis of the present jumbled up reports can ever yield a basis for accurate thinking or furnish unit costs that will not be open to successful attack.

F. Lincoln Hutchins.

AN APPEAL FOR RELIEF FOR THE RAILWAYS

J. S. Bache & Co., members of the New York Stock Exchange, have sent a letter to 32,000 bankers in the United States urging them to take steps in the direction of securing an immediate and substantial advance in railway rates as a means of strengthening the business position of the nation. Their letter is as follows:

"Owing to the great European war, our financial situation is under an emergency pressure, because threatened by the unloading of railroad securities held by Europe.

"Our securities are in disfavor because of low railroad earnings.

"They should at once be made attractive to capital all over the world.

"This cannot be done unless our railroad securities are given a safe margin of earnings. The value of all other securities depends upon the success of the railroads.

"The railroads have proved and the Interstate Commerce Commission has admitted the necessity of enlarged revenues, but the rate decision grants only a meager and insufficient pittance—not more than enough to increase earnings one-eighth of 1 per cent on the total capital of the eastern railroads which made the application.

"This small advance will have no effect in restoring and establishing the confidence of the large investors here and the holders of our securities abroad.

"These securities will be sent over as soon as possible to do so, to draw our gold or its equivalent, and they will not be taken up freely by our own large investors because they have not sufficient confidence in the success of the railroads under the present scale of low freights.

"Rates need to be advanced materially in order to give such a margin of earnings that railroad securities will be sought.

"Further than that; the credit system of the world has been upset. We have lost Europe as our bankers. We not only cannot hope to place new securities in Europe: We are compelled to take back vast quantities of existing securities which for many years Europe has been absorbing. Every year our railroad systems have to spend enormous sums to increase and extend their transportation facilities to meet the growing demands of American commerce. Where are the railroads to obtain the money with which to make the needed additions and improvements? They cannot turn to Europe: American investors are not attracted under present conditions; they will have to look to their earnings until the confidence of investors is restored.

"Needed raises will start all the business of the country towards a prosperous level, because of the confident buying of railroad securities which will then take place, and because of the heavy purchases which the railroads will then be able to make, but cannot make now because of lack of funds and credit.

"This is now a national question and relief should be given to the railroads immediately, in view of the emergency necessity.

"We, therefore, earnestly suggest that you bring this matter at once to the attention of your representatives in Congress, and if you agree with us, urge them to favor the passing of a joint and concurrent resolution of the House and Senate directed to the Interstate Commerce Commission, requesting it, because of the emergency situation with reference to railroad securities, to review and revise the decision in the recent application of the eastern railroads, and in their discretion and in view of the great and extraordinary necessity for this action, to promptly grant further and adequate advances to all the railroads.

"No financial move could be more beneficial now than to make our securities so attractive that the funds of the investing world would be irresistibly drawn to this country.

"This would be accomplished if the railroads were given full and ample earning power. It would stimulate the whole industrial structure and enhance the values of all other securities.

"Will you give this matter your earnest attention and will you kindly let us know if you agree and will act?

"If you approve, please ask some of your larger shippers also to write or telegraph to Washington."

The Operation of Large Classification Yards

Third Series* of Abstracts of Papers Received in the Recently Decided Contest on This Important Subject

EFFECT OF OUTSIDE INFLUENCES ON YARD OPERATION

By F. Lincoln Hutchins
Baltimore, Md.

Efficient operation of yards depends mainly upon right conditions. Little improvement can be expected until many things, extraneous to the jurisdiction of the yardmaster, have been changed. Small kinks and minor improvements will scarcely affect the tremendous terminal expense, which Hadley says has grown during the last 20 years so that, while the cost of line-of-road movement has been enormously decreased, the cost of yards and terminals has been tremendously increased.

The problem deserves wider treatment, for this gradually increasing cost is mainly due to faulty management. Moreover it is difficult to see how special methods can be made of general application. No two yards are alike in arrangement or in the class of business that they handle, and the methods which would be of great efficiency in one situation might prove to be very inefficient in another. Hence an article devoted to the consideration of more efficient and more economical yard management must take up matters outside of the regular yard operations.

At the outset it may be questioned if the establishment of large yards leads to economical operation. It is the universal testimony that no yard was ever made large enough to hold all the cars that tend to come to it. The temptation is to overcrowd any yard that has a reputation for bigness. Every one at a distance thinks that its capacity is unlimited, with the result that more switching is created, more storage demanded, and there results a general movement of cars towards it from all the contiguous territory. The inevitable consequence of all this is that the large yard is often worse off for room to properly carry on its functions than before its enlargement.

The location of classification yards in many cases is open to criticism. Economical working conditions are sacrificed to accidental ownership of land, geographical situation, divisional boundaries and other considerations. How seldom is the man nearest the work called in to consult with the engineering department in deciding what arrangement will best conserve economical working? Who is so well qualified as the yardmaster to know the movement of traffic and the particular arrangement of tracks that will permit of the greatest facility in handling it?

Yards at connecting points, either with other roads or with different divisions of the same system, lead to large losses through dumping into them heterogeneously marshaled cars, followed by the turning over to the connections of cars in like disorderly array. It is the rule, rather than the exception, to depend upon large classification yards to correct the lack of orderly arrangement in collecting and despatching cars along the line. "Let George do it" is a costly method of procedure when the total travel of the car is taken into consideration and when it is taken into every classification yard for re-classification during its journey.

The highest economy in yard operation is to be obtained by keeping cars out of yards to the greatest extent possible, although the contrary practice is now the rule. The reputation for large yard capacity encourages the idea that accommodation exists for the storage of large numbers of cars from which selections may be made to suit the convenience of wholesale shippers. Cars thus held for disposition cause large expense, which is not properly appreciated. This expense is also further needlessly increased by permitting shippers to order forward certain products by car number. Orders to forward certain kinds, or grades, would greatly reduce such expense, for instance, in the matter of coal.

The first need is to adopt all possible means to keep cars out of classification yards. In the fast freight service it has been found that this requirement is imperative to secure quick despatch and that it is necessary to so make up the trains as to secure the longest rolling distance without yard service. Similar attention to ordinary freight would tremendously decrease the cost of yard service, increase per diem mileage of cars, and effect other economies. The Pittsburgh & Lake Erie is a notable example of the application of this principle. Large yards were vetoed and small accumulating points were established from which solid trains for terminal points of the road were run without breaking up at the different yards.

Parsimony in matter of inspection is very expensive. General officers examining payrolls are likely to cut out inspectors and in so doing increase other yard expenses far beyond the picayunish amounts that they think they have saved; enough attention is not paid to the costly result of delays to the switching locomotives and crews, to say nothing of the preventable breakdowns on the road. Economical inspection is only obtained when it is absolutely thorough, and sufficiently rapid to interfere least with the regular routine of yard work.

Yard records have further largely increased yard costs, and needlessly so, for the reason that improvements in accounting have not kept pace with the growth of business. The present reports are inefficient and require unnecessary duplication. The ideal car record is obtained by having an individual slip for each car, either brought in with the car or made upon its arrival. Such a slip formed to carry all the information that may ever be needed as to car or contents permits of instantaneous reply to all possible inquiries and prevents all duplications. Such records when aggregated will furnish results of all yard operations to as fine a degree of refinement as may be desired with a minimum of cost and avoid the necessity of taking lists of yard, either daily or periodically.

Lack of regularly scheduled work for switching crews is partly due to the irregular nature of the business, but where such schedules have been installed there have resulted a betterment in operation and great reductions in cost. Yard operations may be scheduled, as are trains on the road; it would be as unfair to say that this is impracticable in yard work, because of irregularities, as to say that scheduling of trains is impracticable because wrecks and other delays occur on the line.

Many yardmasters endeavor to carry all the confused and complicated operations of their yards in their own minds, making conductors of switching crews work under their specific instructions. This is a most inefficient method, leading to costly use of power and labor. The most economically worked yard is where the yardmaster has the least to do; that is, where the regular operations of the yard are properly scheduled and the individual conductors are held responsible for the fulfillment of the schedules given them. Having definite tasks a conductor is better able to utilize his time and to avoid extra moves, while without such schedules one cannot plan ahead or take advantage of accidental happenings, while losing much time in obtaining special orders for each piece of work.

Orders from traffic and other high officials for special movement of cars is a grave hindrance to orderly prosecution of yard work. This practice has cost very large sums, unknown to the managers, because the accounting methods are not fitted to divulge the expense consequent upon this practice. Until it is realized that patrons of the road, however important, are not entitled to special, out of order service, not much can be done to obviate the expense due to this uneconomic operation.

Marvelous differences are found in the capability of men in the effective handling of a yard locomotive. I had working for

*The prize article and several others were published in the issue of July 3, and several other contributions were also published in the issue of July 24.

me at one time a genius in this line. A person watching would be puzzled to know what he was trying to do, for apparently he was mixing up rather than sorting out; but by cutting his train in a certain place and keeping one class of cars with his locomotive, thus giving him an extra track, he was able to marshal the cars on a limited number of tracks in the required order with a minimum number of moves. Such a man as an instructor can do much to educate other men in the proper handling, thus reducing the cost of the operations. What railroad has secured expert yard operators and sent them out to its different yards to instruct the local men as to the best switching practice?

Many conductors haul their trains just over the switch point and push the car or cars they wish to detach onto the proper track; then again, moving out just over the switch, they repeat the operation for the next cut and so on until they have disposed of all the cars. If, instead of so doing, they had hauled the cars further away from the switch in the first place, they might have made all the cuts without calling for one movemer of the reverse lever, saving in engine expense and in the time of the crew.

In these days of "safety first" it may seem unwise to suggest that brakemen be required to catch slowly moving cars for the purpose of riding and braking them, but properly done this is not a dangerous proceeding, as is well proved by many years of this practice upon many roads without unfortunate results; only in this way may a train be broken up with the least loss of time and with a proper degree of safety. With sufficient leeway several cuts of cars may be moving to their several different destinations at the same time with the greatest effectiveness and economy of operation.

ADVANTAGES OF ADVANCE INFORMATION ON TRAIN CONSISTS

By Jas. D. Schaefer
City Passenger Agent, Chicago, Milwaukee & St. Paul, Pittsburgh, Pa., and Nelson J. Flocker
Bessemer & Lake Erie, Pittsburgh, Pa.

A yard is not intended primarily to hold cars, but as a place from which they are to be despatched. Of primary importance in the efficient operation of a large classification yard is its location. Much depends on this with regard to grades and dimensions, with the view of projections in the future. Many yards are hampered for room to take care of the increased traffic over that handled when they were originally laid out. In this connection it is well to call attention to the fact that many present-day yards are the outgrowth of a layout of tracks designed to take care of the traffic of 20 or more years ago, when business was light and cars were of small capacity and dimensions.

The despatch with which cars are prepared for movement over a hump depends on the system of marking. The present system in many yards is by crayon for loaded cars prepared from the manifest and for empty cars taken from the train, with a triplicate "cut sheet" prepared by the car marker. This sheet shows the number of cars in each draft and the track in the classification yards on which such cars are to be placed. The original copy (provided the switches are thrown from a tower) is furnished to the leverman, another copy to the car-cutter, and the third copy is kept and checked by the conductor and reported to the yardmaster to keep intact the data regarding the hump's operations. A suggestion for improvement of this method would be to have this information furnished the car marker by wire in advance of the arrival of a train, in order that switching lists could be provided, so that the cars will be marked for classification upon the receipt of the train. In this way the cars would be ready for hump classification without any material delay, and the hump would only have to perform the function for which it is primarily intended, namely, the classification of the equipment. Another advantage of this suggestion is that it does not require the same power to move a train of cars onto the hump when it is received under power as when the movement is a "dead" one. This feature would be aggravated in cold weather.

Perhaps the objection would be made to the suggested system that no opportunity would be allowed for inspection for bad order cars in the receiving yard. However, this could be obviated by a road inspection for such defects, before receipt at the classification yard, preferably at the water tank stop immediately preceding entrance into the receiving yard; bad order cars could be carded at that point. The defective cars could then be classified for repairs on the hump. In case a car becomes defective between the inspection preceding the entrance into the receiving yard and receipt at the yard it could be set out on the bad order track at the despatching end of the yard, as such inspection for light defects and air hose connection is always made at that point under present practice. Notation of many of the defects could also be made by switchmen or yard brakemen when going over the train to cut the air hose preparatory to moving the train over the hump. This method of handling cars preparatory to the hump classification does not in any way contemplate the discontinuance of the present manner of reporting, nor the abolition of the "cut-lists."

When one of the writers was assistant general yardmaster of one of the larger southern lines in Tennessee, there was a complete shutdown on empty cars on the division east of the point at which the classification yard over which he had jurisdiction was located. At that time he was making up through solid trains for five southern terminals. As they were being made up these trains had a fair proportion of company box and coke cars in their consist, the balance being perishable freight. The situation seemed to grow worse and it was necessary to reclassify to rush forward the perishable freight. A blockade was imminent, and while we got through all right a lesson had been learned. After clearing up the yard, a new system was inaugurated which was then an innovation in yard car handling in that region. Thereafter when word reached the office that there would be a shutdown on eastbound cars, we would classify all company cars and hold same on outside tracks. However, as fast as power could be obtained, foreign cars were moved out of the way, carded for movement toward home, with the result there was no reclassifying, and all cars were ready for movement in solid trains for the south. We were handling about 2,800 cars on an average daily, probably 33 per cent. foreign equipment.

SOME IMPROVEMENTS IN THE OPERATION OF A FLAT YARD

By Fred P. Grossman
General Yardmaster, Chicago, St. Paul, Minneapolis & Omaha, Minneapolis, Minn.

The use of hump yards for the classification and breaking up of trains works well in the fall when the business is heaviest. One engine on a hump can break up more trains effectively and classify more cars than an engine can in a flat yard, but it requires an army of switchmen and switch tenders to throw switches and keep the cars going onto the track assigned for each individual cut of cars. The damage to cars is also far greater on a hump than in a flat yard, and the claims following, coupled with the enormous amount of help required, must be kept in view.

I am in favor of a flat yard, with a graduating decline from the switch lead onto the various switching tracks. An engine on a lead of this kind can pull more cars up the lead, and it does not require as many switchmen and switch tenders to guard the movement of cars. Cars are not so easily broken, and the consumption of coal and water is about the same. The cars are allowed to move more freely, and a man in charge of the engine can control his helpers better and give better results for the expense incurred. A yard of this kind with an entrance to the tracks on both ends allows the cars to be pulled away from the lead engine without interrupting the work, and there is no lost motion to the lead engine. A foreman of an engine in a yard of this kind, trained to make the proper cuts in break-

ing up trains, can pull back on the lead, and by the time the engine comes back to where he is will have disposed of all the cars, and be ready for another cut. This makes a yard very effective and economical, and a switch engine will handle very nearly, if not as many cars as an engine on a hump, with about one-half the help.

The bad order proposition is handled in our yard by training the car repairers to mark bad order cars, loads and empties, and heavy and light repairs. The light repairs predominate in every yard, consequently we assign two tracks for this work, the light repair loads being set ahead of the empties. This also holds good with heavy repair loads and empties. Our light repair tracks are pulled twice in each 24 hours and the heavy repair tracks but once.

In addition to these repairs, I would call attention to another system we have inaugurated. Our merchandise box cars for outbound freight are largely made up of cars with minor defects; while spotted at the out-bound freight house for loading, two men make the necessary repairs, with occasionally an additional car repairer pressed into service. This plan has proved economical, as well as successful, and keeps the yard free of light repair merchandise box cars.

Our trains have all been assigned to handle certain classes of commodities and for certain destinations. This keeps the high class freight moving promptly, the first train out being made up with through cars, the second taking the overflow, the next the short hauls, and so on down to the dead freight. In the fall these trains are run in sections, but we never deviate in the class of freight handled in each train, except where dead freight is used to fill out tonnage. Trains on other divisions are lined up so that local cars are either on the head end or the rear; the local cars are taken off, through cars are added and the engine and crews changed with no delays.

A yardmaster must know every inch of room in his territory, and must know perfectly at all times the exact situation of every track in his yard. This enables him to handle almost double the amount of cars actually held in his territory.

One of the most complex problems confronting a yardmaster is to eliminate terminal overtime. An engine working directly in a given territory can be manipulated in such a manner as to stop work promptly at the expiration of ten hours, but when an engine goes into a connecting line yard, one loses control of it. In our yard switch engines have been given special hours to commence work, and must retire when they have worked ten hours. In order to divide the work evenly, we start engines at 6:30, 7, 7:30 and 8 A. M. This gives us an engine at all times, and the night force commences work the same way. In this way overtime has been cut down from 250 hours to 25 and 30 hours per month. The most surprising part of it was the efficient service created by this change. Formerly our engines handled on an average of 75 cars a day, while at the present time they are handling an average of 120 cars a day; in the fall this has run up to 162 cars per engine. The physical condition of our yard is against us, and in addition we receive only credit for cars coming into and going out of the yard, no credit being received for work done within the yard. The saving in fuel was enormous, switch engines now averaging about three tons per ten hours against four tons before the change was made. A reduction was also noticed in the water supply, engines now going to the tank twice a day against three and four times previous to the change. After the crews became accustomed to the change of working ten hours straight, they seemed to feel that we were imposing on them when we asked them to work overtime. The service was also better, as the men were in better physical condition, and never loafed as they did when they were working 12 and 13 hours a day.

Before the change in hours was made, the average cost per car for the year was 38 cents; after the change was made, the average cost for the year was 35¼ cents per car, or a saving of 2¾ cents per car. During this latter period we were also hampered by construction work and gravel trains, about 12,000 cars of gravel and about 900 cars of company material being unloaded. This, of course, delayed us considerably, as our yard has peculiar physical characteristics and is at times hard to work.

SYSTEMATIC OPERATION OF LARGE YARDS

By F. E. Ramsdell

Freight Trainmaster, Pittsburgh & Lake Erie, McKees Rocks, Pa.

In order to successfully operate a terminal, classification or break-up yard, it is of vital importance that the yardmaster surround himself with good, careful and reliable men in order that the system of the yard may be carried out in every detail. A competent and intelligent yardmaster will inaugurate a system of reports whereby any failure of the system inaugurated by him will be promptly detected, the error corrected, and any delay to any detail work of the yard avoided. Should a yardmaster discover any careless act on the part of any of his force, he should immediately conduct a careful investigation, applying discipline if necessary. Should he discover further acts of carelessness on the part of the same employee, he will make no mistake in taking him out of the service, as one careless employee will often be the means of causing careless acts on the part of other employees, especially new and inexperienced men.

In order to obviate delays to cars in large yards, it is necessary for the yardmaster to establish a system of yard checking, taking an accurate check of each track in his yard at least once every 24 hours. This report should be personally handled by a thoroughly competent yard clerk, whose business it should be to check all cars with the bills. If this is done any delayed car will be immediately discovered, and a necessary report made to the yardmaster, whose business it is to see that the car is switched out and moved promptly. Delay to cars can only be overcome by constant watchfulness on the part of the yardmaster and his holding certain members of his force personally responsible for any unnecessary delays that may occur.

In order that terminal overtime may be reduced to a minimum, it is necessary for the yardmaster to anticipate movements, watching closely all reports of train arrivals, considering the number of cars for which track room will be required, and arranging his work in such manner that upon the arrival of these trains he will have sufficient room in his receiving yard to take the trains in promptly and avoid such overtime. To successfully minimize terminal overtime, the yardmaster must be a man of excellent judgment and farseeing qualities. Such a yardmaster can save his salary several times each day, and therefore greatly increase his prospects for further advancement. A yardmaster should see that his subordinates arrange the work for his switch engines to obtain the highest possible yard revenue for each movement, thus avoiding unnecessary engine mileage. He should also arrange his work in such a way as to avoid any unnecessary delay caused by any congested condition that may arise in the yard.

After many years of practical experience, I believe that the only method to pursue that will insure the prompt handling of special traffic such as fast freight, etc., is by inaugurating a system as follows:

(1) Keep special traffic separated from slow traffic.

(2) Establish a system of reports showing the arrival and departure of such trains in the yard; also noting any delays occurring either because of the motive power, car, or yard departments, showing the amount of time consumed by the inspection and testing of air, the time consumed in classifying and building up the train, and also any unusual delay it may receive.

(3) The classifying of such cars should be as far-reaching as possible to reduce the handling to the lowest possible minimum, thereby avoiding serious delays to such freight by reducing the liability of damage to both freight and equipment through too frequent handling.

(4) A certain time should be allotted in the yard for the yardmaster to get such trains through his yard, and it should be his duty to see that this time is not exceeded under ordinary con-

ditions. By a system of reports as above outlined, unnecessary delays can be readily detected and corrected.

Blockades in yards are caused by the inability of connecting lines to accept freight promptly; by accidents; by weather conditions, and occasionally by a lack of power. These conditions can hardly be overcome. However, under the ordinary conditions and if proper judgment is used by the yardmaster, an auxiliary storage yard of sufficient capacity beyond such classification or break-up yard will permit him to store his slow freight there, giving his fast or preferred freight a chance to move from the classification or break-up yard on its regular schedule.

In conclusion, to successfully operate a busy classification or break-up yard, it is of vital importance that all freight be moved currently, the yardmaster bearing in mind the importance of keeping sufficient track room in order to take in incoming trains promptly, and also provide sufficient room for classification purposes. A yardmaster should be in close touch with the chief despatcher, working in harmony with his force, and he should be willing at all times to co-operate with him in any way desired. He should also bear in mind the importance of properly making up trains, so as to minimize the delay to such cars at the next break-up yard, as a move in his yard will prevent a delay in the next yard.

SOME CAUSES OF DELAYS TO YARD FORCES

By J. L. Coss

Assistant Chief Despatcher, Chicago, Rock Island & Pacific, Haileyville, Okla.

A yardmaster must possess more than the average ability and qualifications and must be supported by clerks and others who are inclined to display an interest in the work, and especially more so if the yard facilities are cramped. A thorough and complete check of the yard should be made twice a day, the time to be governed by the conditions, by a competent person who understands the handling of traffic and that the delay of cars is the most important question.

Material for repairs to cars is often short and cars must be moved to certain points for certain repairs. Frequently requisitions for material are reduced to such an extent that shops are always out of this or that, while the cars needing the material are standing in the yards in the way of other traffic. When material is ordered from the car owners for repairs to foreign cars, sometimes it is received in 10 days and sometimes in that many months, still the car is standing still. It has been noticed frequently that brasses were not to be secured at the storehouse and a meat train on the road was compelled to roll another car and set it out to brass the perishable freight.

Home route cards are responsible for certain delays to cars for the reason that in many cases the general office must be wired for disposition, and as there is no one on duty in these offices at night and on Saturday afternoons, Sundays and holidays the cars remain until the reply to the inquiry is received. If the record in the car service office is faulty, the car may be a matter of dispute for days and weeks.

In my opinion diversion orders should not exist. The cars are billed out from commercial centers to some terminal and diversion orders are to follow; these may be two to three days behind and during this time the cars are in the yards. It seems that the shippers should have a sale for their materials before they start them out and not have the railroads acting as storehouses.

Cars are held in yards for tonnage all the way from 6 to 24 hours. We do not believe this is justified in spite of the figures showing that the tonnage train is the money maker, for the tonnage figures are made simply from the number of tons handled in the particular train regardless of any other account which may be affected.

A shortage of track forces should be avoided to insure the maintenance of yard tracks and switches to assist in the speedy movement of engines and cars. Yards should be kept clear of all obstructions and so arranged as to permit of the men moving with perfect freedom. The location of the yards should also be such as to avoid street and railway crossings as far as possible.

No doubt poor train despatching may seem to some a little beside the subject, but one may see switch engines standing still waiting for a first class train which is 30 minutes or an hour late, the delay not having been reported to the yard by the despatcher. These minutes could be used to advantage by the yard crews and might possibly save an hour or more overtime to the engine in the end. It may be that the despatcher has not given a close figure on an incoming fast stock or merchandise train, or if it fell down, he did not revise his figures for the yard.

Every employee on the railroad in a measure contributes to the delay of cars in yards. By being a little dilatory in making delivery of telegrams the messenger boy may be the cause of serious delay; by being a little late in calling a crew the caller contributes his share, the engineer being slow in moving out, his, and so on down the ranks.

KEEPING ALL CARS MOVING

By D. F. Stevens

Trainmaster, New York, New Haven & Hartford, New York City

The successful operation of a classification yard depends on the building up of a plan adapted to the volume of business offered and the physical condition of the yard, with ample supervision of the right kind to ensure the carrying out of the most minute detail of this scheme. To accelerate the movement of cars through a classification yard the trains or yard "drags" must be classified in the order of arrival, giving preference to the perishable and high class freight. It then becomes necessary to put road power into the yard as rapidly as the classifications are made and to keep the freight moving out from under the feet of the yardmaster in charge.

At a certain large water-front terminal in mind 30 eastbound classifications are made, caring for some 1,200 cars per day under normal conditions. Of this number probably 1,150 will ordinarily move out of the terminal in good time. The remaining 50 are the "trouble makers," and the efficient yardmaster knows that his supervision is required to speed up these sluggards to at least approximately normal speed. He must see that the shop and defect tracks are switched at the hour set and not permit this to become a convenient task to be performed after everything else has been attended to, and the repaired cars coming from these tracks should be drilled out at the head end of the yard, thereby saving the time ordinarily required to move the length of the classification tracks.

In the yard under consideration there are, in addition to six eight-hour trick yardmasters, two higher priced men who are not burdened with detail work, thus enabling them to exercise general supervision and check to avoid delay to cars, these cars being handled on chalk marks. These men walk over the tracks, looking for such cars as may seem to be delayed, and, if any are found, they cause them to be put in train line for the next train of proper classification. A note is made of the occurrence and it is followed up to ascertain the cause of the delay. This is followed by the application of the necessary remedy to prevent a recurrence. These men also check up the bill rack each morning and evening to see if any old dates show on the card manifests. If any are found they locate the cars and start them moving.

A feeling of personal pride is instilled in the mind of each employee in the yard to the end that every old car becomes a personal reflection upon him, thereby adding much individual supervision. A record is kept of the number of cars switched in each yardmaster's shift and this is given daily to the yardmasters, so that each man knows exactly what the other is doing. This has resulted in increasing the number of cars switched about 150 per day.

When a car is delayed, resulting in a complaint from either the public or the higher officers, the man responsible is inter-

viewed by the trainmaster in person, all the papers in the case being given in, and he is required to explain the error and his understanding of the proper method of handling. In most cases his interest is stimulated. Cases of accident or personal injury, no matter how small, are always followed to a conclusion. The man responsible is located and he is required to explain just what he did, how he could have avoided it, and the way in which it should have been done.

A yard standing, taken every day at 7.00 a. m., and showing the date of arrival of all cars in the yard and their track location, aids materially in reducing the number of old cars. Every two weeks a check is made by the trainmaster, taking an entire day, and the effect seemingly justifies the action.

Yard figures and costs are available to everybody at the terminal and it is surprising and pleasing to find the mechanical and roadway men taking an interest in breaking records. When going at full speed, under high pressure, the master mechanic and road foreman of engines spend their time with the enginemen, explaining to them what is to be done. The response is always apparent. The track supervisors take almost as much pride in the number of eastbound cars put out in a 24-hour period as do the operating men.

If a man shows by his actions a desire to "hit the ball" and to keep the terminal at the "top of the railroad league," every effort is made to help him in every possible way. Unless he becomes chronically bad every effort is made to retain him. Dismissal follows intoxication, insubordination, and dishonesty, and everybody knows it. There is little of either.

While many little tricks of the trade are worked out in actual practice, as the occasion may demand, it is believed that in operating a big classification yard the main thing is the class of men working in it. To secure the desired result it is probably better to employ green men of good habits and break them in, letting your neighbor hire the "boomers." After a man is on the payroll he should be given to understand what is to be accomplished and educated as he goes along. Employees should be imbued with the idea of not being satisfied in remaining brakemen, but to become trainmasters or superintendents. A certain amount of dignity should be maintained, and this is not incompatible with a friendly feeling. Ambition should be encouraged and individual responsibility developed. With these traits the question of the "old car" need not be a disturbing factor in any terminal.

PERSONALITY IN YARD OPERATION

By O. C. Hill

Assistant Superintendent, Chicago, Burlington & Quincy, Kansas City, Mo.

The organization of forces should provide for a general yardmaster, both days and nights, assistant yardmasters day and night on the hump and in city yards, an inside or desk yardmaster days and an outside yardmaster nights, a chief clerk day and night, bill, manifest and diverting clerks, and car checkers. The assistant yardmaster on the humps should be in charge of the hump and trimmer engines and the engines in the departure yard. The desk yardmaster should be in telephone communication with all parts of the yards and departments, keeping in direct touch with them, and should adjust the slack and congestion in the different yards, directing the power from one district to another. He also should get a check of the tonnage switched and waiting to be switched for all directions and the consist of trains on the road, enabling him to determine some time in advance the amount of tonnage that he will have to move in the different directions. These measures will enable him to avoid congestion, terminal overtime and terminal delay of all kinds. He must be vigilant continually to insure the economical operation of the yard.

The general yardmaster should have direct charge of all organizing and planning of the yard work. He should be a hard-fisted man, who is familiar with the work and who is capable of leading his forces, while, at the same time, speeding up the weaker ones and crowding them to the front. He must impress his personality upon all of his employees, with the "ego" left out. He must be an impersonal judge and see that the employee as well as the employer receives his just dues.

In furnishing car checkers and markers the fact should never be lost sight of that they are cheaper than switch engines. Competent car checkers and markers should be located at the entrances of the yard and should be paid a living wage to eliminate constant changing of clerks. Cars should be carded and waybills forwarded to the office promptly, and the carbon of the conductor's list should be furnished the assistant yardmaster. The switch list is a photograph of each train. The diverting clerk should check his diversion orders with the respective car markers. All work of the yard department should be carefully checked and a careful "turn over" made each day to the night forces and each night to the day forces, so that each shift can take up the work where the other dropped it. Care should be exercised in the selection of assistant yardmasters and foremen, and those men should be chosen who have the ability and also the courage of their convictions and who can perform their duties regardless of the criticisms of the employees. In employing switch tenders, care should be exercised to secure bright, capable young men who can be advanced later to switchmen and yardmasters.

The assistant yardmaster should be in direct charge of all employees at the terminal at night, for occasions may arise that require immediate attention and decision, encroaching upon the so-called prerogatives of other departments. For this reason it is necessary that the night yardmaster should represent the heads of all other departments at night and that he have their support while they are asleep and he is working.

PRACTICAL SUGGESTIONS FOR YARD OPERATION

By J. P. Kavanagh

Assistant Superintendent, Baltimore & Ohio, Baltimore, Md.

A classification yard should be of good proportion, located so as to be within easy reach of the bulk of the traffic in both directions to permit of making classifications for as great a distance as possible in each direction. Classifications should be made with a view to enabling trains to travel over as many divisions as possible by changing engines and avoiding the necessity of taking all trains into the yard at the end of each division. This yard should be limited to the handling of slow and expedite freight; should handle traffic in both directions and should be so constructed that the humps will be in close proximity to each other. There is no question but that such a yard should be a hump yard, divided between the direction of traffic, and so planned that each yard can be operated without cross haul.

Independent humps should be maintained in each direction for the handling of fast freight trains. It is essential to have the fast freight handled in the same vicinity as other freight, as pick-ups and short runs coming into the terminal will always have cars intended for such trains; furthermore, it is a good practice to incorporate a transfer station, as generally local freights from two or more divisions will start and finish there, and this transfer station will make cars for all of the fast freight trains.

The operation of a classification yard, as defined, comes under the direct charge of a terminal trainmaster, reporting to the superintendent. His authority over the yard should be without question, and his jurisdiction extended to cover all employees connected with the yard. A yardmaster should be in charge of each slow freight yard with sufficient clerks to handle the business in an up-to-date and intelligent manner. Both fast freight hump yards should be in charge of one yardmaster, with a yard clerk in each of the hump yards; the number of engine crews and the hours of service to be regulated as conditions demand.

Much can be accomplished in the proper handling of the receiving yard, by giving attention to its construction. The aim should be to locate it as nearly as possible on a tangent with an easy grade up to the apex of the hump, making it possible for the class of engine that brings the trains in to shove them over

the hump. Nothing retards the work of a hump more than incoming trains doubling over this yard.

The classification yard should be built on more or less of a curve, on account of the difference in weight of cars and the possibility of handling both loaded and empty cars over the hump. The hump should be so constructed as to insure all cars getting a good start. Heavy cars should be worked to the curved tracks and the light ones to the straight tracks. This, in many instances, will save the necessity of shoving the light cars into the clear.

When the departure of trains out of yard is limited to any extent and it is possible to despatch trains only during certain periods of the day, which condition occurs more frequently on a single track line, the efficiency of the hump engine is increased by advance yards, and trains despatched from such yards invariably show less transportation delay than those despatched from the classification yard. It is, of course, more expensive to operate a yard requiring engines to move trains from the classification yard to the advance yard and we believe that when there is no restriction on the movement, it is better from every standpoint to despatch trains direct from the classication yard.

Car inspectors should keep a record of all cars discovered damaged and report to the yardmaster, so that it can be taken up with the rider, as cars going over the hump should be in proper condition, and if found damaged the rider should be required to explain the cause. By this method, a tendency towards carefulness is created on the part of the inspectors in the receiving yard and the riders.

One of the principal factors in lessening the delays in yards is the repair yard and, in my judgment, this yard should be so constructed that cars can be dropped from the trains as they are switched over the hump onto the repair track, spotted by the rider and repaired without the necessity of a second movement; to do this, requires about five per cent. more room on the repair track than is usually needed and it is my belief that each repair yard should have a capacity of eight per cent. of the total number of cars handled into the yard. Tracks should be built with 18 ft. centers to allow repairmen to work on cars on a filled track without interference by reason of cars being dropped into tracks not filled.

UNIFORM INSPECTION FOR SPECIAL LOADING

The Rock Island Lines has recently issued a pamphlet of instructions covering the uniform inspection and carding of empty box cars, the coopering of cars for grain loading, and the stripping of doors of cars loaded with flour, with a view to having the men well informed and ready to meet the heavy harvest traffic which, from the reports, will be one that will

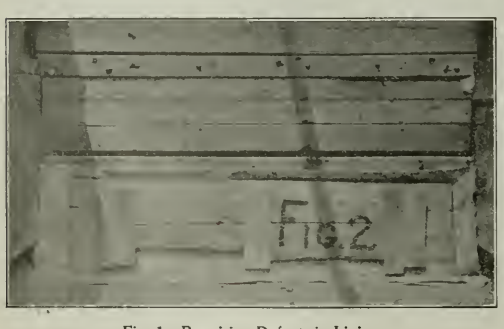


Fig. 1—Repairing Defects in Lining

greatly tax the resources of the road. The pamphlet represents the work of a committee composed of the assistant to the second vice-president as chairman, and other officers who are directly interested in the inspection and handling of cars for special commodities. The following extracts are taken from the pamphlet:

When empty box cars have been repaired, they should be inspected and carded in accordance with the following classification before leaving the repair track:

The maximum use cannot be obtained from box cars if first-class cars are loaded with commodities which damage the floor or lining, stain or saturate the floor with oil or grease, leave a stench, make unfit for carrying flour, merchandise, etc.; or which could, with safety, be loaded in a car in poorer condition or in a car of a different class.

To reduce to a minimum the difference of opinion between car inspectors, the following rules have been provided, specifically indicating the "parts to be examined" and "conditions required" to properly card cars for various classes of lading:

INSTRUCTIONS TO CAR INSPECTORS COVERING EXAMINATION OF EMPTY BOX CARS AND CONDITION REQUIRED TO PROPERLY CARD THEM FOR LOADING FLOUR, CEMENT, GRAIN AND ROUGH FREIGHT.

Parts to be EXAMINED	For FLOUR	For CEMENT	For GRAIN	For ROUGH FREIGHT
Safety appliances	Must be O. K.	Must be O. K.	Must be O. K.	Must be O. K.
Draft rigging	Must be O. K.	Must be O. K.	Must be O. K.	Must be O. K.
Posts and braces	Must be in place and in good condition.	Must be in place and in good condition.	Must be in place and in good condition.	Requires safe running condition.
Siding	Must not be loose, broken or decayed.	Must not be loose, broken or decayed.	Must not be loose, broken or decayed unless can be coopered.	Requires safe running condition.
Roof.	Must be in first-class condition.	Must be in first-class condition.	Must be good, but not necessarily first-class condition.	Not necessary to be in good condition. Safe to run.
Doors	Must be in first-class condition.	Must be in first-class condition.	Operative and safe condition.	Safe condition.
Floor and lining	Must be in good condition, free from protruding nails and from stench, newness, previously having been loaded with Fertilizer, Hides, Bone, Creosote, Oils, etc. Free from oil stains or saturations.	Must be in good condition.	First-class condition not necessary if coopering will make grain tight. Do not O. K. for grain if floor is loose at side sills or is oil soaked. Must be free from stench, account having been loaded with fertilizer, hides, bones, creosote, etc.	Serviceable condition.
Grain strips.	Good condition not necessary.	Good condition not necessary.	Should be in place or in condition to permit of coopering so as to make grain tight and prevent grain from pressing against end.	Not necessary.

GRAIN AND FLOUR CARS

The following instructions apply to the coopering of box cars after such inspection shows they are O. K. for bulk grain loading, or a higher class lading.

Cleaning.—Sweep the car clean, removing any foreign matter that may be lodged behind the lining.

Floors.—Carefully examine the floor for openings through which grain might leak, particularly over the body bolster,

Fig. 2—Further Repairs for Defective Lining

around draft bolts and at the intersection of the floor and the end sills, and at the end, side and door posts. (Most leaks occur over drawbars, at posts over bolsters and at door posts.)

Where openings occur in floor, cover with cooperage paper; if at the junction of floor with posts and braces, use a pad of paper, securing same in either case by nailing a lath or board over the paper.

Where floor shows signs of weakness over the body bolster, cover it for the entire width of car with a piece of 48-in. cooperage paper folded to 24 in. width, securing it with lath and nails

at each edge of paper. If a similar weakness is found over the center sills between the body bolster and the end of the car, cover with paper same as over bolster.

Where bolt heads protrude through the floor and it is covered with paper, an additional precaution must be taken to nail a board over same.

Grain Strips.—Where grain strips are defective or not securely fastened to the floor, apply a paper pad extending 5 in. above the

Fig. 3—Method of Applying Grain Doors

floor of the car, inserting it behind the lining and securing it by nailing a lath or strip of wood over it.

Lining.—Cover any broken or faulty places with cooperage paper over which a piece of board should be nailed. If the size of the defects warrant, cover with paper, over which nail a grain door. (See Fig. 1.)

When the lining is in generally poor condition, in addition to the above mentioned coopering, the defective portion should be protected by lining with cooperage paper 48 in. wide, allowing a 6 in. lap on the floor. When applying to the end of the car, begin at the side of the car about 2 ft. from the corner, fit into the corner and extend half way across the end of the car. Apply to other half of the end of the car in the same manner,

Fig. 4—Method of Applying Grain Doors

letting the ends overlap about a foot where they meet. Secure the paper with lath and nails about 3 in. from the top edge only, using but two 3d shingle nails to a lath. In order that paper behind laths may tear at nails and adjust itself when grain pressure is applied, do not drive nails up to head. (See Fig. 2.)

Cover end doors with cooperage paper and nail boards over the entire opening.

Grain Doors.—Apply three standard grain doors to each side of the door opening. Fold cooperage paper to four thicknesses, making a pad 4 in. wide on the end of a piece of paper 7 ft. long. Apply this to the inside face of the door post, allowing a few inches lap on the floor; then place one end of the grain door against this pad. Fold a similar piece of paper for the other door post and apply in like manner. An additional paper pad should be applied to the face of the door posts extending from the top of the pad above mentioned to the top of the grain doors; then nail the grain doors to the door posts, after which fold the loose ends of the paper extending from the door posts, so as to overlap on the inside of the grain doors, and fasten lightly at the top of the paper with lath and nail. (See Figs. 3 and 4.)

When applying hardwood grain doors, reinforce only cars of 80,000 lb. capacity or over, by nailing an additional grain door

Fig. 5—Cars Stripped for Flour Shipments

lengthwise over the two lower grain doors on inside, with its lower edge about 8 in. above floor. Apply same over cooperage paper.

When applying softwood grain doors, reinforce with two additional grain doors, apply over cooperage paper, placing the lower door about 4 in. from the floor.

Outside Inspection—Siding.—Inspect sides and ends, securely fastening any loose siding with 8d wire nails. Where sills are decayed, prevent leaks at siding by using a pad of paper fastened underneath with a strip of board nailed to bottom of sill.

Stripping Cars Loaded with Flour.—To prevent water damage to floor, the side and end doors of cars loaded with flour should be tightly closed by driving a wedge between door and door-guides, after which apply a strip of 11 in. wide odorless tar water-proof paper over the sides and top of the doors, securing it with lath and nails. (See Fig. 5.)

The Railways of Argentina.—The total mileage of the railways of the Argentine Republic at the end of the year 1913 was 21,908, an increase over 1912 of 569 miles. According to the 1913 statistics, the capital invested in the railroads of the country was $1,168,108,695. The number of passengers carried was 80,279,940, an increase of 7,067,856 over 1912, and the amount of freight transported was 43,038,082 tons, an increase of 4,168,278 tons over 1912. The receipts and expenses in 1913 were $137,255,165 and $86,289,835 respectively.

WILLIAM BARSTOW STRONG

William Barstow Strong, for several years president of the Atchison, Topeka & Santa Fe, whose death on August 3, at Los Angeles, Cal., was noted in the *Railway Age Gazette* of August 7, and whose portrait is given herewith, was one of the prominent pioneer railroad builders of the west. Beginning his railway work as a station agent and telegraph operator, he had worked his way up through the operating departments of the early western railways, the Chicago, Milwaukee & St. Paul, the Chicago & North Western and the Chicago, Burlington & Quincy, when in 1877 he was selected by the Boston interests which had begun the building of the Atchison, Topeka & Santa Fe to take the active direction of the extension of the road, which at that time had built up a system of lines in the state of Kansas, but which had hardly extended beyond the state.

Work had been begun on the line nearly 10 years after the charter was secured in 1869 under a congressional land grant which provided for giving the road 3,000,000 acres of land in Kansas on condition that the road was completed to the Kansas-Colorado line in 10 years from 1863. By the end of 1872 the line had been extended to Colorado and a campaign to populate the country with immigrants was under way. Several brief administrations had had charge of the property between 1872 and 1877, when Thomas Nickerson, who was president, and his Boston associates, put the property into the hands of Mr. Strong as vice-president and general manager.

William Barstow Strong

When Mr. Strong took charge of the property it consisted of 787 miles of line, nearly all in the state of Kansas. He became president in 1881, which office he held until 1889, and thus had executive charge of its affairs during the important period of its extension as a transcontinental system. When he resigned the presidency in 1889, the extreme termini of the company's lines were Chicago, Ill.; St. Louis, Mo.; Galveston and El Paso, Tex.; Deming, N. M.; Superior, Neb.; Denver, Colo.; San Diego, Cal., and Guaymas, Mex., and the mileage including one-half of all the lines owned jointly with other companies, was 7,118 miles.

This was also the period of competitive railway building and rate making on the western railways, and the affairs of the company passed through several exciting crises. When it was proposed to extend towards the Pacific coast by way of Raton Pass, N. M., and also into Colorado, a protracted contest ensued with the Denver & Rio Grande for possession of the mountain passes. This involved much litigation and some fighting by construction gangs. Mr. Strong's connection with the road as vice-president and general manager, with headquarters at Topeka from 1877 until 1881, was therefore during the most active period of the construction and development of this great property. As president of the road he had his office in Boston.

In 1889, on his retirement from railway service, he took up his residence on a farm near Beloit, Wis., near where he had first gone to work for the Chicago, Milwaukee & St. Paul. He served for a time as president of a local bank and was also identified with various other business enterprises. During the last seven years of his life he resided at Los Angeles, Cal. A brief sketch of Mr. Strong's railroad career was published in the *Railway Age Gazette* of August 7, page 266.

REMEMBER IT TO THE ROADS' CREDIT

[From the Chicago Evening Post]

After the railroad rate increase was denied in 1910 the roads comforted themselves with the thought that the fact would keep their employees from wage demands.

No so. Engineers, firemen, conductors, brakemen, yardmen and oilers struck successively for wage increases. And got all or a part of them.

Now, the 1914 rate decision denies the roads everything but a small section of their sorely needed increase in rates.

And despite this limiting of income the cycle of union demands for higher pay is beginning all over again. And the government which limits income is still doing nothing to limit the expense of labor.

On this briefly sketched background yesterday's action by the western roads stands out in something like its true proportions.

They assent to an arbitration that puts their own demands out of court, because the government of the United States asks them to. They could do no less, in view of the world situation.

But when war ends and the country can proceed calmly about its affairs, it should not forget that the railroads, unprotected by the government in wage matters, deliberately threw down their own protective wall for the sake of the general welfare.

The magnanimity of the act should make us the more eager to make regulation regulate *fairly;* to have it regulate the expense to which a road can be put when it presumes to regulate the income of that road.

Financial Returns of the Hungarian Railways.—The returns for the Hungarian railways the first 10 months of 1913, show that during that period the gross receipts were $94,841,600, against $92,321,852 for the corresponding period of the preceding year. Passengers carried in 1913 numbered 147,020,000, as compared with 141,162,361 in 1912. During the 10-month period of 1913, 59,790,000 tons of freight were carried. The total gross receipts of the railways for 1913 are estimated at $112,665,000. This is an increase of about 1½ per cent, but the increase in normal years is usually from 3 to 4 per cent. During the year the railways expended $29,435,000 for the construction of new trackage and switches, stations, rolling stock, etc. There were 222 miles of new line built, making a total of 13,080 miles.

Fuel Economy on the Chicago, Burlington & Quincy

Outline of a Broad and Effective Campaign Conducted by a Committee Representing the Various Departments

By A. N. Willsie
Chairman of the Committee on Fuel Economy

The Burlington has a permanent fuel economy committee consisting of eight members who are officers that are educated in different classes of the service. The committee consists of two superintendents, one of whom has served in the train service, the other in the despatcher's service; two master mechanics, one of whom was formerly the air brake instructor; the chief architect, who is an authority on coal chute matters; the general storekeeper, who is an authority on the quality and cost of coal; the water engineer, who was formerly a special apprentice and is especially proficient in the drafting of engines and who also handles the analysis of water; and the chairman of the committee, who has held an official position both in the mechanical and operating departments. The chairman devotes his entire time to matters of fuel economy. The committee holds meetings at one division point at least every month, and matters pertaining to coal economy are talked over from every viewpoint. At these meetings the local officers are present, including the superintendents, master mechanics, trainmasters, road foremen of engines, roadmasters, master carpenters, chief despatchers, and also as many despatchers, engineers, firemen, conductors, brakemen, yardmasters and switchmen as are available, as it has been found that nearly every department can help to save fuel. The engineers and firemen, and the conductors and despatchers are requested to work closely together. Through the co-operation of the different departments a great deal may be accomplished in saving fuel.

The enginemen are instructed as to how they can save coal by co-operating with the firemen. This co-operation will permit of firing light and often, and will eliminate a great deal of unnecessary popping and smoke. The conductors and trainmen can make material savings by working quickly at stations, by not making any more switches than are necessary, by seeking to prevent hot boxes and, when they do get hot, by having the train stopped at a point where it may be started easily. The roadmasters and master carpenters can help a great deal by repairing defects which cause slow orders just as soon as possible and by seeing that the slow orders are removed as soon as the work has been done. Roundhouse men can help by doing the work reported by the enginemen and keeping the engines in good shape, especially by looking after the grates, keeping the flues cleaned, etc.

The operators and agents can assist by watching the block boards so that it will not be necessary to slow down or stop the trains, as each one of these moves consumes considerable coal. The agents can help by having their switch lists ready so the train crews may readily locate the cars that have to be handled. The conductor before leaving on the trip, is supposed to inform the engineer what work is to be done and at what points. This gives the engineer an opportunity to decide what coaling and water stations he will stop at throughout the trip. By both the engineer and conductor keeping in touch with the despatchers while on the road much more satisfactory plans can be made for making the trip. The despatchers can handle the trains better if they are advised by the individual crews as to what their intentions are.

Yardmasters can save coal by insisting on the switchmen having the hand brakes on the cars released when switching, by properly making up the trains in such respects as having the short loads ahead and putting as many short loads as possible in one train so as to avoid many trains stopping at the same station. The despatchers can help a great deal, not only by keeping in touch with the crews on the road, but by making meeting points at stations where it will not be difficult to start trains, by putting light tonnage trains on the passing track regardless of ruling direction, so as to keep the heavy tonnage trains moving, and also by having the operators open and close switches when it is convenient to do so.

In talking with engineers and firemen a great deal is said about light and frequent firing, the swinging of the doors in order to get good combustion, and especially regarding the unnecessary popping of engines, it being called to their attention that every minute of popping means a loss of 20 lb. of coal and that the biggest part of this can be avoided by careful work on the part of the engineer and fireman, and by their working in conjunction with each other.

Another saving in coal which is of considerable moment is made by the proper firing up of locomotives. It has been found that an engine properly fired up will have steam enough to move it on half the amount of coal that will be used by firing up improperly. Engines that are filled with warm water after having been washed out are fired up with from 300 to 825 lb. of coal, according to the class of the engine, and when cold water is used it requires about 1,200 to 1,400 lb. of coal for the larger types of engines. The despatchers' offices are instructed to give the mechanical department not less than two or three hours' notice when they want an engine. This gives the mechanical department a chance to do the necessary work on the engine and eliminates the necessity of having any engines held, fired up, subject to call.

Considerable attention has been given to the overloading of tanks. It is satisfactory to have the tank filled if necessary, but where it is not necessary, only enough coal should be carried to get the train over the trip safely. Particular attention is called to the tanks that are overloaded. This not only wastes coal at the chutes, but also along the road and that which falls off after leaving coaling stations is an absolute loss. There is also an element of danger from this latter feature, as falling coal is likely to strike some one near the track. It is estimated that the coal which drops around the chute and is allowed to lie there for some time before being picked up involves a loss of $1 per ton. This does not include the loss of the coal that falls off after the engine leaves the chute. A report was started showing the amount of coal picked up at the different coaling stations, and for the last six months of 1913 as compared with 1912 there was a saving of $2,286, and for the last six months of 1913 as compared with 1910, when the committee first began checking this matter up, the saving was $16,141. This is a remarkable saving, but, as stated above, it does not cover the saving that was made by stopping the coal from falling off the tanks after leaving the terminal.

On through passenger trains consisting of 9 to 12 cars the average pounds of coal used per car mile ranges from a little less than 9 lb. to 12 or 13 lb., according to the weather. With our heavy freight engines the pounds of coal used per 100 ton miles ranges from 8 or 9 lb. to 15 or 18 lb., according to the class of the engine and to the weather. Since the fuel economy committee was started a good showing has been made each year. The year 1913, as compared with 1912, shows that on the entire system the gross ton miles increased 6.57 per cent, the passenger car miles increased 2.64 per cent, while the tons of coal used increased only .13 of one per cent. On the lines west, where the daily fuel reports were recently put into effect, the gross

ton miles increased 2.65 per cent, the passenger car miles increased 3.87 per cent, and the coal used decreased 65,863 tons, or 4.5 per cent.

COAL RECORDS

The method of keeping coal records has been made as simple as possible, and at the same time as complete as is necessary. The engineer and fireman are required to sign a coal ticket when they receive coal from the chutes. This ticket gives the division, engine number, weight of coal, service of the train, train number, coaling station and date, and is signed by the engineer and fireman. The coal chute foreman forwards this ticket to the master mechanic. The only other reports the enginemen are required to make out are the regular time report and an engine mileage trip record, these two reports being on the same form, the engine mileage trip record being arranged so it may be easily torn from the time report and sent to the car accountant.

Form 4158.

ENGINE MILEAGE TRIP RECORD

.....191....

Train No. { .....Pass. From..... } MILES
{ .....Frt. To..... } .....
{ .....Work. Conductor ....

Switching at .....Frt.....Hrs.....Pass.....Hrs.

Engine No.....Engineer .....

Time Leaving.....Time Arriving.....

Light Engine From.....To.....Miles.....

Engine with Way Car only From .....To.....Miles.....

Double Headers { 1st Eng. No.....
2nd Eng. No..... } From .....To.....Miles.....

Helping or Pushing From.....To.....Miles.....

Work Train Engine under running orders From.....To.....Miles.....

Work Train Engine under working orders From.....To.....Time.....

Road Switching, 1 hour or over, Name of Station.....To.....Time.....

Road Switching, 1 hour or over, Name of Station.....To.....Time.....

Light Engine Running from Depot to Round Houses, Miles.....

Doubling Hills, Miles.....Nearest Station.....

See Instructions on front cover.

Fig. 1—Form Showing the Engine Mileage Trip Record

The information required on the mileage trip record is shown in Fig. 1.

An engineer's coal performance sheet is made out by the master mechanic daily and posted for the benefit of the men. In switching service the form includes the division, the number of the engine, switching hours, tons of coal and pounds of coal per switching hour, with the name of the engineer and fireman. For passenger and freight service the form includes the division, number of engine, number of train, miles run, number of cars or the total weight of the train, car miles or ton miles, pounds of coal per car mile or ton mile, hours on road, and the names of the engineer and fireman. The superintendent's office supplies the information regarding the number of engine, number of train, number of miles, number of cars or tons per train, hours on the road and the engineer's name, and the master mechanic supplies the rest.

A monthly individual record for each engineer is made out from the daily performance sheets just mentioned. This record contains the date of the month, the engine, train number, train miles, ton miles or car miles or switch hours, tons of coal, hours on the road, and fireman. At the bottom of this form the averages are given with the engineer's name.

A monthly report is also made out for switch service, which includes the division, the engineer's and fireman's name, the total hours switching, the total tons of coal, the pounds per switching hour and the cost per hundred switching hours. This form is sent to the superintendent of motive power, the information being taken from the form previously described. A similar form is made for freight and passenger service, the items here recorded being as follows: Division, engineer, fireman, total ton or car miles, average cars in train, tons of coal, pounds per car or ton mile, cost per car or ton mile, and average speed per hour. This is also sent to the superintendent of motive power for record.

In addition to these detailed forms a summary of the coal performance of all enginemen by divisions is sent to the superintendent of motive power on the form shown in Fig. 2. At the general superintendent of motive power's office these monthly reports are consolidated by divisions. The various items under the headings "Passenger," "Freight" and "Switch" clearly indicate what is required. Under the heading "Coal Used for Miscellaneous Service This Month" the items are credited as follows: For heating, a credit of 20 lb. of coal per car per hour is given; for lighting, 15 lb. of coal per car per hour. This part of the form is filled out by the road foreman of engines, so that during the winter all trains that are heated and lighted are given the proper credit. During part of the year some trains are not heated but are lighted, consequently the road foreman determines how many hours the engines furnish steam for recharging the batteries. The engineers are also given credit for the coal used in intermediate switching. This information is taken from the bottom of the engineer's trip report, and no allowance is made for any switching of less than one hour. Under the heading "Light Engine" is recorded the amount of coal used on engines running light to and from the shops, or when the engines are running light to get a train, or returning after being used on a train, the record being placed under the heading of freight, passenger, or switch, as the case may be. Under the heading "Helper" is recorded the amount of coal used by such engines used for double headers. Under the head "Pusher" is recorded the coal used on regular pusher engines over doubling districts. Under the heading "Work Trains" is recorded all the coal used in this service. Under the heading "Transfer" is recorded the amount of coal used on engines used in regular transfer service for which road rates are paid. Under the heading "Combination Passenger, Freight and Switch on Branch" is recorded the coal used on engines in short stub trains that handle both freight and passenger traffic at different local points.

The last form that has to do with the enginemen's coal performance relates to the monthly performance of each engineer and is placed on a form suitable for a loose-leaf note book for the road foreman of engines. This form gives the month and year, the performance, the average for the particular class of service the engineer is in, the run, and the date attention is called to poor performance. This record is supposed to be carried by the road foreman at all times so that he will be in a position to know what each man's average is whenever he meets him on the road. As stated above, daily reports are posted for the benefit of the enginemen. These reports are usually only one day old, and very seldom over two days old. This also gives the road foreman a good opportunity to keep in touch with the men, and to check up those making a poor performance.

There are four forms made out for keeping track of the coal used and received. The first form is a statement of the tons of coal issued by classes of service, made out from the engineer's coal ticket, as mentioned above. This form includes the engine's number and the amount of coal given the engine for freight, passenger, switch or work service. It also includes an inventory of the coal on hand at each coaling station, being made out the last day of each month, together with a summary which includes the following items: Coal on hand at end of last month; coal unloaded this month; total; coal issued this month; balance on basis of report; on hand as per inventory; and inventory over or short. This form is sent to the auditor of expenditures at Chicago, and is made out by the coaling station foreman with the

name of the station and the period which this report covers.

A daily report of coal unloaded is also made out by the coal chute foreman and sent to the general storekeeper. This form gives the date and number of way-bill, the billing station, the name of shipper, the initial and car number, kind of car, kind of coal, and whether the coal was handled on a tonnage basis or on a wage basis.

A third statement made by the coal chute foreman gives the daily coal statement for the master mechanic. This gives the division, coaling station and date, together with the coal unloaded, car number and tons, together with those engines loaded, giving the number of engine, the tons loaded, the train and the engineer. The summary printed on the same form gives the coal in the chute at 7 a. m. of the previous day and the coal unloaded during the past 24 hours, together with the coal de-

Chicago, Burlington & Quincy Railroad Company

SUMMARY
COAL PERFORMANCE OF ENGINEMEN

_____ Division Month of _____ 191__

PASSENGER

PERIOD	Total Car M ms	Average Cars in Train	Tons Coal	Pounds Per Car M'le	Cost Per 1000 Car M ms	
This Month						Includes Misc'l Coal
						Excludes " "
Same Month Last Year						Includes " "
						Excludes " "
Last Month						Includes " "
						Excludes " "

FREIGHT

PERIOD	Total Ton M ms	Average Tons in Train	Tons Coal	Pounds Per 100 Ton M ms	Cost Per 1 000 000 Ton M ms	
This Month						Includes Misc'l Coal
						Excludes " "
Same Month Last Year						Includes " "
						Excludes " "
Last Month						Includes " "
						Excludes " "

SWITCH

PERIOD	Total Switch Hours	Tons Coal	Pounds Per Switch Hour	Cost Per 100 Switch Hours	
This Month					
Same Month Last Year					
Last Month					

COAL USED FOR MISCELLANEOUS SERVICE THIS MONTH

SERVICE	TONS COAL			Total Foreman	Junior Foreman	Per Cent Junior Foreman
	Passenger	Freight	Switch			
Heating						
Lighting						
Light Engine						
Helper						
Intermediate Switch						
Pusher						
Work Train						
Transfer						
Combined Pas., Frt and Switch on Branch						
Total						

Fig. 2—Form Showing the Coal Performance of Enginemen

livered to engines as shown on tickets, during the past 24 hours, and the coal in the chute at 7 a. m. of the same day. From these figures the shortage or surplus is made up.

A monthly summary of the daily reports of coal unloaded for locomotive use is made up from the daily reports of coal unloaded, as above mentioned, for the superintendent of motive power. This report covers each division separately, giving the coaling station, the billing station, the number of tons under the various headings, egg, nut, etc.

These forms are the only ones used for covering the fuel situation, and have been found to work out very satisfactorily. The daily reports have been found to be conducive to good results, and are believed to create a certain amount of rivalry among the engine crews which materially aids in the economical use of fuel.

Railways in Tientsin.—Since the rebellion in the summer of 1913, the service on the Tientsin-Pukow Railway has been improved, making it possible to reach Shanghai in 36 hours by the weekly express, and in 46 hours by the daily mail train.

GERMAN CRITICISM OF STATE RAILWAY MANAGEMENT*

Germany's state railroad system is an oppressive monopoly and a political mistake. Recently this view was expressed at three different industrial congresses, and in one case the indictment was backed by a two-thirds majority. This revolt against railroad nationalization comes just at the time when some Americans and Englishmen have begun to see in nationalization an easy, infallible way out of all railroad troubles. What aggravates the indictment is that it is mainly directed against the Prussian state system, which, of all railroad systems in Germany, is the most flourishing and efficient.

Every charge that is customarily leveled against corporation railroad ownership is now being leveled against the Prussian state system. The main charge is that the Prussian system makes for monopoly and restraint of trade. In committing—say critics—all the offenses which private corporations commit, the state knows no fear, for against it the public is doubly helpless, and there are no competing roads which can be used to bring the extortionate state to reason. Prof. Walther Lotz, one of the best authorities on railroad management, has just published a book on "German Communications Since 1800," in which he attacks the popular notion that state ownership prevents monopoly. German experience shows the contrary.

NOT A SOLUTION OF MONOPOLY PROBLEM

"Nationalization," writes Lotz, "is not by any means a solution of the monopoly trouble. Monopoly remains monopoly even if it is managed by officials. True, the state is claimed by nationalization enthusiasts to be a higher and unerring entity. But in reality the state is only the national organ of erring men, who are influenced by their virtues, their faults, their interests and their passions. And these influences are all brought to bear on railroad management quite as much when the state does the managing as when private persons do it. Indeed, in countries governed on party principles, privately owned railroads are often more bearable than state-owned railroads, as state-owned railroads are exploited as much as possible for their own advantage by changing parties." And referring to plans of railroad nationalization in foreign countries, Prof. Lotz adds: "This is a reason against nationalizing the railroads in the United States."

What is just now being said against German railroads mostly applies to Prussia. "German" railroads, owned by the Federal government, on the lines discussed in the United States, do not exist, except in Alsace-Lorraine. The system is railroads owned by individual states. The Prussian state, or strictly, the organization known as the "Prussian-Hessian railroad community" is the biggest owner, for it possesses 38,000 kilometers out of the 62,000 in the whole empire. Bismarck aimed at nationalizing railroads on federal lines, but his bill enacting this was defeated owing to opposition by the middle-German and south-German states. At present the only bond between the different state-owned systems is article 42 of the constitution which obliges the states to manage their roads in the general interest of the empire.

Many think that this splitting up is the cause of the defects of German railroad nationalization. Instead of being controlled by the democratic imperial legislature in the general interest, the roads are controlled by the state governments and state legislatures which nearly everywhere are on a reactionary and class basis. This is particularly the case with the "Prussian-Hessian railroad community." The Prussian government is narrowly conservative and agrarian. The Prussian Diet, elected on a narrow, property franchise, is the same. Prussian government and Diet policy is agrarian. It aims at sparing the landowners in matters of taxation, at encouraging the export of grain which is practically bounty fed; and also at encouraging export by the "schwerindustrie," an ally of the agrarians, which controls, on trust principles, the production of coal and iron. The interests

*Berlin correspondence in Springfield (Mass.) "Republican," July 19, 1914.

of the small trader and consumer are neglected. Prussia's railroads are governed in accord with this policy. She has low rates to favor the grain producer and the iron exporter; and high rates which hit the consumer on imported products.

RAILWAYS USED AS GOVERNMENT MILCH COW

A greater objection to Prussia's railroad system is that it uses its monopoly to accumulate vast funds for the state finances. This is considered a breach of sound railroad management and is a violation of a promise. Thirty years ago, during the era of railroad nationalizing, Prussia's minister of public works promised the Diet that the railroads would be run entirely in the interests of those using them, and not in order to make profits. "State railroads," he said, "are not a milch cow; they are not intended to be a source of state revenue."

He later promised that the railroad rates imposed would be only high enough to cover transport and maintenance and to pay a moderate percentage on the purchase debt incurred by the state. A similar promise was made in England in regard to the postal services, which were also not intended to help the state finances. Experience shows that governments are never able to keep such promises. The moment state finances run dry the state trading departments are resorted to as milch cows. Just as the English postal services are bringing in $25,000,000 a year to help the state finances, so the Prussian railroads are bringing in over $200,000,000 clear profit. This vast profit is 36 per cent. of the gross earnings, a proportion probably reached by no other railroad system in the world.

LARGE EARNINGS FROM EXCESSIVE RATES

Germans, who resent this system of exploiting railroads for gain, are not consoled by the fact that the $200,000,000 goes into the state, not into private, pockets. They object that the $200,000,000 is not equably imposed as a tax on all classes according to wealth. It is taken mainly from the nonprivileged classes, on whose traffic the railroad administration imposes heavy transport rates, while the roads carry the landowners' corn and the iron magnates' metal at very low rates, or even, as is suspected, at a loss.

The account books of the "Prussian-Hessian railroad community" for the past 30 years reveal how the state railroads have acted as milch cow for the state treasury. Between 1882 and 1912 over $1,250,000,000 has been taken out of the railroad profits and handed over to balance the state budget. This transaction is made possible by the fact that the $200,000,000 annual profit is far more than is needed to pay interest on and amortize the railroad debt. The profits amount to about 7⅜ per cent. on the railroad debt. But the railroad debt was borrowed at about 3½ per cent. Of the original railroad debt of $2,875,000,000, $1,085,000,000 is in consols, of which nearly all bear 3½ per cent., but a small portion, 4. The state with its 7⅜ per cent. from the railroads makes on this money a clear profit of nearly 4 per cent. The rest of the capital comes out of the "railroad extraordinary fund" and the "disposition fund," against which no interest-bearing consols are issued; and on this portion the state puts in its pocket the whole of the 7⅜ per cent. earned.

In the matter of profits the state's appetite grows. Twenty years ago it was content with 5½ per cent., which put a clear 2 per cent. in its pockets. When this caused objections, the government pleaded that, owing to the bad condition of the state finances, it could not do without the 2 per cent.; but it promised faithfully that the milch cow process should go no further. If profits, it said, showed signs of rising still further, they would be cut down by means of a general rate reduction. Despite this promise, profits were allowed to rise by yet another 2 per cent. on the capital invested; and the rates remained practically as before. This enormous profit did not result from management efficiency. Judged by American standards the management is not efficient. The ratio of expenses to receipts has steadily risen. The profit is due entirely to the vastly increased traffic, the carried freight being about 2½ times greater than it was 20 years ago.

In addition to subsidizing out of railroads the ill-balanced state finances, Prussia has created from the same source a vast state property. This is shown by the railroad capital account. The railroad administration has written off an excessive amount of the original small capital outlay of $2,875,000,000. Altogether $750,000,000 has been amortized. So that of the original railroad debt only $2,125,000,000 remains outstanding. This judged by European values, is a ridiculously small capitalization for 38,000 kilometers, nearly all double, treble, or even quadruple tracked, and splendidly equipped. As a fact, the present sale value of the state railroad system is appraised at $5,200,000,000. The increase in value is due to the putting back into the roads of part of the profits; to extensions built out of profits; and to the natural rise in land and other values. The difference between the outstanding capital debt of two billion dollars odd and the present value of five billion dollars is the profit and property of the state.

HIGH RATES A TAX ON BUSINESS

If the state were a private corporation it might point with pride to this result of 30 years' ownership, but the public would complain and threaten, and ask why a railroad earning 7½ per cent. and in addition creating out of profits capital values of three billion dollars did not reduce its rates? That is the complaint in Prussia. The state, say the complainants, should cut rates heavily; it should be content with the 3½ per cent. which it itself must pay to borrow capital for railroad construction; and if its finances suffer, then let it mend them by imposing property taxes. The high railroad rates tax, not property, but business; and they tax heaviest the businesses which can stand it least.

The complaint is reinforced by the charge that the roads are not efficiently managed. Reichstag Member Gohre said that the state might cut rates heavily and still pocket its 7⅜ per cent. if only it economized in management. Herr Gohre further showed that the roads are badly overofficialized. In the Cologne chamber of commerce it was stated last year that, counting passengers and train tons carried, the Prussian roads have 2½ times as many officials as the American roads; and that they have five times as many clerical and other officials who do no physical work. "The bureaucratic management and the excessive staff would not," the speaker said, "be tolerated by a private corporation."

RATES NOT ADAPTED TO COMMERCE

Most persistent of complaints is that the rates are fixed by bureaucrats who do not understand business; and are taught by their superiors that the rates should favor grain and iron exporters at the expense of other interests. Bismarck had a plan for letting the Diet fix the rates. This plan was not carried out. The rates are fixed by a nominated railroad council of state officials.

This railroad council invites the co-operation of representatives of the business interests; but the representatives are only advisers and have no decisive vote. The interests, however, bring sufficient pressure to push their points against nonrepresented interests. The chief of the railroads, Minister of Public Works, Breitenbach, ascribes to this the high rates. He says that the interests themselves, in their zeal against competition, have prevented a reduction. Minister Thielen, a predecessor, said the same thing. He described the roads as "a morsel between contending dogs for which there is no parallel even in America, where the trusts exploit the roads in their own interests."

Critics emphasize this weak side of railroad nationalization. They say that where roads are privately owned the rates are invariably controlled by some public authority, and this public authority is in turn controlled by the legislature, whereas in Germany the vital matter of rates is withdrawn from the legislature and handled by a handful of uncontrolled bureaucrats.

Story of the South African Railway Strike*

The Causes, Extent and Lesson of the Walkout on the Government Lines Which Was Terminated by Martial Law

By a South African Correspondent

The people of the United States frequently are threatened with serious railway strikes. Some people in America advocate government ownership as a means of eliminating the danger of such strikes. Some railway employees favor government ownership as a means of preventing the development of the conditions whose existence under private ownership they regard as justifying them in striking.

The railways of South Africa are owned and operated by the government. There was a serious strike on them in the early part of the present year, which was speedily crushed. While this occurred some months ago, a fuller narrative of what occurred than has been published in your country may yet be interesting to, and certain food for thought for, the railway officers and employees of the United States and all other Americans who are interested in the labor problems presented on railways, and especially in the form they may take, and the way in which they may be dealt with, under government ownership.

The South African railway strike was not extensive, involving only about a tenth of the railway staff. It was not prolonged, lasting just over a week. It was not destructive of either life or property, being on the whole free from riot. But it was certainly instructive. It taught many a valuable lesson, pointed many a far-reaching moral. It demonstrated, what in South Africa had previously been uncertain, that as a weapon for securing industrial redress the ordinary or passive strike has greater limitations than the ballot box, and the Syndicalist or violent strike, as great limitations as the ordinary strike.

To arrive at the whole truth is probably now impossible, and to arrive at even an approximation of the truth necessitates going back to six months before the railway strike, and considering the general industrial unrest with which the railway troubles were inextricably mixed, and from which the railway strike arose.

ORIGIN OF THE CONTROVERSY

Rand, means ridge, and is the term applied to the gold-bearing ridge or reef extending for 40 miles along a line of which Johannesburg is the center. Along this ridge scores of gold mines are situated, the annual gold output of which is valued at about thirty-eight million pounds sterling. On one of these mines, in May, five underground mechanics had their Saturday shift increased by three hours, refused to work the extra hours, and were dismissed. Their society took the matter up, prohibited other mechanics from replacing the dismissed, and began negotiations with the management.

After a while it was pointed out, wrongly as it now transpires, that the company had really broken the law, that a month's formal notice of the intended change in the five men's hours should have been given. Thereupon the management undertook to go back to the old hours, and to reinstate its men, but did so with the usual stiff-necked ungraciousness which more than anything else perhaps irritates and makes employees unreasonable. Had the employees been sensible they would not have stood upon the manner of their going back to work, so long as the going was advantageous. Instead, however, of setting employers an example of how not to act reprehensibly, the strikers now acted as waywardly as the worst employer could. They now asked, not only that the five men should as hitherto cease work at 12:30 p. m. on Saturdays, but that all workers who previously had worked to 3:30 p. m. should in future cease at 12:30; that instead of the eight-hour day being calculated from the time a man started work till he left it, even when he had to waste perhaps an hour waiting to be lowered or raised from the pit, the time should be calculated from the time he entered the company's gates till he left them; and that disputes should be discussed not by spokesmen elected from the men, but by better practiced, more competent, less fettered spokesmen chosen from the trades union.

If the men had before been inconsistent and unreasonable, the management now was no less so. The issues were no longer confined to one mine and its employees, but affected all the mines and all their employees. When in disputes with their employees, as in this dispute the mine owners avail themselves of the best collective consultation and co-operation, the men, it seems only logical, should not be denied the opportunity of availing themselves of the best consultation within their reach. But this the mine owners insisted the men should not have. They elected to regard the trouble as purely a domestic quarrel between themselves and their employees. They could not, they suddenly conceived, allow third parties, such as trades union officials, to meddle in the matter. The men's trained negotiators being, so to speak, put out of court, a deadlock was arrived at. It was no longer possible to negotiate. It was like leaving a prisoner in the dock and expecting him to take up his case where his ejected barrister had left it. Industrial arbitration courts, though they have in instances notably failed, have in other instances been useful. They might have patched up peace in this case. But there are no such tribunals in South Africa, so the contest of alleged reason degenerated into what avowedly was purely a trial of strength. The workers called a general strike. The mine owners retaliated by employing strike breakers.

Only one outcome was to be expected. Collisions had previously occurred with some frequency. Now the strike assumed forms of unprecedented violence. Private dwellings were burnt. Women and little children suspected of dependence on strike breakers went in danger of their lives till given police protection. Where argument failed, the pick-handle and the dynamite stick were employed. Anarchy was sweeping over the Rand, and ended, as we have said, in turning Johannesburg into a shambles. Syndicalism was abroad.

The position of the government was awkward. A military change had been designed, whereby the defenses would pass from the Imperial troops to the citizen forces of the country. The authorities were, however, in the middle of their arrangements when the industrial trouble broke out. The police forces, excellent in ordinary times, were inadequate in such an emergency, entailing as it did the defense of millions of pounds' worth of machinery. So for a day or two the Rand fell to the mob, and the Imperial troops in the outer districts had to be called in. The government had, of course, long before this intervened between the strikers and the employers. Cabinet ministers, in the thick of the fight, hurried as fast as their motor cars could ply between the headquarters of the hostile camps. At last, on July 7, both sides realized that continuation of the struggle would mean ruin to all involved in it and gain to no one. A truce was patched up, the terms of which were exactly those which, with patience and clear judgment, could have been contrived when negotiations betwen the disputants first ceased. Certain minor concessions were granted right away; the rest were to be referred to an impartial commission. The strikers were to resume work without victimization, and as they would not tolerate the strike breakers, and as the mine owners would

*The writer of this article is a resident of South Africa who was so situated as to be closely in touch with all the developments narrated.

not break faith with these, they were compensated to the tune of £50,000; and of course the men's union had won the recognition they contended should never have been denied them.

AGITATION BEGUN BY RAILWAY EMPLOYEES

The truce with the miners brought no lasting peace; the railway men immediately entered upon the scene. The secretary of their amalgamated society said they had been groaning under grievances for years, and now was the time to strike for redress. What had been done by the mine workers on the Rand could be done by workers generally all over South Africa. They must organize for a great general strike. In future the railway society would act with the Federation of Trades.

Prior to 1910 the separate colonies of the Cape, Transvaal and Natal had each its own legislature, its own state railway staff, its own fluctuations of prosperity, and consequently different standards of pay. However much the emoluments, for instance, of the average station master in the Cape differed from those of his equivalent in the Transvaal, they were on the whole fairly consistent with what other average station masters in the Cape drew. And so through all the grades. Were a man not receiving what, perhaps with an exaggerated sense of his own worth, he believed his due, he had the comfort of knowing that neither were his colleagues. It was not till the colonies united, and the three railway services became one; not till men from different provinces found themselves working *together*, on the same work, but on very different rates of pay, that anomalies became apparent. Hence a certain unrest throughout the service. The railway society, however, represented more the artisan than the clerical grades. It was, therefore, more to questions of hours, piece work, overtime and minimum wages, than to questions of what should determine seniority and promotion, with which it concerned itself; and in the end the issue on which the strike was fought was the clear one of whether or not the administration should retrench when it thought fit.

The railway society, as stated, was not affiliated with, though it co-operated with, the general trades societies; in the July truce no provision was therefore made for railway men. And as they were state servants the government was not able, as in the case of the miners, to act as mediator between employers and employees. The railway men were, however, instructed to formulate their grievances, and informed that, like the general workers, they should have an impartial commission of inquiry. They asked that the unanimous recommendations of a previously appointed Grievance Commission should be adopted; that the railway society should be recognized; that an eight-hour day should be general throughout the service; that the minimum wage for white employees should be eight shillings a day; that piece work should be abolished; that the salaried staff should be better paid; that a permanent inquiry board be appointed; that punishment for striking and making mistakes in train running be less severe; that equal representation on the present appeal board be given the men; and *that the new Union staff regulations be suspended*.

Before the two commissions could sit, many preliminaries were necessary. Almost daily negotiations between the government and the general workers' and railway men's representatives took place. Unfortunately, a hitch occurred. The representatives of the general workers pointed out that their men were dissatisfied with the truce, were not disposed to be bound by the undertaking given to government. The breach widened. There was a feeling that the July events had given labor the ascendency, and that whereas previously they had to beg now they could compel the terms they wanted. There was probably a mutual distrust of the honesty of purpose of either side. However, this may be, a deadlock soon arose. A general strike, it was declared, would be called—when it suited the workers.

Negotiations between the government and general workers thereupon ceased, but the government was prepared to continue with the appointment of the promised commission, and asked labor to assist in the inquiry. Labor, however, professed itself unable either to have anything to do with the election of commissioners or to recommend witnesses to give evidence.

The railway society, however, could not prevail on the railway men to throw constitutional methods to the winds. So the promised strike was postponed. But it hung like a threat over the community. The election of the railway commission, to consist of a judge of the Supreme Court, a government nominee, and a member elected by the men, was proceeded with. Meanwhile the government had been considering why, as it had negotiated with the railway men's accredited representatives, it could not recognize their society. It was decided the society would be recognized on condition that its constitution was redrafted to provide that it should not be a political organization, that it should be composed only of railway and harbor servants, and that it should in no way be associated with outside organizations.

RAILWAY EMPLOYEES AROUSED BY FALSE RUMORS

This was under discussion, and matters were progressing not perhaps without obstacles, but on the other hand not without hope of peaceful settlement, when suddenly on October 8 the press alleged that a number of railway men were to be dismissed. Estimated railway revenue, it was announced, had not been realized; expenditure had far exceeded expectations, largely through increased increments to staff; recent industrial disturbances had so unbalanced trade that the future looked dark; and some retrenchment was necessary.

Loud and vehement came the retort that this was victimization; the railway men had dared to assert their claims, now they were to suffer for their temerity. Revenue, it was urged, might have fallen; it was bound to fall when by recent rate reductions the earning power of the railways had been reduced by nearly a million pounds a year. But trade, the critics contended, remained good; the tonnage had not appreciably decreased; the railways were as busy as ever; overtime was plentiful: then why dismiss men? The minister of railways explained that the rumor had been premature and exaggerated. Expenditure and revenue were, indeed, being watched. Officers had been asked for recommendations as to possible economies. It was always, and at present more than ever, necessary to consider economies. But there were other ways of effecting economies besides dismissing men. The railway board was considering what should be done. A decision could not be arrived at for some time. But if men had to be dismissed, nothing like the number rumored would go.

The railway society was, however, suspicious. It appointed a deputation to ascertain from the minister exactly what was intended. The minister replied that he was prepared to receive a deputation of railway men, but as the conditions on which the government was prepared to recognize the railway society had not yet been complied with he could not receive the officials of the society. The latter were indignant, and feeling deepened as a rumor got abroad that not only was retrenchment contemplated, but that it had already started. Men in Johannesburg, it was affirmed, who had been prominent in the July events, had already been dismissed, and labor leaders, it was further stated, were itching for an immediate general strike, if the railway men would come out.

The minister repeated and amplified his statement, this time direct to the staff, pointing out that the men were casual employees, engaged on short contract and subject to 24 hours' notice; and were among those employees who in a huge concern like the South African Railways are continuously being dismissed or engaged as the exigencies of a fluctuating traffic necessitate. He could guarantee there would be no victimization, and indeed there was nobody to victimize, as the staff as a whole had been loyal during July, however wild the utterances of the officials of their society; but he could not guarantee that retrenchment might not become necessary, because he could not anticipate the future.

This relieved the position. In a public pronouncement the railway society informed the press there would be no strike.

The crisis was over. The unrest had died down. The position was normal. So matters continued till Christmas. Then just towards the close of the year rumor dropped another bombshell among the smouldering embers. Large numbers of railway men, it was alleged, were being dismissed; five hundred had been scheduled for that purpose; no reason was assigned for the sudden and drastic action; this was the administration's Christmas box to those who had been foolish enough to trust.

The answer was that only 70 men had been dismissed, and that these were temporary employees. Even this, it was retaliated, was unendurable. There was no need for dismissing men. The railway society demanded that retrenchment be stopped, that those discharged should be reinstated, and that a definite guarantee be given that no further retrenchment take place: these demands to be granted by January 7, otherwise a strike would be called.

It was impractical the answer came, to reinstate the 70 men, even if sufficient reason were adduced, as the dismissals had been decided upon by the Railway Board after the most careful consideration. It was impossible to give a guarantee that future retrenchment would not become necessary. And it was preposterous to demand that the Railway Board should abdicate its functions at the dictation of an irresponsible and officially unrecognized society. But if, in anticipation of further retrenchment, the staff had any specific practical suggestions for distributing the burden more equally, by temporarily reducing wages or hours generally, the government was prepared to consider such suggestion. None was made.

It is perhaps inevitable in a huge concern like the South African Railway, even had Union not brought a crop of still flourishing anomalies, that anomalies should frequently arise. Perfect equity is hard to attain even in small affairs. Officials controlling men are not all ideally fitted for the task, are not always in that balanced, temperate frame of mind which men controlling the destiny of another man, however humble the latter, should preferably be. Injustices, therefore, no doubt occur. This is true not only of a railway but of all businesses. But on the South African Railway there is machinery to check this as far as may be. There are impartial appeal boards on which representatives of the workers sit. It is no doubt laborious, it is often discouraging, for an individual, especially a workman with little education, to fight a lonely battle through to the board. A society of his fellows to help him along is then useful, to men and to the government, if it helps to secure equity and content. But the object of the society should be to enable men specifically to present their grievances. The society should not truculently insist on the random granting of what a man asks for merely because he asks. Much less should it do so in the case of an indefinite number of unspecified men. Yet this is what was done, and this is what was wrong. Every charge leveled by the railway society against the administration was vague and unsupported by evidence.

On the South African Railways every man is employed on specific conditions. He knows, or should know, what those conditions are. He may be subject to 24 hours' notice, or to a month. He may, if his services be dispensed with, be entitled to a pension, to a gratuity, or to nothing more than the wage for the time he has worked, according to the terms of his contract. These are his rights. These rights he is entitled to insist upon. And as long as they are respected he has received justice and is entitled to nothing more. For the South African railway man to expect more, is to assume that a government railway is a benevolent institution, not a business concern, which is untenable.

It is perhaps true that whereas a private employer, in theory at least, considers only his own pocket and the exigency of the moment, a government employer should take a wider view; should consider whether in retrenching a man, especially in a country like South Africa, where there are few commercial openings for railway men, the saving to the railway is not less than the burden of unemployment thrown on the country. But if this is a consideration it can weigh only when by parliament it has been laid down as a definite principle to be practiced; and then if the railways are to continue to be run on purely business principles, there must be some arrangement for repaying them from general revenue for the losses which such unbusinesslike principle would entail. Until such arrangements exist, it may be politic, in times of acute industrial unrest, to waste wages on men not required rather than precipitate a strike and bear the consequent expense; or it may not be politic. That is for the government administration to judge, and if in the opinion of labor it judges wrongly, it is for labor, by constitutional means, to get redress through parliament, not to try to overawe the administration. For while strikes and their cost are to be avoided if possible, there is an even worse evil to avoid, and that is the evil that would result from the belief that not the exigencies of the service, but the dictates, the often preposterous dictates of the railway society, is what shall determine the policy of the administration. Strikes are bad. But for a moment to admit that the railway employees, not the Railway Board, should decide when and what men shall be dismissed, is obviously preposterous. It strikes at the root of all discipline. It may be a modern, but it is a silly notion. If in times of depression the Railway Board elects to consult its men for suggestions as to economies that may avert the necessity for dismissals, well and good. That is an act of grace conceivably beneficial to both parties. But to contend that the Railway Board should be responsible for the capital and interest on the £80,000,000 invested in our railways, whilst its economic policy should be dictated by an irresponsible and largely uninformed trades union, is to advance a theory the acceptance of which would be more ruinous than the worst strike ever engineered.

Yet this is precisely what the railway society demanded. Unless the temporary employees dismissed were reinstated by January 7, and unless a guarantee were given that no more employees were dismissed, a general railway strike for January 8 was threatened; with the further proviso that if at any time the railway society could lay its hands on 25 orders of dismissals, it would call a strike. The society claimed that it had the support of 90 per cent. of the railway men; it professed to be able to bring the whole railway service to a standstill in a day, in both of which estimates subsequent events proved that the society was ridiculously mistaken.

Thus the issue in the South African industrial unrest became a railway one. The Federation of Trades decided to support the railway men, and if necessary to call a general strike of all trades, but this latter necessity, it was at first believed, would not arise, as if the railway men struck successfully the mines would soon have to stop for lack of coal.

RAILWAY STRIKE CALLED

It was then seen that the organization of the railway society was bad, that its optimism was ill-founded. The strike was called. In the most turbulent centers, Johannesburg and Pretoria, the response was fair; but not as satisfactory as was expected; many men continued to work, and the administration succeeded in running a number of its trains. At important centers like East London the men demanded a ballot before they would strike. Uitenhage was unwilling to come out. Kimberley voted against a strike. Capetown refused to strike. Bloemfontein was shocked at the executive's precipitate and unsanctioned action.

On the other hand, the government was prepared. It had profited by the experiences of July. The new citizen force was now in existence, and so excellent were the arrangements that within a few hours armed men and munitions were pouring into the disaffected areas. The stations, the railway line, and those who elected to continue working were from the first obviously assured of adequate protection. There was no opportunity for "pulling out," no opportunity for rioting; order was firmly maintained.

On the 9th, however, the Cape mail was dynamited, luckily

with little damage, and of course heated speeches poured in torrents. On that date several of the strike leaders, including the secretary of the railway society, were arrested under the Peace Preservation Act. This action gave an impetus to the strike. The running staff came out in increasing numbers, loyal drivers refused to carry armed men to the Rand, there was a feeling that the government had been needlessly autocratic, and to show their resentment increasing numbers of men in outside centers, especially Durban and Salt River, went on strike.

The Federation of Trades, indignant at the arrest of the strike leaders, and piqued perhaps at the fact that foodstuffs and coal for the mines continued, by extraordinary exertion on the part of the authorities, to be brought to Johannesburg in quantities at least sufficient to prevent acute distress, decided to take over the control of the strike, and to call a general strike of all trades. Meanwhile several unsuccessful attempts had been made to blow up the line. The train services in the Free State, Natal and the Cape were practically unaltered, but in the Transvaal only a limited service could be maintained.

GENERAL STRIKE ORDERED

On January 13 the general strike was called, and the government retaliated by declaring martial law in the centers most threatening. The strikers formed bands to prevent their sympathizers being carried away by excitement, the towns and suburbs were parceled out for military control, committees to supervise the distribution of food and fuel were formed to prevent extortion, and from every part of the country men of all kinds volunteered for whatever duties the government elected to give them.

Thereupon the train service in the Transvaal improved, only a tenth of the railway men were out, the others, certain of protection, followed their inclinations unmolested, and the strike began to crumble. Regrettable events, blunders on the part of the martial law authorities, and blunders on the part of the strike leaders occurred, several arrests were made, much ill-feeling was caused; but there was practically no bloodshed, no destruction of property, and very little brutality of any sort. The iron hand of martial law was too strong for that, and the great tragedy passed off without any of the atrocities which characterized the events of July.

By January 15 the outcome of the strike was certain. Comparative quiet reigned in the worst centers. Fortune, it was clear, was against the strikers. By the sixteenth there was a rush for reinstatement. The surrender was unconditional.

But, however satisfactorily to the public the strike had terminated, the country had suffered heavy monetary loss. It was, in the opinion of the government, impossible to face a recurrence every six months, to have the business of the country upset and its credit prejudiced whenever a few irresponsibles, who as events proved had not the support they imagined, elected to inflame passions and call a strike. So nine of the ringleaders were deported. They were, the government claimed, the enemies of South Africa, "declared by themselves, and declared by their acts." And Parliament, taking that view, has just passed an indemnity bill confirming the action of the government.

But the money and trouble entailed by the strike has not been entirely wasted. Whatever grievances there were have not been removed, but it is the intention to continue with the commission the inquiries which automatically stopped when the railway society's secretary, who was one of the commissioners, was deported. And as now the railway men appear to realize, that however excellent their case, the ballot box, constitution and constructive measures generally are the most likely to prove useful where strikes have proved useless, there is reasonable hope that we are nearer than ever to a solution of our industrial difficulties.

Only about 3,500 railway men went on strike. As previously stated they acted illegally in leaving their work without due notice, and, speaking strictly, those who had pension or other accruing rights had forfeited them. The majority were, however, allowed to resume work.

Finally it should be mentioned that since Union in 1910 the increments to the South African railway men have been increased by over £681,000 per annum, and in many ways the administration has done much to improve the conditions of the workers. But conditions of working have become much more complex and staff complexities have naturally increased proportionately.

LOCOMOTIVE STAYBOLTS*

By C. A. Seley†

The cost of repairing a broken staybolt, even if the work can be combined with other necessary work, is not simply that of the labor and material employed, but also some portion of the value of the service of the engine which is lost thereby, and if the actual costs of staybolt maintenance and other matters incident thereto were closely computed, very good reasons for means of improvement would be manifest. Not that improvements have not been made. The iron makers have been diligent in producing special staybolt irons that have more lasting qualities to stand the peculiar requirements of that service. By the use of special mixtures and methods of piling and working, special brands of iron are produced which give very excellent results, but the breakage of solid staybolts has not been entirely stopped by such means.

With a well-designed and well-built boiler equipped with solid staybolts, there should not be serious staybolt trouble until about the third year of its use. In other words, the solid staybolt in modern, well-designed boilers, is from 50 per cent. to 75 per cent. perfect, based on 100 per cent. being the life of the average firebox, which is now about 5 years.

Experiments have been made showing the relative expansions of the firebox and the outer boiler sheets when under pressure, proving they are not alike, and therefore the staybolts, in addition to the tensile load imposed by the pressure, have also an angular strain due to these irregularities. It is these angular movements many times repeated, that account for broken staybolts, for the direct pull is taken care of by a relatively high factor of safety. In proof of the latter statement assume staybolts with $\frac{7}{8}$ in. diameter at smallest portion, spaced 4 in. by 4 in. in a boiler carrying 200 lbs. steam pressure. Each bolt support 16 sq. in. and a consequent load of 3,200 lb. The bolt area is .60132 sq. in. and the above load is therefore 5,320 lb. per sq. in. As staybolt iron has generally not less than 48,000 lb. ultimate tensile strength the factor of safety exceeds nine. This proves the undesirability of large staybolts, as with large sizes there is an increase of rigidity, whereas the desirable feature is flexibility.

It seems clear that they do not break on account of lack of strength of the cross section, but on account of the overstressing of the outer fiber due to angular vibration, and it might be well to theorize as to when the initial check or break in the outer fiber occurs. Reference has been made to tests showing angular movements of sheets and staybolts under pressure, but it is likely that these do not produce the extreme movement which may account for the initial check or failure of the outer fiber, which progresses gradually inward and results finally in complete fracture. Reference has been made to the irregular temperatures of the sheets, produced by rapid and uneven heating of the firebox in firing up, also in cooling down and washing. It is believed that at these times the angularity is greatest and is accountable for the initial checks, although at these times there is no pull on the bolts. After water circulation is well started, undoubtedly the amount of angular movement is greatly reduced, although remaining in some degree, but the damage has been done, the check started and in course of time evidenced by the complete fracture.

Now, what is the remedy? More flexibility of the body of the bolt between the sheets to reduce the stress on the outer fiber

*Extracts from a paper on "The Art of Locomotive Staybolts," presented at the April meeting of the New York Railroad Club.

†President, American Flexible Bolt Company.

so that the initial check will not occur, and also reduce their strength as levers to punish the firebox material, reduce the buckling and save the fireboxes. It is manifestly impossible to correct the handling of engines at terminals so that these irregular temperatures and stresses will be done away with. Availability of power is the first consideration and terminal forces are under extreme pressure to get engines turned in the shortest possible time, and engines which they are not in a hurry for get the same treatment generally in respect to the matters which contribute to staybolt breakage and firebox cracking.

Recognizing the necessity of meeting the situation and demands for availability of power, many railroads have installed improvements in washing out which contribute materially to that phase of the question. Bright minds have also been at work on the staybolt structure and some very meritorious designs have been produced, but generally at considerable increase over the solid bolt, both as to first cost and application cost. The importance of the necessity for extension of staybolt life and increase of locomotive availability, will, however, justify increased cost, the degree of which being dependent upon conditions. Owing to staybolt breakage occurring generally close to the outside sheet, the earlier attempts to secure flexibility of the staybolt structure in this country were to change the outer end to a ball and socket form, which gave complete and absolute flexibility at that end. This idea originated on the Pennsylvania Railroad, and is in extensive use there and elsewhere at the present time and has served as the basis of subsequent modifications and improvements of the various staybolts of that type and which are generally and commercially known as flexible staybolts.

One of the more recent developments in the art aims directly to increase the flexibility of the body of the staybolt to eliminate breakage and also save the firebox sheets by the simple expedient of making staybolts with a body of two pieces of half-round iron, thus having two neutral axes, each much closer to the outer fiber than in the solid section, and then by twisting the body present the plane of greatest flexibility in every direction in which a lateral stress may come to it. The ends of these bolts are larger than the body and take the usual staybolt thread, and are applied to the boiler in the same manner, and at same cost as that of solid bolts. As they have a relative flexibility of body several times that of solid bolts of equivalent cross section, it is reasonable to believe that the outer fiber stresses have now been reduced so as to give such bolts a life of three, four, or half a dozen times that of solid bolts, and it can be reasonably expected that these bolts will last the life or more of the average firebox, and more than that is unnecessary, an economic feature of importance.

As a general proposition, it pays to use the best, and this applies particularly in locomotive maintenance and availability Analysis shows that it costs about two dollars to apply each dollar's worth of material purchased for a railroad shop, but this is probably too low in considering the relative cost of material for staybolts and their application, particularly in breakage renewals. The costs for cooling down, emptying, stripping, removal and replacement of the broken bolts, and the other parts involved, together with the loss of time of the engine, makes the material costs insignificant by comparison. If the causes which contribute to staybolt breakage, are also responsible for the early failure of fireboxes a railroad could almost afford to use gold staybolts, taking all the factors into consideration.

Brazilian Railway Development.—A recent statement by Senhor Hermès da Fonseca, the president of Brazil, says that the railway system of Brazil was increased in 1913 by 1,431 miles, bringing the total up to 15,280 miles. Of this total 2,188 miles are operated by the federal government, 5,728 miles are leased by it to individuals, 3,454 miles have been "conceded" by the federal government to private enterprise and there are 3,903 miles which have been conceded by the different states.

BUSINESS PRINCIPLES AND RAILWAY MAIL PAY

The Railway Business Association has issued the following statement on the railway mail pay question:

Proposals for readjustment of railway mail pay now pending before Congress involve such serious divergence of view as to facts and as to principles of fairness that the attention of business men is invited to the situation. As business men we submit:

1. The government dealing with a company which cannot refuse to deal should not permit the price to be fixed by an official who has a balance sheet stake in making the price low.

2. The government should not force upon a railroad a contract which no business house would accept, under which the quantity of service to be rendered is estimated in advance by the purchaser, the pay to be determined by that estimate and service in excess of the estimate to be performed but not paid for.

3. Congress should not confuse the consideration of mail pay, a purely economic and business proposition, with political and irrelevant questions such as are involved in the Moon bill and which would draw in a large number of persons interested in its passage wholly apart from the question of pay.

4. Congress should not act on mail pay until it has the report of the Joint Committee of Congress which has been investigating this subject for two years, or at all while engrossed in an unusually large legislative program.

The Moon bill in constituting the postmaster-general the arbiter as to price ignores a fundamental principle of business fairness.

The buyer, in business, fixes the price, but the seller can refuse to deal. The railways cannot refuse to deal. Mail carriage is made compulsory by the Moon bill under heavy penalties. To attain perfect impartiality the umpire should be connected neither with the railways nor with the public. This being impracticable, the power should be exercised by an authority farthest removed from temptation to be overzealous for low pay. The postoffice department is more interested than any other government body. One test applied to postoffice administration is the size of the deficit. There is in mail administration so much that is personal or political that postoffice officials are under undue temptation to bias.

How this works is plain from the record. Postmaster-General Hitchcock stated in House Document No. 105, dated August 17, 1911: "The committee (of postoffice department officers) estimates that through a readjustment of railway mail pay on the basis of cost with 6 per cent profit a saving to the government could be made of about $9,000,000." This estimate, assuming the fairness of cost plus 6 per cent, gave the public the impression that the postmaster-general had declared the roads to be overpaid by $9,000,000.

Congress in 1912 provided for a joint committee before which the railroads emphasized that the method of finding cost omitted allowance for interest on investment.

The postoffice department on January 16, 1914, proposed "to allow such additional amounts as may be necessary as shall render the whole a proper proportion of a fair and reasonable return on the value of the property necessarily employed." Thus the department investigation had been conducted without co-operation of the railroads, although they had offered co-operation, and an estimate of $9,000,000 over-pay had gone to the country before the railways had had an opportunity to point out this vital omission which was subsequently acknowledged by the department.

The department contends that the roads ought to perform government service at a lower rate than private service. Postmaster-General Burleson says: "The carriage of the mails by the railroad companies for the government cannot be considered as of the same character of service as that performed by them as common carriers for the general public. . . . Rates for carrying mails on railroads should be less than those which might be fixed for commercial business." If the argument is that the mails are

a means of communication for the government and for citizens, and hence should be carried at a low rate, it is only necessary to point out that the weight of letters and government matter combined according to the report of the department for 1912 made only 17 per cent of the mail, as against 83 per cent newspapers, magazines, books and merchandise, which are essentially freight. Since that report the parcel post has been established and has swollen to a degree unknown the ratio of "freight" mail to letters and government matter. The department does not attempt to present in 1913 a corresponding analysis. If the argument is that mail-carriage develops the territory served by a road and produces remunerative tonnage, it is sufficient to reply that on that very theory passenger rates have already been depressed below the freight basis by the states and railway mail earnings are even lower than passenger. If passenger rates are to be raised, as Mr. Brandeis suggests, why reduce mail pay?

The most disinterested witness is M. O. Lorenz, associate statistician of the Interstate Commerce Commission. Dr. Lorenz attended hearings of the joint committee and participated in colloquies between representatives of the department and of the railway committee, of which the chairman is Ralph Peters, president of the Long Island Railroad. Dr. Lorenz reached his conclusions as to rates by two methods—first, cost plus taxes and interest on bonds without contribution to dividends or surplus; second, passenger train earnings minus an arbitrary 10 per cent representing those passenger train services in which mail does not participate. Dr. Lorenz says:

"On the basis of the commercial principle, the conclusion is reached that 22½ cents per 60-ft. mail car hauled one mile, with a separate payment for side and terminal services, would constitute a fair adjustment for the first year, being an increase over the present rate of pay, but still probably an underpayment." The 22½-cent rate, Dr. Lorenz states, "would be an increase of certainly more than 10 per cent."

This was on September 27, 1913. On February 12, 1914, Assistant Postmaster-General Stewart submitted his draft upon which the mail pay provisions of the Moon bill are based, and instead of 22½ cents, which Dr. Lorenz concludes would be an underpayment, recommended "not exceeding 20 cents." This aroused so much protest that the postoffice department proposed, and the House Committee on the Post Office and Post Roads adopted, an amendment making the base rate "not exceeding 21 cents," still 1½ cents below the rate on which Dr. Lorenz says mail service would make no contribution to dividends or surplus.

Proposing, in other words, a nominal rate schedule which the expert of the Interstate Commerce Commission says would perpetuate underpayment, the department would reserve to itself the power to reduce even that rate.

The Moon bill in providing that the postmaster-general, without appeal, shall by estimate in advance determine how much service shall be paid for at the rates determined by him, also without appeal, ignores another fundamental business principle.

Congress in adopting such a method would be compelling a railroad to accept a contract which no business house free to decline would accept—a contract agreeing to furnish material for a lump sum, the quantity having been estimated by the buyer and any excess over that amount to be furnished and not paid for. The present statute prescribes quadrennial weighings, about 90 per cent of the service being thus computed and the remainder by space and otherwise. The Moon bill makes weighings annual, but reduces to about 10 per cent the traffic which is to be weighed; about 90 per cent is to be computed by space, and this not space used and measured, but space estimated and authorized in advance by the department. For actual weighings it would substitute the individual personal opinion of officers of the department as to the service which will be performed. While changing the weighings from quadrennial to annual, the bill would shift measurement on the bulk of the business from actual weighings to estimates and from statutory mandate as to method to the discretion of the department, without appeal either as to method or as to the result of applying the method.

Power to determine method and frequency of measurement of mail service performed ought to be statutory, or at least subject to appeal.

The parcel post illustrates the practical importance of this principle. The growth of that service should be considered with special accuracy, because of its immense volume, because it deprives the railways of express and freight revenue, and because its development cannot be computed in advance.

In our judgment measurement should be annual or oftener and the frequency and method of ascertainment determined or umpired otherwise than by the postoffice department.

The Moon bill comes before Congress with powerful momentum. It is based upon a draft made by the second assistant postmaster-general, reported by the House Committee on the Post Office and Post Roads without minority protest, made the subject of a special rule of the House, and contains provisions which attract to its support without reference to railway pay the following:

1. Applicants for assistant postmasters in first and second class postoffices, with whom incumbents must under the bill compete in examinations. 2. First, second and third class postmasters, whose salaries are dealt with. 3. Persons performing service for contractors in carrying the mail, whose claims are made liens. 4. Federal and Confederate veterans, who are exempted from age limitation in selection of fourth class postmasters.

These extraneous provisions, whatever their merits, give an interested motive in the passage of the whole bill to large numbers of persons and tend to deprive of the consideration which it deserves the main question of fairness to railroads.

The largest advantage hoped for from increases in freight rates is the strengthening of the market for railway securities through reassurance to investors concerning the treatment which our railways may expect from the government. What will be the value of this reassurance if the government with one hand grants an advance in freight rates and with the other reduces mail pay? What confidence will investors have in the fair intent of the government if revenue for any railway service is to be determined by specifically interested persons and if provisions dealing with railway compensation are to be passed substantially as a rider upon other provisions with which they have nothing to do and for whose adoption there is great political pressure, and this at a time when an investigation covering many months by a joint committee of Congress is about to result in a report?

We believe that if Congress and the public understood the merits of this question the legislation adopted would differ fundamentally from what is proposed in the Moon bill. Congress and the country should study the question deliberately and in the light of full information.

Whatever legislation is enacted should indicate both by its terms and by the circumstances of its adoption an unmistakable purpose on the part of Congress to deal fairly and justly with the railroads.

Corporation Eugenics.—The institution by the General Electric Company of a compulsory physical examination for employees seeking to return to work after illness or a period of unemployment will naturally provoke opposition on the part of the workmen affected. But the regulation should operate to improve the efficiency of the employees by serving as an inducement to them to keep in good physical condition. There is nothing the average American is so prodigal of as his health. If he knows that his job depends on his keeping fit, there will be the strongest possible incentive for him to safeguard himself against disease. The company is obviously inspired by a desire to reduce its liability under the Compensation law; but the rule may prove a benefit to the men, as have the rules against drinking, enforced by the railroads. Perhaps in the end the corporations will do more for practical eugenics than the legislatures.—*New York World.*

Maintenance of Way Section

The abuse of cost data by using such information without making due allowance for local conditions has created a common prejudice against the collection and use of cost data of any kind. As outlined by Mr. Bowser in another column, there are many conditions which must be taken into consideration in making an accurate analysis of cost figures, especially if made upon such a general basis as the cost of maintenance per mile of line. However, such objections are frequently magnified. The importance of the general collection and comparison of cost data should be strongly emphasized, for they lie at the basis of all economical practices. Evident deficiencies in such data should cause more care in their collection rather than a general condemnation of this material. If used intelligently, with proper consideration of the purpose for which they are prepared, they will reveal the weak as well as the strong points in any organization or system of work. On the other hand, nothing will tend to discourage the use of cost data as quickly as unwise and unintelligent cost comparisons, as such comparisons defeat the very purpose for which cost data are collected.

The Use and Abuse of Cost Data

The extent to which maintenance practices are continually changing can be realized best by comparing present methods with those of a decade or two ago and by noting the numerous instances in which practices which were then considered unnecessary refinements have since been made standard. Not many years ago curves were not spiraled and little attention was given to their correct superelevation The compensation of grades for curvature is another generally accepted principle which was once considered a refinement; and only a few years ago tie plates and rail anchors were commonly considered of doubtful value. The advocates of rail canting believe that this practice should not be considered an unnecessary refinement, but that it is warranted by the increasing service required of the track. They point to its general adoption on the European roads with their permanent track construction as supporting their contention. The fact that this practice is not widely adopted in this country, as shown in another column, indicates that it is not generally approved. But it is standard on several roads and is regarded with favor on others. As with any practice not in general use, it must be used with care, for under certain conditions it can become positively injurious. In general, our tracks are suffering from too little rather than too much attention to the refinements of maintenance. Lack of attention to the accurate maintenance of gage, to line and surface, to drainage, etc., all result in increased wear and destruction of materials and in increased labor charges.

Refinements in Track Maintenance

One early effect on American railways of the European war will be the curtailment of the supply of creosote available for the treatment of ties, bridge material, etc. Over 39,500,000 ties were treated in 1913, approximately two-thirds of which were treated with creosote. Over 108,000,000 gal. of creosote were required in this country last year, of which 62 per cent was imported. This oil comes principally from Germany and England. While the production of American creosote is increasing, it has never exceeded 38 per cent of the requirements of this country, and even with free access to European oils there was a shortage last year which required the closing down of several plants. Since creosote is a by-product, the war will seriously interfere with its production abroad as well as its transportation to this country, and it is to be expected that the amount imported will be seriously curtailed. Many of the plants operating in this country, and especially in the southeastern states, depend almost entirely on foreign oils and carry only a limited supply. When this is exhausted there will be presented the alternative of closing down the plants or operating them with some other preservative material, such as zinc chloride or crude oil, both of which can be secured in large quantities in this country. One favorable factor in the situation is that the war began late in the season when the treatment of material required for this year's work is approaching completion. The general policy of retrenchment enforced this year also undoubtedly has reduced the demand for treated material. While many of the plants operate throughout the year, the effects of their closing down at this season will not be as serious as they would after the first of the year, when the requirements of next year will be more pressing; and conditions in Europe may be entirely changed by that time.

A Threatened Shortage of Creosote

Twenty-two papers were received in the contest on "The Distribution of New Material and the Collection of Scrap." These papers were turned over to W. J. Towne, assistant general manager, Chicago & North Western; D. J. Brumley, engineer of valuation, Illinois Central, and R. D. Long, assistant general storekeeper, Chicago, Burlington & Quincy, who awarded the first prize to Ernest Cordeal, St. Louis & San Francisco, Springfield, Mo., and the second prize to E. J. McVeigh, general storekeeper, Grand Trunk, Montreal, Que. Other papers accepted for publication were contributed by J. P. Costello, roadmaster, Atchison, Topeka & Santa Fe, Pueblo, Colo.; E. B. Fithian, general roadmaster, St. Louis, Iron Mountain & Southern, Little Rock, Ark.; D. F. Stevens, Baltimore & Ohio, Baltimore, Md.; J. T. Bowser, Cincinnati, New Orleans & Texas Pacific, Danville, Ky.; S. C. Tanner, master carpenter, Baltimore & Ohio, Baltimore, Md.; J. W. Powers, New York Central & Hudson River, Oswego, N. Y.; W. O. Houston, division engineer, Michigan Central, Jackson, Mich.; E. M. Keays, material supervisor, Chicago & North Western, Evanston, Ill.; R. B. Abbott, division engineer, Philadelphia & Reading, Harrisburg, Pa.; F. L. Burrell, general foreman bridges and buildings, Chicago & North Western, Fremont, Neb.; J. J. Hess, assistant engineer maintenance of way, Great Northern, St. Paul, Minn.; R. Huber, roadmaster, Chicago, Burlington & Quincy, Brookfield, Mo.; J. W. Carey, clerk to supervisor, Pennsylvania Lines West, Bellaire, O.; A. M. Clough, supervisor, New York Central & Hudson River, Batavia, N. Y.; W. S. Taylor, superintendent of terminals, Chesapeake & Ohio, Covington, Ky.; John Carmichael, Hagerstown, Md.; E. K. Coggins, chief clerk to roadmaster, Southern Railway, Knoxville, Tenn.; P. Quinlivan, roadmaster, Delaware, Lackawanna & Western, Buffalo, N. Y.; George E. Lowe, supervisor, Delaware, Lackawanna & Western, Elmira, N. Y., and W. F. Rench, supervisor, Pennsylvania, Perryville, Md. These papers were prepared by men in all branches of maintenance of way work and cover the entire field. They discuss the problems and the common deficiencies of our present system, and should impress upon all maintenance men the importance of cooperation. The two prize winning and several other papers appear elsewhere in this issue, and others will appear in later maintenance sections.

Awards in Material Contest

FUNDAMENTAL PRINCIPLE UNDERLYING THE SUCCESSFUL DISTRIBUTION OF MATERIAL

THE prompt delivery of material by the store department is essential to the economical prosecution of any kind of railway work. In order that this department may be able to perform its function it is necessary that it be given a detailed and complete list of the material desired, a sufficient time in advance to enable purchases to be made and deliveries secured. In the case of any single order the problem is simple, but when orders are multiplied by the thousand the complications increase. The expenditures for maintenance of way alone of the railways of the United States amount to about $350,000,000 annually, of which approximately $150,000,000 goes for materials used by the 500,000 employees of this department. The distribution of this amount of material over 245,000 miles of line requires close co-operation between the purchasing, store and maintenance of way departments. If the men in each department would try to put themselves in the places of men in the other departments they would better realize some of the problems confronting others, and the first step towards effective co-operation would be taken.

The maintenance of way department initiates the orders for large amounts of materials, and uses them ultimately, and it is with this department that we are more directly concerned here. The first step in the ordering of material is the preparation of a definite schedule of operations for the entire season. With this in mind the dates at which various materials will be required at different points can be determined approximately. If this information is then given to the store department it in turn can plan its work to protect these different jobs. The receipt of material on the site of work either too early or too late, results in unnecessary expense and loss. While under any system which can be devised delays will occur at times, owing to errors in one or more of the three departments concerned, an occasional difficulty should not be permitted to destroy the system and break down this co-operation.

Another phase of this problem that deserves special emphasis is that of the large amount of money tied up in material held in stock. Not being confronted with the actual figures, many maintenance of way officers fail to realize the sums which are tied up continually in unnecessary stocks of new and scrap materials and that the amount of materials so held is multiplied many times over on the entire system. The attention given to this subject during the past few years is tending to better conditions along this line, but to attain the greatest success it is necessary that each officer give the effort to improve conditions his support. As long as the men in charge of work out on the line will run carloads of excess material upon a cut-off while the inspection train passes over the main line, as was done on one eastern road, little progress will be made. The details of the proper methods of handling materials are well covered in the papers received in the contest on this subject, several of which are published in this issue.

NEW BOOKS

Symmetrical Masonry Arches. By Malverd A. Howe, Professor of Civil Engineering, Rose Polytechnic Institute. Size 6 in. by 9 in., 245 pages, illustrated, bound in cloth. Published by John Wiley & Sons, Inc., New York. Price $2.50.

The second edition of Howe's "Symmetrical Masonry Arches," which has just appeared, corrects all errors that were found in the first edition, simplifies the demonstration of the formulae and contains a considerable amount of new material. The book was written to present in simple form the elastic theory of designing masonry arches. The formulae presented in the book are not intended to be rigid or exact, in view of the fact that the materials used in the construction of arches are more or less uncertain in character and it is felt that all formulae given, although somewhat approximate, are within the limit of accuracy to which such construction can be carried out. The book includes a number of examples worked out in detail to show the various processes and methods of checking. It describes a number of typical arches and includes an appendix giving general data for over 500 arch bridges.

Letters to the Editor

RELINING A CURVE WITH A STRING

PHILADELPHIA, August 7, 1914.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

Referring to the article entitled "A Practical Method for the Adjustment of Curves," in the issue of May 15, describing a method for the lining of curves by means of offsets from a string 100 ft. long without the use of instruments, I have recently been given charge of a line on which I was confronted with a most interesting problem of this kind, which a corps of engineers had failed to solve satisfactorily after extensive effort. An 18 min. curve 2½ miles long had long been the cause of many complaints. In applying the method described in the article mentioned a foreman spent six hours taking the ordinates with the 100 ft. cord, the ordinates ranging from 1¾ in. down to ⅜ in. with an average of ⅞ in. The office work in computing the corrections required six hours additional, after which the lining of the track was done, the throw amounting to as much as 10 in. in some places. A further increase in the superelevation from 1 in. to 1½ in. was made, since which time all complaints have ceased. The accompanying reading, taken with a track inspection instrument before and after the curve was lined, showed the improvement made in the riding qualities as indicated by the instrument.

	Inspection, June 16, 1914		Inspection, August 4, 1914	
	South track	North track	South track	North track
Water spills	6	17	1	3
Hor. cyclometer readings	1,321	1,914	460	1,191
Vertical cyclometer readings	473	723	211	487
Pedometer readings	184	250	108	113
Time	39	40	42	43

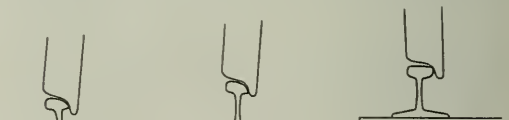
SUPERVISOR.

EFFECT OF CURVE-WORN RAILS ON DERAILMENTS

GILA BEND, Ariz., June 23, 1914.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

One of the most important items of every section foreman's duties is to keep his track in good gage. Straight track, once properly gaged and spiked, will cause little trouble, but on curves a different proposition is presented. The rails on any curve of over 5 or 6 deg., even if double-spiked, will spread from ¼ in. to 1 in. after three or four months' service.



Contact of Wheel Flanges on Curve Worn Rails

The reasons for this are obvious. When rounding a curve wheel flanges hug the gage side of the outside rail, exerting a downward and outward pressure, the outward pressure varying with the speed of the train. The wheel flange will wear the gage side of the rail to the shape of the wheel profile and at the same time the continuous outward pressure will cause the outside of the bottom flange of the rail to sink down into the ties deeper than the inside, causing the rail to "roll out," as shown in Fig. 1.

The usual remedy for this wearing and "rolling out" of

the rail is "setting up the rail." By this method the trackmen pull all the spikes, raise the rail 6 or 8 in. and square the surface of the ties with adzes or sharp mattocks, let the rail down and respike it. This corrects the gage, but the danger of derailments is increased. Before, the ball of the rail, worn to the shape of the wheel, fitted snuggly against the flange; now, having changed its position relative to the wheel, the wheel tread comes in contact with the ball of the rail on top and the flange touches it on the side, which is worn round. Owing to the fact that on a curve the wheel never runs exactly parallel, but at a slight angle with the rail, the round worn surface of the head presents an incline (Fig. 2.) in place of a perpendicular side (Fig. 3.) to the wheel flange, the slightest defects in the road bed or rolling stock are liable to cause the flange to climb the rail. For many derailments which have come under the writer's observation, the causes given were: Rough track, stiff truck bearings, uneven loads, etc. No doubt those defects contributed heavily to such derailments, but the primary and real cause was undoubtedly the changed position of the worn rail surface. Roadmasters and other maintenance of way officers should inspect carefully any curve worn rails before allowing foremen to square them up. If the rail ball is worn to the extent described, the only safe remedy is to relay that particular curve as quickly as possible.

W. E. Schott,
Section Foreman, Southern Pacific.

HANDLING BRIDGE MATERIAL

Sylvania, Ohio, July 11, 1914.

To the Editor of the Railway Age Gazette:

In your issue of June 19 there is a letter from Storekeeper regarding a reduction of the stock of surplus bridge material. While the party writing this letter signs himself a storekeeper, it is quite evident that he has been something else besides a storekeeper, for he knows the requirements of a bridge and building man, as stated in the last two paragraphs of his letter, that such a man must be capable of doing almost everything as well as being a storekeeper.

The question of properly handling stock in the bridge and building department of any road of any consequence is one that probably has caused a great many gray hairs to appear on the head of more than one head of such a department. Usually a man in this department is a good builder, but a poor bookkeeper or storekeeper, unless he is properly supplied with a first class clerk. In my opinion a master carpenter on a division should be given a clerk who thoroughly understands the art of keeping stock and of keeping books so that the master carpenter need not be required to do it. His services are much more valuable along the road to see that the gangs are kept in work and are doing the work properly.

It is very true that a bridge and building man knows what work will be done each year, or at least it should be so, and in my opinion it is so on all well regulated roads of any consequence, for such roads usually prepare a program a year ahead of time. However, authority for such expenditures is seldom given before the snow has left in the spring, for the general officers will say, "There is plenty of time before you will do this work, so why order the material?" The facts in the case, however, are that such material can seldom be supplied short of 60 to 120 days. Therefore, if authority is not granted until, say, March 1 and the material does not arrive until July 1, there is not very much of the working season left, if the program is at all extensive. I very well remember one season while I was division engineer that we ordered our materials in plenty of time to have our work started nicely about July 1. The requisition, however, was not authorized by the general officers until such time as to bring the material on to the division along in November. Anyone familiar with bridge and building work knows full well that this puts an engineer up against a condition which is rather hard to combat.

However, we were fortunate in having a storekeeper at headquarters in the mechanical department who had a great deal of material on which we could draw and make the most important repairs to our bridges and buildings. The result was that we engineers were caught along in December with a great stock of bridge and building material on hand which brought upon our heads a most severe censure. This then brought about a revision by the storekeeping department as to bridge and building material. It was decided, and I think wisely, that a certain stock of material would be kept on hand by the mechanical storekeeper for the use of the maintenance department on proper shop order or requisition. This stock was determined by the division and general officers and included a certain amount of bridge material which, as I remember, was enough to build a bridge 100 ft. long, together with enough other materials to put up a small freight house. We also were permitted to carry at a few places, probably 100 miles apart, a few bridge stringers, caps and ties for use in extreme emergency. This stock, if well watched, should usually be sufficient to take care of any emergency on the division.

The next year we then started a system of ordering our materials delivered at one end of the road in carload lots, say enough to take care of one month's work in the bridge department. This was required to be delivered at a certain time. Another quantity would be delivered a month later and so on through the season. This gives the purchasing agent a chance to buy this stock at fairly good prices and at the same time not carry in the maintenance department a very large stock balance of such materials. This material was usually unloaded by local way freights on the site of the work, which of course saved work train service. Materials for repairs to the buildings were also ordered by the carload under the same system.

Co-operation between the general heads of departments and the purchasing department when requisitions are forwarded by division officers should, in my opinion, make such a system quite practical. I do not know how this system worked out, as I left shortly after it was inaugurated, but believe it to be a system which will keep down the stock balance to the lowest possible point.

A. Swartz,
Vice-president, Toledo & Western.

COMPARISON OF MAINTENANCE OF WAY COSTS ON A MILEAGE BASIS

By J. T. Bowser
Queen & Crescent Route, Danville, Ky.

The comparison of mileage costs of maintaining track and structures appears to be the general method used by railroad executives in judging the relative efficiencies of organizations or of standard practices. These comparisons are, as a rule, made between the costs of two or more divisions, or between two or more affiliated roads, and quite often between competing lines.

It is generally conceded that these comparisons can only be considered very broadly at best, on account of widely varying conditions existing on different roads. It is, however, in comparing divisions or lines operating under apparently the same conditions and through country of apparently the same general character, that such figures are often misleading. If we look beyond the general conditions in making comparisons of costs, wide discrepancies may often be reconciled.

The number and length of the grades should be considered, not the ruling grades. A grade, as a rule, means fast track, and fast track means increased maintenance costs. A difference in the maximum curvature may make quite a difference in the cost of upkeep of track, the increased wear of the rail alone being considerable. The number, length and character of the tunnels are not often considered at first glance. Tracks may traverse a district for miles where the material available for roadbed is of very poor quality, and

yet such a condition may be only local and may not affect a parallel line or a division operating through country of apparently the same general character. Also in comparisons of the cost per mile to maintain bridges, trestles, etc., the number, length and character of construction are not always given due consideration.

It is often the subject of remark, among patrons of railroads and among railroad officials as well, that the general appearance of buildings and grounds on one road is very much better than on another railroad, the railroad official probably adding, mentally, "and on less money too." In such cases, do they always consider the number and kind of buildings to be maintained? Is it kept in mind that the road which does not make such a good showing, probably has to provide and maintain cottages for its section men, operators, agents, etc., at a number of its stations? Is the character of the communities which it serves taken into consideration when judging the appearance of its station grounds? Grounds at stations where a heavy freight business is done, or where timber, ties, etc., are stored prior to shipment, cannot be kept as neatly as grounds at stations where this is not the case.

A very important item in expenses which may not always be taken into consideration in making comparisons is created by the ruling of the Interstate Commerce Commission, which provides that in all betterments which at first glance do not appear to bear any relation to maintenance costs, the cost to replace in kind the structure on which the betterment is made, must go as a charge to expenses. Thus maintenance costs on a road which is following out a policy of heavy betterment, such as replacing light bridges with heavier construction, may show greatly increased maintenance costs, which are not to be explained until the above mentioned ruling is recalled. A fair comparison is a gage of efficiency, a healthy rivalry is good for us; but do we always give each other the credit for what "we are up against"?

DISCIPLINE RECORDS IN THE MAINTENANCE OF WAY DEPARTMENT

By A. Swartz
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Discipline among maintenance of way employees sometimes is a difficult question to handle, depending somewhat upon the character of the employees. Foremen in the track department as a class are of a sensitive nature, so that whatever discipline is necessary it should usually be applied with a great deal of consideration. These men are somewhat different from men in train service, as the results of their work are so much more apparent to everyone. They usually take a great pride in their work and look for commendation, which is very natural among men with a limited education.

My personal opinion regarding the suspension of track foremen for some breach of rules is that very little result is gained by applying such a method. These men usually can be reached more quickly by giving them a good lecture and stating to them the possibility of danger which might have resulted or which did result from the breach of rules. There are no doubt some cases where track foremen positively must be taken out of service, but which all will agree has been done in the past sometimes without proper regard for the results to the road, as well as to the laborers, who are left on the section to be handled by an entirely new man.

I believe in having a man on the section as leading laborer who can at times take charge of the section as might be necessary by the sickness of the foreman or by the foreman being called away on extra gang work for a month or so. However, I never was thoroughly satisfied that when a change of foreman was needed it was best to put this leading laborer in the vacant position as foreman. I think better results are obtained by bringing a foreman from another section or a bright leading laborer and shifting the leading laborer on the section where the position is vacant over to the other section. This way of dealing will bring about better discipline among the men, will result in better work being done and less chance thereby being given for disciplining the foreman because of the fact that the men know how to do the work under the instructions of the foreman.

It has been my observation that any discipline to the foreman is usually brought about by the slackness of some of his men, which, of course, can be laid to the door of the foreman by calling it improper supervision. However, at times men do things which the foreman does not supervise at the very time it is done.

Track supervisors should always have a personal record of all foremen in their employ, together with that of the leading laborers. It possibly would be well if the supervisor kept a record of the minor happenings on a foreman's section so that when it was necessary to apply discipline he would have the past record of his man before him. There are of course some supervisors who can very readily carry a record of these men in their minds at all times because of their close dealings with them day after day. However, such a record is not in the hands of the general roadmaster or engineer in charge of the division unless a written record is kept. There are times when the engineer wishes to know these points about track foremen when filling a vacancy which would result in a promotion for a foreman.

At the same time when keeping a demerit record, as it may be called, I think that a merit record should also be kept. This has been my policy in handling men in the operating department. A record such as this shown to the men themselves in case it is necessary to apply discipline very forcibly impresses on their mind that their actions are being watched. Provided they are men at all they should have some natural pride in keeping down such records. I think it will be found that it is very seldom necessary to dismiss or suspend a foreman and for but very few reasons, excepting the use of liquor.

Perhaps one of the most serious offenses which a track foreman might commit would be to permit his hand car or motor car to be struck by a train. In such a case conditions surrounding the accident must necessarily determine the discipline to be applied. As a rule, however, such acts are very gross negligence and the foreman permitting such accidents is generally ready to be dismissed.

One of the best ways to maintain discipline among track foremen is for the roadmaster or the engineer to keep a record of the work which a foreman has been told to do, stating the time at which it should be done; then if the work is not done within the allotted time the foreman should be reminded of the fact and required to give a first class excuse. If this occurs frequently a severe reprimand with a threat of dismissal will surely bring about the required results. If such action is followed this class of men will be very careful to perform their duties according to the rules of the railroad.

It is my opinion that a foreman who has been reduced to a track laborer will very seldom make good again unless, of course, he had been made a foreman on probation, as you might say. The old track foreman, having been such for a number of years, does not take very kindly to working as a laborer, so that usually it is best to let him go entirely or ship him to the other end of the road to act as leading laborer if it is thought that another chance will wake him up.

It is my opinion that all division engineers should keep a whiphand on their roadmasters, requiring that except in extreme emergency the dismissal of a foreman must first be sanctioned by the engineer, for without a doubt some roadmasters being so closely in touch with men will at times develop personal feelings so that they sometimes dismiss men for these reasons. However, we will admit that with the class of roadmasters now being obtained this is not so customary as in years past. The same sort of discipline can readily be applied to foremen in the other sections of the maintenance work, such as bridge and building, waterworks or interlocking departments.

The Handling of New and Scrap Maintenance Materials

The Prize Winning and Other Papers Received in This Contest. Practical Discussions of the Problem

FIRST PRIZE—THE HANDLING OF MAINTENANCE OF WAY MATERIALS

By Ernest Cordeal

St. Louis & San Francisco, Springfield, Mo.

Any effective plan for the handling of maintenance of way material must be one which insures co-operation between the purchasing, stores and maintenance of way departments. Each of these departments had to do, at some time or other, with the materials which are eventually used in the maintenance of roadway and structures, and each should assume its proper share of responsibility for the insurance of the utmost economy.

Aside from emergency requirements, the maintenance of way department should be able to anticipate its needs within close limits, for a year or more in advance. The purchasing department, provided with accurate information as to requirements several months in advance, should be able to buy at such times and in such quantities as to obtain the best prices, at the same time insuring delivery in advance of the time when this material will be required for use. The stores department, standing between the purchasing and the consuming departments, is in the most favorable position to hold the balance, curbing the tendency of the maintenance of way men to accumulate and hold an over-supply in fear of unexpected shortages, and regulating the rendition of purchase orders so as to prevent either over-stocking or shortage.

The accounting for material from the time of the origin of the order for its purchase to its final disposition as useless scrap, should undoubtedly be in the hands of one and only one department, preferably the stores department. Often interruptions occur in the performance of maintenance of way work and stocks of material remain on hand for periods of months, or even years. In case such material has been turned over by the stores to the maintenance of way department, it is more than likely that its existence will be overlooked; material of the same kind and grade will be ordered unnecessarily to provide for the current needs of some other part of the system and the unused stock will deteriorate and depreciate in value, or be lost by theft or by lack of systematic care.

Foreseeing future requirements in times of fairly stable business conditions is not accompanied by any great difficulties. Records are, or should be, available on every railroad from which a very close estimate may be made as to the requirements each year to provide for the ordinary work of maintenance. It is true, that such estimates may be rendered inconsistent with demands by unforeseen depressions calling for retrenchment, by unexpected prosperity leading to increased activity, or by disasters of considerable consequence, requiring immediate and extensive replacements. Such phenomena are, however, of so infrequent occurrence as to be negligible in the consideration of the material problem.

The material which will be required during any year for the construction or renewal of tracks, bridges or buildings is accurately known months in advance. The maintenance of way department should be able to formulate a definite plan of operation, setting forth the approximate time at which each piece of work will be commenced. This will enable the store department to file its orders with the purchasing department at such time, and in such form as to permit of contracts for material being so placed as to provide for delivery at a time but little in advance of actual requirements, without interfering in any way with the exercise of economical methods of purchase.

All requisitions for material, whether for ordinary maintenance, or for construction and replacement work, should originate with the using department and should pass through the store department. The accumulation of surplus or obsolete stock is frequently the result of efforts on the part of the store department to keep up its supply of material to meet prospective needs, with insufficient knowledge as to changes in standards or variations in requirements.

Requisitions for material rendered by responsible officers of the maintenance of way department at a fixed time in advance of the date needed, would provide the store department with the necessary information to request purchases with accurate knowledge as to requirements, and would thereby prevent over-stocking, or the ordering of material which had been rendered obsolete by changes in design. In passing through the store department, requisitions for material should be carefully checked against the stock on hand, to prevent the placing of purchase orders for articles already on hand. The purchase orders passing from the stores to the purchasing department should be forwarded well in advance of the desired date of delivery, enabling the purchasing official to profit by market conditions.

In the absence of complete and reliable data as to future requirements, the purchasing department is often led by reason of temptingly low prices to stock up heavily on certain classes of material. Such a procedure may be responsible for a large ultimate loss. Interest on the capital invested, depreciation in value due to the necessity of holding the stock for a long period, or total loss of value through a revision of standards may more than offset the initial advantage gained in unit price.

The suggested plan of ordering wherein the maintenance of way and stores departments co-operate in furnishing reliable forecasts as to requirements, if competently and consistently followed, will materially assist in maintaining at a minimum the amount of capital investment in materials.

The material once delivered to the railroad by the producer or manufacturer should be entrusted to the store department, and should remain in its possession until the time of its actual use in repairs or construction. The evils resulting from the practice of turning material over to the maintenance department, to be distributed or stored and accounted for, are manifold. Each division superintendent, roadmaster, section foreman or bridge and building foreman, in a more or less mistaken endeavor to protect himself and his division, increases his orders above his actual needs and accumulates a surplus stock of materials, which are often held pending use for long periods, are frequently lost or destroyed, and represent at all times an unnecessary investment of capital. Large quantities of material scattered over a wide territory are very difficult to keep in strict account, even when their care is in the hands of a department thoroughly conversant with material accounting, and when such a task is required of men burdened with the numerous other duties in connection with maintenance of way, the bookkeeping feature is almost sure to be neglected.

The handling of materials in stock between the time of purchase and use is strictly a store department problem. The ideal condition from the storekeeping standpoint alone would be that in which it were possible to make delivery of all material on cars loaded at the point of purchase, directly to the point of use at the time required. A considerable part of the maintenance of way material may, in fact, be handled in this way, particularly if due consideration is given to placing loading orders, so as to make possible distribution without preliminary sorting or handling.

A great amount of material cannot, of course, be handled in this manner, but must be unloaded and stored, reloaded in such quantities and at such times as required and delivered to the point of use. The handling of such material is the principal function of the store department, and is the item wherein is

found the greatest opportunity for effecting economy by the introduction of adequate methods of storing, and of keeping an accurate check of stock.

Centralization of stores at one or more principal points, from which points issues are made at frequent and regular intervals to smaller points, or direct to the work, simplifies the handling of the material at the same time that it permits protecting all requirements with a minimum stock of each class of material. The central store, located preferably at a point nearest to the base of supplies to minimize useless back-haul, should receive, store and carry in account all material, and should by means of regular and comprehensive reports maintain records of the stock carried by each of the sub-stores.

The systematic arrangement of store shelving and bins, as well as of the platform and yard, to provide for the segregation of the various classes of material to simplify the filling of requisitions, to enable inventories to be taken with great accuracy and little difficulty, and to render the detection of shortage or overage of stock a matter of certainty, should be given special attention. Bin sizes, shelf and platform space and dimensions of skidways should be carefully planned, so as to accommodate the maximum stock required at any time. Minimum limits may also be set to indicate the point to which the stock may be allowed to decrease before orders are placed for its replenishment.

The handling of second-hand and scrap material in such a manner as to secure therefrom the maximum value in reclaimed parts, and the highest market price for that portion which cannot be put to further use by the railroad, is an important factor in reducing the net cost of operation. For all the material used in repairs and replacements, an approximately equivalent weight of scrap is released. Nearly all of this old material possesses a certain value if presented at the proper market. Aside from this value as scrap, it has been demonstrated by a number of railroads, which have gone into the matter of reclamation, that about 20 per cent of the material which is ordinarily sold as scrap may be worked over at small expense and returned to stock to be used in place of new material.

The mere sorting of scrap by competent material men will net large returns on the labor expended. Not only is it possible to secure higher prices for scrap material carefully sorted into the different grades, but during the process a large amount of usable material will be found, which without repairs of any kind can be returned to the store department.

The reclamation of large quantities of material may be effected without any great capital expenditure for the erection of an extensive plant, or for the installation of expensive machinery. A few inexpensive machines, such as pneumatic hammers for straightening bolts and rods, bolt cutters, forges and shears, may be used to great advantage.

Undoubtedly the greatest agent of reclamation is the recently invented process of oxy-acetylene welding and cutting. With a small oxy-acetylene installation at command, a reclamation plant will be able to repair great numbers of castings and forgings, which must otherwise be sold as scrap. The cutting burners are most effectually used in reducing large scrap units, practically worthless in their entirety, but increased to a substantial value when cut into sizes convenient for handling. The cutting may be done very rapidly, and at an insignificant cost by use of the oxy-acetylene burner.

SECOND PRIZE—THE PROPER DISTRIBUTION OF NEW AND THE COLLECTION OF SCRAP MATERIAL

By E. J. McVeigh

General Storekeeper, Grand Trunk, Montreal, Que.

Since the railways were first divided into departments, one of the evils they have suffered from has been the lack of co-operation in the handling of supplies. It was discovered that the best possible excuse for work not done, or delayed, was "waiting on the stores for material." So there has been a lack of co-operation, and the supply department has been made the scapegoat. This has reference to the securing of material as required, and not to surplus material and inflated stocks.

In considering how material should be handled through the stores department, co-operation must be our cornerstone. We will assume that we are dealing with the ordinary railway with its full complement of departments, including that of the stores. Each department should make an effort to anticipate its wants in general maintenance material for 60 days in advance, and send to the storekeeper a requisition properly signed on a specified day in each month, for this material. In making this up the quantity used in the past should be considered, and extra work to be undertaken, taken into account. A full and careful description of the article wanted should be given when it is a thing not in common use, and it should be clearly stated how, where, and why wanted.

In compiling a purchase requisition from department requisitions the storekeeper should give all information possible, adding to that furnished by departments when necessary. He should place all regular maintenance supplies and material on one requisition, and material for betterments or unusual supplies on another, designating these as "A" and "B," or other distinguishing marks, and using different colored paper to further distinguish them, the idea being that the executive officer may tell at a glance what requisitions he should consider carefully, and may safely hold up for consideration, without causing delay and confusion, by holding lists containing material and supplies actually required for the economical operation of the road. The requisition covering the regular stock supplies should be passed on to the purchasing agent at once, and the supplies ordered for prompt delivery. The executive should hold the storekeeper strictly to account for these supplies, the criterion to be the monthly balance figures and the periodical stocktaking. If these requisitions are not carefully made up, and more material is asked for than is actually required for use in the period, the result will show up at once in increased stock on hand. The inventory must be taken by someone other than the storekeeper, and preferably by the auditor of disbursements.

It should be understood that the storekeeper has the right to question any items on department requisitions in his territory, and advise against the purchase of such items as he may consider unnecessary. No item of material on any requisition should be canceled, or reduced in quantity, without the maker of the requisition being advised. No one questions the right of the executive officer to cut off items, or reduce quantities, but it is poor business to leave men in the dark as to what they may expect. The treasury of their company suffers by uncertainty. The stores people should be promptly advised of all contemplated changes in standards, so that, as far as possible, they may avoid being caught with a heavy stock of discarded material on hand.

Finally, the three important factors in maintaining low stocks are, co-operation between the departments and the storekeeper in all things pertaining to material and supplies; careful supervision of requisitions by storekeepers, and prompt purchase and delivery. I have put this last, but it is possibly the most important of all, because prompt purchase and delivery is one end of co-operation, and a very important end. Failure at this end leads to nearly all the evils we suffer from in the handling of supplies. It destroys the other fellow's co-operation. We impress on the storekeeper, the locomotive man, the car man, and all the others, that they *must* ask for a 30 days' supply only, and they *must* make an honest effort to play the game. They get a 60 to 150-day delivery, or worse, and they get into trouble. By the time they get out of it, they make a vow that never again will they be caught in that way—in the future they will look after themselves. One-ended co-operation is no good.

This really throws each man back on his own resources, he proceeds to lay up supplies to protect himself, and stock figures go up in leaps and bounds. In cases where men holding the material make their own inventory, it is frequently the practice to "cook" the figures

The last condition is worse than the first. The money has been paid out, and the material is in stock, but no one knows it. With material on hand for which no account must be made, carelessness in handling it results. Co-operation is the only remedy, and it can be secured by education, and a restoring of confidence. Men order material lightly because they may get it, and they may not. If they are taught that they will get what they ask for, but *will be held strictly to account for it,* not only on paper, but in fact, *and they are so held,* matters will be greatly improved. It has become a habit on many roads for the departments to resent the storekeeper's supervision of requisitions, but if any intelligent man will carefully inspect the requisitions that come to the storekeeper during six months, he will understand why such supervision is necessary and important. The thing that will appeal to him strongest is how supposedly practical men can make such ridiculous mistakes in ordering the material they use in their business. It is not that the storekeeper knows more about each man's business than the man himself does, but he is a check, and who of us would want his important work to go out without being checked? The man ordering lumber is thinking of his building, not how the lumber can be got to best advantage.

After the securing of the material comes the distributing of it, a matter of even greater importance, and one that means much more labor and expense. The fundamental principle here is that all material and supplies shall remain the property of the supply department until actually used. On large railway systems it is neither profitable nor advisable that there be a sufficient number of storekeepers employed to deliver all the material in detail to men who will actually use it. But the supplies in the hands of the departments must not be considered as removed from the jurisdiction of the storekeeper of the division, and whether the parties making the final distribution report it to the storekeeper or auditor, the material should be under the general supervision of the storekeeper of the division, as representing the supply department.

On each division the departments should put in requisitions once each month, these to be an estimate of their requirements and to be approved by the general heads of departments. The material may be issued in detail on requisitions signed by the head of the department on the division, always with the understanding that the division storekeeper shall check them closely, and refer back, or reduce quantities that he finds excessive. Having records of quantities supplied, he can do this as no one else can.

In the handling of scrap, and reclaiming usable material, the first principle to be laid down is, that the department making the scrap must not be allowed to make the final sorting, and reclaiming before it is sold. This may sound somewhat radical, but I make the statement advisedly, knowing whereof I speak. The working departments are just as incapable of handling their scrap properly as they are of handling their new material to good advantage. The scrap pile is the grave for too many mistakes, of both sins of omission and commission.

Man is an animal that does one thing at a time, if he is to do anything well. While he is maintaining track he cannot handle scrap to advantage. While building or repairing locomotives his heart is in his shop, not in the scrap yard, and it is right that it should be so. This is the age of the specialist. Many men have specialized in scrap, and made fortunes thereby. The railroads are the greatest scrap makers in the world. In some years they make $200 worth per mile of road operated. In other words, it is one of the biggest things in the railway world. Why should not they have a specialist to handle it, especially in view of the fact that in nearly every carload of railway scrap sold, there is enough good usable material to pay for the handling of the load, leaving the amount realized from sale a net profit?

Beyond all question, scrap should be sent to central scrap yards and sorted under the supervision of a man who makes a specialty of that work. This man is not made in a day, or a year, nor in five years. He must be familiar with all railway material, and its value. He must know the material so that he may rescue anything that can be used again. He must know the value so that he will not spend more to reclaim an article than the article is worth new. And he also must work in close co-operation with all departments, so that he will not spend money to rescue material that, while fit for use, is nevertheless scrap, on account of changes in design that have made it obsolete.

Most of the railways have a number of flat cars that are out of commission as traffic handlers. These cars should be used in the scrap business. At each shop, money is being spent in an attempt to sort scrap. Stop this, and load the material direct from the shop on to these cars, a number of which may be assigned to each shop. When the car is loaded, bill to a central scrap yard, where it will be promptly unloaded, and returned with a load, or part load, of reclaimed material.

The scrap yard should be laid out on a liberal plan, and should include space for rails of all kinds, frogs, boilers, bridges, and steel cars. The miscellaneous scrap should be unloaded in one pile and sorted from there into separate piles, according to classification. A locomotive crane with a magnet should be used both to shunt cars and to handle the material. Reclaimed material should be piled close to a track for reloading on cars.

Material to be worked over may be returned to the shops, and the work done there, or the necessary machinery may be installed at the scrap yard. Personally, I am of the opinion that work should be done at the scrap yard. The shops want their material ready for use, they will not do reclaiming work willingly, and what we do against our will, we do not do well, or cheaply.

Much time is wasted on many of our railways by the office staff in looking after credits for salvage. There may be something in this for the department, but there is nothing in it for the company. Receipts from scrap yard can go in as extra revenue, and be credited to departments on percentage basis. Good material may be charged back at the price of new when ready for use, or if it is worked over, at a price agreed upon.

APPLYING "SAFETY FIRST" METHODS TO MATERIAL HANDLING

By E. M. Keays

Material Supervisor, Chicago & North Western, Evanston, Ill.

The long and heavy trains of scrap that used to be cleaned up from certain divisions on this road were the subject of many a tale years ago. This is not true at present. Last fall such a train was planned by the operating department on one of the heaviest divisions. The road scrap picked up didn't justify the wages of the train crew. Many of the section foremen said at the time, "If you clean out our scrap bin now, we won't have anything for the regular scrap car next week," or, "If you take away our scrap tools now, we won't have any to exchange with the supply car next trip, and what we can't exchange will be cut off." Nothing could better illustrate the attitude that scrap education has at last produced.

One day last summer, after going over several very clean sections carefully, I came to the end of my work at the last section tool house, just at 6 o'clock, and waited for the section gang to come in on their car. The inside of the section house was another mark of the foreman's workmanship—no "junk" in corners or under the bench, and everything in its place. Before the car was run in for the night, the day's accumulation of small scrap, together with several pieces of car scrap which had been picked up, was unloaded into the scrap bin, and the tools on the car were placed in their racks—everything made shipshape for the next day's work. That's the condition that ought to exist all the time on all sections.

There are, of course, foremen whose very mode of life can be told from their tool houses. There are foremen who "haven't got the time to be bothered with a few old bolts and stuff"—"give me another man and I can do all the fancy work you

want." The scrap propaganda has been one of education for years. Most of the foremen have now been brought up to see that it's easier to bring in the daily scrap than to take the best part of a day cleaning up just before the scrap car is due. A clean tool house, with well-maintained tools, and an ample scrap bin, mean so much towards the efficiency of the section gang that we can't stop to argue about it nowadays. The class of laborers that are employed now only learn by example, and the tool house is both the beginning and the end of every day's work.

Well-maintained tools need not be expensive tools. Storehouses catch a lot of criticism about furnishing the cheapest thing on earth. In three cases out of four it will be found that the loudest denunciation of this kind comes from the foreman who has half the tools on the section in a perpetual state of disrepair. There is a class of foreman who will let his men go thumping over a section week after week on a handcar with loose gears and bearings till the poor old car falls to pieces before he will do ten minutes' work on it. It is his class that keeps better tools off the road.

Some foremen who have learned to be excellent workmen are tough customers when it comes to their "treasures." One foreman had five red lantern globes in his house. Nobody knows how long he had been waiting and carefully ordering these at times when he thought they would slip by to him on requisitions. His excuse was that three years ago the neighboring foreman had borrowed one—"you can't tell when we might need all of these—the station agent might want one, too, some day." But globes cost 50 cents each. Engine tools that are gathered from the right of way are often carefully accumulated and hidden. The problem is to get them turned over to the supply car monthly. If you can't get the foreman to do this voluntarily, you might as well make up your mind to spend the time to make a thorough check of tool houses several times a year.

One foreman had the usual supply of stock rails at his tool house, but also had a multitude of short pieces of all lengths. These pieces were neatly assembled behind the tool house on some old ties, all in the neatest order. Asked about these, he began to be a bit touchy that he was being found fault with, until it was shown to him that in the usual course of events it would be 19 years before his supply of pieces would be used up, and that long before that time he would be on the pension roll, and his side tracks would all be laid with 90-lb. instead of 72-lb. rail. When the money value of those pieces was figured up, and he came to realize that the only dividend being earned was rust, his spirits revived, even when he was told to load up more than three-quarters of it. Tons and tons of steel may sometimes be brought in off the road in this way. Even though a new rail has to be cut occasionally here and there, this will be the cheaper method.

One foreman was very proud of the switch lamps in his yard. He had 31 main line lamps on side tracks in his yard, and one had to admit that they were maintained in a condition to be proud of. He spent so much time on those lamps that this in itself would have been a reason for taking them away. Every engineer coming over those Nebraska plains at night must have been able to see that galaxy of red and green lights for miles. How anybody could figure out which was the main line at night till he got right on top of the switches was a puzzle. Even when presented with this view of the matter the foreman resented being put off with something cheaper—a common side track lamp. When the yard was built a few years before, the construction forces had left these main line lamps, and they were an heirloom. His contention, as far as safety was concerned, was that main line switches were always locked. We showed him one that wasn't. After that those lamps came in very peaceably.

It is easy enough to storm at a foreman, but that method never made good workmen, and they are quite as willing to be good workmen as any other class of men. It is one thing to antagonize men, and to get things done because they know they have to do it; it's another thing to show them that a little daily care towards keeping things in order makes the work easier all around, and is the "right" way to have it done. To do this, not only must one have the co-operation of the roadmaster, but he must make him a thorough convert to the business side of the matter, so that his attitude while among the men is infectious. Some of the best results have been obtained after a quiet walk up the track with a roadmaster and foreman, pointing out each bit of scrap, even as small as a nut or washer, and calling off money values of each as it is passed—"That rod over in the ditch will be worth 90 cents as soon as you send it in to be straightened; that bolt is worth 3 cents now before the thread gets all rusted up," and so on.

Many foremen who do not readily respond to the teaching that scrap is valuable, and for this reason must be cared for, will soon see the point if they are called to account for it as a disfigurement to the section. The men who will leave a drawbar lying out in the ditch day after day are becoming fewer and fewer the more they know that they are certain to be criticized for "that litter out there." Many a man has come away with a different idea of material after he has seen the piles of scrap fed through the reclaiming plant and come through on the other side all sorted and ready for its many uses again.

Because car material coming in off the road is such a large part of all scrap, the car foremen are encouraged to watch for all scrap cars going through to the shops, and to take such material as can be used, or can be repaired locally. All foremen make reports as to what is thus put in service again. This saves much work in the main reclaiming yard, with its attendant congestion of cars there at times, and the double haul on the material. Certain material always finds its way to Chicago as the better facilities at the larger point enable cheaper work. The figures on the outside reclaim work are published monthly, and are instructive, both to the department officers and to the men who have been doing the work at the different points.

It has always been our policy to welcome suggestions and criticism of material and supplies. This is not meant to be an encouragement to the great army of kickers, but if a man has anything worth saying we want to hear it as soon as we can. The safety first idea again emphasizes the wisdom of an open policy of this kind. Nine reports about defective or unsatisfactory material may not amount to much, but the tenth may be valuable, and very often the situation can be remedied without expense—very often with a distinct saving.

Repeated instances like this ought to show that the only way that permanent results can be secured, and the only way that a system can be started that will become self-running, is by keeping at it. At times the men on the road are inclined to laugh at what they call the Chicago idea of co-operation: the best way to get a job done is to get the other fellow hypnotized into doing all the work while you do the bossing—victory for co-operation. There was a division storekeeper who was reproved for the untidy state of his territory. His reply was: "Oh, well, you simply can't do anything with these fellows. They don't know what you want, and they wouldn't do it if they did." Evidently this man had failed to hypnotize. Most of the sections on the division were worked by laborers who seem to understand 25 words of English, and who never get beyond. Had the same method been applied to him in his early days as he applied, he would never have graduated out of first grade in school. As a matter of fact, he had been carefully nurtured through 13 years of school, and had then been on the railway for 14 years. Then "it's no use" if some Italians can't pick up a new method in 15 minutes. This doesn't mean that he is to treat men to a pink tea before starting work with them, either.

Getting material on the ground is simple beside the problem of watching its use. The foremen keep their own material books and forward them monthly, with their coming month's orders, to the roadmaster. These books are checked; if they are not, material will disappear without a proper accounting, and from these books the division accountant makes up his material accounts, rail and tie statements, etc. The supply car takes care of standard material after requisitions have made the due rounds for approval. Rail and large orders for fastenings are ordered

through the assistant general manager. The supply cars, each of which can cover three divisions a month, are handled on the way freights according to regular schedule, and the rule of exchange of tools and other material is insisted upon. Where way freight work is heavy, the scrap cars can be handled as trailers to the supply car. If on a light division such work will delay the train, a separate scrap car is started out of designated points on a merchandise schedule. The division storekeepers reclaim what they can from these cars; the rest is sent to the general scrap yard. A distinct saving can be made in careful loading of scrap. Not only is a carelessly loaded car an annoyance which takes twice as long to unload as it should, but at times of unavoidable congestion in the scrap yard, or at times when there is a car shortage, a purely avoidable loss will accrue. This may not be appreciated by smaller points that handle a few cars of scrap a week, but at a large point as much as 50 per cent greater speed can be made in releasing equipment.

Obsolete material on the road is not as pressing a matter as in the locomotive and car departments, where a type may vanish in a few years. As the lighter rail gradually sifts down to the country divisions, where it still has a long life ahead of it, other material can follow. But don't be so thrifty that everything has to be used up. It's cheaper to buy new angle bars, even for second-hand rail, than it is to have several miles of battered joints. Get all your signal department material under a storekeeper and save money.

The safety first movement wasn't built up in a day. That idea is being emphasized all the time—when it ceases to be, results will stop. Take care of the small accidents and get the habit, and then the large ones won't happen. How many of the men who formerly were too busy to be bothered with the preventing of small accidents are yet too busy to be bothered with saving pennies so that the dollars will take care of themselves? How many of these men are still in the class that will innately fight the very idea expressed by the words material economy?

HANDLING BRIDGE DEPARTMENT MATERIAL

By S. C. Tanner

Master Carpenter, Baltimore & Ohio, Baltimore, Md.

While in general, the policy of keeping stock material at one place for distribution is a good one and prevents a lot of surplus and obsolete material accumulating along the line, I find that much economy can be gained in the bridge and building department by giving the foremen on outlying districts a lumber or material car with their camp equipment. This should be a box car of the non-revenue type, but suitable to keep the stock dry and in good condition and capable of being moved over the road in a train. The foreman should see that this car is well stocked at all times with material of various kinds suitable for taking care of emergency repairs to platforms, walks, floors in buildings and on public road crossings and bridges, so that he can make repairs on short notice without waiting to order materials from the storekeeper or from division headquarters.

Such a car is also valuable in storing the surplus material which usually accumulates when finishing a job and oftentimes is a source of supply to finish a job when the original bill runs short, thus preventing the making of a special shipment of a small amount from the storekeeper with the necessary delay. It can also be used to good advantage in taking care of perishable material, while on small jobs, such as cement, lime, paint and glass. The material supply train which passes over each division each month restocks these cars and takes back into the storekeeper's stock any surplus material accumulated, thus avoiding overstocking the cars on the road.

The material supply train is in charge of a representative from the stores department. All material to fill orders accumulating during the month which have been officially approved, is delivered at the place where it is to be used, and at the same time all the scrap along the line is gathered up and taken to division headquarters. Here it is carefully sorted. That which is suitable for future use is placed in stock; that which can be reclaimed by repairing is sent to the shops and repaired and then placed in stock for future distribution; and the real scrap which is not fit for future use is classified for sale.

When any large quantities of material or any special materials are needed, a requisition is made, and when approved, the order is placed with the purchasing agent, who makes the purchase and the material is delivered where it is to be used, thus saving extra handling and delay. All returnable worn-out material or supplies, tools and agents' supplies must be returned to the supply train before new supplies are issued. Old and second-hand bridge material is carefully guarded by the master carpenter and returned to his headquarters where it is stored for future use in building bulkheads, for blocking or temporary use as it is needed, thus saving the new material and getting full value for the old.

Much economy is derived by the proper ordering of material, and especially in the bridge and building departments. I find that it is a very common practice with foremen to order lumber in even lengths, and usually 14 ft. or 16 ft. long. This method of ordering is expensive and many times is the cause of much delay in furnishing the material. Every order should specify the exact size of lumber required, giving the length, width and thickness, so that the storekeeper can substitute other sizes which will cut to advantage. As an example, many times a lot of lumber is needed for repairs to a platform 5 ft. wide, but the foreman orders 2 in. x 12 in. plank 16 ft. long, figuring on cutting it in three pieces. This would leave 2 ft. B. M. waste, but if ordered in exact sizes, the storekeeper could furnish it in 5 ft., 10 ft., or 20 ft. lengths and would not have any waste. He could also furnish it in any width to suit the needs. It is best to let the storekeeper stand the waste.

In maintenance of way, we find as much if not more true economy in the conservative use of material as in its distribution. The right kind of material should always be used in the right place, as high-priced material is often used, when a cheaper grade would suit the purpose just as well. For example, cheap material should be used in false work or work of a temporary nature, or in permanent work that is submerged in water where it is not subject to depreciation other than decay, while, on the other hand, in permanent work where timber or other material is exposed to the weather, or other destructive elements, the very best should be used.

In wooden water tank construction, the hoops are the vital part, and all depends on them for safe maintenance. Steel hoops are much used in late years, but we find that they are far from being reliable, as their life is usually from four to eight years, and in some localities where there is salt air, their life is very short. They are used as a rule on account of their cheapness, but it is false economy to use them at any price. The very best wrought-iron hoops should be used on all water tanks, as from our experience a service of over 20 years leaves the wrought hoops in good enough condition to place on a new tank.

The best paint should be used on permanent work, but there are many times that a cheap paint would last as long as needed and reduce the cost. When asked to furnish paint for tie spotting last spring, I requested permission to prepare a cheap paint for this temporary work, which request was quickly granted. I then had the paint prepared by the following formula: Mix thoroughly together 30 lb. of white lead, 3 gal. of raw oil, and 1 qt. of dryer, then stir in 120 lb. of silica and ½ gal. of benzine. This will make 10 gal. of thick white paint, semi-paste, which will take up in use 6 gal. of benzine or any light evaporating oil; this paint will weigh about 17 lb. to the gal. We use the benzine or gasolene to make the paint short and sticky. When prepared in this way it will cost about 30 ct. per gal, compared with white lead and oil at a cost of $1.25 per gal. It will last one year in good condition, and as six months is all that is usually required, the saving on a large railway system is important. The tie spotter should be instructed to keep this kind of paint in the paste form, and when using it, should keep with him a small bottle of benzine or gasolene to thin it as needed, thus saving loss by evaporation.

In the framing of all timber, care should be taken to construct the joints so that they will drain themselves and dry out. To

paint the joints of new timber which contains sap, is poor economy, as it will not dry out and soon produces decay. All timber should be provided with a free circulation of air. In a six-year test, we find that crude oil mixed with a little lamp black to make it a thin paint, applied once a year, has proved the best resistant to rust of steel where exposed to salt air and coal and coke. It is cheap and quickly applied, and while these beams six years ago were a solid mass of scale, they are now entirely free from scale. Paint would not stick to these beams, due to the friction of the coal and coke, but the crude oil will not rub off and it therefore preserves the steel.

EDUCATING FOREMEN TO THE VALUE OF MATERIAL

By E. B. Fithian

General Roadmaster, St. Louis, Iron Mountain & Southern, Little Rock, Ark.

For the past several years the tendency has been to concentrate maintenance of way material at some central point convenient for handling and forwarding to location where needed, within the field of operation. These concentrating points are naturally under the supervision of the supply or stores department, which handles not only the requirements of the maintenance of way department, but of the other departments as well. The plan does away with the necessity of carrying material in stock on the line for new work and ordinary repairs, excepting at important junction points and in heavy terminals, where considerable inconvenience in operation might be experienced if prompt repairs are not made.

The success of this plan depends on the following eight fundamental principles: First, close watching and keeping up stock requirements of standard material. The supply department should encourage frequent conference and inspection of stock by division officials to assist in keeping in touch with division requirements. Second, furnishing correct detailed information by division officers in ordering material. Third, furnishing promptly proper material when ordered. Fourth, proper facilities for storage and prompt handling of material. Fifth, co-operation of the operating department in furnishing equipment for loading material, and moving it after loading. Sixth, education of foremen and district officers to foresee their needs, and order material sufficiently in advance of requirements, thus permitting the supply department to handle economically in connection with other work. Seventh, never order material by wire, except where prompt movement is required, and such orders should always be given preference. Confirm all such orders by regular requisitions. Eighth, never make more than one requisition for the material required for each piece of work; and, if necessary to hurry, trace same by referring to previous requisition.

The principal duty of a division maintenance of way officer is the distribution of forces and the provision of proper material for carrying out work. Requisitions for material should receive his close scrutiny for checking and following up to destination. A big mistake often made is the leaving of such work to subordinate officers or clerks, which results in improper information being furnished on requisitions, and the shipment of wrong material. This of course means delay to the work, extra cost, and often in foremen improperly carrying out the work, by taking for granted that material furnished is the material he is expected to use and making the best of it.

Over-stocking in material often occurs when information is demanded of division and other officers before they are in a position to furnish such information intelligently; for instance, requirements for bridge material, prior to inspection and approval of program. In other cases it is due to the lack of careful study and thought of conditions and requirements. Again, information is too often obtained from parties not in a position to supply such information correctly.

The caring for and collecting of maintenance of way scrap has been principally a question of education, on the road with which the writer has been connected for the past six years. Both colored and white foremen did not seem to realize that the railroad was interested in the saving and collection of all material that had a value as scrap, if not again usable. The men, of course, were less interested in this matter than the foremen, and it took time to instill in their minds that the proper place for non-usable material was in the scrap pile, at the tool house, and not over the banks, or in the nearest stream.

The running of scrap cars over the entire division each month, collecting the scrap at tool houses, has its effect in keeping before all foremen and men that the collection of scrap is a matter of interest to the entire division. We also find it necessary to point out scrap where noted and insist on its being kept cleaned.

All scrap material collected on this road is turned into the supply department, which, in turn, sorts and classifies it, saving for further use material that can be used again. Proper credit is allowed the division from which the material is received.

The finding and reclaiming of usable material, shipped with the scrap, requires an experienced and competent man. He should be conversant with all classes of material and tools, and know what is obsolete.

I find it a good practice never to permit a supervisor, roadmaster or foreman to consider a piece of work complete until all material left over in doing that piece of work is picked up and cared for, whether it is new or regular maintenance work.

TRUE ECONOMY IN HANDLING MAINTENANCE MATERIAL

By J. J Hess

Assistant Engineer Maintenance of Way, Great Northern, St. Paul, Minn.

A very great saving can be accomplished by proper distribution of materials, saving expense of rehandling and delays which occur thereby. It has been found good practice when relaying rail to have the old rail marked in accordance with classifications so that the various kinds required on other portions of the line can be loaded at the points released, thus saving rehandling. All rail fastenings and fixtures recovered are sorted, that being fit for further use separated and shipped to stores as second-hand material, and remainder as scrap, receiving proper credit from the stores department in return.

No material is kept on hand other than what is considered absolutely necessary for emergency purposes at division headquarters or some central point, and this is in charge of the stores department. Supply cars are run over the line once a month for the purpose of delivering material on requisitions which are always closely scrutinized to prevent any unnecessary accumulation. It is the duty of the roadway department to keep close check of what is on hand, in addition to showing this information in the requisition book. All surplus and worn-out materials are also loaded and taken to the storehouse at this time, so that there is never any opportunity to make a special cleanup.

The proper distance between post rails would seem to be governed by the density of traffic and the condition of the rail. Two miles would be a long ways to go for a rail in winter time during such storms as are experienced in the northwest. It is conceded to be false economy not to have good and sufficient tools and supplies, and where a surplus is found to exist it would seem chargeable to lack of proper supervision.

There is a danger of going to extremes in economizing on material. The progress of work is likely to be hindered if materials and supplies are not furnished when requested. It is quite often the case that a lack of a switch point necessitates the removal of stock rails. Frogs, crossings, etc., when permitted to remain in use after becoming too much worn are apt to cause derailments and sometimes cause flanges of wheels to break due to contact with fillers, castings, etc.

By permitting a rail to remain in track when battered at the end, the adjoining rail naturally becomes battered. If only three bolts are used where four are required, the extra strain is apt to cause breakage. The same thing applies to ties, piles and, in fact, almost everything used in roadway.

Making a Double Track Fill Nearly 185 Ft. High

The Bessemer & Lake Erie Is Using Large Quantities of Steel Mill Refuse in a 1 1-2-Mile Improvement

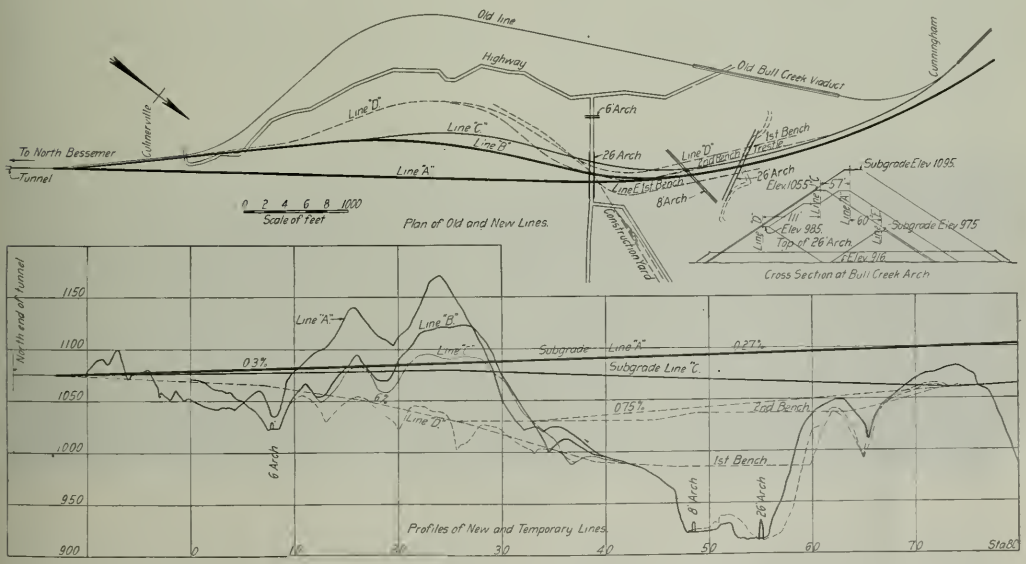
The double-track improvement which the Bessemer & Lake Erie is carrying on between Culmerville, Pa., and Cunningham, a distance of 1½ miles, includes a fill across the valley of Bull Creek having an ultimate maximum height of nearly 185 ft., which is thought to exceed that of any railway em-

Filling the Trestle on the Second Bench

bankment previously constructed in this country. This improvement, as it is being carried out at present, provides a new direct double-track line replacing one of the two remaining single track sections on the company's main line between North Bessemer and Conneaut Harbor; it is designed to form a part of a future reduction in northbound grade which will effect important economies in operation, and it serves as a means for the disposal of a large amount of steel mill refuse.

The disposing of some 100 to 150 carloads of slag and other refuse material daily from the steel mills in the Pittsburgh district which are served by this road must be considered as one of the economical reasons for building the Culmerville fill. As the road is thus enabled to obtain the material already loaded on cars by the steel works with a road haul of about 15 miles, and as substantially all this material has been through the furnace and makes an embankment more solid than could be obtained with excavated material, although the fill is somewhat longer on this line than on a line with the cuts and fills balanced, the results are in favor of this line. The first trestle was 65 ft. high. This was filled and then the track was raised about 10 ft. when another trestle 45 ft. high was driven on top of this new fill. The upper trestle did not go out of line or surface while being filled. Fills 80 to 100 ft. high made from excavated material in this vicinity have all given trouble for some years, either on account of sliding or the upper part of the fill settling down into the bottom part. This waste material has no tendency to slide, however great the weight put upon it, which is a great advantage when the fill is to be about 180 ft. high.

In common with other ore-handling roads in this territory, the Bessemer is continually seeking places along its line where this material can be used economically without wasting and with resulting advantage to the road. The refuse must be removed from the mills daily to prevent serious interference with their operation, and, as it is handled in the same cars that bring in ore, it is essential that it be unloaded promptly in order to release the cars. For this reason several available places are usually kept ready at all times so that when one filling place is completed or cannot be used without wasting the material, as, for instance, when additional trestles are needed or a change in construction



General Details of the Improvement on the Bessemer & Lake Erie Between Culmerville, Pa., and Cunningham

track layout must be made, the force can be moved quickly to another point and the disposal continued without interruption.

In considering plans for double-tracking the section between Culmerville and Cunningham a new alinement was sought, first, because the curvature and grade on the old line are not up to the standard which is desirable for the company's new work, and, second, because the 135 ft. steel trestle which spans the Bull Creek valley has its footings on clay, making it practically impossible to fill the structure without rendering it unstable during the operation. A number of new lines were run and estimates prepared, resulting in the final adoption of the lines shown in the accompanying plan and profile. The line A, with its long tangent, 48 min. curve and uniform grade of 0.27 per cent, is the ideal line, but it does not connect with the old line at Cunningham and is only considered as a part of the further improvement extending to the north. The same is true of line B, except that it provides an alternate location at the south end with smaller quantities of excavation. The line C, with easy grades and curves, connects with the old line at Cunningham, and since the fill required for this line forms a part of the big fill necessary on line A, as shown in the cross-section, line C can be considered as one of the stages in the construction of the ultimate line. The double track fill on line C between Culmerville and Cunningham contains about 1,600,000 cu. yd.

The reduction in northbound grade which will be secured in the construction of line A and its proposed extension to the north, together with similar reductions that can be made at several other points, will make possible the operation of northbound freight trains under the pusher system, instead of double-heading as at present, thereby materially reducing the engine mileage. This possible advantage is increasingly important as the development in the coal mining industry between North Bessemer and Culmerville proceeds, considerably increasing the amount of northbound freight traffic.

The first work on the Culmerville improvement was begun in September, 1912. The temporary construction line, marked D on the accompanying plan and profile, was first built on a 3 per cent. grade from the old line to the south end of the low level trestle. This trestle, which had a maximum height of 70 ft., consisted of four-pile bents braced in towers and built of long-leaf yellow pine for the longer pieces and of maple or native wood for lengths under 40 ft. This first trestle was connected up September 25, 1912. Meantime, work had been under way on the construction of the 26 ft. arch 716 ft. long which carries Bull Creek under the new fill, and an 8 ft. arch 678 ft. long which carries a small tributary creek just south of the larger one.

The first trestle was filled by April, 1913, and a second trestle on the same level was started in June and connected up in August. This trestle was filled by November and during the winter the work of spreading between these trestles and jacking up the tracks about 10 ft. was continued. In the spring a high level trestle 45 ft. high was driven in the dump on the line C, being connected up in April, 1914. This trestle was filled by June and since that time work has continued in spreading on both the upper and lower levels within the limits of the big fill. The work on the upper level is calculated to provide a temporary uniform grade of 0.75 per cent, the same as the northbound grade on the old line, so that an alternate line will be ready for operation for through trains at any time that it may be needed. The next step will be to raise this level to the grade of line C, and when the complete development to the north is authorized the fill can then be raised to the grade of line A.

A Side View of the Second Trestle on the First Bench Showing 26-ft. Arch Carrying Bull Creek and the Old Viaduct in the Background

All of the work in connection with this improvement is being handled by company forces under the engineering department, of which H. T. Porter is chief engineer. This policy of handling improvement work by company forces is well established on the Bessemer, as the road has been practically double-tracked in the last eight years by that method with complete satisfaction to the company's officers. The Culmerville work required an average force of between 125 and 150 men and a maximum of about 200. The filling gangs consisted of from 30 to 50 men, the foreman of each gang reporting to a general foreman in charge of the work train and the unloading of material, who reports to the engineer of track. Similarly, the foremen of trestle and concrete gangs report to a general foreman, who in turn reports to the engineer of bridges.

Panorama of Big Fill Near Culmerville During the Filling of the Temporary Trestle on the Second Bent

The filling material is brought in full trainloads by road crews who set it out in sidings along the old main line and pick up a load of empty cars that have been placed in these sidings to go north to Conneaut Harbor for ore in the summer or back to the mills for refuse, or to the mines for coal in the winter. About 125 cars of material are received daily on this work. The loaded cars are handled from the sidings along the main line down to the dumping trestles and the

Looking Along the Fill Over the First Temporary Trestle. Second Trestle on First Bench at Right and Old Viaduct at Left

empty cars are handled back to the sidings by one work engine. Additional storage tracks, with a capacity of about 85 cars, are provided along the construction line D for storing loads and empties.

During the filling of the two low level trestles and the spreading between these trestles, all loads were handled over the construction line D, approaching the dumping trestles from the south, and the empty cars were removed by the same route. On the completion of the upper level trestle a construction track was laid to connect the north end of this trestle with the old line near Cunningham and the loads were then handled to this upper level from the north end and the empties removed at the south end. More than 50 per cent of the material must be shoveled from the cars as the engineering department has no control over the class of cars in which the refuse is loaded. In order to keep down the dust during this unloading, water tanks, which are filled by pumping from the creek below, were located along the approaches to the trestles and all material is wet down as the cars are pushed slowly past the tanks. In addition to the two concrete arches carrying the creeks under the big fill, a 26 ft. arch 311 ft. long is required to carry a highway near the south end of the fill, a 6 ft. arch 220 ft. long carries a small stream under this highway, a 6 ft. arch 174 ft. long was required just north of Culmerville, and a highway crossing was also built near Culmerville. The total yardage of concrete required for these structures was 18,970. All of these structures are of mass design.

The two creek arches under the big fill, which contained over 12,000 cu. yd. of concrete, were placed from a mixing plant located near the viaduct on the old line. The concrete materials were dropped through the viaduct into storage bins feeding to a one-yard Smith mixer. The mixed concrete was elevated to a bin holding two batches, from which it was dumped into a one-yard car running on a small trestle built over the arch forms the full length of the culvert. This car was operated by a cable and hoisting engine and could be dumped at any desired point along the work.

FELT TIE PADS

Tie pads of felt, which are used to some extent on European roads, are being tested by the New York Central, the Pennsylvania, and the New York subway. These pads are manufactured by the Q & C Company, New York, of imported cow hair, which is saturated with a special tar. They are made in three thicknesses, one, two and three-ply, the latter being about ½ in. thick. They are placed between all tie plates and the ties to absorb the shock, preserve the tie and particularly in terminals, to eliminate the noise. The thinnest pad is generally used in Europe, where one company that has used several million per year, reports that its ties when so protected last one-third longer. The pads are made about ⅛ in. smaller all around than the plates to improve the appearance, as the edges would become ragged if they projected beyond the metal plates.

Panorama of Big Fill Near Culmerville During the Filling of the Temporary Trestle on the Second Bent

The New York Central installed a number of these pads in April, 1911, on tracks in the Grand Central Terminal, in which the rail is carried on wooden blocks imbedded in concrete. Smooth bottom tie plates are used and the rail is held in place with screw spikes. The first pads used were two-ply, but later installations have been made with three-ply pads in order better to absorb the shock. The first pads installed are reported to retain their ability to perform this function and these pads have not shown much evidence of wear.

Raising and Shifting a Six-Track Main Line

A Description of the Manner in Which the Track Work Was Handled Under Traffic on a Very Busy Road

By W. F. Rench
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In addition to the interesting structural and architectural features of the improvements now being made by the Pennsylvania at its North Philadelphia station, which were described in the *Railway Age Gazette* of April 3, there were many and varied problems presented to the maintenance department for solution during the progress of the work. Thus, although the improvement extended over but one mile of line, it included typical problems of alinement, grade, switch connection and bridge adjustment, and involved the raising of a six-track main line system and numerous connecting yard tracks under a heavy traffic.

The object of the improvement was three fold: First, an increase in facilities by providing an additional track for passenger traffic in each direction with high island platforms and an additional drill track on each side of the main track layout, the one on the westward side being used also as a freight running track; second, the reduction of the grade at the station from 0.7 per cent to 0.3 per cent to eliminate delays caused by the difficulty of starting the heavier trains on the former grade; and third, the necessity of renewing three bridges in this section which were inadequate to carry the increasing train loads.

The ideal maximum grade on the division is 0.6 per cent. By the use of this grade west of the station between Seventeenth street and the crossing of the Philadelphia & Reading, with a vertical curve directly over the P. & R. bridge, the increased depth of floor system required for the new bridge at the latter point was secured. The 0.3 per cent grade adopted for the greater portion of the station platform length provided the greater depth of floor necessary for the new bridge over Broad street and supplied some additional headroom for the street. The continuance of the 0.6 per cent grade east of Broad street connected at Allegheny avenue with the opposing grade of 0.1 per cent by a long vertical curve caused the greatest problem in the whole elevation. The maximum change in grade was 3 ft. 10 in., and the average 3 ft. The existing bridge at Germantown avenue was raised to the new grade and later renewed and the Twelfth street bridge was encased in concrete to carry the deeper roadway.

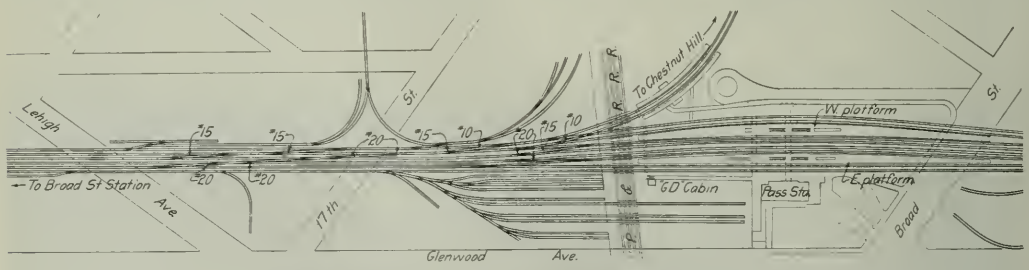
The raising of the main and yard tracks was an interesting problem for the maintenance department on account of the density of traffic. The week day passenger schedule included 200 trains every 24 hours, one-half of which moved between 7 a. m. and 5:30 p. m., during the working day. The freight traffic which was handled almost entirely upon the inner tracks amounted to 15 trains in each direction during the same period. Some of the more important freight trains were run upon the outer tracks, but generally at times when the greatest intervals occurred between passenger trains.

The extent of this traffic practically precluded any raising of those tracks on week days except that on No. 4 track between the hours of 6:30 a. m. and 8:30, two one-hour open periods occurred which were duly utilized. The Sunday schedules not only carried one-third fewer trains, but also had longer open periods. These were necessary to provide the opportunity not only to make a substantial lift, but also to unload on the main tracks the material necessary for the raising.

The yards shown on the accompanying drawing are in constant use on week days for a very heavy local business and for the considerable traffic at the grain elevators, but are idle on Sundays. For this reason Sunday was also the only day when certain of these tracks could be raised.

Gangs furnishing a total of 100 men for the main tracks and 60 for the yards were used for this Sunday work, a different lot of men being used on alternate Sundays. An itinerary was planned for the work train which provided for periods varying from 30 to 45 minutes successively upon No. 4 and No. 1 tracks as opportunity offered and at other times in the yards on either side, care, however, being always taken to utilize intervals in the late afternoon for dumping material necessary to back fill the main tracks which had been raised during the course of the day. These movements were facilitated by the presence of crossover switches at each end of the work.

During the time that actual raising was in progress all trains were slowed by flags, to which attention had been drawn by a general notice. Upon completion of the day's work the tracks were left in fit condition for regular service and at no time was any speed restriction laid by order, nor was any necessary.



The New Track Layout of the Pennsylvania at North Philadelphia

The aim of each Sunday's work was to attain an average raise of one foot through a half mile of both passenger tracks, which with the settlement from traffic of the following week netted about 9 in. of permanent lift. The operation on week days consisted mainly of moderate raising of the freight tracks also under protection of a flag and of the yard tracks whose use could be spared and of such surfacing of the tracks already raised as might be necessary.

The usual consumption of material was about 7 cars each week day and 18 cars on Sunday. In all, 610 cars of cinders and 155 cars of stone were required for the work. The material was all supplied in hopper bottom cars, which greatly facilitated the unloading.

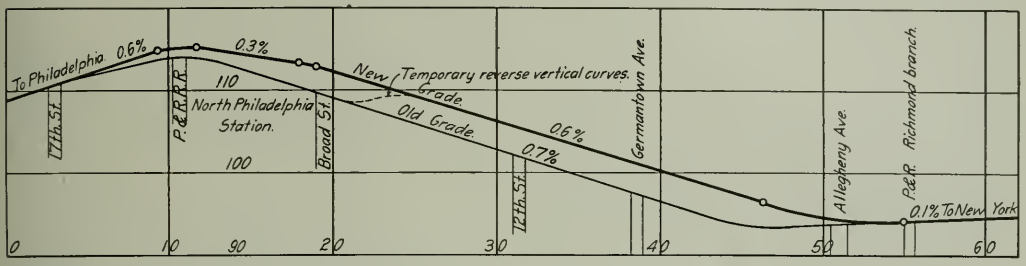
The grade of the main track system had to be adjusted to the

grade of the yard and elevator tracks connecting with it. A crossover was projected between tracks 4 and 5 just west of Twelfth street. This crossover, however, would have prevented the separation of grades between tracks No. 4 and No. 5, which was the only means possible of connecting No. 5 track with the yard tracks without increasing the grade of the latter beyond the allowable maximum which already existed. A solution to this problem was found by moving the crossover to an almost equally satisfactory location near Broad street. An 0.8 per cent grade was then established for No. 5 track, between Broad street and the junction with the yard track near Twelfth street. This distance is just half the maximum train length and by using a 0.6 per cent grade eastward from that point the resultant grade for the maximum train length was kept at 0.7 per cent, which was considered the maximum permissible for this track, which is used rather frequently as a freight running track.

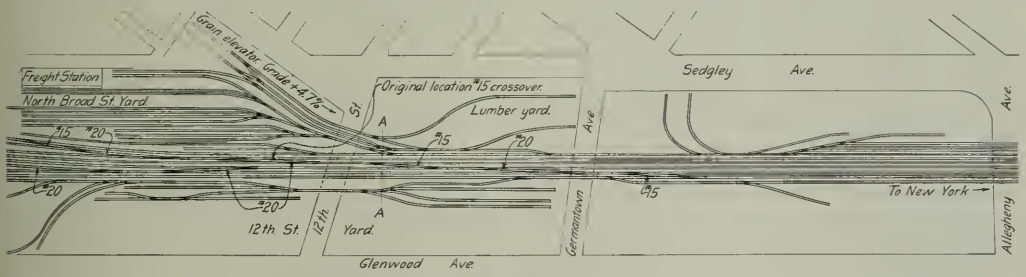
This separation of grades between tracks No. 4 and No. 5 required that the latter should be as much as 20 in. lower than No. 4, but as this is little more than the depth of standard shoulder it has worked no disadvantage from the standpoint either of operation or maintenance. The No. 0 track was also placed 20 in. below the main track grade, and this arrangement was of very great advantage in establishing proper connection with the various yards and industrial sidings, many of which were on trestle work. No greater grade than 2 per cent was required, and all intersections were provided with suitable vertical curves.

A special problem was presented in the raising of the four-track bridge carrying yard tracks across Twelfth street. The elevation of the southerly track on this bridge was fixed by the connection which this track makes with the main line immediately east of the bridge. A similar elevation on the northerly track would have required a grade of 4.7 per cent on the lumber yard lead. As the business of this industry amounts to about 600 car loads per year this siding connection could not be lost, and it was finally decided that a moderate downward inclination of the bridge toward the north could not introduce any great disadvantage either in operation or maintenance, and would allow the northerly track to be lowered enough to secure a 2 per cent grade instead of the 4.7 per cent.

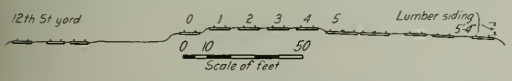
The realinement of tracks to establish the reverse curves, made necessary by the widening of the main track system at the station platforms, involved the substitution of a No. 7 frog for the original No. 8 in track No. 3 and of a No. 10 in track No. 2 to keep the resulting curvature at both ends of the new crossover essentially that of a No. 8. Realining of track No. 1 through the No. 15 crossover required one end of the crossover to be changed to a No. 24 to render the resultant curvature the same as that of the original No. 15, and thus permit the continuation of the 30 mile per hour speed limit through the crossover. These two cases illustrate the advantage of combining odd numbers in the same crossover when occasion demands.



Profile of Grade Revision Through North Philadelphia Station



The New Track Layout of the Pennsylvania at North Philadelphia



Cross Section on Line A-A in the Accompanying Plan

The operation of shifting the two Chestnut Hill branch tracks to their new positions on the new bridges 32 ft. north of the old location and of shifting one of the passenger platforms which forms a part of the improvement, was carried on by a special organization. The westward traffic on this branch, excepting one train which was run against traffic, ceases at 11.20 p. m. Two gangs of men were employed for this work, one working from 10 p. m. until noon and the other from 6 a. m. to 8 p. m. The westbound track was laid during the night, while there was no traffic, and in the morning both eastbound and westbound movements were made over the one completed track, while the relocation of the eastbound track and platform was carried on.

Although it would have been possible to establish a circular curve between the Philadelphia & Reading and the Sixteenth street bridges, it was decided to increase the curvature at the platform in order to continue a curve of larger radius at Sixteenth street, the curvature gradually increasing from this point

to the platform. This arrangement is of benefit to operation as the trains naturally go into the station under some headway which must gradually be reduced to a stop. The curvature varies inversely as the speed, giving the curve somewhat the form of a parabola.

On account of the complicated layout between Seventeenth street and the P. & R. bridge, special care was necessary in shaking out the switch connections and the new curves on the Chestnut Hill branch and the interchange sidings. A drawing was prepared with extreme accuracy to a scale of 32 ft. to the inch, using very thin lines for the tracks. From this drawing dimensions were scaled as required, the result being very satisfactory. The detailed lining of the various curves as well as of the connections was obtained by the use of a string.

Although the force of signal men and track men frequently reached as high as 250, and these men were required to work on tracks which were handling 40 branch line passenger trains in addition to the 100 main line trains, 35 freight trains and almost continuous drill movements on No. 0 and No. 5 tracks, the work was accomplished between March 5, 1913, and September 1, without a casualty of any kind. This was attained not by slowing down the traffic, but by unceasing vigilance and fidelity to established rules of safety. The work was carried out by close co-operation between the chief engineer's organization and that of the division superintendent.

COMPARATIVE TESTS OF BUMPING POSTS

A series of comparative tests of car stopping devices was recently conducted in Chicago by two important trunk line railroads. The report covering the first cost, cost of installation and relative efficiency of these devices, as indicated in the tests, has just been completed, and is abstracted below.

Eight devices were selected for test, representing, as far as practicable, the three general groups in use. Three different principles are used in the design of these three types, as follows: First, blocking the wheels of a car, the arrestive force being transferred through the center pin and center fastenings to the car body; second, direct contact of the car coupler with a solid object, the blow being transferred directly to the frame of the equipment and the stopping device; third, the same as the preceding, except that some portion of the momentum is absorbed by the device. In these tests the first and third groups were represented by one device each, the remaining six being classed in the second group.

The method of testing, as decided upon by representatives of the companies furnishing the devices, was to allow 10 loaded cars rolling free to strike them at a speed of 10 miles an hour. In the first test the number of cars was reduced to 7 and the velocity developed amounted to 7.2 miles an hour. The result of this test was so disastrous that all later tests were made with one loaded car rolling free striking the device at a velocity of from 6 to 8 miles an hour.

The results cannot be considered conclusive, as in all cases the tests were too severe, either destroying the devices or damaging them so badly as to make them of no further service without heavy repairs, except in two cases in the second group, in which there is little doubt that if a second trial had been made they also would have been seriously damaged.

The showing made by the device in Class A indicates that the principle upon which it is designed, namely, stopping the wheels, is wrong. While the wheels may be successfully stopped, the strain on the castings and center pin from the momentum that may be developed is too great to stop the car without some destructive action. In the design of devices in Group B, no provision is made for the motion of the device after it is struck by the car, and the devices have not sufficient strength to resist the great shock which at times they may be required to take up. Even if this strength were provided the shock would manifestly be too severe upon the equipment. The tests indicate that better and safer results will be obtained in switching yards by placing something in front of the device, such as an earth mound, for example, to partially absorb the blow caused by the contact of the car and the stopping device. While the device in Group C is more nearly correct in principle, the tests showed it to be structurally weak, and, although reliable figures are not obtainable as to the cost of its construction and installation, it is evident that, at best, the results obtained are out of proportion to its first cost and maintenance.

The report calls attention to the need for a device that will combine in its design and construction the ability to absorb the blow delivered in general switching service without endangering the equipment. It is recognized that this result cannot be attained at the prices now paid for stopping devices, but it is evident that the decreased cost of maintenance would warrant a much larger expenditure in first cost for such a device than the prices now currently paid.

In order to get comparative costs, all of the stopping devices were installed by the same men and as nearly as possible under the same conditions. The original cost varied from $45 to $60, and the cost of installation from $6.25 to $11.55. Eliminating the first test the impact in foot tons per second developed varied between 552 and 880.

THE ROADMASTERS' CONVENTION

The thirty-second annual convention of the Roadmasters and Maintenance of Way Association of America will be held at the Auditorium Hotel, Chicago, on September 8-11, inclusive. The widespread interest in the work of this association indicates that this will be one of the most successful conventions in its history and a large attendance of roadmasters and supervisors is expected. The following is the program:

TUESDAY MORNING, 10 A. M.

Convention called to order by President T. F. Donahoe.

Addresses of welcome, on behalf of the city of Chicago, by Mayor Carter H. Harrison; on behalf of the railroads by W. G. Bierd, president, C. & A., and R. H. Aishton, vice-president, C. & N. W.; on behalf of the Track Supply Association by President Walter H. Allen.

Three-minute addresses by past presidents.

AFTERNOON

Reading of committee reports and general discussion.

WEDNESDAY MORNING, 10 A. M.

Reading of committee reports and general discussion.

AFTERNOON

Reading of committee reports and general discussion.

THURSDAY MORNING, 10 A. M.

Reading of committee reports and general discussion.

AFTERNOON

Reading of committee reports and general discussion.

FRIDAY MORNING, 10 A. M.

Election of officers.

Reading of committee reports and general discussion.

Among the subjects on which committee reports will be presented are: New and improved manual and power driven track tools; the proper organization and economical use of labor and material for safe maintenance of track; the proper method of rail renewals; the proper type of track accessories, and cleaning and policing the right of way from the standpoint of safety and economy.

The third annual banquet given by the Track Supply Association will be held in the Auditorium Hotel on Thursday evening. Among the speakers will be A. W. Thompson, vice-president of the B. & O.; A. T. Hardin, vice-president, N. Y. C. & H. R.; E. F. Wendt, member, Board of Valuation Engineers, Interstate Commerce Commission, and T. F. Donahoe, president of the Roadmasters' Association.

The Track Supply Association will hold its annual exhibit at the same time and present indications are that the number of exhibitors will exceed even that of last year.

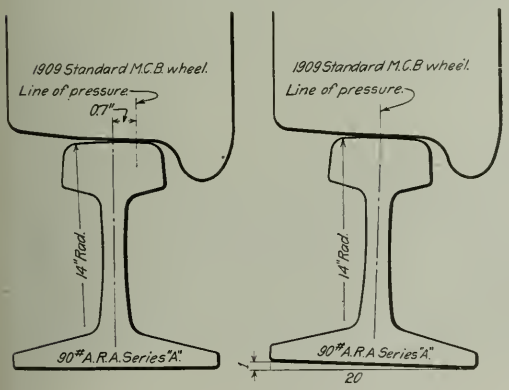
Recent Tendencies Regarding the Canting of Rails

A Discussion of This Subject with a Resume of the Practice of Twenty-four Representative Roads

The rail problem has become one of primary importance within the past few years and all classes and causes of failures have been carefully studied. Prominent among the types of failures is that termed "head" failure, which includes nearly 50 per cent of all failures. Among the contributing causes of head failures is the unsymmetrical loading of the rail. The A. R. A. sections now widely used have a radius of the top of the head of 14 in. The present standard coning of car wheels is 1 in 20. As a result, the line of contact of a *new* wheel on a *new* rail is about ¼ in. from the center of the rail on the gage side. The application of the wheel load to the rail at this point, therefore, introduces shearing and bending stresses in the rail in addition to the direct load.

To overcome this unsymmetrical loading it has been suggested that the coning of the wheels be reduced or eliminated altogether. The New York Central & Hudson River has recently reduced the coning from 1 in 20 to 1 in 38, while several prominent railway men have advocated eliminating this coning entirely. (See article entitled "Rail Failures Due to Eccentric Loading," by C. A. Morse in the *Railway Age Gazette*, April 19, 1912.) However, this latter suggestion meets with the active opposition of the mechanical department, which has found that the wear of wheel flanges and the accidents resulting from worn flanges have increased rapidly in the few instances where coning has been eliminated.

Another suggested remedy is to cant or incline the entire rail to the standard angle of wheel coning, in this way securing a contact with the wheel over the center of the rail. This practice is common in Europe, but has not been widely adopted in this country. The canting of rails is not, however, a new idea in this country, as it has been practiced to a considerable extent by track men for many years. There is a natural tendency for a rail to cant or "roll outward" under traffic, and experienced

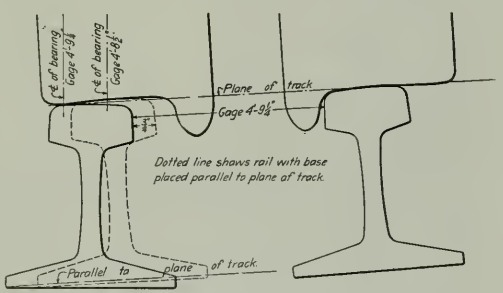


Contact of New Wheels on New Rails When Rails are Vertical and Canted

track men have inclined the rail inward slightly when laying for many years to offset this tendency and also in the belief that the rail remains closer to correct gage.

Theoretically, this practice has considerable to commend it, especially on tangents and on the high side of curves. Practically, however, there are several more or less serious objections to it. It will be admitted without question that the inclining of the rail to permit the application of the load over the center of the rail is to be desired, especially when the rails are stressed to their present high limit. The heavy wheel loads and dense traffic of the modern railroad are justifying numerous refinements in track construction and maintenance which earlier railroading practice would not warrant, and the advocates of rail canting believe that this practice comes within this category. Those men who do not believe in the canting of rails are opposed to it because of the practical difficulties encountered in working this out rather than in the merits of the plan itself, believing that, at present, at least, these difficulties out-weigh any advantages which would be obtained.

The full benefits from canting rails are secured only with new wheels on new rails, while in service both wheels and rails are soon worn from their true contour. Also no matter how well a road may maintain the wheels under its own equipment, the large number of foreign cars which must be handled and which will not be in as good condition, tends to remove the advantage. Without tie plates the inclination must be given to the rail by adzing the ties. At the present time nearly all the ties are adzed by hand. It is difficult to secure even adzing when providing a level rail seat, and the difficulties are materially increased when the ties are adzed at a slope and to one uniform slope. Therefore, it is difficult, if not impractical, to cant rails without using tie plates. Where plates are used the desired slant can be given



Effect of Canting of the Low Rail on a Curve and Wide Gage in Throwing the Wheel Contact to the Outer Edge of the Head

in the plate while the bearing of the plate on the tie is horizontal. However, with inclined tie plates it becomes necessary to tieplate all ties continuously instead of spotting them in on new or treated ties as is customary on many roads, and it introduces torsion stresses in the rails at the joints where Continuous, Weber, or other base supported joints are used. The canting of rails also introduces torsion in the rails at switches, crossings and other special work where the rails must be vertical.

On the low side of curves the canting of the rail introduces a special problem essentially different from that existing on tangents or on the high side of curves. To secure the proper superelevation, both rails are normally inclined towards the center of the curve. In canting the low rail, part or all of this inclination is removed and the line of contact of the wheel with the rail is thereby thrown towards the outer edge of the head. This condition is further aggravated by the wide gage commonly found on curves, permitting the more or less prominent false flanges of the worn wheels to run on the rail. One of the accompanying drawings made from actual contours secured on the track shows this condition. The concentration of the load on the outer edge of the low rail increases the tendency of the rail to roll out, one of the things that the canting is intended to correct. Furthermore, with the load applied at this point, especially under slow trains with frequent slipping of the locomotive drivers, the head of the rail is soon ground parallel to the plane of the track while

the flowing of the metal is materially increased. For these reasons the canting of the low rail on curves can hardly be considered advisable, even though it may be the practice to cant both rails on tangent and the high rail on curves.

Because of the differences in practice and in opinion regarding the advisability of canting rails, we give below the practice and the opinions of 24 representative large roads on this subject:

On the New York Central & Hudson river it is the practice to cant the rails when laying by adzing the ties and by the use of inclined tie plates. The rail is inclined about 1⅛ in. in 5½ in., or about 1 in 40. In this way the rails receive the maximum bearing from the wheels, while very little additional labor is required since it is necessary to adze the ties whenever rail is relaid. It is believed on this road that the results secured from this practice more than warrant this extra work and expense.

The Canadian Pacific strongly favors the canting of rails and for the past four or five years has been purchasing shoulder tie plates ½ in. thick at the shoulder and ⅜ in. thick at the opposite side of the rail base, giving an inclination of 1 in 40. It is believed that this practice tends towards smooth running, and also to prevent the nosing of locomotives and the oscillating of cars from one side to the other. It is found that the head of the rail takes its wear nearer the center than formerly, but it is believed that even better results will be obtained by increasing the inclination to 1 in 20, as is standard on European roads.

On the New York, New Haven & Hartford rails are "rolled in" slightly when laid and when regaging track, although it is not the standard practice to cant rail to any considerable extent. A new design of tie plate has been made providing for canting the rail about 1/16 in. in 5½ in. This plate has been adopted only tentatively and it may be found after experimental use that it will be advisable to increase this to ⅛ in., equivalent to a slope of 1 in 40.

The Southern Pacific uses a flat bottom tie plate 8½ in. square on both tangents and curves. This tie plate is ½ in. wider on the outside of the rail than on the inside to offset the tendency of the rail to roll outward. While it is not the standard practice on this road to cant the rail, it is frequently necessary to regage the track on sharp curves, and in such instances it is the practice of the track men to cant the rail inward slightly. For this reason this road is inclined to favor a beveled tie plate for use on medium and heavy curves, thereby slightly canting the rail at those points.

While the Philadelphia & Reading does not now cant its rails, it is expected that ultimately this will be the practice and that tie plates will be rolled accordingly. It is believed that the ratio of the slope of the rail should be at least as great as the coning of the wheel, although this ratio is now somewhat indefinite due to the present transition in the rate of coning of wheels.

About six years ago the Baltimore & Ohio purchased a considerable number of tie plates tapered ⅛ in. in 5½ in. for use exclusively on curves. While good results were secured from these plates, their use was not extended. It is believed that some beneficial results will be obtained in canting the rail in by bringing the wheel bearing nearer the center of the head of the rail, by overcoming the tendency of the rail to turn outward, and also by giving the tie plate a greater thickness at the outer edge of the rail base where the greatest strength is required. Practically, however, it is believed that the benefits derived from the use of inclined tie plates is very much reduced with the hand adzing of ties.

The Delaware, Lackawanna & Western has never canted its rail, and it is at the present time adzing all ties so that the flat tie plates will have a uniform horizontal bearing. However, the advisability of canting rails when laying has been more or less seriously considered and this road has arranged for the purchase of a small number of Lundie tie plates for use on the new cut-off north of Scranton. It is believed that this practice will materially assist in preventing rails from rolling out, although this road has had no experience to back up this opinion.

For several years it has been the practice of the Chicago, Burlington & Quincy to purchase an inclined tie plate, but for the past year this road has been buying flat tie plates for the lines west of the Missouri river, while still using inclined tie plates on the lines east of the river. One of the serious objections to the use of inclined tie plates on this road is the difficulty encountered at switches and crossings where the rails must be vertical. The use of the canted tie plate is being continued on the lines east, primarily, in order to have all the tie plates uniform.

The Missouri Pacific uses tie plates canted to a slope of 1 in 80 on curves. The canting of the rail to a slope of 1 in 20 is not regarded with favor and since the majority of the wheels in actual service are worn to a coning other than standard, it is believed that the canting of rails to this angle would result in heavy wear on the outside of the head.

The practice of the Union Pacific has never been to cant rails when laying, although this subject has been discussed to some extent. Considering the mechanical difficulties in laying track with present methods, it is doubted if any decided benefits will be secured by canting the rail.

It is not the standard practice on the Minneapolis, St. Paul & Sault Ste. Marie to cant rails when laying. However, recently in laying some new 85-lb. rail, mainly on old ties where the inside rails on curves had been turned over somewhat by a heavy, slow traffic and where there were no tie plates, the outside edge of the base had cut into the ties badly. When laying the new steel the roadmaster adzed the ties to give the low rail on curves a cant to overcome this tendency to over turning. As tie plates were then applied the rail has remained in this same position. Later investigation has shown that this canting has been one of the contributory causes for the flowing of the metal on the outside edge of the low rail, although the wide gage on the curves is the most potent reason for this condition. This flowing is also a result of the fact that fully 75 per cent of all wheels passing over the rail have tires which are more or less grooved and the rim of this depression has a more serious action on the edge of the head of the rail when it is canted than when it is vertical. Because of the many difficulties preventing securing a perfect contact between the rail and the wheel, the road is of the opinion that no benefit is secured from canting the rail.

It was formerly the practice of the Chicago, Milwaukee & St. Paul to use beveled tie plates on curves to cant the rail toward the center of the track, but this practice was abandoned when it was found impractical to apply them so that the rail would not be canted through a portion of its length and level, or canted in the opposite direction, at other points, thereby creating undue stress in the rail. It is not now the practice to cant the rails when laying them, although when relaying rail the ties are adzed slightly deeper on the inside of the rails than on the outside for the purpose of lengthening the time before the rails turn out because of traffic rather than for the express purpose of canting the rails in. Tie plates are now used on all soft ties and on all oak ties on curves on line carrying a considerable traffic. Where the tie plates are used very little trouble is experienced in rails canting out or the gage widening.

It is not the practice of the Chicago & North Western to cant the rails when laying them, although a recent investigation showed that most steel gang foremen and roadmasters were giving the rail a slight inclination. Recent instructions provide that the rails shall be laid on a level bearing.

It is not the standard practice of the Pennsylvania Lines West of Pittsburgh to cant rails when laying them. While the inclination can be given the rail by adzing the ties to the desired angle, this is considered simply a makeshift. Until tie plates are applied continuously on tangents as well as curves the benefits derived from canting rails will be largely theoretical.

The Lehigh Valley lays its rail vertical on tie plates with the outside end extending further beyond the base of the rail than the inside for the purpose of overcoming the tendency of the rail to "roll out."

The Lake Shore & Michigan Southern uses sawed red oak ties almost exclusively, thereby making the canting of rail impractical without further adzing of the ties. It is believed that

the canting of rail has little to recommend it in practice on any individual road, since fully 90 per cent of the wheels are worn by service on rails laid vertically.

Among other roads which do not cant rail when laying are the Chicago, Rock Island & Pacific, the Seaboard Air Line, the Grand Trunk Pacific, the Southern Railway, the Pennsylvania Railroad, and the Louisville & Nashville.

REPLACING A SWING BRIDGE WITH A VERTICAL LIFT STRUCTURE

The new double track vertical lift bridge of the Pittsburgh, Ft. Wayne & Chicago and the Chicago & Alton over the south branch of the Chicago river a little less than two miles south of the Chicago union station was placed in service on July 29. As the old swing bridge, which was formerly in use at this point, extended under the new structure, one-half of the old bridge had to be removed before the new bridge could be lowered into position.

The old structure was a double track through pin connected revolving draw span on a stone center pier and wooden abutments. Its length out to out was 223 ft. 6 in. This bridge was put in service in 1883 and was reinforced in 1893. It was obsolete and did not accord with the latest government requirements as to channel width, making it essential to replace it.

The new bridge is of the vertical lift type, designed by Waddell & Harrington, Kansas City, Mo., with a movable span 272 ft. 10 in. center to center of end pins, which is the second longest span of this kind ever built. The ends of the span are skewed about 45 deg. The supporting towers at each end are 53 ft. 6 in. long, 29 ft. 6 in. wide and 195 ft. high from top of masonry to center of sheave wheels. The bridge has a clearance of 9 ft. above the water when closed and a maximum clearance when raised of 120 ft., requiring a lift of 111 ft. The clear river channel is 200 ft. The weight of the moving span, including tracks, machinery and machinery house, is about 1,600 tons. This weight is counterbalanced by blocks of reinforced concrete suspended from sheaves at the rear of the end towers. The moving span is carried by 64 2¼-in. steel cables, 16 at each corner, passing over the 15-ft. sheaves at the top of the towers.

New Vertical Lift Bridge Over Chicago River Replacing Old Swing Span Shown Below

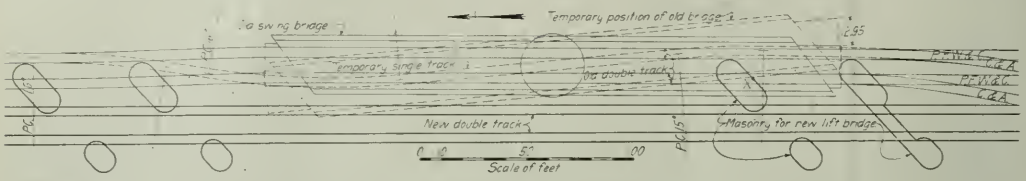
In erecting the bridge, the towers were built first and the movable span was erected by the cantilever method in the open position. Fan falsework was used to support the end panels of the lift span from the towers until the lower chord had been closed. The overturning tendency in the towers due to this method of erection was balanced by the counterweights. On account of the position of the old span it was impossible to lower the new lift span to the closed position until everything was in readiness for the operation of the new bridge and traffic could be diverted long enough to remove one-half of the old span and adjust the new bridge for operation. When the bridge

was finally lowered in position after cutting out the old span the error in grade and line was very small.

The accompanying sketch shows the original location of the swing span, the temporary position that was made necessary in order to clear the post of the new end tower at the point marked "X" and the location of the new bridge. The north end of the swing span in the temporary position extended too far west to allow the two tracks to be carried around the masonry for the new bridge and to clear the fan falsework supported from

The end of the remaining portion of the old draw span was jacked over about four ft. on the center pier in order to clear the new bridge. This allowed the new lift span to be lowered into position, adjusted, and traffic put back on the new structure. The south half of the old bridge was dismantled in place, being supported on falsework.

The design and the erection of the new bridge were handled under the supervision of R. Trimble, chief engineer maintenance of way, and J. C. Bland, engineer of bridges, of the Pennsyl-



Location Plan of Old Swing Span, Temporary Position and Masonry for New Vertical Lift Bridge

the north tower. On this account the bridge was operated with a single track during the construction period, the alinement including a 16 deg. curve, a part of which was on the swing span.

The new bridge being ready for service, all arrangements were made with the shipping interests to close the stream for navigation between 5 and 9 a. m. on July 29. The railroad traffic was detoured during the operation, the tracks being taken at 4 a. m.

The first operation in removing the old bridge was to cut off the skew panel at the north end of the span in order to make this arm of the bridge short enough to handle down the river

vania Lines. The Great Lakes Dredge & Dock Company had the contract for placing the masonry for the new bridge and the Pennsylvania Steel Company fabricated and erected the new span and dismantled the old draw.

Rolling Stock on the Italian State Railways.—On June 30, 1913, the Italian State Railways had in service a total of 10,261 passenger cars, 98,095 freight cars, 2,312 work and repair cars, 3,408 baggage and mail cars, 5,102 steam locomotives, 56 electric locomotives, 95 steam trucks and 51 electric trucks. There were

North Half of Old Span Supported on Scows and Completely Severed from the Rest of the Bridge

on scows. Two steel scows lashed together were placed under the north arm and blocking was placed under the floor beams. The water ballast in the scows was then pumped out by tugs and steam siphons until the weight of that end of the bridge was transmitted to the scows. Oxy-acetylene torches were used to burn off the truss members adjacent to the panel over the center pier and the north half of the bridge was then floated away. This portion of the old span was landed some distance down the river where it could be dismantled at leisure.

also 383 narrow gage cars, of which 224 were in Sicily and the remainder in Tripoli. During the fiscal year 1912-1913 there were constructed for the Italian State Railway 4,750 freight cars, 500 baggage and mail cars, 327 passenger cars, 160 steam locomotives, 51 electric locomotives, 17 narrow gage locomotives, of which 12 were for Sicily and five for Tripoli, and 197 narrow gage cars, of which 59 were for Sicily and 128 for Tripoli. All the new rolling stock was built in Italy, preference being given to Italian firms as an aid to national industry.

A Unique Method of Strengthening a Truss Bridge

Two Spans Carrying Tracks Over Faults in Rock Are Reinforced by Sinking Cylinders Under Panel Points

By Wm. H. Warnecke
Assistant Engineer, New York Central & Hudson River, New York.

In order to permit the operation of heavier motive power on the main line of the River division of the N. Y. C. & H. R. it was necessary to strengthen several bridges in 1912 and 1913. The original bridges on this division, the main line of which is the West Shore Railroad from Weehawken to Ravena, were nearly all reconstructed or strengthened between 1902 and 1904, to permit the operation of heavier motive power and equipment at that time. Several bridges which were stronger than the average of the original structures were allowed to remain at that time and were not strengthened. When the operation of still heavier locomotives became imperative, it became necessary to strengthen these few bridges which remained.

Fig. 1—Bridge No. 54

Two of these bridges, Nos. 54 and 56, located immediately south of Highland Falls station, are peculiar in that they were constructed to carry the tracks over transverse clefts in the rock bottom of the Hudson river, which it was found impossible to fill with safety, on account of the steep slope of the rock toward the center of the river. These bridges, which are placed close to the precipitous faces of the rock cliffs forming the shore, are double track, through truss spans, with two trusses each, of the pin-connected Pratt type, the length of spans being 135 ft. and 199 ft., respectively. The rock bottom on the in-shore side lies above the water level directly under the in-shore truss in each case for nearly the whole length of the bridge, and under the outside truss the water line extends only a portion of the length of the span, the end panels being located over dry bottom, which consists of boulders and gravel overlying the shelving bed rock. The bottom, which is under water at low tide, is overlaid with a considerable depth of soft mud.

In order to relieve the trusses from the full effect of the live loads, wooden blocking was placed under the ends of the floor beams wherever this could be done without going into the water at low tide, or on the soft bottom. In this way the in-shore ends of all floor beams were supported, and also the out-shore ends of all except four interior beams of bridge 54 and six of bridge 56. This blocking under the out-shore ends of the beams was put in somewhat as an experiment to see if the material overlying the rock would hold such load as came upon it, and it was found that it would.

When, in 1912, it became necessary to provide for still heavier locomotives than had up to this time been permitted, it was necessary to further strengthen these bridges, and it was at first decided to replace the superstructures. As this involved a very large expenditure, and as a future change in the line is contemplated which will eliminate these bridges altogether, it was decided to furnish the necessary strength by providing additional bearing to complete the system of temporary floor beam supports and by strengthening the steel floor system. The method of construction for these additional supports for the floor beams is quite unusual and will be described in the following:

DRILLING OPERATIONS

Two core drills were used in drilling the holes for the reception of wrought iron pipe columns. One, a steam-driven drill, was used on bridge 56 only; the other, driven by a three-cylinder gasolene engine, was used on both bridges. Fig. 2 shows the latter drill at work. The drilling operations were carried on from below the bridge in order not to interfere with the operation of trains. At bridge 54, where the water was not so deep as at bridge 56, a crib of ordinary construction was built and sunk to support the platform for the drilling outfit, whereas, at bridge 56, it was cheaper to build a pile platform.

As soon as the temporary drill platform was completed, the drilling operations started. It was necessary to drill through from 15 to 30 ft. of sand, gravel, broken stone and boulders (shown in Fig. 3, which is a section through the center line of the out-shore truss of bridge 56) before solid rock could be reached. The supports shown in this figure are only for the out-shore ends of floor beams, the in-shore ends being supported as hereinbefore mentioned, and as shown under the four exterior beams. This necessitated driving a casing which would subsequently form part of a steel and concrete column. This casing, of extra heavy 12 in. wrought iron pipe in lengths of 5 to 10 ft., was driven by a solid weight of 1,500 lb., operated by the hoist on the drill. Large boulders encountered in driving the casing were shattered by placing a small charge of dynamite in the hole left after the removal of the core made by drilling several feet into the boulder. Before any blasts were set off, however,

Fig. 2—A Core Drill Driving a Casing

the drill was removed entirely and the casing raised about 4 ft.

To provide an even bearing for the casing in the sloping rock, a shelf was made by blasting. The blasting in this case was identically the same as that adopted in shattering the boulders. After the casing was firmly set, the drilling of solid rock was commenced. The depth of holes in the rock varied from 8 to 12 ft., according to the slope. Had the rock been comparatively level, a depth of hole of from 3 to 4 ft. would have been sufficient for the foundation of the 8 in. pipe columns. When the drilling of each hole had been completed, the stone core was broken off at the bottom and removed; this left a hole 10¾ in. in diameter. A core taken from one of the holes is shown in the lower left hand corner of Fig. 2.

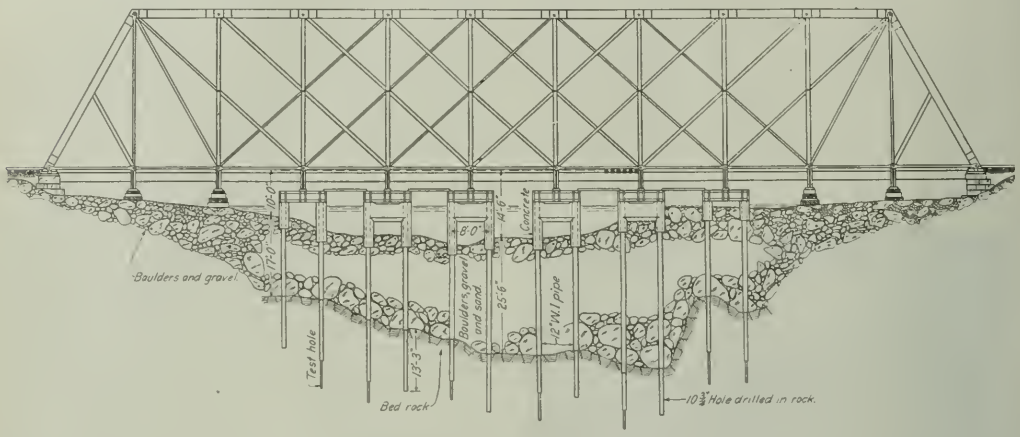


Fig. 3—Strengthening a Bridge by Means of Supporting Cylinders

PLACING PIPES AND COLUMNS

The filling of the pipe casings was deferred until the drilling of all the holes had been completed. During this period of time considerable sand had entered the holes through fissures in the rock, and had become tightly packed. This was removed by loosening it with a steam jet and then cleaning it out with a flopper-valve sand pump. The placing of the inside pipes followed the cleaning of the hole. The inside pipes were centered in the casings by means of two sets of bolts in each length of pipe. Each set contained three bolts, extending from the inside surface of the pipe to the desired distance outside, the bolts being equally spaced around the circumference of the pipe, each set 1 ft. from the end of each length of pipe. Being provided with nuts the bolts could therefore be made adjustable. The inside pipes extended from the bottom of the holes up through the casings to the underside of the girders shown in Figs. 3 and 4; they were made up of 10 ft. lengths of 8 in. wrought iron pipe, ½ in. thick, coupled together with bearing joints, and with the top lengths and casings sawed off at the required elevations. These inside pipes have four rows of 2 in. x 4 in. slot holes, one row in each quadrant, space alternately 1 ft. apart lengthwise of the pipe. These holes permitted the grout of 1:2 proportions, with which the pipes were filled after being placed to run through and fill up the space between the pipe and casing, and the pipe and rock below the casing.

When the work as described above had been completed, the columns were encased in concrete above the river bottom as a matter of preservation. Further, where there was considerable depth of water, and, therefore, a considerable length of unsupported column which might be a source of weakness due to the action of ice in winter, longitudinal expansion and contraction of the bridge span, etc., concrete struts were placed between the columns and were made an integral part of the concrete encasing said columns. These struts are shown in Fig. 3. Where there was little or no water the columns were encased in concrete of octagonal form, as shown in Fig. 4, with the concrete struts omitted. A built-up galvanized sheet metal form, of the shape shown by the finished concrete in Fig. 3, with one side open to permit of its removal after the concrete had hardened, was set up where a strut was required, and the reinforcement then placed. "U" shaped 1¼ in. rods, extending around the 12 in. casings and coupled together at the center of the strut with turnbuckles, were placed near the top and bottom of the concrete. Stirrups, "U" shaped, of ⅞ in. diameter rods, were hung from the upper set of bars. To the stirrups were wired 1 in. diameter longitudinal reinforcing rods equally spaced between the upper and lower set of "U" bars. A mixture of 1:2:4 concrete was then placed. After the concrete had sufficiently hardened, the metal form was removed and used for another strut. To expedite the work, however, several of these forms were made and used at both bridges. The forms for the octagonal concrete column casings were made of wood.

Fig. 4—Octagonal Concrete Casings Supporting Girders and Floor Beam

PLACING THE GIRDERS

Cast steel caps 19 in. x 19 in. x 1½ in., with ¾ in. circular rims of 12¾ in. inside diameter, and 3 in. in depth, were

placed over the pipes after the completion of the concrete work. The underside of the cap and the inside of the rim were faced to provide a snug fit over the outside pipes and a good bearing on the tops of both inside and outside pipes, respectively. The built-up girders shown in Figs. 3 and 4 were then placed and bolted to the caps, which were provided with four 1 5/16 in. holes. A space of 1 3/8 in. remained between the underside of the lower flange of the floor beam and the top of the bearing plate on the upper flange of the girders after the girders were placed. This space was filled with a pair of wedges which were driven to secure a light bearing under the floor beams. Holes were then drilled in the wedges and girder and slot holes were made in the lower flange of the floor beams, and the three bolted together. The slot holes were designed to permit the free longitudinal expansion and contraction of the bridge span. The girders were tied together with 4 ft. x 4 in. x ⅜ in. angle struts placed on the upper flange, as shown in Fig. 3. Stiffeners were placed in the web of the floor beams directly over the center of the girders.

The method of strengthening was developed by A. W. Carpenter, formerly engineer of structures, and now valuation engineer. The field work was under the supervision of R. E. Dougherty, district engineer; J. W. Pfau, engineer of construction, and G. W. Kittredge, chief engineer.

ABSTRACT OF ENGINEERING ARTICLES

The following articles of special interest to engineers and maintenance of way men, and to which readers of this section may wish to refer, have appeared in the *Railway Age Gazette* since July 17, 1914:

New Low Grade Line from Tacoma, Wash., to Tenino.—The Northern Pacific is completing a double track line with low grades, 44 miles long, to replace a single track line between the same points and provide a continuous double track between Seattle and Portland. The construction included some heavy grading work along the east shore of Puget Sound, a large part of the embankment being protected by a sea wall of an unusual type. One tunnel, 4,391 ft. long, was driven near Tacoma. Details of the interesting features of this new line were published in the issue of July 24, page 159.

Passenger Terminal Improvements at Buffalo.—As a result of extended negotiations with the city's Terminal Station Commission, the Delaware, Lackawanna & Western has agreed on plans for a new passenger terminal to be located on the Buffalo river and work has been begun on the structure. The conditions making this improvement necessary and details of the proposed station are included in an illustrated description in the issue of July 24, page 166.

The Federal Valuation of the San Pedro, Los Angeles & Salt Lake.—On account of the general interest in the important task which the government has undertaken of making a physical valuation of the railways of the country, the detailed description of the organization which has been formed on the San Pedro line and the methods which are being followed in collecting the field data for this valuation, written by E. G. Tilton, formerly chief engineer of this line, is very timely. This was published in the issue of July 31, page 195.

New Great Northern Line from Oroville to Wenatchee.—The 134 miles of new line built by the Great Northern between Wenatchee, Wash., and Oroville, serving a large undeveloped area and providing a low grade outlet to Spokane for a considerable amount of traffic, involved the relocation of 13 miles of highway most of which was the Washington state road No. 10, the driving of three tunnels and the bridging of five rivers. This interesting construction work was illustrated and described in the issue of July 31, page 202.

New Passenger Terminal at Dallas, Tex.—Contracts have recently been let for a union station in Dallas, Tex., which will replace the five stations previously occupied by the nine roads entering the city. The details of this improvement were contained in an illustrated article in the issue of August 7, page 252.

Railroad Development in the Philippine Islands.—The problem of transportation was a difficult one in the occupation of the Philippine Islands by the United States military forces following the Spanish war, and the development of adequate railway facilities in the islands was one of the first things to which the new civil government, established after the war, turned its attention. A discussion of this development touching on the engineering features, details of construction, organization and traffic problems, contributed by C. H. Farnham, formerly chief engineer, Cebu division of the Philippine Railway Company, was published in the issue of August 14, page 279.

Building a Modern Terminal Road at Youngstown, Ohio.—The Lake Erie & Eastern, a subsidiary company of the Pittsburgh & Lake Erie and the Lake Shore & Michigan Southern, is building a line 8¾ miles long through the city of Youngstown, O., to reach a number of important industries and possibly to form, ultimately, a link in a direct freight connection controlled by the New York Central Lines between Youngstown and Cleveland. The construction of this road involved exceptionally heavy bridge work in which advanced practice in a number of details has been adopted. An illustrated description of this construction work was published in the issue of August 14, page 286.

An editorial commenting on the elimination of shop painting on the structural steel for the heavy bridges on the Lake Erie & Eastern was published in the issue of August 14, page 275.

NEW FRISCO BOOK OF RULES FOR THE MAINTENANCE OF WAY DEPARTMENT

The St. Louis & San Francisco has just gotten out a book of rules and instructions for employees engaged in the maintenance of way department, which differs from those commonly used in its greater completeness and detail. In addition to the general rules for all employees and those for the foremen, etc., detailed instructions are given regarding the size of gangs and the methods to be adopted when laying rail, placing ballast, etc., the purpose of the book being not only to promulgate rules for the proper prosecution of the work, but to standardize this work as far as possible over the system. Detailed instructions are given regarding the places where tie plates, anti-creepers, etc., are to be used and the methods of installation. Seven pages are devoted to the laying of rails. Equally detailed and complete instructions are given for the guidance of foremen of water service, bridge foremen, signal maintainers, etc. These instructions cover 106 pages. In the rear of the book there are drawings of standard ballast, sections, mile posts and other markers with tabular data showing the amount of material required for repair and renewal work, etc.

A NEW ASPHALT ROOFING

The patterns and colorings of slate and tile roofing are approached in effect by a new prepared asphalt roofing manufactured by the Patent Vulcanite Roofing Company, Chicago. The new material, which is known as "Vulcan-Tile," is new only in the decorative features, the same fire-resisting and weather-proof qualities possessed by the granite coated asphalt roofing, which has been sold by this company for several years, being secured by the use of the same base, the same substance and the same coating. The patterns which give the roofing the appearance of slate or tile when laid are a part of the rock surface which insures that they will last as long as the roof. Vulcan-Tile is coated with crushed granite in two colors, red and green. The Vulcanite asphalt, which is used as the saturating and coating compound, is claimed to make the roofing material withstand softening and evaporation in hot weather, freezing and cracking in winter, crumbling in dry weather, and to insure its being fire-resisting, waterproof and wind-tight. The material is put up in rolls weighing 80 lb., and containing 108 sq. ft. Rust-proof nails and binding cement are packed in each roll. The roofing, the colors and the patterns are guaranteed for ten years.

Electrification of Railways in Italy.—Electric operation has recently been begun by the Turin & Savona Railway of Italy for passenger traffic only, on the section of the line across the Apennines, between the latter town and Ceva, a distance of 29 miles. This section, which is the heaviest part of the line, includes the Belbo tunnel, about three miles in length with maximum grades of 2.5 per cent. The maximum speed is 31 miles per hour. Savona ranks after Genoa and Venice, as one of the important coal ports of Italy; it is also an important manufacturing town, with large steel works.

THE NEELY SPRING LOCK

A new spring nut and bolt lock is being tested by the Pennsylvania Railroad, the Pennsylvania Lines, and the Pittsburgh & Lake Erie, all of which report satisfactory service. The Neely spring lock is applied without special tools and can be used with either square or hexagonal nuts on standard track bolts. The locking feature is secured by the ribs which are shown engaging the edges of the nut in the accompanying illustration. The locks are made from a rolled bar of high grade spring steel which, it is claimed, will insure a permanent spring and take care of the natural elongation of the bolt in service. Each lock is heat treated and tempered in oil.

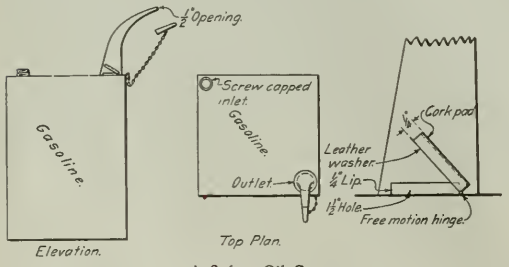
The Pennsylvania Railroad has had a number of these locks in service on the lower rail of a curve at West Philadelphia since March, 1913. The traffic over this track is very heavy and consid-

Neely Spring Lock

erable amounts of water, gas and grease are present. On an inspection made in December, 1913, all of the locks were in good condition, with one exception, the looseness of that particular lock being attributed by the officers making the inspection to peculiar conditions surrounding that point. The test on the Pennsylvania Lines has been made at Upper Sandusky, Ohio, where the locks have been in service on about one mile of track for over a year. A report of this test states that the lock is giving very satisfactory service. The Pittsburgh & Lake Erie is testing 500 of the locks at McKeesport, Pa., the latest report on this test stating that their service up to date has been satisfactory but that they have not been in use for a long enough time to draw final conclusions. This lock is made by the Neely Nut and Bolt Co., Pittsburgh, Pa.

A SAFETY OIL CAN

The oil can shown in the accompanying drawing has been devised by S. Joseph DeGraeff, division storekeeper of the Coast division of the Southern Pacific, in response to a demand for a can which would increase safety in handling gasolene and other highly inflammable oils. This can is made



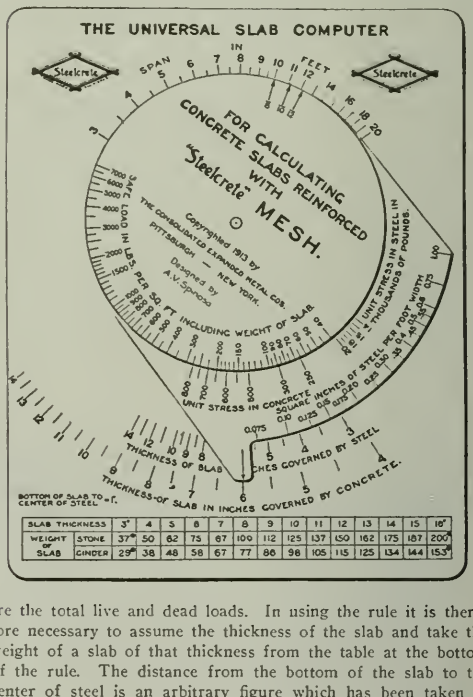
A Safety Oil Can

from an old 5 gal. oil can, and is painted target red for gasolene, and corresponding colors for other materials. The word "gasolene" is stenciled on all sides and on the top. The contents of the original packages are transferred to these safety oil cans immediately upon receipt, thereby doing away with the necessity of keeping an open can around section and tool houses.

THE UNIVERSAL SLAB COMPUTER

A new circular slide rule has recently been perfected by the Consolidated Expanded Metal Company, New York, for the design of reinforced concrete slabs using any unit stresses in the concrete and steel, and any common bending moment, span, load and slab thickness. The rule was designed by the use of the "straight line" formula, which was slightly simplified to reduce the number of operations on the rule. Any difference in results attained by the rule and with the exact formula is said to be negligible and is on the side of safety. The unit stresses in the steel shown on the face of the rule range from 14,000 lb. to 20,000 lb. per sq. in. The unit stresses in the concrete shown on the face of the rule range from 250 to 800 lb. per sq. in. The arrows marked 1/8, 1/10, and 1/12 represent the bending moment factor which is usually covered by the specifications. In general, the value of 1/8 should be used for a simple slab, 1/12 for a continuous slab, and 1/10 for a slab simple at one end and continuous at the other.

The safe loads in lb. per sq. ft. given on the face of the rule



SLAB THICKNESS		3"	4	5	6	7	8	9	10	11	12	13	14	15	16"
WEIGHT OF SLAB	STONE	37#	50	62	75	87	100	112	125	137	150	162	175	187	200
	CINDER	29#	38	48	58	67	77	86	98	105	115	125	134	144	153#

are the total live and dead loads. In using the rule it is therefore necessary to assume the thickness of the slab and take the weight of a slab of that thickness from the table at the bottom of the rule. The distance from the bottom of the slab to the center of steel is an arbitrary figure which has been taken as one inch in designing the rule. If it is desired to provide for a distance other than one inch, the result can be corrected by deducting one inch from the thickness of the slab secured on the rule and adding the value desired. In all slab problems the double solution is necessary, the first to secure the minimum thickness of slab required by the limiting unit stress in the concrete, and the second to secure the area of steel required with the given thickness of slab, load, span and bending moment.

The slide rule is made of celluloid, and is approximately 4¾ in. by 6¼ in. The lettering is covered with a finishing coat to prevent its rubbing off. Full directions for using the rule are given on the back.

English Cloth for Belgian Railway Employees.—The Belgian State Railways recently ordered 180,000 yards of English textiles for employees' uniforms.

General News Department

In Montreal and many other places the Canadian Pacific is putting on duty numerous armed guards to watch buildings, yards, cars, bridges and and other property.

The grain elevator of the Intercolonial Railway at St. John, N. B., was destroyed by fire, August 12, together with 350,000 bushels of wheat. Estimated loss $1,000,000.

On Sunday, August 16, according to a press despatch, the sum of $25,000 was taken in by the government in the shape of tolls for the passage of vessels through the Panama Canal.

The Railroad Smoke Inspectors' Association of Chicago held its annual excursion and outing on August 18, at South Haven, Mich. A number of informal addresses dealing with the smoke situation in Chicago were made.

Plans for the rehabilitation of the Mexico Northwestern have had to be suspended on account of the European war. The road is owned by a syndicate of Englishmen, who also have other large property holdings in Mexico. During the long period of revolution long stretches of track and many of the bridges were destroyed. Parts of the line are now in operation.

On a tour of 3,500 miles traveled by Mayor James H. Preston and party, of Baltimore, recently made in the interest of the coming National Star Spangled Banner Centennial, the efficiency of American railroad service was shown by the fact that the entire journey was made on schedule time. The party traveled in a special car on regular trains; visited 22 cities in 16 states of the central west and south, and used 12 different railroads.

Telegraph operators employed by the Southern Pacific system are taking a vote on authorizing a strike to enforce their demands for increases in pay and changes in working conditions on the lines east of El Paso, to correspond with those provided in a contract for the lines west of El Paso which went into effect on September 1 last year. The men ask an increase of 12½ per cent in rates, increased pay for overtime, and $5 a month extra for operators who are station agents and also perform certain other duties.

The safety bureau of the El Paso & Southwestern has issued a circular showing the behavior of 3,607 automobiles and their drivers observed during the period of one week while crossing the tracks of the road in El Paso. It was found that 2,907, or 80 per cent of the drivers of these automobiles, did not look in either direction; 620, or 17 per cent looked only in one direction, and only 80, or 2 per cent, took the precaution to look both ways before crossing the tracks; while 296 of the number who looked in neither direction crossed at a speed greater than 20 miles an hour. And six of this number saw the flagman and crossed the tracks disregarding his signal.

The monorail street car line which was built in the northern part of New York City a few years ago, appears, after many vicissitudes, at last to be dead. A new line of ordinary street cars, with storage battery motive power, was put in service August 18. The line is from the City Island station of the New York, New Haven & Hartford Railroad to Belden's Point, about 3 miles. The opening of the line followed the condemnation of the monorail as unsafe a few months ago. The Union Railroad bought the monorail franchise from the Interborough Rapid Transit Company. On the first car run over the road this week were Edward E. McCall, chairman of the Public Service Commission; District Attorney Francis Martin; the Acting Borough President of the Bronx, and other public officers.

The Southern Pacific Company has recently completed a new commissary building at Los Angeles, Cal., at a cost of $100,000. In its construction and arrangement every possible means has been taken to provide a sanitary and up to date commissary plant. It is dust proof and fly proof. The provisions are weighed, iced, sorted and issued without once having been touched by human hands. All liquids are delivered in sealed glass containers and cream is moved in gallon tins that are thrown away after once being used. In order to eliminate contamination from refuse there has been provided a special concrete-lined room where the garbage, pending incineration, is immediately placed under refrigeration. The building is surrounded by covered platforms on all sides which are provided with water, compressed air and steam used to keep the buildings in a sanitary condition. The building is also provided with a humidor, measuring 10 ft. by 4 ft., having a capacity of 40,000 cigars. The supplies issued from this commissary aggregate between $40,000 and $50,000 in value per month, and this only for the southern territory, which extends from Los Angeles north to Fresno and Santa Barbara and east as far as New Orleans. In combination with the big kitchen is a cooking school, where the dining car cooks are instructed in the preparation and serving of stock material. The exterior of the building is thoroughly in keeping with the interior in sanitation and cleanliness, the moral effect of cleanliness on the crews not having been overlooked.

Westinghouse Air Brake Contest

The competition in which the sum of $2,000 in prizes was offered by the Westinghouse Air Brake Company for the six best stories submitted, under certain conditions, dealing with the experience and practical knowledge of railroad employees regarding any striking performance of the air brake manufactured by that company closed August 1, 1914. The following committee of judges is now engaged in examining the stories: W. E. Symons, consulting mechanical engineer, Chicago; Willard Smith, editor, Railway Review, Chicago, and R. V. Wright, managing editor, *Railway Age Gazette*, New York. Very considerable interest was displayed in the contest and a large number of stories were submitted, so that several weeks will elapse before the judges will be able to announce the winners of the prizes.

"Safety First" Rules for Passengers*

Don't stand in the doorway. Some fool may rush through the waiting room and hurl you on the tracks. Besides, you are in the way of other passengers.

Don't rush through the doorway. You may collide with someone coming in and hurl him out on the tracks.

Don't stand too near the tracks. There is always a possibility of your being jumped on by some irresponsible leaping from a moving train, or being caught by something projecting from a car.

Don't attempt to cross tracks to eastbound platform until you are sure that there is nothing coming this way on the west-bound tracks. Hesitate a moment and look.

Don't step on any metal if you can avoid it. There is a live rail under the wooden guard on both sides of the center platform, contact with which means death. Use extreme care not to stub your toe under the guard rail.

Don't attempt to board a moving train. There is no business or engagement so important as to risk the chance of going through the rest of your life on crutches.

Don't stand near the door of a baggage car. There may be baggage to unload and a trunk coming down on your toes is not a pleasant sensation.

Don't cross in front of a standing train unless you are sure that you can get clear in case it should start.

Don't fail to reach the station in sufficient time to catch your train. More men have dropped dead from overexertion trying to catch trains than have died under the wheels.

The Western Wages Arbitration

The locomotive engineers of the Western roads have chosen as their member on the board which is to arbitrate the wages controversy with their employers, F. A. Burgess, assistant grand

*From a typewritten bulletin posted by Station Agent S. J. Murray, at Hewlett, Long Island.

chief engineer of the brotherhood; and the firemen have chosen Timothy Shea, assistant president of their brotherhood. The railroads, as announced last week, have chosen Vice-president Park of the Illinois Central, and Vice-president Byram of the Chicago, Burlington & Quincy. The names of the other two members will not be announced for some time. The Act of Congress of July 15, 1913, the Newlands law, providing for the settlement of controversies concerning wages and conditions of service between railroads and their employees, provides that after the selection of the arbitrators by the parties the four thus selected are to be convened upon order of the United States Board of Mediation and Conciliation, and that when thus assembled they shall be allowed fifteen days within which to select the two impartial arbitrators; and the Board of Mediation has adopted the policy of requiring them to exhaust the fifteen days in that effort. But if the four fail to agree upon the impartial arbitrators, the law provides that they are to be named by the government board; but there is no limitation of time as to their selection and appointment. In the present case both parties to the controversy have asked that they be given until the first week in October to prepare their cases, and inasmuch as the hearings must begin within ten days of the appointment of the two impartial arbitrators, the government board will not announce the two names until about September 20, even if the men should be selected before that date.

The Canadian Pacific Telegraph Department

The Canadian Pacific Railway now operates 13,800 miles of telegraph line, 102,600 miles of wire, and 1,400 telegraph offices; and over three-fourths of its wires are used in commercial service. The length of the wires now in use is three times that recorded in the year 1900, and the number of offices is 40 per cent greater than in that year. The number of messages sent in 1913 was about 5,000,000, or three and a half times as many as in 1900. The company operates more than twenty long duplex circuits, including one from New York to Winnipeg. Between Montreal and Bamfield, B. C., which is the terminal of the cable to Australia, the Wheatstone apparatus is used. The Morkrum printing telegraph has been used on this company's lines for two years and four duplex circuits are in operation now.

Apparatus has been ordered for a duplex Morkrum circuit between Montreal and Winnipeg and for another between Winnipeg and Moose Jaw. These two new long circuits will be worked by tape transmission, the speed of which is about 60 per cent greater than can be attained by hand transmission. Telephones are now used by train despatchers on over 6,000 miles of Canadian Pacific lines. Telephone equipments are carried on trains.

Illinois Candidates for Legislature Asked Not to Pledge Support for Anti-Railroad Bills

W. T. Tyler, vice-chairman of a committee of the Illinois railroads, has addressed a circular letter to all candidates for the state legislature, asking them not to pledge their support for anti-railroad bills before their introduction in the assembly. The letter follows:

"As a candidate for the general assembly, you no doubt will be importuned to pledge yourself, if elected, to support certain measures proposed to be introduced at the next session, including bills directed against or ostensibly for the regulation of the railroads. This letter is addressed to you by the railroads of the state of Illinois to ask that you do not bind yourself to support or vote for any bill of this nature until it is regularly introduced in the assembly and you have had an opportunity to inform yourself fully as to its full purport and effect and its need.

"The last session of the general assembly created a Public Utilities Commission with full power to regulate the railroads of Illinois in every particular as to operation, rates of charge, service to the public, etc. It also provided this commission with ample machinery and experts to enable it to correctly determine the necessity for and the best manner of applying regulative measures. Hence, there does not now exist in Illinois a need for direct action by the legislature upon such matters.

"The effect of most legislation affecting railroads, and especially that introduced by the labor organizations, is greatly to increase the cost of operation of the railroads. You will, of course, recognize that this increase in cost of operation must be paid by the consumer; that is, by the citizens of the state, so it is only proper that the Public Utilities Commission charged with the responsibility of securing for the people of Illinois the best service at the minimum of cost, should, after a proper investigation, determine as to the necessity for these items of increase; and, as stated above, this commission is prepared to inform itself fully upon the various matters from every angle and will give full consideration to the interests of the public, the railroads and the employees in its deliberations.

"We believe that it will be repugnant to you to bind yourself to vote for or support a bill upon the full effect of which you have not had an opportunity to inform yourself and which when finally introduced may contain features not fully and fairly represented to you and of immense importance to the public as well as the railroads, and that this in itself will deter you from giving any such pledge; but in the past some candidates have, through misunderstanding or otherwise, inadvertently allowed themselves to be so pledged, to their later embarrassment. Hence the railroads, asking merely for the same consideration accorded to any other citizen of the state of Illinois, ask that you preserve an open mind upon all proposed legislation affecting or regulating them until, if you are elected, the proposed law is placed before you in the regular and proper manner and you are enabled to hear both sides of the issue involved. You will then be free to act as seems to you to be fair and just.

"Won't you do us the courtesy to acknowledge receipt, and if consistent advise if you will grant our request?"

R. S. A. Convention Subjects

Secretary C. C. Rosenberg of the Railway Signal Association has issued the following abstract of the program for the annual meeting of the association, which is to be held at Bluff Point, N. Y., September 22.

Committee I. Signaling Practice.—Reports on aspect for instructions to trains to take siding at a non-interlocked switch; requisites for switch indicators and automatic train control. Also additional data on track circuits and treated ties.

Committee II. Mechanicol Interlocking.—Mechanical derail layouts and switches (8 drawings).

Committee III. Power Interlocking.—Specifications for the installation of a vitrified clay conduit system, including drawings; specifications for incandescent electric lamps; the use of thirty volts or less for the control of interlocking apparatus, conclusions 1 to 8, inclusive. Revised drawing No. 1,309.

Committee IV. Automatic Block.—Specifications for R. S. A. cell caustic soda primary battery and specifications for direct current vibrating highway crossing alarm. Three drawings showing circuits for automatic block systems.

Committee V. Manual Block.—Rules governing signal supervisors and rules governing maintenance of block signals.

Committee VI. Standard Designs, Etc.—Presenting twenty (20) drawings of various apparatus shown in detail and assembly. Also six (6) exhibits as information. Report on signal symbols and nomenclature.

Committee VII. Subjects and Definitions.—Definitions for twelve words.

Committee VIII. Electric Railways and A. C. Signaling.—Specifications for transformer oil; specifications for petrolatum for use in impedance bonds; specifications for a. c. electric generators, and specifications for overhead crossings of electric light and power lines. Also data of systems using a. c. railway signaling submitted as information.

Committee IX. Wires and Cables.—Changes in existing specifications for galvanized steel signal wire. Specifications for galvanized messenger wire, also recommended sags for messenger wire of various sizes and strength; specifications for rubber insulated tape and specifications for friction tape.

Committee X. Storage Battery and Charging Equipment.—Specifications for electrolyte for lead type storage battery; specifications for nickel, iron alkaline storage battery and specifications for concrete storage battery box. Also eight drawings.

Special Committee. Method of Recording Signal Performance.—Five forms for recording interruptions to traffic by signals.

Special Committee. Signaling Requirements of Electric Railways.—Report showing signal aspects and rules for same as

adopted by the American Electric Railway Association; submitted as information.

Special Committee. Lightning Protection.—Specifications and requisites for air gap lightning arresters; specifications and requisites for vacuum gap lightning arresters and specifications and requisites for choke coils for use with lightning arresters.

American Foundrymen's Association and American Institute of Metals

The American Foundrymen's Association and the American Institute of Metals will hold their annual conventions at the LaSalle hotel, Chicago, September 7-11. In connection with these conventions the Foundry & Machine Exhibition Company will conduct its annual exhibit from September 5 to 11, inclusive, at the International Amphitheater located at the Stock Yards in Chicago. This exhibit will include many articles of interest to railroad men. A review of the list of the 164 exhibitors discloses the fact that 50 per cent of them handle railway supplies. About forty of these are prominent builders of modern machine tools that are in every-day use in railway shops. Others represent shop accessories, such as pneumatic tools, grinding machines and abrasives, cranes, hoists and other shop fixtures that are no less important. The oxy-acetylene and electric welding companies will be represented with working demonstrations of their systems as will also the Goldschmidt Thermit Company. Railway men who can take the time to attend this exhibit will find it very well spent.

Master Blacksmiths' Convention

The twenty-second annual convention of the International Railroad Master Blacksmiths' Association was held at the Hotel Wisconsin, Milwaukee, Wis., August 18-20. The meeting was presided over by H. E. Gamble, of the Pennsylvania Railroad, and the convention was welcomed to the city by A. E. Manchester, superintendent of motive power; J. F. De Voy, assistant superintendent of motive power, and J. J. Hennessey, master car builder, of the Chicago, Milwaukee & St. Paul, and by W. W. McLellan. Following is a list of the exhibitors:

Acme Machinery Company, Cleveland, Ohio.—Samples of forgings and model of forging machine. Represented by C. E. Smith, C. W. Durschlag and F. R. Andrews.

Ajax Manufacturing Company, Cleveland, Ohio.—Samples of forgings. Represented by A. L. Guilford, J. A. Murray and Henry Gaul.

Chambersburg Engineering Company, Chambersburg, Pa.—Photographs of power hammers, presses, etc. Represented by H. S. Nixon.

Goldschmidt Thermit Company, New York.—Sample welds. Represented by H. S. Mann and W. A. Aldrich.

Houghon & Co., E. F., Philadelphia, Pa.—Carbonizing compounds, quenching and tempering oils. Represented by F. B. Niesser.

National Machinery Company, Tiffin, Ohio.—Forging, grinding and bolt threading machines.

Convention of United Yardmasters' Association

The first annual convention of the United Yardmasters' Association was held at the New St. Louis Hotel, Duluth, Minn., August 3, 4 and 5. Among the subjects presented for discussion were: Closer Relationship Between Yard Men and Their Superior Officers; Promotion of a Higher Standard of Efficiency in all Departments of Yards and Terminals; Courtesy to Patrons and Fellow Employees; Elimination of the Practice, so Prevalent Among Shippers, of Tipping Switchmen for Services; Concentrated Efforts Against Intemperance, and Promotion of Greater Care in the Handling of Equipment and Shipments, and a More Rigid Inspection of Conditions in Which Loads Arrive and Depart. Through the courtesy of the railroads, special trains carried the members over the terminals of the Northern Pacific and over the Duluth, Missabe & Northern to Virginia, Minn.

This association is composed of yardmasters and assistant yardmasters throughout the country and aims to promote general efficiency in the operation of terminals. The officers for the past year, all of whom were re-elected, were: John Murphy, president; J. J. Meehan, vice-president; D. J. Flynn, treasurer, and W. H. Streeter, secretary. The next convention will be held at Seattle, Wash.

Old Time Telegraphers and Historical Association

Secretary F. J. Scherrer of this association announces that in view of the distressing conditions growing out of the European war, the meeting scheduled to be held in Kansas City, September 15, will not be held. The officers of the Society of the United States Military Telegraph Corps fully concur in the postponement of the reunion. Notice of the time and place for the 1915 reunion will be sent to the members in due course.

MEETINGS AND CONVENTIONS

The following list gives names of secretaries, dates of next or regular meetings, and places of meeting.

Air Brake Association.—F. M. Nellis, 53 State St., Boston, Mass. Next convention, May 4-7, 1915, Hotel Sherman, Chicago.

American Association of Demurrage Officers.—A. G. Thomason, Demurrage Commissioner, Boston, Mass. Annual convention in April.

American Association of Dining Car Superintendents.—H. C. Boardman, D. L. & W., Hoboken, N. J. Next convention, October 22-24, Washington, D. C.

American Association of Freight Agents.—R. O. Wells, Illinois Central, East St. Louis, Ill. Annual meeting, May 21-24, 1915, Richmond, Va.

American Association of General Passenger and Ticket Agents.—W. C. Hope, C. R. R. of N. J., 143 Liberty St., New York. Annual meeting, September 15-16, Boston, Mass.

American Association of Railroad Superintendents.—E. H. Harman, Room 101, Union Station, St. Louis, Mo. Next convention, August 20-21, New York.

American Electric Railway Association.—E. B. Burritt, 29 W. 39th St., New York. Annual convention, October 12-16, Atlantic City, N. J.

American Electric Railway Manufacturers' Association.—H. G. McConnaughy, 165 Broadway, New York. Meetings with American Electric Railway Association.

American Railway Association.—W. F. Allen, 75 Church St., New York. Semi-annual meeting, November 18, Chicago.

American Railway Bridge and Building Association.—C. A. Lichty, C. & N. W., Chicago. Next convention, October 20-22, 1914, Los Angeles, Cal.

American Railway Engineering Association.—E. H. Fritch, 900 S. Michigan Ave., Chicago. Next convention, March 16-18, 1915, Chicago.

American Railway Master Mechanics' Association.—J. W. Taylor, 1112 Karpen Bldg., Chicago. Annual meeting, June, 1915.

American Railway Tool Foremen's Association.—A. R. Davis, Central of Georgia, Macon, Ga. Annual meeting, July, 1915.

American Society for Testing Materials.—Prof. E. Marburg, University of Pennsylvania, Philadelphia, Pa.

American Society of Civil Engineers.—Chas. W. Hunt, 220 W. 57th St., New York. Regular meetings, 1st and 3d Wednesday in month, except, June, July and August, 220 W. 57th St., New York.

American Society of Engineering Contractors.—J. R. Wemlinger, 11 Broadway, New York. Regular meetings, 2d Thursday in month, at 2 P. M., 11 Broadway, New York.

American Society of Mechanical Engineers.—Calvin W Rice, 29 W. 39th St., New York. Annual meeting, Decemher 1-4, 1914, New York.

American Wood Preservers' Association.—F. J. Angier, B. & O., Mt. Royal Sta., Baltimore, Md. Next convention, January 19-21, 1915, Chicago.

Association of American Railway Accounting Officers.—E. R. Woodson, 1300 Pennsylvania Ave., N. W., Washington, D. C. Annual convention, April 28, 1915, Atlanta, Ga.

Association of Manufacturers of Chilled Car Wheels.—George W Lyndon, 1214 McCormick Bldg., Chicago. Annual meeting, second Tuesday in October, New York.

Association of Railway Claim Agents.—C. W. Egan, B. & O., Baltimore, Md. Annual meeting, 3rd week in May, 1915, Galveston, Tex.

Association of Railway Electrical Engineers.—Jos. A. Andreucetti, C. & N. W., Room 411, C. & N. W. Sta., Chicago. Annual convention, October 26-30, 1914, Chicago.

Association of Railway Telegraph Superintendents.—P. W. Drew, Soo Line, 112 West Adams St., Chicago. Annual meeting, June 22-25, Rochester, N. Y.

Association of Transportation and Car Accounting Officers.—G. P. Conard, 75 Church St., New York. Next meeting, December 8-9, 1914, Richmond, Va.

Bridge and Building Supply Men's Association.—L. D. Mitchell, Detroit Graphite Co., Chicago, Ill. Meetings with American Railway Bridge and Building Association.

Canadian Railway Club.—James Powell, Grand Trunk, P. O. Box 7, St. Lambert (near Montreal), Que. Regular meetings, 2d Tuesday in month, except June, July and August, Windsor Hotel, Montreal, Que.

Canadian Society of Civil Engineers.—Clement H. McLeod, 176 Mansfield St., Montreal, Que. Regular meetings, 1st Thursday in October, November, December, February, March and April. Annual meeting, January, Montreal.

Car Foremen's Association of Chicago.—Aaron Kline, 841 Lawler Ave., Chicago. Regular meetings, 2d Monday in month, except July and August, Lytton Bldg., Chicago.

Central Railway Club.—H. D. Vought, 95 Liberty St., New York. Regular meetings, 2d Friday in January, May, September and November. Annual meeting, 2d Thursday in March, Hotel Statler, Buffalo, N. Y.

Civil Engineers' Society of St. Paul.—Edw. J. Dugan, P. O. Box 654, St. Paul, Minn.; Regular meetings, 2d Monday, except June, July, August and September, Old State Capitol Bldg., St. Paul.

Engineers' Society of Pennsylvania.—Edw. R. Dasher, Box 75, Harrisburg, Pa. Regular meetings, 1st Friday after 10th of each month, except July and August, 31 So. Front St., Harrisburg, Pa.

Engineers' Society of Western Pennsylvania.—Elmer K. Hiles, Oliver Bldg., Pittsburgh, Pa. Regular meetings, 1st and 3d Tuesday, Pittsburgh.

Freight Claim Association.—Warren P. Taylor, R. F. & P., Richmond, Va. Annual meeting, June 16, 1915, Chicago.

General Superintendents' Association of Chicago.—A. M. Hunter, 321 Grand Central Station, Chicago. Regular meetings, Wednesday preceding 3d Thursday in month, Room 1856, Transportation Bldg., Chicago.

International Railway Congress.—Executive Committee, 11, Rue de Louvain, Brussels, Belgium. Next convention, June 23 to July 6, 1915, Berlin.

INTERNATIONAL RAILWAY FUEL ASSOCIATION.—C. G. Hall, C. & E. I., 922 McCormick Bldg., Chicago. Annual meeting, May 17-20, 1915, Chicago.

INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—Wm. Hall, 829 W. Broadway, Winona, Minn. Next convention, July 14-17, 1915, Sherman House, Chicago.

INTERNATIONAL RAILROAD MASTER BLACKSMITHS' ASSOCIATION.—A. L. Woodworth, Lima, Ohio. Next convention, August 18-20, Hotel Wisconsin, Milwaukee, Wis.

MAINTENANCE OF WAY & MASTER PAINTERS' ASSOCIATION OF THE UNITED STATES AND CANADA.—T. I. Goodwin, C. R. I. & P., Eldon, Mo. Next convention, November 17-19, 1914, Detroit, Mich.

MASTER BOILER MAKERS' ASSOCIATION.—Harry D. Vought, 95 Liberty St., New York. Annual convention, May, 1915.

MASTER CAR & LOCOMOTIVE PAINTERS' ASSOCIATION OF THE UNITED STATES AND CANADA.—A. P. Dane, B. & M., Reading, Mass. Next convention, September 8-11, Nashville, Tenn.

MASTER CAR BUILDERS' ASSOCIATION.—J. W. Taylor, 1112 Karpen Bldg., Chicago. Annual meeting, June, 1915.

NATIONAL RAILWAY APPLIANCES ASSOCIATION.—Bruce V. Crandall, 537 So. Dearborn St., Chicago. Next convention, March 15-19, 1915, Chicago.

NEW ENGLAND RAILROAD CLUB.—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass. Regular meetings, 2d Tuesday in month, except June, July, August and September, Boston.

NEW YORK RAILROAD CLUB.—Harry D. Vought, 95 Liberty St., New York. Regular meetings, 3d Friday in month, except June, July and August, 29 W. 39th St., New York.

NIAGARA FRONTIER CAR MEN'S ASSOCIATION.—E. Frankenberger, 623 Brisbane Bldg., Buffalo, N. Y. Meetings monthly.

PEORIA ASSOCIATION OF RAILROAD OFFICERS.—M. W. Rotchford, Union Station, Peoria, Ill. Regular meetings, 2d Thursday in month, Jefferson Hotel, Peoria.

RAILROAD CLUB OF KANSAS CITY.—C. Manlove, 1008 Walnut St., Kansas City, Mo. Regular meetings, 3d Friday in month, Kansas City.

RAILROAD MASTER TINNERS, COPPERSMITHS AND PIPEFITTERS' ASSOCIATION.—U. G. Thompson, C. & E. I., Danville, Ill. Annual meeting, May, 1915.

RAILWAY BUSINESS ASSOCIATION.—Frank W. Noxon, 30 Church St., New York. Annual meeting, December 10, 1914, Waldorf-Astoria Hotel, New York.

RAILWAY CLUB OF PITTSBURGH.—J. B. Anderson, Room 207, P. R. R. Sta., Pittsburgh, Pa. Regular meetings, 4th Friday in month, except June, July and August, Monongahela House, Pittsburgh.

RAILWAY ELECTRICAL SUPPLY MANUFACTURERS' ASSOCIATION.—J. Scribner, 1021 Monadnock Block, Chicago. Meetings with Association of Railway Electrical Engineers.

RAILWAY FIRE PROTECTION ASSOCIATION.—C. B. Edwards, Fire Ins. Agt., Mobile & Ohio, Mobile, Ala. Annual meeting, October 6, 1914, Washington, D. C.

RAILWAY SIGNAL ASSOCIATION.—C. C. Rosenberg, Times Bldg., Bethlehem, Pa. Annual meeting, September 22-24, 1914, Bluff Point, N. Y.

RAILWAY STOREKEEPERS' ASSOCIATION.—J. P. Murphy, L. S. & M. S., Box C, Collinwood, Ohio. Annual meeting, May, 1915.

RAILWAY SUPPLY MANUFACTURERS' ASSOCIATION.—J. D. Conway, 2136 Oliver Bldg., Pittsburgh, Pa. Meetings with M. C. B. and M. M. Associations.

RAILWAY TELEGRAPH & TELEPHONE APPLIANCE ASSOCIATION.—G. A. Nelson, 50 Church St., New York. Meetings with Association of Railway Telegraph Superintendents.

RICHMOND RAILROAD CLUB.—F. O. Robinson, C. & O., Richmond, Va. Regular meetings, 2d Monday in month, except June, July and August.

ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.—L. C. Ryan, C. & N. W., Sterling, Ill. Next convention, September 8-10, 1914, Chicago.

ST. LOUIS RAILWAY CLUB.—B. W. Frauenthal, Union Station, St. Louis, Mo. Regular meetings, 2d Friday in month, except June, July and August, St. Louis.

SALT LAKE CITY TRANSPORTATION CLUB.—R. E. Rowland, Hotel Utah Bldg., Salt Lake City, Utah. Regular meetings, 1st Saturday of each month, Salt Lake City.

SIGNAL APPLIANCE ASSOCIATION.—F. W. Edmunds, 3868 Park Ave., New York. Meeting with annual convention Railway Signal Association.

SOCIETY OF RAILWAY FINANCIAL OFFICERS.—Carl Nyquist, C. R. I. & P., La Salle St. Sta., Chicago. Annual meeting, September 15-17, Hotel Aspinwall, Lenox, Mass.

SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—E. W. Sandwich, A. & W. P. Ry., Atlanta, Ga.

SOUTHERN & SOUTHWESTERN RAILWAY CLUB.—A. J. Merrill, Grant Bldg., Atlanta, Ga. Regular meetings, 3d Thursday, January, March, May, July, September, November, 10 A. M., Candler Bldg., Atlanta.

TOLEDO TRANSPORTATION CLUB.—J. S. Marks, Agent, Interstate Despatch, Toledo, Ohio. Regular meetings, 1st Saturday in month, Boody House, Toledo.

TRACK SUPPLY ASSOCIATION.—W. C. Kidd, Ramapo Iron Works, Hillsburn, N. Y. Meetings with Roadmasters' and Maintenance of Way Association.

TRAFFIC CLUB OF CHICAGO.—W. H. Wharton, La Salle Hotel, Chicago.

TRAFFIC CLUB OF NEW YORK.—C. A. Swope, 291 Broadway, New York. Regular meetings, last Tuesday in month, except June, July and August, Waldorf-Astoria, New York.

TRAFFIC CLUB OF PITTSBURGH.—D. L. Wells, Erie R. R., Pittsburgh, Pa. Meetings bimonthly, Pittsburgh. Annual meeting, 2d Monday in June.

TRAFFIC CLUB OF ST. LOUIS.—A. F. Versen, Mercantile Library Bldg., St. Louis, Mo. Annual meeting in November. Noonday meetings October to May.

TRAIN DESPATCHERS' ASSOCIATION OF AMERICA.—J. F. Mackie, 7122 Stewart Ave., Chicago. Annual meeting, June 15, 1915, Minneapolis, Minn.

TRANSPORTATION CLUB OF DETROIT.—W. R. Hurley, Superintendent's office, L. S. & M. S., Detroit, Mich. Meetings monthly, Normandie Hotel, Detroit.

TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, N. Y. C. & H. R., East Buffalo, N. Y. Next meeting, September 15-18, Hotel Sherman, Chicago.

UTAH SOCIETY OF ENGINEERS.—Frank W. Moore, Newhouse Bldg., Salt Lake City, Utah. Regular meetings, 3d Friday in month, except July and August, Consolidated Music Hall, Salt Lake City.

WESTERN CANADA RAILWAY CLUB.—W. H. Rosevear, P. O. Box 1707, Winnipeg, Man. Regular meetings, 2d Monday, except June, July and August, Winnipeg.

WESTERN RAILWAY CLUB.—J. W. Taylor, 1112 Karpen Bldg., Chicago. Regular meetings, 3d Tuesday in month, except June, July and August, Karpen Bldg., Chicago.

WESTERN SOCIETY OF ENGINEERS.—J. H. Warder, 1735 Monadnock Block, Chicago. Regular meetings, 1st Monday in month, except January, July and August, Chicago. Extra meetings, except in July and August, generally on other Monday evenings.

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF JUNE, 1914

Name of road.	Average mileage operated during period.	Operating revenues: Freight.	Operating revenues: Passenger.	Operating revenues: Total, inc. misc.	Operating expenses: Maintenance: Way and structures.	Operating expenses: Maintenance: Of equipment.	Operating expenses: Traffic.	Operating expenses: Transportation.	Operating expenses: General.	Operating expenses: Total.	Net operating revenue (or deficit).	Outside operations, net.	Taxes.	Operating income (or loss).	Increase (or decr.) comp. with last year.
Ann Arbor	292	$108,952	$42,848	$165,594	$24,077	$9,347	$6,508	$66,927	$9,106	$115,965	$49,629	$34	$13,770	$35,893	—$3,271
Bangor & Aroostook	631	240,590	52,664	307,966	37,564	42,132	2,471	78,489	10,855	171,491	136,475	—559	7,438	128,478	—15,550
Chesapeake & Ohio Lines	2,367	2,421,879	528,321	3,161,159	443,398	536,437	58,907	1,023,939	133,710	2,196,391	964,768	1,570	64,469	901,869	—48,493
Chicago, Rock Island & Pacific	7,852	3,438,595	1,538,202	5,931,553	782,218	844,004	149,745	2,174,880	144,031	4,094,878	1,836,675	—9,464	250,938	1,576,273	—255,313
Detroit, Toledo & Ironton	441	134,213	12,276	157,630	116,739	44,338	3,941	90,804	9,469	265,291	—107,661	....	13,038	—120,699	—25,271
Georgia, Southern & Florida	395	116,063	60,157	202,488	21,911	32,556	8,350	77,865	10,472	151,154	51,334	....	11,192	40,142	3,755
International & Great Northern	1,160	429,733	173,863	654,704	138,643	Cr. +15,412	25,097	401,598	33,936	583,862	70,842	—1,260	25,000	44,582	—33,855
Lehigh Valley	1,444	3,072,000	420,843	3,621,628	368,424	511,943	85,542	1,103,816	88,224	2,157,949	1,463,679	—39,931	126,895	1,296,853	360,158
Nashville, Chattanooga & St. Louis	1,231	648,745	249,512	972,653	113,984	148,713	44,949	351,528	28,666	687,840	284,813	—362	31,577	252,874	128,014
New Orleans, Mobile & Chicago	403	127,897	28,542	166,899	24,633	30,807	3,790	51,757	8,295	119,282	47,617	34	6,310	41,341	17,183
Oahu Ry. & Land Co.	102	58,944	22,540	88,441	4,301	7,141	664	21,724	7,468	41,298	47,143	....	6,966	40,177	3,307
Spokane, Portland & Seattle	556	222,701	158,755	415,928	162,649	43,603	9,614	92,374	13,965	322,205	93,723	2,902	53,400	37,421	124,164
Union Pacific	3,616	2,871,225	932,862	4,049,072	470,773	635,608	124,651	1,015,239	132,336	2,378,607	1,670,465	—7,829	189,274	1,473,362	—345,235
Western Maryland	661	593,975	87,761	711,148	189,445	198,762	23,526	293,533	33,432	738,698	—27,550	—1,754	27,105	—56,409	13,872

TWELVE MONTHS OF FISCAL YEAR ENDING JUNE 30, 1914

Name of road.	Average mileage operated during period.	Operating revenues: Freight.	Operating revenues: Passenger.	Operating revenues: Total, inc. misc.	Operating expenses: Maintenance: Way and structures.	Operating expenses: Maintenance: Of equipment.	Operating expenses: Traffic.	Operating expenses: Transportation.	Operating expenses: General.	Operating expenses: Total.	Net operating revenue (or deficit).	Outside operations, net.	Taxes.	Operating income (or loss).	Increase (or decr.) comp. with last year.
Ann Arbor	292	$1,407,141	$535,468	$2,096,169	$246,509	$264,302	$63,118	$793,496	$87,575	$1,455,000	$641,169	—$97	$164,050	$477,022	$11,550
Bangor & Aroostook	631	2,958,888	663,167	3,795,412	513,970	504,078	30,576	1,232,128	121,208	2,401,960	1,393,452	—1,318	112,606	1,279,528	358,112
Chesapeake & Ohio Lines	2,367	28,866,516	6,098,059	36,690,021	4,138,092	7,692,748	669,283	12,167,906	985,908	25,653,937	11,036,084	28,486	1,330,935	9,733,635	429,701
Chicago, Rock Island & Pacific	7,853	42,348,182	18,186,009	65,388,334	8,479,599	9,452,480	1,808,655	27,279,927	1,872,478	48,893,139	16,495,195	—165,055	3,200,577	13,129,563	—1,481,716
Detroit, Toledo & Ironton	441	1,269,388	136,489	1,542,734	720,851	574,430	32,455	975,178	73,919	2,376,833	—834,099	....	75,738	—909,837	—667,423
Georgia, Southern & Florida	395	1,454,363	830,691	2,596,549	318,223	508,529	101,824	1,059,710	123,676	2,111,962	484,587	—1,349	136,220	347,018	47,556
International & Great Northern	1,160	7,024,295	2,243,936	9,941,374	1,633,202	1,100,369	321,038	4,556,773	400,198	8,021,580	1,919,794	—18,854	339,841	1,561,099	810,973
Lehigh Valley	1,444	33,519,367	4,795,147	39,783,564	4,575,062	7,011,946	1,002,872	14,071,183	948,099	27,609,162	12,174,402	—280,244	1,549,895	10,344,263	—1,863,874
Nashville, Chattanooga & St. Louis	1,231	8,781,321	3,071,445	12,778,333	1,938,499	2,391,419	513,441	4,853,052	383,028	10,073,439	2,698,894	—10,058	326,557	2,362,279	—206,799
New Orleans, Mobile & Chicago	403	1,710,284	368,125	2,204,370	325,121	278,201	46,478	705,123	96,234	1,451,157	753,213	908	85,726	666,579	8,989
Oahu Ry. & Land Co.	102	813,220	302,770	1,192,885	114,693	96,689	7,895	268,182	60,969	548,428	644,457	....	87,324	557,133	3,396
Spokane, Portland & Seattle	556	2,870,639	1,635,894	4,901,740	880,721	455,070	96,038	1,217,341	159,472	2,808,642	2,093,098	—5,843	640,800	1,446,455	—559,362
Union Pacific	3,616	35,826,351	10,616,227	51,075,516	5,614,030	7,309,133	1,266,978	13,803,468	1,505,023	29,498,632	21,576,884	125,696	2,263,265	19,187,923	1,906,065
Western Maryland	661	6,877,763	1,021,816	8,267,736	1,588,475	1,887,555	280,045	3,825,336	267,219	7,848,630	419,106	1,754	263,205	154,147	1,221,726

Traffic News

The Oklahoma two-cent fare case will be tried before Federal Judge Youmans, in Oklahoma City, October 21.

The Missouri, Kansas & Texas is running a "good roads special" train over its lines in Texas to arouse interest in the construction of better highways.

The State Railroad Commission of Alabama has ordered sweeping reductions of freight rates on the Central of Georgia, the Western of Alabama, and the Louisville & Nashville.

The Western Classification Committee has announced that hearings will be held at its office in Chicago to consider applications for changes in ratings, rules, etc., on August 24, on nuts and cheese, and on August 25, on junk and fire-fighting apparatus.

The Central Freight Association roads began a meeting in Chicago on Tuesday of this week to prepare tariffs of advanced freight rates as allowed under the commission's recent decision. It is hoped to have the tariffs ready so that they can be made effective October 1.

Export freight is moving from Atlantic ports in small volume, and some increase is expected during the next week. Inquiries for coal are being received from Mediterranean ports. Press despatches from Galveston report that in the four days, August 15-18, large quantities of wheat were shipped from that port—about 1,000,000 bushels.

W. R. Grace & Co. have announced rates on lumber from the Atlantic to the Pacific coast through the Panama canal by the Atlantic & Pacific Steamship Line. The rates are $13 per 1,000 board feet for 30-foot lengths and less, $14 for lengths from 30 to 40 feet, and $17 for lengths from 40 to 50 feet. The $13 rate represents a reduction of $4 from the rate via the Straits of Magellan.

The Senate at Washington on Monday of this week agreed to the House Bill to admit foreign ships to American registry; and this law, facilitating commerce between this country and Europe, was expected to be signed by the President on Wednesday. American vessels will still have the monopoly of coastwise traffic, the new registry privileges applying only for the benefit of overseas trade.

The Southern Railway is to make a month's tour with its "dairy instruction car" over its lines in Virginia, beginning at Charlottesville, August 24. The car will visit 53 towns. The car is fitted out like a complete farm dairy and carries charts and exhibits giving complete information about dairying and its problems. Milk samples will be tested and advice given on all questions of interest to dairymen.

It is reported in Buffalo that while the railroads delivering freight at ports on the Atlantic seaboard in the United States are unable to accept shipments of freight for Europe on account of the unsettled condition of ocean transportation because of the war in Europe, the Canadian Pacific has announced, at its western and southern agencies, that it is prepared to accept all freight for all ports in Great Britain and Ireland.

Representatives of the Texas Railways held a meeting recently in Galveston to discuss plans for obtaining general advances in Texas rates, either by application to the railroad commission or by proceedings in the courts to restrain the operation of rate schedules already fixed by the commission. Commissioner Mayfield, of the commission, has announced that he favors a public hearing to consider a petition from the roads, but he says that the organization of the commission is inadequate for an investigation of such magnitude.

For the benefit of the fruit growers in West Virginia, Virginia and Maryland, the Baltimore & Ohio has issued a booklet containing a list of the orchardmen and commission merchants in the localities mentioned. The lists embody valuable information to both the producers and receivers of fruit. They include a list of brokers and wholesale dealers in the markets of New York, Philadelphia, Baltimore, Washington, Boston, Providence, Springfield, Shelburne Falls and Worcester. In 1912 apples shipped over the Baltimore & Ohio amounted to 1,861 carloads, and there were 221 carloads of peaches.

Charles L. Chandler, South American agent for the Southern Railway, at Chattanooga, tells southern manufacturers and merchants that they should lose no time in taking advantage of the opportunity which the war in Europe has given them for extending their trade with South American countries, particularly with Argentina and Uruguay, on account of the direct steamship service to these countries through the port of Mobile. These countries have been buying largely from Great Britain, Germany and France, but must now find a new source of supply. The recent establishment of an American bank at Buenos Ayres and Rio Janeiro will prove of great advantage. Mr. Chandler is prepared to furnish information of every character in regard to South American markets.

The roads of the Transcontinental Passenger Association have announced the authorization of low fare colonist excursions to the West and Northwest Pacific Coast this fall. Tickets from Chicago one way second class will be sold at $38, and from Missouri river points at $30, with corresponding reductions from St. Louis and other points. These tickets will be on sale daily from September 24 to October 8. This move is contrary to the expressed intention of the roads which voted a year ago not to make the colonist reductions this year. The initiative was taken by one of the larger lines, which insisted that its territory needed the assistance of low rates in securing settlers. A majority of the roads immediately agreed to the plan, but it was decided to limit the sale to two weeks.

A "Corn Show" is the latest novelty adopted by a railroad company to promote business. The Oregon-Washington Railroad & Navigation Company has issued in pamphlet form a premium list for such a show, to be held at Walla Walla, November 25, 26, 27 and 28. Competition is open to everybody in the territory tributary to the company's lines in Oregon, Washington and Idaho. Not much corn (maize) has been raised in those states in the past, and the traffic department of the road is taking measures to encourage its growing. The acreage planted in Oregon and Washington this year is more than double that of last year, and the quality is much better. There will be a large number of prizes, ranging from $50 for the best general display down to $2.50, which is the amount of the smaller prizes for a single acre, and for the best twelve ears of corn. A number of manufacturers have offered prizes of agricultural implements.

The railway members of the Western Trunk Line Committee, the Southwestern Tariff Committee ,and the Trans-Missouri Freight Bureau have prepared tariffs, to become effective on September 15, canceling the allowance for actual weight of dunnage not in excess of 500 lb., used by shippers and furnished at their expense to protect freight in carloads shipped in box, stock or refrigerator cars. This action is in accordance with a recent decision of the Interstate Commerce Commission allowing the cancellation of the dunnage allowance in Southwestern territory. The dunnage allowance was instituted by the Minneapolis, St. Paul & Sault Ste. Marie about two years ago and was adopted by the roads in Western classification territory, but not in the transcontinental tariffs. The commission held that in view of the fact that the substitution of dunnage for the more expensive boxes and crates and other packing material is of advantage to the shipper and reduces the gross weight upon which freight charges must be paid, it is not inconsistent that the carriers should receive revenue for the total weight hauled.

In the Supreme Court of the District of Columbia, on Monday of this week, the American Steel & Wire Company was denied its application for an order directing the Interstate Commerce Commission to make an affirmative order in the industrial railway case. The commission having held that the Newburgh & South Shore Railway, the traffic of which is the subject of this suit, is only a plant facility, the trunk line or long distance railroads on April 1, discontinued dividing through freight rates with it. The Newburgh & South Shore operates 59 miles of freight lines in and around Cleveland, Ohio. During the arguments R. F. Dennison, attorney for the Cleveland City Street Railroad, which also is interested in the suit, said that this is one of the cases in which the commission, by threats of indictments uttered against the trunk lines, is able to accomplish by indirection what the courts will not allow it to accomplish by

direct methods—classification of railroads by ownership. "The fundamental question here involved," declared C. W. Needham, attorney for the commission, "is as to whether the Steel Trust and other big corporations are to be allowed to collect from $25,000,000 to $40,000,000 a year in rebates, under pretense that the tracks which they have built to their plants are common carrier railroads, performing a service of transportation for the public."

The art of packing fruit is the latest subject to be taken up by a traveling instruction car. The "Agricultural Department" of the New York Central road in conjunction with the College of Agriculture of Cornell University is going to start a car on this mission August 21, manned by professors from the college, representatives from the New York State Department of Agriculture, and from the fruit growers' associations, and by Mr. Welsh, agriculturist of the New York Central. The car will be fitted up with exhibits of all kinds relating to the packing and marketing of fruits, and of uniform grading of apples as required under the provisions of the new apple packing law of New York. Demonstrations will be made, at each stop, of the packing of "orchard run" fruit, which will be furnished by local growers. The new law is the outgrowth of efforts of the fruit growing societies of the state, to secure legislation which will result in more uniform packing and a better reputation for quality of New York apples. Lantern slides will be used by the lecturers to show the increasing receipts of different varieties of apples in the New York City market, the preferences of different markets for different varieties, prices of fruit and the effect of cancellations of car orders on the available car supply. The car is going to stop at Marlborough, Ulster Park, Saugerties, Coxsackie, Ravena, Schodack Landing, Stuyvesant, Hudson, Germantown, Poughkeepsie, Spencerport, Brockport, Albion, Medina, Lockport, Fulton, Oswego, Hannibal, Red Creek, Sodus, Williamson, Webster, Hilton, Morton, Lyndonville, Barker, Burt and Ransomville. A period of three hours is allowed at each town.

The Pacific Mail Steamship Company

R. P. Schwerin, vice-president and general manager of the Pacific Mail Steamship Company, in giving testimony this week before the Interstate Commerce Commission, said that the existence of the company depends on the willingness of the commission to grant its application for permission to continue in the eastwise trade to Mexican ports. The Pacific Mail is controlled by the Southern Pacific, which reaches by rail some of the Mexican cities with which the steamship company trades.

The specific point involved in the hearing was Mazatlan. Mr. Schwerin said that he had no fear that the Panama Canal act could be construed to include his company's business with Mexican and Central American points other than those reached by the Southern Pacific's rail lines. But, without the Mazatlan business his company could not engage profitably in the South Coast trade; and the company's Oriental business would become unprofitable if the coasting steamships were discontinued.

The steamship company has paid no dividends since 1898, and he said that its continuance "has been largely sentimental."

The company has seven steamships running to China, Japan and the Philippines and nine between San Francisco and Panama.

Control of Plague at New Orleans

The plague situation in New Orleans is entirely under the control of the Public Health Service of the United States. There are 10 commissioned officers now in the city with 300 employees under their command. All freight passing through and out of New Orleans receives thorough inspection from the officers of the Public Health Service. Every vessel entering and clearing from the port is fumigated with carbon monoxide gas, which effectually destroys all vermin or other animal life without in the slightest degree injuring the most delicate cargo. . . .

Railroad freight leaving the city receives a thorough inspection. As rat fleas are the only carriers of plague, all freight cars are inspected when empty by officers of the Public Health Service, who see that they are clean, free of rats, and rat-proof.

Cars which are not proof against rats are required to be repaired before being loaded. During one week 800 cars were ratproofed and 10 condemned. Approximately, 2,000 cars a week are being inspected. Not only are the cars inspected, but the freight intended for them is also examined, and packages likely to harbor rats are required to be repacked. All cars are loaded under the direct supervision of inspectors of the Public Health Service. Each car so loaded is closed by the inspector, and sealed with a lead seal bearing the Service device. Cars loaded under this inspection are labeled with the inspection number, car number, destination, and the legend, "Inspected and passed as rat free, conditional upon unbroken seal."

Freight passing through the city is handled with the utmost despatch, and there is no need for the diversion of freight intended for any destination other than Costa Rica (which maintains a quarantine).

Several of the railways entering New Orleans have already taken up the question of rat-proofing their storage and freight terminals, in accordance with the plans which are being drawn up by the Public Health Service.—*From a Government Report.*

General Reduction of Freight Rates in North Carolina

The special commission appointed in North Carolina last October to consider a proposed reduction of freight rates in that state has made a report recommending a reduction which on the average amounts to about 18 per cent. The conclusion of the commission is in effect a compromise between the view that present rates are reasonable, and a reduction of about 33 per cent which was made by a law, the "Justice Act," passed by the legislature last year, and subsequently suspended because of the complaints made by the carriers. It is expected that the governor will prescribe the new rates to go into effect October 12; although the railroad companies still have the privilege of protesting. There are few or no reductions on rates for ten miles and less. The provision, heretofore in effect, that the Southern Railway might charge 25 per cent above normal rates on shipments originating in the mountain division, is done away with. Railroads operating less than seventy-five miles of lines in North Carolina are not affected by the present report. The special commission recommends that rates for these shorter roads be fixed by the North Carolina Corporation Commission.

National Industrial Traffic League

The summer meeting of the National Industrial Traffic League was held at the Copley-Plaza hotel, Boston, Mass., on August 12-15. The committee on storage rules reported the success of the negotiations conducted with the American Railway Association and the Interstate Commerce Commission regarding a uniform code of storage rules, which has now been tentatively endorsed by the commission. The committee on weighing also reported the results of similar negotiations which have led to the adoption of a code of weighing rules, with an exception on the part of the league as to the provision for tolerance. The committee also called attention to a new code of rules proposed by the Chicago Coal Dealers' Association which have been submitted to the American Railway Association. The subject of federal supervision over track scales was discussed and the league expressed its tentative disapproval of such supervision.

The proposed elimination of dunnage allowances by the western roads was discussed, but no action was taken, although many of the shippers are opposed to the cancellation on the ground that it will in effect increase freight charges. A report was presented by a special committee on graduated storage charges and demurrage charges and the subject was referred to a joint committee on legislation and storage charges. The committee was opposed to the theory of storage charges graduated to penalize the practice of storing beyond a reasonable time, on the ground that it is the duty of the carriers to store freight. Consideration was also given to a proposition of the American Railway Association for an increased demurrage charge for refrigerator cars when used for perishable freight shipments, the proposed charge being $2 per car per day for the first 48 hours and $3 a day thereafter. The committee on demurrage and storage charges will confer on this with the commission merchants, many of whom are in favor of the plan.

A proposed amendment to the Carmack amendment of the commerce act, which is a part of the administration securities bill, was discussed and opposed on the ground that its prohibition of the limitation of liability by the carriers would nullify present classification provisions relating to the uniform bill of lading, without which rates would be advanced 10 per cent. The legislative committee and the bill of lading committee were instructed to endeavor to postpone any action by Congress on the Carmack amendment at this time.

Commission and Court News

INTERSTATE COMMERCE COMMISSION

The commission on August 19 decided against the railroad commissions of Arkansas, Missouri and Oklahoma in their petition asking for a reduction from the rate of 3 cents a mile on interstate passenger fares through those states. The complainants sought to have the two cent intrastate rate made the basis of interstate charges. The commission held that the defendant railroads did not voluntarily establish and do not voluntarily maintain the intrastate passenger fare of two cents a mile, and that interstate fares at the three-cent rate were not unreasonable. In appealing to the Interstate Commerce Commission the state commissions sought to show that a reduction of the interstate rate would stimulate travel, filing exhibits tending to support the contention that the two-cent intrastate rates had produced increased net revenues for the carriers. The commission thought other conclusions might be drawn from other tables and sustained the three-cent rate. The commission says, however, that the ruling does not mean that "there may not be force in the theory that a reduction of rate tends to increase travel."

Rates on Wheat to Sioux City, Iowa

Sioux City Terminal Elevator Company et al v. Chicago, Milwaukee & St. Paul et al. Opinion by Commissioner Clements:

The commission in this case prescribes local rates on grain from producing stations in South Dakota, Nebraska, Iowa and Minnesota to Sioux City, Iowa. (31 I. C. C., 482.)

Rates on Wrapping Paper to Muskogee

E. C. Adleta, doing business as Adleta Paper Company v. Chicago & North Western et al. Opinion by Commissioner McChord:

The commission finds that rates of 51 and 52 cents per 100 lb., respectively, on wrapping paper to Muskogee from Nekoosa, a representative Wisconsin point and Munising, a representative Michigan point, are unreasonable; and it is ordered that these rates should not exceed 34 cents and 35 cents per 100 lb., respectively. Reparation awarded. (31 I. C. C., 347.)

Rates on Canned Goods to Oklahoma City

Carroll, Brough & Robinson et al v. Atchison, Topeka & Santa Fe et al. Opinion by Commissioner Daniels:

The commission finds that the present rate of 45 cents per 100 lb. in carload lots on canned goods and other similar articles listed under this heading in the western classification No. 51 from Galveston, Houston and other points in south Texas to Oklahoma City and other intermediate points in Oklahoma are unreasonable and discriminatory against Oklahoma City as compared with the rate on the same commodity from Galveston to points in Texas, Arkansas, Kansas and also as compared with rates from other gulf ports and other sources of supply of canned goods to points competing with Oklahoma City. (31 I. C. C., 466.)

Uniform Demurrage Code

Michigan Manufacturers' Association et al v. Pere Marquette et al. Opinion by the commission:

Complainant alleges as unreasonable various provisions of the uniform or national code of demurrage rules, particularly in relation to their application to certain kinds of traffic in Michigan. A request is made that the free time allowed be changed from two days to three days for unloading cars containing coal, coke, charcoal and lumber (except cargo and lightered lumber); to three days for loading or unloading cars of sash, doors, blinds, inside finishing materials, box materials,, and mixed cars of dressed lumber; to three days for loading cars with furniture and to five days for loading, weighing and billing coal at mines in the state. The commission does not feel that these Michigan industries differ so materially from similar industries in other sections as to entitle them to special demurrage rules. In those exceptional cases wherein the exigencies and peculiar nature of the shipper's business are such as to make it more economical to hold cars beyond the free time allowed it is only proper that demurrage for the additional delay should be charged. It would seem that these instances are, with most of the Michigan shippers, sufficiently rare as to permit of such additional charge being offset by credits if the shipper is operating under the average agreement, or to be otherwise taken care of, if not operating under that agreement, by resort to the bunching or weather-interference rules. It adheres to previously expressed views that the existence of merely unique or exceptional transportation conditions in certain localities furnishes no ground for exceptions unless it be made to appear clearly that discrimination would otherwise result against such localities. In this case there would be no such discrimination. (31 I. C. C., 329.)

Rates from Bowling Green, Kentucky

Bowling Green Business Men's Protective Association of Bowling Green, Ky., v. Louisville & Nashville et al. Opinion by Commissioner Meyer:

The commission finds that the construction of through rates from Chicago and Milwaukee territories to Nashville, Tenn., by the addition of proportional rates from points of origin to the Ohio river to the local rates from the river to Nashville contrasted with the construction of rates to Bowling Green by the addition of the local rates to and from the river crossings does not result in discrimination against Bowling Green. A similar manner of constructing through rates from Indianapolis territory to Nashville and Bowling Green is found to discriminate against the latter point and it is ordered that the through charges from Indianapolis territory via Louisville to Bowling Green should not exceed the rates concurrently effective on like traffic to Nashville. (31 I. C. C., 1.)

Through Rates Between Rail and Water Lines

Pacific Navigation Company v. Southern Pacific et al. Opinion by Commissioner Meyer:

Complainant, a common carrier operating the steamers Harvard and Yale (formerly in service between New York and Boston) between San Francisco, San Pedro and San Diego, Cal., asks that the defendant rail carriers be required to establish through routes and joint passenger fares with its steamers to the same extent as at present maintained with the Pacific Coast Steamship Company and the San Francisco and Portland Steamship Company. The commission finds that complainant's request should be granted. In so far as the Western Pacific and the San Pedro, Los Angeles & Salt Lake and their connections are concerned the commission holds that it unquestionably has jurisdiction to require the establishment of through routes with complainant's steamers because the rail carriers have no rail lines between San Francisco and Los Angeles, and the question of short hauling themselves can not be raised. In view of the fact that the Southern Pacific and the Atchison, Topeka & Santa Fe which have rails of their own between San Francisco and Los Angeles have granted through routes in connection with the Pacific Coast Steamship Company and the San Francisco & Portland Steamship Company, it is held that they also may be required to join with complainant in establishing through routes and joint fares. The commission also finds that by maintaining through routes and joint fares with the two steamship companies and refusing to establish them with complainant, defendants are violating section three of the act to regulate commerce. It is also declared that if rail carriers are permitted to choose the particular boat lines with which they will establish through routes and joint rates, they will be able to dictate who shall operate on the water and who shall not, for a boat line which is accorded a monopoly of the through rail-and-water traffic will soon be able to drive its competitor out of business. The spirit of the act to regulate commerce is to maintain the freedom of our ports and to allow boat lines to engage in traffic upon equal terms. To permit the rail carriers serving a port to favor one boat line or another would destroy the freedom of competition between boat lines, which the act is intended to preserve and would practically close ports to all but the favored vessels. (31 I. C. C., 472.)

STATE COMMISSIONS

The Minnesota Railroad & Warehouse Commission has issued an order directing that hereafter the Chicago, St. Paul, Minneapolis & Omaha and the Chicago & North Western, for the purpose of applying rate schedules, shall be considered as separate and independent roads.

The Kansas Public Utilities Commission has issued an order refusing permission to the railroads to apply western freight classification No. 52 on Kansas traffic without approval of the commission. The commission, however, has given its approval, with the exception of 12 classes of items, on which it proposes to have an investigation.

The Texas Railroad Commission has issued an order abolishing the Galveston-Houston differential rates on cotton and cotton linters and establishing in their place commodity rates based on a distance tariff, to become effective on September 10. The commission states that every effort was made to avoid changes in the amounts of the rates.

The Iowa Railroad Commission has filed a petition with the Interstate Commerce Commission asking for a rehearing of the interior Iowa rate case, which was decided recently by the Interstate Commerce Commission. The petition claims that the rates fixed in this case unjustly discriminate against the interior Iowa cities in favor of places along the Mississippi river.

The Public Utilities Commission of Ohio has issued a circular addressed to the railroads and shippers of Ohio entitled, "Keep the Cars Moving," appealing both to the railroads and shippers to make every effort to obtain the maximum efficiency in the use of freight cars to avoid a possible car shortage. The bulletin contains a list of suggestions to the railroads and also suggestions to the shippers of methods for securing maximum efficiency.

The Nebraska State Railway Commission has issued an order, to take effect September 6, providing for a reduction of about 19 per cent in all class freight rates in Nebraska, covering about one-third of the total freight traffic of the state. The reduction is based on a distance tariff with certain modifications. The commission says in its decision that a compilation prepared by its rate expert shows that the reduction on the intrastate traffic will aggregate $611,000 annually. There will also be a substantial reduction on interstate rates, the amount of which is impossible to estimate, but which the commission says will probably amount to $750,000 annually. The commission says that the jobbing points of the state have been placed on an equalized basis, the purpose being to preserve present commercial conditions so far as it is possible to do so without continuing present inequalities or abuses. The commission found the Nebraska merchants opposed to a distance traffic, and is unanimous in its opinion that to establish a rigid maximum and minimum distance tariff would be disastrous to the jobbing and manufacturing interests of the state and that it would reduce competition without benefit to the ultimate consumer.

Colorado Public Utilities Commission

The Colorado State Railroad Commission went out of existence on August 12, and was merged with the new Colorado Public Utilities Commission, which was created by an act of the legislature last year. The new commission has jurisdiction over railroads, express companies, telephone, telegraph, water, lighting, power and street railway companies, and has power to suspend rates in advance of their taking effect, its decisions to be subject to review by the state supreme court. The bill creating the commission was rendered operative recently by District Judge Allen, of the city and county of Denver, through the issuance of an injunction restraining the secretary of state from referring the act to a referendum at the fall election. Two referendums attacking sections of the act will be submitted to the voters under the referendum act, but will not affect it as a whole. The court's decision in effect authorizes the merging of the old commission with the Public Utilities Commission. A. B. Anderson, S. S. Kendall and George T. Bradley, the three railroad commissioners, are to serve in a similar capacity on the new commission. Under the old laws the commission could only act on complaint and could not initiate proceedings on its own motion. The new commission is given power for the immediate enforcement of its decisions until reversed by the supreme court.

PERSONNEL OF COMMISSIONS

Henry L. Oestreich, senior assistant division engineer of the New York Public Service Commission, First district, died August 13, at Atlantic City, N. J., where he had been for eight weeks suffering from septic poisoning. Mr. Oestreich was born in 1869, and was graduated from New York University in 1888. During the construction of the New York subway, 1900-1904, he was in charge as assistant engineer of the section of construction on Lafayette street and Fourth avenue, between Great Jones street and Nineteenth street. Later he had charge of important construction for the Centre street loop.

COURT NEWS

At Fairmount, W. Va., the Baltimore & Ohio has been served with an injunction, under the new prohibition law of West Virginia, restraining the carrier from delivering certain whiskey consigned to A. Bellomo, for 57 other persons; and the company is further restrained from accepting intoxicating liquors for transportation to persons in that state without first ascertaining that the liquors are for the personal use of the consignees.

The New York State Public Service Commission, Second district, has been enjoined temporarily by Judge Ray of the United States District Court, from enforcing its order requiring the Delaware, Lackawanna & Western to restore two trains between Syracuse and Oswego. Judge Ray does not question the jurisdiction of the Public Service Commission to regulate intrastate service on an interstate carrier, but holds that an interstate carrier so regulated may appeal to the federal courts rather than to the courts of the state. But he holds that the present service is sufficient, and the case will have to be tried on its merits in his court. The time for final disposition of the case has not been set.

Decisions of Courts Affecting Labor

The federal bureau of labor statistics has issued its annual bulletin No. 152, containing a selected list of decisions by the federal courts and the higher courts of the various states on labor laws and kindred subjects.

About 170 court decisions are considered. Most notable are the decisions which relate to the new remedy of workmen's compensation for industrial accidents. The constitutionality of the laws of New Jersey and Washington on the subject was sustained by the supreme courts of those states. A provision of the law of Wisconsin which makes it the duty of the employer to provide medical treatment for the injured workmen is the subject of a decision which points out some ways in which abuses may be avoided. This bulletin probably presents the largest number of strictly American cases on this subject that can be found as yet in a single volume.

Many decisions are reported construing the federal statute relating to the liability of interstate railroads for injuries to their employees, the chief point involved being the scope of this law. Among the employees held to be within its provisions are a brakeman getting ice to cool hot boxes on his train, a truckman loading a detached car with interstate freight, a pumpman at a water station, a repair man working on an engine tender on a siding, a member of a switching crew placing an oil car to furnish oil for fuel for an interstate locomotive, a yard clerk taking the numbers of the cars in an interstate train, and a track repairer injured by an intrastate train while at work on a bridge.

There is a report of the contempt case against the leaders of the American Federation of Labor, growing out of the injunction in the Buck Stove and Range Company case. The Supreme Court of the United States in May, 1914, reversed this judgment because of the lapse of time since the acts complained of were committed, but without expressing any opinion as to the merits of the case. A law of Illinois forbidding the use of emery wheels, etc., for polishing processes in basements, without reference to the actual conditions as to ventilation, and one of Louisiana limiting the hours of labor of certain classes of stationary engineers were held to attempt unjustifiable discriminations.

Railway Officers

Executive, Financial, Legal and Accounting

Duval West, of San Antonio, Tex., has been appointed receiver of the San Antonio, Uvalde & Gulf.

E. T. Lamb, receiver and general manager of the Atlanta, Birmingham & Atlantic Railroad, with headquarters at Atlanta, Ga., has been elected president of its successor the Atlanta, Birmingham & Atlantic Railway. Brooks Morgan, of Atlanta, has been elected vice-president, and F. K. Mays, treasurer and purchasing agent, has been appointed secretary and treasurer.

Operating

P. H. Mattimoe has been appointed superintendent of weighing, inspection and handling freight of the Wabash, with headquarters at St. Louis, Mo.

J. L. Terry, general superintendent and auditor of the Denver, Laramie & Northwestern, has been appointed general manager, with headquarters at Denver, Colo.

James B. King has been appointed trainmaster of the Taylor subdivision of the International & Great Northern and J. A Caldwell has been appointed trainmaster of the Gulf division.

David Crombie, who has been appointed superintendent of transportation of the Canadian Northern, Eastern lines, with headquarters at Toronto, Ont., as has been announced in these columns, was born in 1864, at Hamilton, Ont., and was educated in the public schools. He began railway work in, 1882 with the Grand Trunk, and previous to 1890 was operator, agent, and train despatcher on that road. He then served as train despatcher and car service agent on the Flint & Pere Marquette at Saginaw, Mich., until 1900, when he became superintendent of transportation at Detroit of its successor the Pere Marquette. From 1903, to 1907, he was out of railway service, and in the latter year went to the Grand Trunk as master of transportation. Three years later he was appointed assistant to general transportation manager, and in 1912, was made assistant to vice-president, remaining in that position until January, 1913, when he was made general superintendent of transportation of the same road. In August of the same year he returned to the service of the Pere Marquette as inspector of transportation at Detroit, and in May, 1914, was appointed inspector of transportation of the Canadian Northern, which position he held at the time of his recent appointment as superintendent of transportation of the same road as above noted.

D. Crombie

The jurisdiction of C. W. Coe, superintendent of the Toledo division of the Wheeling & Lake Erie, at Brewster, Ohio, has been extended over the Cleveland division. F. B. Barber, who has been superintendent of the Cleveland division, has been appointed assistant superintendent of the Cleveland and Toledo divisions with headquarters at Brewster. D. J. Morris, assistant superintendent, has been appointed assistant superintendent of transportation at Brewster.

H. H. Maher has been appointed trainmaster of the Lake Superior division, including the Duluth-Superior terminals, of the Northern Pacific, with headquarters at Duluth, Minn. R. T. Taylor has been appointed trainmaster of the First, Second, Fifth, Tenth and Eleventh subdivisions, Lake Superior division, with office at Duluth, in place of L. F. Newton, transferred to Mandan, N. D., as trainmaster. A. M. Deverell has been appointed chief despatcher and division operator of the Minnesota division in place of W. G. Howland, transferred.

Arthur John Hills, whose appointment as general superintendent of the Ontario Grand division of the Canadian Northern, Eastern lines, with headquarters at Toronto, Ont., has already been announced in these columns, was born on February 15, 1879, at Toronto. He was graduated from Ridley College at St. Catherines in 1893; from Upper Canada College, at Toronto in 1896, and from the University of Toronto in 1899. In April of the latter year, he entered the service of the Canadian Northern, as stores and material agent of the construction department in Manitoba. From June, 1901, to December, 1903, he was a clerk in the general superintendent's office at Winnipeg, Man., and then went to the third vice-president's office of the same road at Toronto. He was appointed superintendent of the Canadian Northern Ontario in January, 1908, with headquarters at Toronto, which position he held at the time of his recent appointment as general superintendent of the Canadian Northern as above noted.

Traffic

B. D. Shropshire has been appointed commercial agent of the Rock Island Lines at Ft. Worth, Tex., to succeed I. G. Thompson, resigned.

The headquarters of D. L. Rupert, division freight agent of the Detroit, Toledo & Ironton, have been removed from Ironton, Ohio, to Lima.

W. A. Dolan having resigned as general New England agent of the Chicago Great Western at Boston, Mass., that office is abolished, and C. L. Smith is appointed general agent freight department at that place.

Engineering and Rolling Stock

Paul A. G. Tilmot has been appointed assistant roadmaster of the Northern Pacific at Tacoma, Wash.

F. D. Nauman has been appointed division engineer on the Chicago division of the Baltimore & Ohio, with headquarters at Garrett, Ind., succeeding John Tordella, promoted.

H. F. Staley, master mechanic of the Carolina, Clinchfield & Ohio at Erwin, Tenn., having resigned, G. F. Shull has been appointed acting master mechanic, and W. S. Moseley has been appointed mechanical engineer, both will have their headquarters at Erwin.

Purchasing

The office of purchasing agent of the Southern Pacific at Portland, Ore., held by A. E. Hutchinson, has been abolished.

OBITUARY

Major Joseph G. Pangborn, formerly assistant general passenger agent of the Baltimore & Ohio, at Baltimore, Md., died in that city on August 15, of heart disease. He was born at Albany, N. Y., on April 9, 1845, and began railway work in December, 1876. He was general advertising agent of the Atchison, Topeka & Santa Fe previous to 1878, and then for two years was confidential clerk to the general manager of the same road. From May, 1880, for one year he was chief clerk in the advertising department of the Baltimore & Ohio, and has been in the continuous service of that road ever since. In May, 1881, he was appointed assistant to the general passenger agent; one year later he was promoted to assistant general passenger agent. At the time of his death he was a member of the Safety Committee. At the time of the Chicago fair in 1893, he was chairman of the World's Transportation Commission, endowed by the late Marshall Field to study transportation history. In connection with this work he went to Europe, Asia and Africa to gather data for a history of transportation from the earliest times, and some of the results of his researches were embodied in a book entitled "The World's Railway."

Equipment and Supplies

LOCOMOTIVE BUILDING

The Atlanta & West Point is in the market for one locomotive.

The Stewart Sugar Company, Stewart, Cuba, has ordered one Mogul type locomotive from the Baldwin Locomotive Works.

The Cincinnati, Hamilton & Dayton has ordered 30 Mikado and 5 Pacific type locomotives from the Lima Locomotive Corporation.

The Cleveland, Cincinnati, Chicago & St. Louis reported in the *Railway Age Gazette* of August 14 as being in the market for a number of switching locomotives, is in the market for 11 locomotives of that type.

The San Diego & Arizona has ordered one Consolidation freight locomotive from the American Locomotive Company. This locomotive will have 22 by 30 in. cylinders, 57 in. driving wheels, a total weight in working order of 212,000 lb., and a steam pressure of 200 lb. This is in addition to a similar order reported in the *Railway Age Gazette* of August 7.

CAR BUILDING

The Chesapeake & Ohio is in the market for 350 freight cars.

The Lehigh & Hudson is in the market for twenty 50-ton ore cars.

The Southern Pacific has again opened negotiations and is now inquiring for 2,600 box cars.

IRON AND STEEL

The Chicago & Illinois Western has ordered 238 tons of steel consisting of girders, I-beams and columns from the Chicago Bridge & Iron Company, Chicago.

The Chicago, Milwaukee & St. Paul has ordered 128 tons of material for a subway at Winnebago avenue, Chicago, from the Wisconsin Bridge & Iron Company, Chicago.

Roumanian Railway Extensions.—The Roumanian Legislative Assembly recently unanimously voted a credit of about $100,000,000 intended for the development of the railways of the country. Among the most interesting of the new lines proposed is the construction of a line to connect Bucharest directly with Belgrade.

Falling off in Argentine Railway Receipts.—The most important Argentine railways render accounts for the fiscal year from July 1 to June 30. With the exception of three companies gross receipts for 1913-14 show an important falling off as compared with those of the preceding year. This is attributed in the first place to disastrous droughts, which resulted in greatly diminished wheat and linseed crops, and in the second place to the general business depression. The Buenos Aires Great Southern shows a falling off in gross receipts from $31,334,970 in 1912-13 to $26,084,440 in 1913-14. Decrease in gross receipts in 1913-14, as compared with 1912-13, was as follows on the different lines: Buenos Aires Great Southern, $5,250,530; Buenos Aires & Pacific, $3,372,484; Buenos Aires Western, $2,082,862; Central Argentine, $2,068,112; Midland, $104,138; Northeastern Argentine, $95,432; Rosario to Puerto Belgrano, $142,029; Provincial of Santa Fe, $550,706; Compañia General de Buenos Aires, $1,034,451. Gross receipts of three railways showed the following gains in 1913-14 as compared with 1912-13: Entre Rios Railway, $65,698; Central Cordoba, $344,553; Buenos Aires Central, $106,537. The government railways, which render accounts for the calendar year, show the following falling off in gross receipts for the first six months of 1914 as compared with corresponding period of 1913: Central Northern & Chaco branches, $536,009; Northern Argentine, $138,834; Northern Argentine (Cordoba division) and Northwestern, $7,953.

Supply Trade News

The patent granted William R. McKeen covering all-steel box cars, as mentioned in the July 10 issue, on page 80, should have been numbered 1,107,086, instead of the number mentioned, which was the serial number.

George Blackmore, eastern sales manager of the Union Switch & Signal Company, has been elected vice-president and director of the Bryant Zinc Company, Chicago, with headquarters at New York, effective September 1.

Edmund Quincy, Lehigh 1913, for the past year with the Pennsylvania Steel Company, Steelton, Pa., will become connected with the engineering department of the Q & C Company, New York, effective September 1.

Willard Doud, formerly shop engineer of the Illinois Central and Chicago, Burlington & Quincy, having completed the special engineering work involved in the construction of the new shops for the Belt Railway of Chicago, at Chicago, announces the opening of offices in the Morton building, 538 South Dearborn street, Chicago, for the handling of all matters pertaining to the design, construction, equipment and operation of railroad and industrial shops and power plants.

There have recently been put in service three Waddell & Harrington type vertical lift bridges, with unusually long spans. Of these, the one over the Missouri river at Mondak, Mont., for the Great Northern is 296 ft. long, the longest of this type ever built. The second longest is the one over the south branch of the Chicago river in Chicago, for the Pennsylvania, which is 272 ft. 10 in. long. The third bridge, which measures 271 ft. from center to center of pins, is over the Yellowstone river on the Great Northern.

Thomas A. Griffin, chairman of the board of directors of the Griffin Wheel Company, Chicago, died on the steamship Korea on the way from Yokohama to Honolulu on August 12. Mr. Griffin was born August 28, 1852, at Rochester, N. Y. His first business experience was as an apprentice at Rochester, and since 1868 he had been continuously in the car wheel manufacturing business. In 1875 he went to Detroit and operated for the Michigan Car Company its plant known as the Detroit Car Wheel Company. In 1879 the Griffin Car Wheel Company of Detroit was organized, and the following year Mr. Griffin went to Chicago, where he organized the Griffin & Wells Foundry Company, which was merged into the Griffin Wheel & Foundry Company in 1886. Mr. Griffin at this time acquired all of the interest in the Griffin Car Wheel Company at Detroit, and subsequently the name of this company was changed to the Griffin Wheel Company. Besides having five foundries in Chicago the company operates foundries in Boston, St. Paul, Detroit, Kansas City, Denver, Tacoma and Los Angeles.

T. A. Griffin

TRADE PUBLICATIONS

Bridge and Pier Lamps.—Bulletin No. 16 of the Armspear Manufacturing Company, New York, contains eight pages devoted to illustrations of its spheroidal lens bridge and pier lamps. These lamps are built to conform to the latest specifications of the Bureau of Lighthouses.

Railway Construction

Atlantic, Waycross & Northern.—Grading work is now under way, it is said, on an extension from Kingsland, Ga., west to Folkston, 22 miles. The company now operates 11 miles of railroad from St. Mary's west to Kingsland. (February 20, p. 407.)

Birmingham, Selma & Mobile.—An officer writes that as soon as bonds are sold contracts will be let to build a line connecting Blockton, Ala., Marion and Selma, to have a total length of 67 miles. Track has been laid on 12 miles. The maximum grades will be 1.5 per cent, and maximum curvature 4 deg. There will be one 200-ft. steel bridge and 38 trestles. The company expects to develop a traffic in lumber, logs, cotton, grain, fertilizer, cattle and coal. J. F. Johnston, president, Brent, Ala.

Carthage & Copenhagen.—Plans are being made, it is said, to build the extension projected in 1912 from Copenhagen, N. Y., south to a connection with the Lehigh Valley at Camden, about 35 miles. The company now operates 9 miles of railroad from Carthage southwest to Copenhagen.

Chattahooche Valley.—This company, which now operates a 34-mile line from Standing Rock, Ala., south via West Point, Ga., to Jester, Ala., is making surveys, it is said, to build a 15-mile extension. The projected route is from McCulloh to a connection with an existing line to Columbus.

Cincinnati, New Orleans & Texas Pacific.—An officer writes that a contract has been given to Dunn & McCarthy, Chicago, for building 8.9 miles of second track between tunnel 15, just south of New River, Tenn., and tunnel 16, just north of Sunbright. The work will consist of the construction of parallel track on present grade.

Dominion Atlantic.—Work is now under way on the North Mountain branch from Centerville, N. S., on the Cornwallis Valley branch, to Weston 14.79 miles. It is expected that the branch will be opened for operation in 1915. A contract to build the line was given last year to Kirk & Cooke, North Sidney. (December 12, p. 1147.)

Hamlin & Guyandotte.—This company has been incorporated in West Virginia with $50,000 capital and office at Hamlin. The plans call for building from a point at or near Hamlin to a point on the Guyandotte river near West Hamlin, in Lincoln county. The incorporators include L. R. Sweetland, J. S. Pridemore, L. M. Thacker and A. F. Morris of Hamlin. J. W. Dingess, of Huntington, and George E. McComas of Milton.

Illinois Central.—This company has awarded a contract for the extension of its freight yards at Fulton, Ky., to H. W. Nelson, Fulton, Ky. The improvement consists of the extension of the old tracks a distance sufficient to accommodate 80 additional cars and the building of a few new tracks. This will require grading to an extent of 80,000 to 90,000 cu. yd. The estimated cost is $75,000.

Kansas City, Kaw Valley & Western (Electric).—This company will start work soon, it is said, on the extension from Bonner Springs, Kan., west to Lawrence. The company started work in 1913, on a line from Kansas City west via Bonner Springs to Lawrence, about 40 miles, and in June of this year opened for operation the first section from Kansas City to Bonner Springs, 17 miles.

Missouri, Arkansas & Southwestern.—Under this name, a line is to be built, it is said, from Mena, Ark., east to Hot Springs, about 80 miles. The Century Construction Company is the contractor and promoter. G. D. Thayer is president of the construction company and general manager of the railway company. B. W. Bartholomew is chief engineer, Mena.

Monongahela Southern Traction.—Incorporated in Pennsylvania with a $108,000 capital to build from California, Pa., south to Brownsville, about five miles. C. L. Snowden, president, Brownsville; J. P. McKelvey, Pittsburgh; C. H. Story and F. B. Snowden, Brownsville, and L. V. Phillips, Uniontown, are directors.

New York Subways.—The New York Public Service Commission, First district, has executed a contract with the Rapid Transit Subway Construction Company for the construction of section 1-A, of Routes Nos. 4 and 38, the Seventh avenue subway in the borough of Manhattan. This section covers the connection between the new Seventh avenue subway and the existing subway at the Battery. The contract price is $474,244. The commission also, executed a contract with the Station Construction Company, Inc., for station finish on certain stations on the extension of the Fourth avenue subway from Forty-third to Eighty-sixth streets, borough of Brooklyn. The contract price is $251,134.

Northern Pacific.—This company has awarded to the Cook Construction Company a contract for grading a branch line from Beach, N. D., southerly a distance of 26 miles.

Reading, Birdsboro & Pottstown (Electric).—An officer writes that this company expects to let contracts in about 60 days to build from Reading, Pa., southeast via Birdsboro, Berks county, to Pottstown, about 25 miles. W. Abbott Whitman, Sr., president. A. H. Leader, engineer, Reading. (May 22, p. 1171.)

Seattle, Port Angeles & Lake Crescent.—We are told that the Erickson Construction Company, Seattle, Wash., is now at work building about 27 miles west of Port Angeles and 37 miles east, connecting at Fairmount, Wash., with the Port Townsend & Puget Sound. The company will not build a street car line at Port Townsend, nor any extension along Hood canal to Olympia. It is expected that the line will be completed this year between Port Townsend and Port Angeles, 50 miles. It will probably be eventually extended further west into the heavy timber section of Clallam and Jefferson counties. C. J. Erickson, president, Seattle. (July 24, p. 190.)

Shelby Northern.—This company expects to begin work in October, it is said, on a line from Shelby, N. C., north to Casar, about 20 miles. C. R. Poole, Rockingham, N. C., may be addressed.

South Carolina Roads.—We are told that a preliminary survey has been made and most of the right of way has been secured for an 18-mile line to be built from a connection with the Carolina, Atlantic & Western at Hartsville, S. C., northeast to a connection with the Atlantic Coast Line at Society Hill. The promoters are not ready to let contracts for the construction work, as a charter has not yet been secured. Steam is to be used as the motive power for freight service and the question of using both gasolene and electric storage battery cars for passenger traffic, is under consideration. The principal commodities to be carried include fertilizer, cotton, cotton seed, tobacco, grain, fruit, agricultural products and coal. C. D. O'Neal, Wilmington, N. C., may be addressed.

Southern Railway.—An officer writes that a contract has been given to W. W. Boxley & Co., Roanoke, Va., for building seven miles of second track on the Washington division between Charlottesville, Va., and Arrow Head. The work involves a slight revision of grade.

Texas Roads.—M. J. Healey, Big Springs, Tex., and associates, who are promoting the construction of a railroad from Big Springs, Tex., northwest to Texico, N. Mex., about 175 miles, expect to place surveyors in the field to locate the route about September 1. Land and money bonuses in aid of the project have been raised in the different towns along the route. Residents of Big Springs have agreed to contribute $30,000 and 25 acres of land in return for which the general offices and shops are to be located at that place. The line will connect with the Texas & Pacific at Big Springs, and with the Santa Fe at Lamesa and at Texico.

Toledo, Ottawa Beach & Northern (Electric).—An officer writes that this company now operates a line from Toledo, Ohio, north to Toledo Beach, Mich., which is six miles south of Monroe. The company has been considering for some time the question of building an extension of about three miles from Toledo Beach north along the shore of Lake Erie, but will not extend the line to Monroe, as has been reported.

Wilmington & Carolina Beach (Electric).—Under this name a line is to be built, it is said, from Wilmington, N. C., via Sunset Park to Wilmington Beach, about 13 miles. In addition the company plans to build about 11 miles of city lines, and a power house. C. C. Chadbourn is president.

RAILWAY STRUCTURES

Birmingham, Ala.—A contract has been given to the Jefferson Construction Company, New Orleans, La., it is said, to build the viaduct over the tracks of the Louisville & Nashville and the Southern Railway on First avenue, in Birmingham. (May 8, p. 1055.)

Colmar, Pa.—The Philadelphia & Reading has applied to the Pennsylvania State Water Supply Commission for permission to build a bridge at Colmar.

Covallen, Pa.—The Pennsylvania Railroad has applied to the Pennsylvania State Water Supply Commission for permission to build a bridge at Covallen.

Elizabethtown, Pa.—An officer of the Pennsylvania Railroad writes that a contract was given recently to the Pitzel Construction Company, Lancaster, Pa., for improvements at Elizabethtown to cost about $54,000. The work includes the changing and building of the freight station and making other improvements. A new passenger station 27 ft. by 75 ft. of stone construction will be built on the north side of the track, about one-quarter mile east of where the present station is located. The main waiting room will be down on the street level and there will be baggageways leading up to the passenger tunnel underneath the tracks. All platforms will be of cement and there will be two enclosed shelter sheds of stone construction 64 ft. long.

Halifax, N. S.—On the Dominion Atlantic, which is controlled by the Canadian Pacific, improvements are being carried out in connection with the laying of larger rails, which include the substitution of concrete steel structures for all bridges and culverts. The new Bear river bridge over 1,425 ft. long is about completed. Work has recently been started on the Avon bridge at Windsor, to be 1,110 ft. long, and the Weymouth bridge over the Sissiboo river to be 1,100 ft. long. New bridges have been built also on the Midland division across the Shubenacadie river at Cambridge, at Moose river and at Allen's creek, and one is under construction at Gaspereau. Trestles have been filled in and sidings lengthened at various points, and new stations were built at Wolfville, at Patterson and at Mosherville.

Milwaukee Wis.—The Chicago & North Western has awarded a contract for a bridge on its main line over the Milwaukee river near Milwaukee, to the Cleary-White Construction Company, Chicago. This company has let a sub-contract for driving piles to Pellett & McMullen, Manitowoc, Wis.

Pennsylvania.—The Pennsylvania State Water Supply Commission has approved the applications of the following railroad companies to build bridges; Chartiers Southern, six bridges, over Little Chartiers creek and Daniel's run in Washington county; Pittsburgh, Chartiers & Youghiogheny, five bridges, in Washington county, and Pennsylvania Railroad, two bridges, in Crawford county.

Scranton, Pa.—An ordinance has been passed by the city of Scranton, it is said, granting permission to the Delaware, Lackawanna & Western to carry out improvements, including the elimination of grade crossings at McHale's court, West Scranton and at Court street, North Scranton. It is understood that the company will at once carry out this work, also the elimination of the grade crossing at Myrtle street. In addition plans have been made to eliminate the grade crossing at Theodore street, North Scranton.

The Street Car Lines of the Argentine Republic.—There were 666 miles of electric tramways in Argentina in 1913, 476 of which were located in the city of Buenos Aires, and the remainder in various provincial cities. Passengers carried by the Buenos Aires lines in 1913 numbered 423,661,587, an increase in round numbers of 31,000,000 over 1912.

Railway Financial News

Atlanta, Birmingham & Atlantic Railway Company.—This is the name of the new company organized as successor to the Atlanta, Birmingham & Atlantic Railroad Company; and at a meeting of the directors in Atlanta, August 15, E. T. Lamb, receiver in charge of the property and general manager for the past year, was chosen president of the new corporation. Brooks Morgan, of Atlanta, was chosen vice-president. All of the officers of the operating, traffic and accounting departments were continued in their present places. F. K. Mays is both secretary and treasurer. The court is expected to terminate the receivership within a few days. Application for the approval of bonds to be issued by the new company is now pending before the Georgia State Railroad Commission.

Canadian Pacific.—A special meeting of the stockholders is called for October 7, the day of the regular annual meeting, to vote on a proposal to increase the capital stock of the company by the sum of $75,000,000. This will increase the outstanding amount from $260,000,000 to $335,000,000, or the full amount authorized. In a statement dealing with the company's financial position President Shaughnessy says that no new works of any magnitude are contemplated at present, and therefore no necessity exists for a further issue of capital stock, but that this proposal is to provide for the company's future capital requirements as they arise. The last financing of the company was in December, when $52,000,000 of 6 per cent notes were issued.

New York, New Haven & Hartford.—The suit of certain stockholders entered in the Massachusetts Supreme Court July 17, demanding that the company, and the men who were its directors from 1904 to 1911, refund sums alleged to have been wasted by mismanagement, came up before Justice Braley at Boston, August 18, and an injunction was issued restraining the directors named in the suit from transferring stock of the company held by them pending a decision by the full bench of the court, which has under consideration the application for the appointment of a receiver in this suit.

Pere Marquette.—The committee formed last April to protect holders of equipment obligations has agreed with the receivers, to deposit $57,833 on the first of each month during the current fiscal year for payment of principal and interest on equipment obligations. In addition to these contributions by the committee the receivers purpose to apply $65,000 a month to the repair of cars. J. P. Morgan & Co. and the Guaranty Trust Company have acquired approximately $1,700,000 of the equipment obligations, and, under arrangements with the receivers, have taken a like amount of receivers' certificates in exchange.

San Antonio, Uvalde & Gulf.—On application of a majority of the stockholders of this company the United States District Court for the district of Texas, on August 12, appointed Duval West, of San Antonio, receiver for the property of the company and also for the Medina Irrigation Company. This railroad extends from San Antonio, Tex., southeastward to Corpus Christi, and westward to Uvalde and Crystal City. The total length of lines operated is 314 miles. The amount of stock outstanding is $230,000; and the bonds amount to $3,663,000. The Bankers' Trust Company of St. Louis is the trustee. The president and general manager of the road is A. R. Ponder, San Antonio.

Railway Extension in India.—The government of India has given its consent to the construction, by the Mysore Durbar, of a line of meter gage railway from Mysore to Arsikere via Hassan, a distance of 107 miles.

New Chinese Railways Contract.—At Peking, on July 26, a representative of an English firm signed the final contract to finance and construct a railway from a point opposite Shasi in the Yangtze Valley to Shiung-yi-fu in Kwei-Chou, with a branch line from Cheng-te-fu to Changsha, the capital of Hunan.

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WE GUARANTEE, that of this issue 8,950 copies were printed; that of these 8,950 copies, 7,446 were mailed to regular paid subscribers to the weekly edition, 280 were provided for counter and news companies' sales, 1,111 were mailed to advertisers, exchanges and correspondents, and 143 were provided for samples and office use; that the total copies printed this year to date were 328,450, an average of 9,384 copies a week.

Volume 57 August 28, 1914 Number 9

Contents

*Illustrated.

The Contest on the Operation of Terminal Yards

The superintendent, trainmaster, or yardmaster in charge of the operation of a terminal yard performs a double duty. His first responsibility is to secure the efficient and economical operation of his yard. Hardly secondary in importance is the providing of proper service for the various industries and team tracks. He must not only operate the yard economically for the company, but he must also give the patrons the proper service, for the influence of the yard crew in securing and holding traffic is not always realized by railway men. These are but two of the numerous phases of terminal operation whose consideration is included in the contest on "The Operation of Terminal Yards," which we are now conducting. In order that this discussion may be of the greatest practical value to those engaged in this phase of railway operation, we urge all who are now, or who have been, in charge of the operation of terminal yards, to prepare discussions on this subject. Several excellent papers already have been received. We will pay $50 and $35 for the two best papers received, and our regular space rates for all other papers accepted and published. The awards will be based on the practicability of the methods suggested and the completeness with which the subject is covered. All contributions should be sent to the editor of the *Railway Age Gazette*, 608 South Dearborn street, Chicago, and must be received not later than September 15, to be considered by the judges.

Superintendents Getting Together

The American Association of Railroad Superintendents, whose meeting is reported in this issue, shows an encouraging increase in members and has received a lot of expressions of friendly interest from general managers; but still the association as a whole has not yet found its gait. A gathering like that of last week is profitable to every member who participates in it with serious purpose, and even the informal conferences, outside the meeting room, afford, for many members, a sufficient recompense for the time spent; but to give the association the dignity it deserves, and to avoid letting it fall into the class of mere social gatherings, like the Old Time Telegraphers', a lot of members have got to do some vigorous work in committees. The committee men now in office have done much good work, but evidently they have not felt warranted in giving to their tasks the time necessary to formulate conclusions of the kind which will make an impression on the American Railway Association. The need of an association of superintendents is very definite. The only body which deals with their problems is the American Railway Association, which does very little discussing in open meeting—and even that discussing is not made public until several months afterward. The really important discussions all take place in committee rooms; and that, for many subjects, is not the most profitable way. It is to be hoped that those 41 general managers who have given the superintendents a few pleasant words, will follow up their letters with a substantial "boost." Messrs. Taylor and Underwood have made a good beginning.

The Death of Darius Miller

People sometimes say that no man is indispensable. And it is true enough that after the deaths even of men who have played the largest parts in political and business affairs the world seems to go on much as before. But every once in a while some strong man who is in his very prime and appears to have years of usefulness before him is suddenly stricken down, and then there is a feeling that while he was not exactly indispensable, nevertheless the world has suffered a heavy loss because he was not allowed to live out what, it seems, should have been his allotted years of achievement. The death of Darius Miller is one which causes feelings and reflections of this kind. Urbane, tactful, optimistic, sagacious, an indefatigable worker, an able administrator, at the head of one of the greatest railroad systems in the world where he had an almost unsurpassed opportunity to do creative work for the owners of the property and for the public, it seems sad beyond expression that he should have been cut off at only 55 years old when he was in the very middle period of his prime. Doubtless in the world's hard economy no one is exactly indispensable. But when such men as Darius Miller

go they are long and greatly missed in important places. A certain man, on being introduced to James J. Hill, remarked that he knew Mr. Miller. "Then you know a very great railroad man," Mr. Hill immediately responded. Mr. Hill properly appraised Mr. Miller's remarkable qualities somewhat earlier than others, but every man competent to have an opinion would now accept Mr. Hill's judgment. Mr. Miller was more than a great railroad man. He was a great citizen. He was a great citizen both because of his civic activities and because every man who does creative work in industry or commerce such as he did is a great citizen of his own country and of the world. How unfortunate it is that so many able men devote their lives to promoting the welfare of their country by building up its commerce and industries as Darius Miller did, and receive very little credit or thanks for it from the public, while this same foolish public is bestowing lavish credit and thanks on men whose only public service consists in frequently standing up in their places and talking for two hours without stopping to think. While Mr. Miller will be long remembered as a great railroad man, he will be even longer remembered by those who frequently came in contact with him as one of the truest, finest and most lovable gentlemen that ever lived. Without ostentation or condescension he was the soul of kindness, consideration and politeness to every one, high or low, and whether in business or in social life. The railroad world and the business world of America have suffered a heavy loss.

A FRANK EXPRESSION OF PUBLIC SENTIMENT

THE indifference of the public to the perplexities which policemen, constables and magistrates encounter in dealing with the tramp problem is well known. The average citizen takes so little thought about the possibility of inconvenience or danger to himself by reason of the railroad tramp, and what it might mean, that his representative in the legislature usually takes no thought at all. Public sentiment is so little likely to produce any form of action that the narrow or indolent legislator can safely devote his time and energies to some pleasanter form of activity. But indifference does now and then give way to something positive. There is a reason why there is such general acquiescence in the policy of silence and neglect. The "pocket nerve" is affected. This nerve is always affected when it comes to breaking up a widespread abuse.

Every thoughtful and public spirited citizen should be interested in the following very frank reportorial expression in the Utica (N. Y.) Press:

> Rome, August 16.—Railroad detectives on Saturday arrested 17 tramps, whom they took off trains in Verona and took them to Higginsville before Justice of the Peace Smith E. Schwody, who sentenced them all to 15 days each in the county jail in this city. It will cost the county about $300. The people of Verona should remember this justice when he comes up for office again.
>
> There are now 58 prisoners in the Rome jail. Railroad detectives must stand in with the Prison Commission, who demanded a larger jail for the county. What good does this do? As soon as these tramps are released they will jump the first train out of the city and no one will be benefited. Had they been left alone they would have gone out of the county and no expense would have been imposed on the county of Oneida.

Here is very definite evidence of public sentiment in favor of lawlessness because it costs too much money to enforce the laws. Such sentiment is very common, though it is not often so plainly expressed. Railroad officers have made some little effort to stiffen magistrates' backbones, here and there, but it is evident that such missionary work must continue to encounter the deadening influence of this local short-sightedness.

It is plainly evident that the way to deal with the tramp problem on railroads, whether in the state of New York or in any state, is to consider it as one state-wide problem. The towns and cities are always jealous of each other and usually are actuated by the narrowest views.

The right of local self government is a vital feature of our republican constitution; but it is subject to regulation and limitation by the sovereign state; and there does not seem to be any way in which this regulation can be applied to the tramp problem except through the means of a radical legislative act. Local police departments and local magistrates need to be freed from every influence tending to weaken their respect for a rigid law. The law for repression of tramps should bear with strong and equal force in every part of the state, every day in the year. There seems to be no hope of this except through direct state administration.

SAVINGS UNDER GOVERNMENT OWNERSHIP

WE publish on another page a letter written recently by Sir George Paish, editor of the London Statist, to E. P. Ripley, containing an estimate of the saving in the annual cost of railway capital which could be made in this country under government ownership. In view of several estimates relating to the same subject matter which recently have been made in this country, that of Sir George is highly interesting, for he is one of the leading authorities on financial subjects in the world. For years his paper has specialized on American railway affairs, and its American railroad sections, which have been regularly republished in book form, have been mines of authoritative information regarding the operating and financial results of our roads. Being an Englishman, Sir George can participate in discussions of our railway questions without heat, prejudice or partisanship.

One of the most notorious estimates of the saving which under government ownership could be made in the cost of railway capital was that presented by Clifford Thorne to different organizations and persons, and which varied from $411,000,000 to $464,000,000, according to the size of the mistakes which Thorne made in his figures. In an address last February C. A. Prouty, director of valuation of the Interstate Commerce Commission, roughly estimated that the railways would cost the government $20,000,000,000; that the interest rate that would have to be paid on this debt would be 3 per cent; that, therefore, the total interest of the government would be $600,000,000 per annum, which would be some $72,000,000 less than the interest and dividends paid by the railways. In his recent book on Government Ownership of Railways, Samuel O. Dunn, after making estimates of the total amount that the government would have to pay for the railways, and the rate of interest it would have to pay on the railway debt, concluded that the government's maximum possible saving in cost of capital would be $120,000,000 a year. He believed, however, that the saving was likely to be substantially less than this, if, indeed, there were any at all.

Arriving at his conclusion by a different method, Sir George Paish places the maximum possible saving at $130,000,000 a year. Of this, $70,000,000 would be saved by refunding the funded debt of the railways in 3½ per cent government bonds, provided this refunding were possible. Sir George doubts, however, whether it would be possible for years, simply because he doubts if those who hold the bonds would be willing to exchange them for government 3½ per cent bonds.

"Thus," he concludes, "one cannot safely calculate a greater immediate profit from government ownership than about $60,000,000 per annum," and, of course, if there were any considerable increase in operating expenses under government ownership this saving would speedily be more than wiped out. As a matter of fact, the greatest possible savings that could be made under government ownership in the cost of railway capital are so much smaller than the smallest increases that it can be naturally assumed would occur in the cost of operation, that it may be regarded as certain that the adoption of government ownership, instead of yielding profits to the government, would speedily involve it in heavy losses.

THE INTERSTATE COMMERCE COMMISSION AND PASSENGER FARES

THAT the Interstate Commerce Commission meant business, and was not merely holding forth an empty hope when it suggested, in the eastern rate advance decision, the possibility of increasing passenger fares, is demonstrated by its decision of last week denying the petition of the state commissions of Arkansas, Missouri and Oklahoma for a reduction of the interstate fares in those states from three cents to two cents a mile, the rate forced by those states for intrastate travel.

That there is no immediate danger that the function of the Interstate Commerce Commission is to be limited to computing the sums of intrastate rates made by state legislatures or commissions, and prescribing the result as a measure of the interstate rates, has been thoroughly demonstrated by several recent decisions of the Supreme Court, notably that in the Shreveport case. As to what the commission would consider a reasonable passenger fare, however, it has never given any very definite clew until this opinion. The commission not only holds that state-made fares are not to be taken as criteria of the reasonableness of interstate fares, but expresses the conclusion that "from all the evidence, to base interstate passenger fares from and to and through Arkansas, Missouri and Oklahoma on three cents a mile does not result in rates that we are convinced are unreasonable."

It is interesting to note, moreover, that the commission was not influenced by the claim commonly made by the state commissioners that the growth of traffic proves that it has been stimulated by the two-cent fare. The commission says: "There are so many conditions determining the extent of passenger travel that accurate conclusions cannot be reached from the consideration of any one condition alone. . . . Population is increasing in the states here represented, and greater density of population means more travel. . . . The comparisons of revenues intrastate between the two-cent and three-cent periods prove nothing in favor of the lower fare. . . . This does not mean that there may not be force in the theory that a reduction of a rate tends to increase the traffic or travel."

The lawfulness of the two-cent fares not being in issue, the commission expressed no conclusion as to their reasonableness for intrastate travel, but it does make this highly significant suggestion: "It may be that a mileage scale of passenger rates applicable to both state and interstate business somewhat less than three cents per mile would be reasonable in this territory and would, if adopted, remove the alleged discrimination now complained of. Without expressing an opinion as to this we deem it not improper to suggest its consideration by complainants and defendants as a possible basis of a fair adjustment of the controversy."

The suggested compromise could be brought about by the simple and time-honored expedient of splitting the difference, as the interstate rates are now based on three cents and the state rates on two cents in the territory under consideration. In other parts of the country an adjustment on this basis would require the states to give up something they have gained in state rates in return for concessions which the carriers have already made as to interstate rates and in some of these other sections the roads are already working out plans for advancing all interstate rates to a minimum of 2½ cents a mile. It is understood that it is also proposed to follow the suggestion made by the Interstate Commerce Commission and ask the various states that have enforced reductions to two cents to allow an advance.

There is no reason for making state rates lower than interstate rates; on the contrary, every principle of rate-making demands that rates for short distances be on a higher basis than rates for long distances. The railways now have an excellent opportunity to advance interstate fares to a reasonable basis. If they then fail to convince the states that the two-cent fares are too low, the Shreveport decision points the remedy. It is no longer the case that discrimination in rates can be corrected only by reducing the higher rate. If the commission holds that $3 is a reasonable fare for an interstate journey of 100 miles, there should, it would seem, be little difficulty in proving that the passenger who pays that rate is discriminated against in favor of the man who rides 150 miles for the same fare within the limits of a single state.

Interstate fares in Western Passenger Association territory were generally reduced to about two cents a mile on May 1 under the aggregate fare clause of the fourth section of the commerce act. At the same time the Central Passenger Association roads refrained from reducing their rates by refusing to recognize state rates in filing their interstate basing fares with the Interstate Commerce Commission. As the aggregate fare clause requires only that the fare for a through route shall not exceed the aggregate of the intermediate interstate rates it was only necessary for the eastern roads to maintain their interstate basing fares at 2½ cents a mile to avoid reducing through fares. It is understood they are now planning to advance all interstate fares to that basis.

CANADIAN PACIFIC

IN the last few days of trading before the New York Stock Exchange closed Canadian Pacific stock was conspicuous for its rapid declines in price, even in a market that was almost unprecedented in the rapidity with which prices in general fell. The desire of foreign holders of Canadian Pacific securities to convert their holdings into cash was ample explanation for the drop in the quoted prices of the stock; but the question that arose in a good many people's mind was as to whether the reaction from the boom of recent years in Canada had not adversely affected the Canadian Pacific to such an extent as to account in some part for the greater pressure on this stock than on that of most United States roads. The annual report of the Canadian Pacific for 1914 does not justify any such conclusion, although it indicates that the Canadian Pacific, like other Canadian industries, has felt the reaction which has taken place in Canada.

In the fiscal year ended June 30, 1914, the company earned $81,135,000 from freight, as compared with $89,655,000 in the previous year, and $32,478,000 from passengers, as compared with $35,545,000 in the previous year. On the other hand, revenue from sleeping cars, express, telegraph and miscellaneous increased from $13,274,000 in 1913 to $15,069,000 in 1914, so that the total decrease in earnings was $9,580,000, or between 7 and 8 per cent. This is by no means a startling falling off in gross earnings, especially when it is remembered that the earnings in 1913 were the largest in the history of the company.

Even more important, however, is the fact that the company was able to reduce its transportation expenses in proportion to its loss in gross revenue. Total operating expenses in 1914 amounted to $87,389,000, and in 1913 to $93,150,000. Included in these totals are $42,250,000 in 1914 for transportation expenses and $46,074,000 in 1913. This is a reduction of nearly $4,000,000, or more than 9 per cent. Without detailed expense accounts it is impossible to tell how much of this reduction is in labor. Undoubtedly Canada was paying too highly for its labor in the few years preceding 1913 and it may well be that a considerable portion of the saving in transportation expenses in 1914 was made in the wages paid to employees in this department. Probably the greater part, however, was because of increased trainload.

Appropriations for both maintenance of way and of equipment were reduced with the falling off in business; but were not heavily cut. In 1914 $16,427,000 was spent for maintenance of way, as against $18,499,000 in 1913, and $16,617,000 for maintenance of equipment, as against $17,199,000 in 1913. The reduction in maintenance of way looks heavier than it really is, due to the fact that in 1913, 1912 and for some years previous the Canadian Pacific had been paying too high for its section labor because of the competition for this class of labor, due to the construction work

on the Pacific coast extension of the St. Paul and the extensive building by both the Grand Trunk Pacific and the Canadian Northern. Apparently, therefore, the earning power of the Canadian Pacific, so far from being impaired by the depression in Canada, has suffered less than a great many of United States roads, especially the transcontinentals, in recent years.

In 1914 the Canadian Pacific hauled 27,801,000 tons of freight, as compared with 29,472,000 in 1913, and 25,940,000 in 1912. The average earnings per ton per mile was 7.5 mills in 1914, as against 7.7 mills in each of the other two years, the average length of haul remaining about the same in the two years, so that the ton mileage of revenue freight was less by 5.70 per cent in 1914 than in 1913. The Canadian Pacific in 1913 carried a larger proportion of non-revenue freight than most roads in this country the total ton mileage of non-revenue freight in 1913 being 1,744,000,000. In 1914 the ton mileage of this non-revenue freight was but 1,497,000,000, a decrease of 14 per cent, reflecting, probably, the slackening in branch line building by the company.

Despite the falling off in ton mileage there was a quite notable increase in the average revenue trainload, which in 1914 was 407 tons, as compared with 381 tons in 1913. The total trainload, including non-revenue freight, was 464 tons in 1914 and 440 tons in 1913. This is an increase of 5.48 per cent, and is in part the result of an increase in carloading per loaded car of 2.91 per cent.

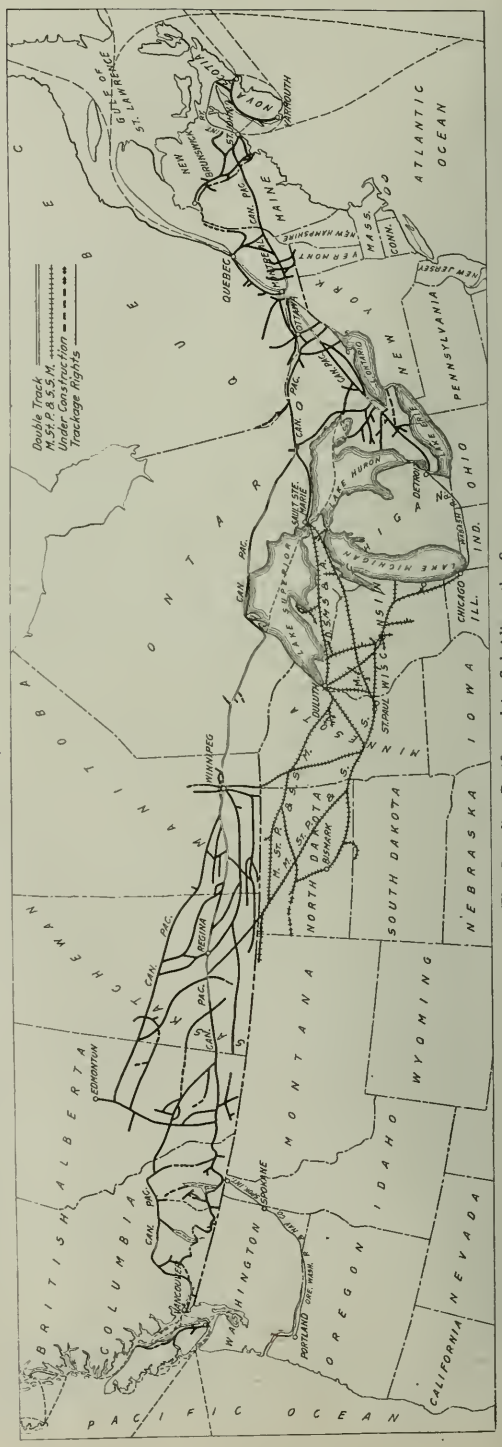
The Canadian Pacific shows only the total tonnage of commodities carried, and in showing the principal commodities separately the annual report shows flour by barrels, grain by bushels, livestock by head, etc. Making a rough approximation, however, the following table shows the tonnage in 1914, compared with 1913, of the principal commodities.

	Tons carried	
	1914	1913
Flour	862,000	793,000
Grain	5,548,000	5,159,000
Livestock	1,000,000	800,000
Lumber	4,532,000	4,000,000
Manufactured articles	8,148,000	9,519,000
All other articles	9,159,000	9,625,000

Earning power is only one of the factors in the price at which Canadian Pacific stock has sold in recent years. The assets of the company, in addition to its railroad property, are enormous. Among these assets, of course, is the company's credit and ability to raise new money cheaply. Undoubtedly the European war as well as the Canadian depression has affected this credit; but on the other hand the Canadian Pacific is in no immediate need, apparently, of new capital and a period of cessation from new construction would give the company, probably, a more efficient and well-knit together plant than would a continuation of an extensive program of branch line building.

In the last annual report for the first time the company separates its property investment as between railway and rolling stock. The total for these two items in 1913 was placed at $452,321,000. In 1914 the railway was carried on the books at $338,084,000, and rolling stock at $153,256,000. In addition, the company owns ocean, lake and river steamships costing $24,171,000, and also owns securities, the cost of which was $107,868,000 and the par value of which is $162,606,000. Previous to 1914 the company did not show on its balance sheet, except in a foot note, the land in Manitoba, Saskatchewan, Alberta and British Columbia. These lands are now taken on to the balance sheet as inactive assets, which, together with certain power and mining company stocks (carried at $4,797,900) are carried at a total value of $133,022,000. Apparently the book value of these lands is a very conservative estimate of their sales value. For instance, Alberta agricultural lands are carried at $13 an acre on the books, whereas an average of $17.80 per acre was received for agricultural lands sold in 1914 and, exclusive of irrigated lands, $16.57. The irrigated land sold during the year brought $66.93, while the irrigated land in the eastern section of Alberta is carried on the books at but $40 an acre.

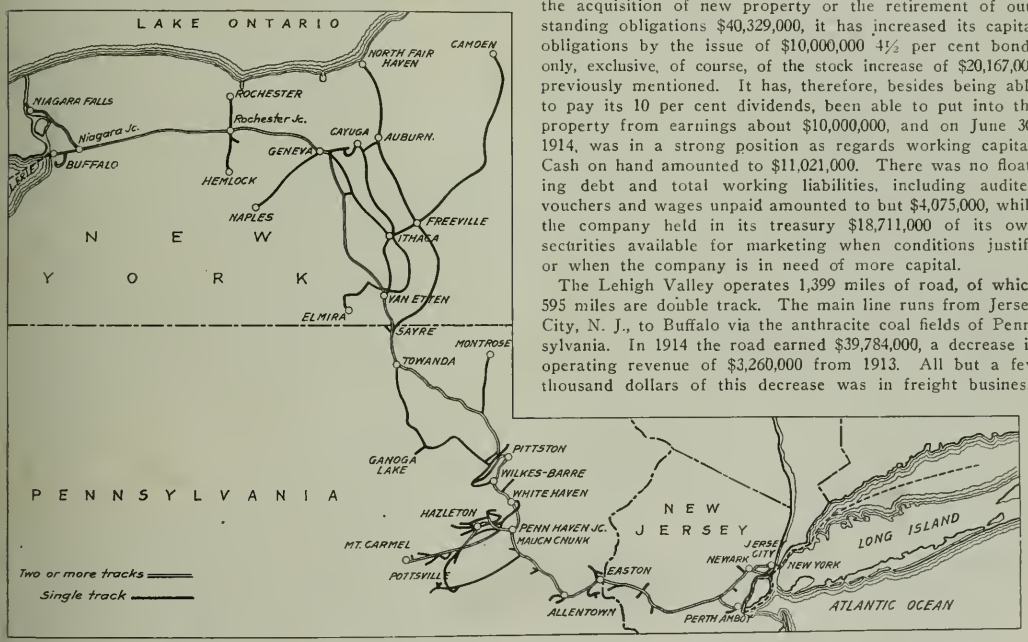
The outstanding securities of the company were increased during the year by the sale of approximately $4,000,000 4 per cent preference stock and $10,000,000 4 per cent consolidated debenture



The Canadian Pacific and its Subsidiary, the Soo

stock, and by the sale of $52,000,000 6 per cent notes, which are secured by the deferred payments on land and town sites totaling $42,667,000; government securities amounting to $10,089,000, and a deposit with the trustee totaling $3,790,000. The note sale was made to stockholders at 80 and amounted, of course, to a considerable extra dividend. President Shaughnessy says that the money provided from this sale of notes is all that will be required for the purposes of the company. Cash on hand at the end of the year totaled $36,778,000. Stockholders, however, are to be asked to authorize an increase of $75,000,000 in the ordinary stock, although there is no intention of issuing any of this stock until conditions materially improve in Canada and increased business warrants extensions or additions and betterments.

During the years 1910 to 1913 the company spent $60,000,000 for cars and locomotives, and during 1914 the deliveries amounted to about $14,000,000. The payment for these deliveries is to be made in 15 annual installments through a separate corporation—the Victoria Rolling Stock & Realty Company; but the entire cost has been advanced by the Canadian Pacific pending the sale of rolling stock equipment bonds.



The Lehigh Valley

The following table shows the principal figures for operation in 1914 compared with 1913:

	1914	1913
Mileage operated	12,044	11,602
Freight revenue	$81,135,295	$89,655,223
Passenger revenue	32,478,147	35,545,062
Sleeping car, express, telegraph and miscellaneous	15,068,667	13,273,732
Total	129,814,824	139,395,700
Maint. of way and structures	16,426,582	18,498,741
Maint. of equipment	16,617,247	17,198,573
Traffic expenses	3,626,612	3,376,981
Transportation expenses	42,250,286	46,074,299
General expenses	4,322,104	3,953,770
Parlor and sleeping car expenses	1,348,979	1,241,700
Commercial telegraph	1,613,688	1,691,953
Expenses of lake and river steamers	4,183,397	1,113,808
Total	87,388,896	93,149,826
Gross corporate income	42,425,928	47,491,437
Net corporate income	32,198,617	36,615,085
Appropriations	*125,000	1,125,000
Dividends	27,709,520	24,379,827
Surplus	4,364,097	11,110,258

The total ton mileage in 1914 of all revenue freight was 5,219,000,000, a decrease from 1913 of 10.21 per cent. The average length of haul was 174 miles in 1914, or about 3 per cent less than in 1913. Of the total 29,924,000 tons carried in 1914, 13,565,000 tons were furnished by anthracite coal. This was a decrease of 1,168,000 tons in the anthracite coal tonnage as compared with 1913. The other commodities in which there was a considerable decrease in tonnage were bituminous coal, cement, brick and lime, iron and steel rails and grain.

With the falling off in coal and other heavily loading commodities it was to be expected that there would be a smaller average train load. The revenue train load in 1914 was 595 tons, and in 1913 599 tons, a decrease of less than 1 per cent, and due in part to a larger proportion of empty car mileage and in part to a smaller loading per loaded car. The Lehigh Valley figures two empty cars equal to one loaded car in estimating the average cars per "draft," and

LEHIGH VALLEY

IN 1911 and the early part of 1912, after the Lehigh Valley had in 1910 increased its outstanding capital stock by the sale of $20,000,000 par value of stock to its own shareholders and raised its dividend to 10 per cent, there were expressions of opinion made quite freely, especially in New York, that the company had overestimated its earning capacity and would fail to justify the optimism of its directors. The year 1912 was not a prosperous one for the company, but even then it succeeded in earning its dividend; 1913 was a very prosperous year, and in 1914, although the company felt the general business depression and especially the falling off in anthracite coal traffic, it earned its 10 per cent dividend, even without the extraordinary $685,000 received as other income from dividends on the stock of the Temple Iron Company.

Furthermore, while the company has spent during the four years since July 1, 1910, for the betterment of the property, the acquisition of new property or the retirement of outstanding obligations $40,329,000, it has increased its capital obligations by the issue of $10,000,000 4½ per cent bonds only, exclusive, of course, of the stock increase of $20,167,000 previously mentioned. It has, therefore, besides being able to pay its 10 per cent dividends, been able to put into the property from earnings about $10,000,000, and on June 30, 1914, was in a strong position as regards working capital. Cash on hand amounted to $11,021,000. There was no floating debt and total working liabilities, including audited vouchers and wages unpaid amounted to but $4,075,000, while the company held in its treasury $18,711,000 of its own securities available for marketing when conditions justify or when the company is in need of more capital.

The Lehigh Valley operates 1,399 miles of road, of which 595 miles are double track. The main line runs from Jersey City, N. J., to Buffalo via the anthracite coal fields of Pennsylvania. In 1914 the road earned $39,784,000, a decrease in operating revenue of $3,260,000 from 1913. All but a few thousand dollars of this decrease was in freight business.

on this basis there were 30.9 loaded cars per draft on the average in 1914 and 30.5 in 1913. This presumably accounts for a very slightly higher percentage of freight helping locomotive mileage in 1914 than in 1913, the figures being 9.52 in 1914 and 8.65 in 1913. On the other hand, the percentage of passenger helping locomotive mileage was but 2.59 as against 2.88 the year before, and the mileage of light locomotives was reduced from 1,820,000 in 1913 to 1,585,000 in 1914, and the switching mileage from 5,517,000 in 1913 to 5,364,000 in 1914.

Total operating expenses of the Lehigh Valley amounted to $27,609,000 in 1914, a decrease of $1,499,000. All of this decrease was in maintenance, maintenance of way and structures costing $5,694,000 in 1913 and $4,575,000 in 1914, a reduction of $1,119,000; and maintenance of equipment, $7,561,000 in 1913 and $7,012,000 in 1914, a reduction of $549,000. The heaviest cut in maintenance was made in the appropriation for rails, $729,000 being spent on this account in 1913 and $310,000 in 1914. With the smaller rail renewal it was, of course, possible to make a saving in roadway and track labor, which includes the labor of placing rails in track. There was also a considerable reduction in the amounts spent for bridges, trestles and culverts. Most of the saving made in maintenance of equipment expenses was through smaller amounts charged for renewals of locomotives and renewals of passenger train cars—which means the charges against operating expenses for equipment sold or scrapped—and a somewhat smaller expenditure for repairs of freight train cars. Larger amounts were charged for depreciation of both locomotives and freight cars.

The full-crew law was probably in part responsible for the company's inability to reduce transportation expenses with a reduction of traffic handled.

It is interesting to note that in 1914 the company had on an average 22,017 employees in its service as against 22,800 in 1913, and the total payments to labor in 1914 amounted to $17,120,152 and in 1913 to $17,639,628.

The following table shows the principal figures for operation in 1914 as compared with 1913:

	1914	1913
Mileage operated	1,444	1,439
Coal freight revenue	$18,492,683	$20,385,389
Merchandise freight revenue	15,026,684	16,339,749
Passenger revenue	4,795,147	4,867,554
Total operating revenue	39,783,564	43,043,372
Maint. of way and structures	4,575,062	5,694,422
Maint. of equipment	7,011,946	7,561,271
Traffic expenses	1,002,872	982,858
Transportation expenses	14,071,183	13,993,617
General expenses	948,099	875,651
Total operating expenses	27,609,162	29,107,820
Taxes	1,549,895	1,447,205
Operating income	10,344,263	12,208,137
Gross corporate income	13,208,535	14,511,892
Net corporate income	7,056,660	8,761,828
Dividends	6,060,800	6,060,800
Surplus	995,860	2,701,028

NEW BOOKS

Theory of Arches and Suspension Bridges. By J. Melan, professor of bridge design, at the German Technical School at Prague. Translation from the German made by D. B. Steinman, professor of civil engineering, University of Idaho. Size 6 in. by 9 in., 303 pages, 119 illustrations, 3 plates, 9 tables, cloth binding. Published by Myron C. Clark Company, Chicago. Price $3.

Professor Melan's treatise on the "Theory of Arches and Suspension Bridges" has gone through three editions in Europe and has already found some application among bridge engineers in this country. Believing that no work of the same scope could be found in any language, the translator undertook to prepare the present English version in order to widen its sphere of usefulness and render it accessible to the profession in this country. The translation is made from the third edition and reproduces that book without omission. In some cases the examples and tables have been converted from metric to English units and characters and abbreviations have been changed to conform to our standard symbols. An appendix covering masonry and concrete arches and a bibliography of literature on arches and suspension bridges are included.

Letters to the Editor

ROADMASTERS' AND MAINTENANCE OF WAY ASS'N

Hillburn, N. Y., August 24, 1914.

To the Editor of the Railway Age Gazette:

May I call the attention of the readers of the *Railway Age Gazette* to the following letter which was recently sent by H. R. Safford, chief engineer of the Grand Trunk, to T. F. Donahue, general supervisor of road of the Baltimore & Ohio and president of the Roadmasters' and Maintenance of Way Association:

"I notice by the press that the annual meeting of the Roadmasters' and Maintenance of Way Association will be held at Chicago on September 8. I have notified all of our officers who are members of your association, not only giving them permission but encouraging them to attend the meeting, and have also arranged to have a number of our supervisors attend the meeting in the hope that they will become connected with your body, as I feel that the work which your association is doing is not only beneficial to the men individually who belong to it but the company whom they serve."

W. C. Kidd,
Secretary Track Supply Association.

WHERE THE COMMERCE COMMISSION MIGHT HELP

New York, August 19, 1914.

To the Editor of the Railway Age Gazette:

Referring to the letter in your issue of July 31 regarding a possible retrenchment in the legal expenses of the railway companies, I write to say that the letter rather understates the case—not that this is a bad fault, but that it may fail to attract the attention it deserves. The Commerce Commission might well address itself to several aspects of the case, because certain phases would be difficult for railroads to handle.

For instance, your correspondent mentions the fact that an insolvent railroad is saddled with receivers and lawyers for receivers, lawyers for the creditors and lawyers for the stockholders. As often as not the receiver is a lawyer, not a trained railroad operator, which is illogical and expensive, even when nothing worse can be said. As a matter of fact the courts have in many instances appointed as receivers lawyers who were either favorites of the court or nominees of the incompetent management which brought about the receivership—in so many instances that it would seem to be a rule rather than an exception. It is hard to understand why the management of an insolvent corporation should have the appointment of its own nominee as receiver. Our general bankruptcy law has advanced beyond this stage. Is it not time for our railroad and general corporation law to advance?

And why should the court appoint lawyers as receivers? The first thing the lawyer-receiver does is to retain another lawyer as counsel. Then he has to overwork the general manager in order to supply the practical information that the receiver himself lacks. Should the corpus of the estate be burdened for such inefficient service? This is perhaps a difficult point to drive home without mentioning specific instances, and these can only be mentioned at the risk of contempt of court. Perhaps the attention of some member of congress could be drawn to the fact and he could be furnished with enough definite instances to prove the case.

A possible retrenchment which your correspondent does not mention is in the department of rolling stock. Most railroad companies in ordering new equipment specify a number of details in their locomotives and cars which differ from the specifications of other lines. Each of these details adds to the cost of equipment out of all proportion to the value of the item, and in addition the railroad pays the salary of one or more experts who have invented the necessity for the detail. If the railroads would buy standard equipment they would save both the extra outlay for fancy specifications and the salaries of the men who devise them.

Rooter.

The Present Status of Clearance Legislation

A Discussion of the Necessity for Such Action, with a Review of the Laws Passed and Orders Already Issued

The subject of side and vertical clearances has received much attention from railway operating and engineering officers during the past decade. Increased attention has been given to it recently because of legislation enacted or threatened in several states and in Congress during the past three or four years. Thirteen bills were introduced in nine different state legislatures last year relating to this subject, three of which became laws, while a bill of this same nature has also been introduced before the legislature of Georgia. In addition, the Railroad Commissioners of Ohio and California issued definite orders last year, and several other commissions have the question under consideration. This is therefore a question of much importance to railway men.

OBJECT OF CLEARANCE LEGISLATION

As the purpose of any legislation establishing minimum side and vertical clearances is ostensibly to remove dangerous conditions, and thereby decrease the risk of accident, the necessity for such action can best be determined by an examination of the accident reports of the Interstate Commerce Commission. These reports show that during the fiscal year ending June 30, 1913, a total of 10,550 persons were killed and 86,688 injured in accidents on steam roads. Of these, 5,558 killed, and 6,310 injured, were trespassers and 2,939 killed and 56,619 injured were employees on duty. Of the accidents to employees on duty, 94 deaths and 1,835 injuries were the result of coming in contact with bridges, tunnels, buildings, or other obstructions while riding on cars or engines. The total number of deaths from this class of causes, including those of passengers and trespassers, was 146, and of injuries, 1,979. Thus, the deaths resulting from persons coming in contact with lateral or overhead obstructions were 1.4 per cent of the total fatalities and the injuries thus caused were 2.3 per cent of the total injuries. As to employees, 3.2 per cent of the fatalities to them and 3.2 per cent of the injuries to them resulted from the same classes of causes.

TABLE SHOWING SUMMARY OF ACCIDENTS FOR YEAR ENDING JUNE 30, 1913

Causes	Total employees on duty		Total persons	
	Killed	Inj'd	Killed	Inj'd
Train accidents—				
Collisions	280	3,367	457	8,031
Derailments	227	2,243	334	6,534
Accidents to trains, cars or engines, except collisions, derailments and boiler explosions	9	293	15	415
Bursting of or defects in locomotive boilers or boiler attachments	41	1,002	43	1,017
Total train accidents	557	6,905	849	15,997
Other than train accidents—				
Accidents to roadway or bridges not causing derailment, such as fires, floods, landslides, explosions, etc.	7	17	8	18
Coupling or uncoupling cars (exclusive of accidents with air or steam hose)	195	3,360	195	3,361
While doing other work about trains (not in shops or engine houses) or while attending switches	143	24,114	143	24,114
Coming in contact, while riding on cars, with overhead bridges, tunnels, or any signal apparatus, or any fixed structure above or at side of track	*94*	*1,835*	*146*	*1,979*
Falling from cars or engines	406	6,647	904	7,659
Getting on or off cars or engines	154	9,358	843	14,486
Other accidents on or around trains not here named	66	1,959	146	7,322
Being struck or run over by engines or cars at stations or yards	752	1,664	2,226	3,474
Being struck or run over by engines or cars at highway grade crossings	...	...	1,125	3,080
Being struck or run over by engines or cars at other places	544	490	3,744	2,133
Other causes	21	270	221	3,065
Total	2,382	49,714	9,701	70,691
Grand total	2,939	56,619	10,550	86,688

If conservation of human life is the object sought by such legislation, there are several other directions toward which it would seem that legislative action could be directed with greater prospect of getting substantial results. For instance, the enactment of stringent legislation regarding trespassing and its enforcement would do a great deal to stop the fatal accidents to trespassers, of which 5,558 were reported last year, or 38 times as many as were caused by narrow clearances. In fact, the deaths resulting from clearance conditions ranked eleventh in number in the 15 classifications of accidents given in the general summary prepared by the Interstate Commerce Commission.

The protection of its employees should be a primary object of all railroads. If this is the purpose sought by such legislation, attention may also be called profitably to the accidents occurring in coupling and uncoupling cars in which 195 employees were killed and 3,360 injured last year, largely as the result of carelessness of employees or their assumption of unnecessary risks. Also, 406 were killed by falling from cars or engines, and 154 in getting off cars or engines, while 1,296 were killed as the result of being struck by trains. The tabulation in the lower part of the preceding column taken from the accident report of the Interstate Commerce Commission for the fiscal year ending June 30, 1913, shows the number of accidents resulting from clearance conditions as compared with those due to other causes, the statistics regarding the former being given in italics.

An investigation made on one of the large systems with several thousand miles of line, and covering the five years from 1907 to 1911, inclusive, showed that only 5 persons were killed and 56 injured by accidents due to overhead obstructions and that 2 persons were killed and 80 injured because of lateral obstructions, while the total claims for the accidents caused by these lateral and overhead obstructions amounted to only $27,000.

The nature of the obstructions causing the clearance accidents reported by the Interstate Commerce Commission is shown in the following table:

Causes of clearance accidents	Total	
	Killed.	Injured.
Switch stands	6	396
Water cranes	6	154
Mail cranes	4	60
Buildings (at side of or enclosing track)	26	244
Bridges, side	29	124
Bridges, overhead	51	315
Tunnels	6	9
Overhead wires	5	143
Poles (including signal, telephone, telegraph, electric light, warning poles, etc.)	4	237
Miscellaneous	9	297
Total	146	1,979

It will be seen that 106 deaths and 683 injuries, or 73 per cent and 35 per cent, respectively, of the totals were the result of striking buildings and bridges. Eighty fatalities, or over one-half of all, resulted from striking bridges alone, while only six were caused by low or narrow tunnels, commonly considered dangerous obstructions. Thirty-four deaths resulted from miscellaneous causes, such as striking switch stands, mail cranes, water cranes, telegraph poles, overhead wires, etc.

In a study of this nature it is important to ascertain to what extent accidents of the class under investigation are increasing or decreasing. Taking the past ten years, covering the period of agitation of this subject, it is instructive to note that the number of employees killed on duty because of clearance conditions decreased from 584 during the five year period from 1904 to 1908, inclusive, to 427 for the five year period from 1909 to 1913, inclusive, a decline of 157, or 27 per cent. During the same time the number of employees in train service, who are exposed to accidents of this kind, increased from 279,831 to 305,195, or 9 per cent. The number killed per 10,000 employees,

therefore, decreased from 4.2 to 2.8, or 33 per cent in 10 years.

This decrease would naturally be expected from a survey of conditions, and is due to a number of important influences. In the first place, the railroads have been the first to observe dangerous conditions on their lines, and have spent large sums of their own accord in remedying them. While it is not possible to secure data showing the number of accidents resulting from coming in contact with switch stands, mail cranes, etc., for any number of years, it is safe to assert that this class of accidents has been greatly decreased as the result of a very general campaign to move obstructions of this nature further back from the tracks. A great deal of attention has also been given to the "safety first" campaigns inaugurated on many of the roads, and they have been the means of directing attention to many other conditions which have been remedied. Also, the working conditions of trainmen have been greatly improved. The universal adoption of the air brake has made it unnecessary for them to expose themselves as formerly, while the increasing proportion of trains which move from one terminal to the next without breaking up, tends towards the same results.

PRESENT CLEARANCE CONDITIONS

With a desire to ascertain the present clearance conditions on the various roads throughout the country, we have collected data regarding the standards, and the extent to which they are conformed to, on 33 representative roads in all parts of the country, and having over 100,000 miles of line. The information naturally divides itself into two parts—one relating to the standards adopted and enforced on new work and reconstruction along old lines, the other relating to clearances actually existing on old operated lines.

A survey of the existing standards shows that a minimum lateral clearance of 7 ft. measured from the center line of the nearest track is commonly adopted, with only three roads reporting less and several more. Likewise, 22 ft. may be regarded as the standard vertical clearance from the top of the rail to the low point of overhead structures, with 8 roads using a less distance and several working to 23 ft. and 24 ft. These standards of 7 ft. and 22 ft. conform to the standard bridge clearance diagram of the American Railway Engineering Association. Several roads which report these clearances as standard on bridges, also state that greater clearances are found elsewhere.

It must not be assumed that no structures will be found which do not conform to the standard clearance limits on the different roads. These limits are merely adopted as standards to which all structures are being brought as rapidly as practical. From the data available it is estimated that about 25 per cent of the structures on old lines do not conform at present to the adopted standards of the various roads, although every road reporting states that its standards are enforced on all new construction and reconstruction where conditions permit. Obviously, there are certain places, especially in cities, where overhead viaducts or other limiting conditions make it impossible to comply with the standards. Also, all but four of the roads that reported state that their standard clearances have been increased since 1900, and most of them within the past four or five years. Obviously it is not possible or financially practicable to bring all the structures on a railway into harmony with these new standards at once. Large sums, however, are being expended in moving switch stands and buildings, widening cuts, securing standard clearances in the rebuilding of structures, etc., one road of 3,500 miles reporting having spent over $1,400,000 on such work within the past few years.

Intimately connected with the subject of lateral clearances is that of the minimum distance between track centers. The standard recommendation of the American Railway Engineering Association is that tracks be spaced 13 ft. between centers. Twenty-three roads report this as their standard for main lines, while one reports 12 ft. and six 14 ft. or more. It is estimated that 75 per cent of the tracks conform to the standards adopted by the different roads for themselves and many individual roads report that 100 per cent conform. The prominent exceptions to 13 ft. track centers are almost all in the east, where physical conditions and long established location make any increase in the distance between track centers difficult to secure and exceedingly expensive. In many of the eastern cities where the right of way is fully utilized, increasing the distance between the track centers means the elimination of one or more of the tracks entirely.

The same distance of 13 ft. is generally standard between the centers of main and adjacent side or passing tracks, although in several cases a wider spacing is used, three roads adopting 15 ft., one 16 ft. and one 19 ft. The purpose of this wide spacing is to protect employees when inspecting trains standing on the passing tracks or engaged in similar work from trains moving at high speed on the adjacent main track. About 60 per cent of the tracks adjacent to main tracks are reported to conform to the adopted standards of the various roads.

In yards the operating conditions are different, and it is entirely practical to place the tracks closer together. The speed of trains here is relatively slow, while the additional land which would be required if a wide spacing was adopted in a yard of 30 or 40 tracks, for instance, would frequently render such spacing in a yard impractical. As a result, several roads are using 12 ft. between centers in yards, although the majority use 13 ft. here also, and this latter spacing must be recommended as better practice. The replies indicate that over 90 per cent of the yard tracks conform to the existing standards of the individual roads. As yards are being rebuilt and new tracks added, the distance between centers is being increased so that the percentage complying with the standards is steadily increasing.

CLEARANCE LEGISLATION

As an indication of what may be expected in legislation on this subject, a digest of the existing laws and important orders of the various commissions is given herewith. The individual states have been most active in passing this kind of legislation, and clearance laws have been enacted in Indiana, Kentucky, Massachusetts, Michigan, Minnesota, North Dakota, New Hampshire, Ohio, Oregon and Vermont. The railroad commissions of some states acting under broad powers have issued orders having the same force as statutes. Such orders have been issued in California and Ohio, for example. Clearance bills have also been introduced in the national Congress at various times, but have never been passed. The latest was the Martin bill introduced in 1910, but which never came to a vote.

In Michigan the minimum allowable height of bridges above the track is 18 ft. except in cities. In Vermont it is required that as bridges are rebuilt they must have a minimum clearance between trusses of 15 ft. for single track and 27 ft. for double track, with a minimum vertical clearance of 22 ft. New Hampshire requires that no bridge shall be rebuilt with a vertical clearance of less than 21 ft. and further stipulates that no car over 14 ft. high be operated within the state. In Kentucky the law requires that no bridge shall be constructed with less than 22 ft. vertical clearance.

The state law of Indiana provides that it shall be unlawful to maintain a structure less than 21 ft. above the top of rail or within 7 ft. of the center of the track without the consent of the commission or to construct any structure within those limits unless it be within a city. It also requires that the nearest point of contact of a locomotive or car shall not be less than 18 in. from any structure without the consent of the commission. The state law of Ohio provides that structures shall not be less than 21 ft. above the track except where the commission finds such a requirement impractical, this exception applying only to side tracks. An administrative order of the commission dated December 30, 1913, specifies a minimum lateral clearance line 7 ft. from the center line of track down to 4 ft. above the top of rail, and extending down from this point to a point 5 ft. from the center of the track at the elevation of the top of rail. Further exceptions are also made for

freight and passenger platforms, while additional clearance is required on curves.

Minnesota and North Dakota are the states which have most recently passed clearance legislation, both having done so in 1913. The Minnesota statute forbids the construction or rebuilding of any structure within 8 ft. of the center line of the track or less than 21 ft. above the top of rail, although the railroad commission is given authority to suspend these restrictions at any particular place. The minimum distance between tracks is also fixed at 14 ft. for main tracks and 13 ft. for yard tracks. The North Dakota law forbids the operation of any locomotives or cars after January 1, 1915, which exceed 10 ft. 6 in. in maximum width and 14 ft. 2 in. in height. It also requires that no structure be maintained or erected along main or side tracks within 8 ft. of the center of the track or less than 21 ft. above the top of the rail. These clearance regulations, however, do not apply to any structures on the railroad right of way which are owned, leased, or used by any outside person or corporation. The railroad commission is also given authority to exempt any structure built prior to the passage of the act. This law also specifies that no tracks shall be constructed with less than 13 ft. between centers.

In Rhode Island it is required by law that no bridge shall be built over any railroad track with less than 18 ft. clear distance above the top of rail, excepting structures rebuilt to replace existing structures. In Oregon, while the railroad commission has not issued any definite orders prescribing clearances, it has recommended a side clearance of 8 ft. and a vertical clearance of 22 ft. above the top of rail for main tracks. Massachusetts requires that no bridge shall be constructed over a railroad at a height less than 18 ft. above the track, except by the written consent of the Board of Railway Commissioners. In Illinois, the railroad and warehouse commission insisted on 22 ft. overhead clearance wherever practical for a number of years, and about three years ago a rule was also adopted requiring yard tracks to be not less than 13 ft. between centers.

The Railroad Commission of California issued an order, effective January 1, 1913, providing for a minimum overhead clearance of 22 ft., and a minimum lateral clearance of 7½ ft. for tunnels and bridges, and of 8 ft. for water stations, fuel stations and other side structures. The minimum distance between the center line of yard and industrial tracks and structures, including platforms higher than 4 ft., is established at 8½ ft., while platforms under 4 ft. in height and over 1 ft. must be 6½ ft. from the center of the track. The minimum distance between the center lines of tracks is established at 13 ft., except that house and team tracks may be built on 11½ ft. centers. While the Corporation Commission of Oklahoma has not issued any definite orders regarding clearances, it has recommended a 22 ft. vertical clearance and 7 ft. minimum lateral clearance in some instances.

A bill now before the legislature of Georgia requires that all structures extending over 40 in. above the top of the rail of the adjacent main track shall be at least 8 ft. from the center of the track. However, all structures which it will cost more than $100 to remove or renew individually, are exempted from the provisions of this act.

The Martin bill, which was introduced in the national House of Representatives in 1910, but which was never brought to a vote, provided that the maximum width of locomotives and cars should not exceed 10 ft. 6 in. and the height 14 ft. 2 in. It also stipulated that no structure of any kind should be closer than 6 ft. 11 in. to the center of the track excepting platforms not over 3 ft. 11 in. from the top of rail and the minimum vertical clearance was established at 20 ft. By the provisions of this act, the Interstate Commerce Commission was to be given authority to exempt individual obstructions from the provision of this act if conditions rendered this necessary. This bill also fixed the minimum distance between tracks as 12 ft. 6 in. and provided that all equipment, track and structures should be brought into conformity with it by January 1, 1912

A bill introduced in the House of Representatives by Representative Stevens on December 15, 1913, intended to promote the safety of railway employees and passengers, provides among other things that the Interstate Commerce Commission shall have power to order any changes in track, structures, or equipment, which in its opinion will increase safety. No action has been taken on this bill, but if passed, it is probable that this broad provision would be interpreted to include authority over clearance conditions.

The railway act of the Dominion of Canada requires a vertical clearance of 22 ft. 6 in. and a clear headway of 7 ft. above the top of the highest car. The Board of Railway Commissioners is given authority to exempt any tunnel or bridge from the provisions of the act where only trains equipped with air brakes are operated. An order of the Board of Railway Commissioners, dated November 9, 1910, has fixed the lateral clearance at 6 ft. from the gage side of the adjacent rail, or 8.35 ft. from the center of the track.

Fundamental difficulties confronting clearance legislation

In view of the legislation passed and proposed, it is pertinent at this time to call attention to a few of the practical fundamental principles governing and some of the difficulties confronting such legislation, which it is evident have not been sufficiently considered in all cases in the past. In the first place, to be consistent, any legislation which specifies the limits within which structures may not be built, should also specify the maximum dimensions of the equipment operating within those limits. This has been done in the North Dakota law, and was included in the Martin bill referred to above. However, as a matter of public policy, it is difficult to see how it can be advisable to set by law any limit beyond which cars and locomotives cannot be built. The continuous record of railway development and increased efficiency of operation in this country has been made possible only by increasing the car and train load. Because of the increasing cost of operation the necessity for economy in operation was never greater than at the present time. A man is rash, indeed, who will venture to seriously predict where this development will terminate. As prominent a railroad man as the late E. H. Harriman predicted a few years ago that the railways of this country would eventually adopt a 6 ft. gage.

If it be necessary to enact any legislation it should refer primarily only to new construction and to reconstruction undertaken by the railways on their own initiative, and should not be retroactive. If reasonable, such legislation undoubtedly would not meet with serious opposition from the railways and would serve to secure uniformity of standards on all new work at once and gradually on old work. It is unfair and frequently not practical to require that all structures on old lines shall be made to conform to new limits within the short period of time given in most of the laws proposed, while it requires an expenditure of large sums of money which could be devoted to much better uses. It is the experience of all roads that practically all facilities, with the possible exception of large terminals in congested cities, are rebuilt every 15 or 20 years. As these structures are rebuilt from year to year they can be brought into conformity with any reasonable requirements without any great additional expenditures. By thus making haste slowly the desired conditions would in a relatively few years be brought about which radical clearance legislation could bring about in a shorter time only at an enormously greater cost.

Any clearance diagrams adopted must be practical and be framed with a full knowledge of railway operation. The clearance diagrams of Minnesota and North Dakota are glaring violations of this principle, being plain rectangles 16 ft. wide and 21 ft. high. Strict compliance with these requirements would necessitate the removal of all cattle guards, through girders, bridge portal bracing, station platforms, intertrack fences, dwarf signals and other similar facilities commonly regarded as not presenting any dangerous conditions.

The adoption of clearance regulations should be made only

after a careful study of local conditions in the territory under consideration. For instance, while horizontal and vertical limits of 8 ft. and 21 ft. may be entirely practical in Minnesota and North Dakota, where the railways have been built comparatively recently and where there are no congested terminals, these limits would be utterly unpractical in Pennsylvania, New Jersey and New York, where track centers and building lines were established many years ago and can be changed only at enormous cost. With the present free interchange of traffic the same cars may be moved over any line in the country, and the danger of accident arises largely from a lack of uniformity in the location of structures rather than from the size of the equipment, and a man on an eastern road accustomed to its narrow clearances will not expose himself in the same manner as will a man on a western road. It is therefore difficult to see how one definite standard can be applied equally on roads in different parts of the country. It would appear to be more equitable to fix these limits for perhaps three or four large areas, taking these different fundamental conditions into consideration in the establishments of the limits.

If legislation of this kind must come it should be national rather than state. The confusion which would result on a road operating in 10 or 12 states, each with different requirements, is evident. Furthermore, such conditions would be an actual menace to the employees. Many crews pass through portions of two or three states on their regular runs, and the existence of different clearance standards is certain to increase the number of accidents. Besides, with the present attitude of several of the state legislatures, it is difficult to predict the limits to which these measures might go.

Within recent years especially the clearances of many structures embraced in grade separation work in cities have been established by ordinances or contract. In some instances, as in New York, these measurements have been established by orders of the state railroad commissions. There is thus opportunity for a conflict of authority which has been recognized in the laws of two or three states. Also, for state or national legislation to nullify the work already done on public order would not appear fair or equitable. In this connection it must be remembered that the establishing of limits, especially of vertical clearances, to apply within cities where grade separation is in prospect may render such work impossible. The adjustment of grades where several roads and numerous intersecting streets are involved is now frequently an exceedingly difficult problem to solve. If still further complicated by additional restrictions, some of these projects will undoubtedly have to be abandoned.

The suggestion has been made that limits could be set in the large cities and terminals less than those governing out on the line. It is the general practice for the road freight crews to leave their trains in the large yards in the outskirts of the important cities. Other crews then bring these cars in for distribution throughout the city. These transfer trains are generally short and of relatively slow movement, and wide clearances are not as necessary for them as for main line trains.

THE FINANCIAL ASPECT OF CLEARANCE LEGISLATION

In view of the present condition of railway finances and the immediate outlook for the future, any discussion of clearance legislation must center very largely about its cost. Very little exact data regarding the cost of such work has been collected. Two years ago when the Martin bill was before Congress, estimates made by 115 roads with 152,600 miles of main line showed an approximate cost of $139,000,000 to comply with the lateral clearance requirement of 6 ft. 11 in.; $135,000,000 to secure an overhead clearance of 20 ft.; $167,000,000 to secure a minimum distance of 12 ft. 6 in. between tracks, and $5,600,000 to bring the equipment within the specified limit, or a total of approximately $450,000,000. Assuming a proportionate outlay for the entire mileage of the country, compliance with the Martin bill would cost the railways $716,000,000, or over $2,900 per mile of main line.

Estimates prepared more recently by 13 roads with 34,895 miles of line show a total cost of $74,857,250 to secure a minimum vertical clearance of 20 ft., or $2,145 per mile for these roads. Likewise, 14 roads with 28,736 miles of line estimate that it would cost them $100,170,000, or $3,486 per mile to secure a minimum clearance of 22 ft., while several roads considered this latter limit unpractical and made no estimate. Similar figures of the cost of meeting a lateral clearance requirement of 7 ft. made by 14 roads with 30,077 miles of line totaled $59,136,349, or $1,966 per mile. On the basis of a minimum lateral clearance of 8 ft., 12 roads with 26,305 miles of line estimated the cost of complying at $104,573,000, or $3,975 per mile. While all the above figures are estimates, they show plainly that compliance with clearance legislation of this sort will be exceedingly expensive on any basis which may be adopted, and on the basis of the legislation so far enacted, it will not fall short of $2,500 per mile of line for the entire country.

Such legislation will affect not only the railways but private industries as well. The above figures refer only to the expense that would have to be borne directly by the roads and do not include the cost of changes that would be made necessary about industrial plants, which would also reach a very high figure. One large corporation which made a careful estimate of the cost of compliance with the proposed Martin bill found that it would cost it alone over $1,600,000. It is entirely probable that the total cost to railways and industries would exceed $1,000,000,000. In North Dakota changes in industrial plants were obviated by exempting from the provisions of the law all structures upon the railroad right of way owned, leased, or used by private parties. It is difficult to see what difference it would make to a railway employee whether he was knocked from a car by an obstruction owned by the railway or one owned by a farmers' elevator company.

It is pertinent to inquire at this time just how the money necessary to comply with such requirements could be secured. As the expenditure could be justified only as an operating measure, and as it would not increase the value of the property or earn any return, it would seem that it should be charged to operation and not to capital account. But with the present decreasing tendency of operating revenues, it is difficult to see how work of such magnitude could be paid for out of operating income.

IS CLEARANCE LEGISLATION ADVISABLE?

In view of all of the above, the question arises whether clearance legislation is advisable. The analysis of railway accidents shows that only 1.4 per cent of all deaths and only 3.2 per cent of the fatalities to employees result from coming in contact with lateral or overhead structures. Likewise, accidents of this sort have decreased 33 per cent in the past five years. The roads have nearly all adopted increased clearance standards, and are bringing their structures into conformity with these standards as fast as is practical and at a relatively large expenditure of capital. It is therefore pertinent to inquire if the agitation for legislation on this subject at this time is not ill advised, and if as a matter of public policy it might not be more expedient to expend the large sums which clearance legislation would cost in other directions where the expenditure would secure greater returns from the standpoint of safety to the railway employees and general public alike, as, for instance, for the elimination of highway grade crossings.

It must be remembered that no matter what form legislation takes it will not eliminate all accidents of this nature. The accident reports of the Interstate Commerce Commission do not show the location of the obstructions causing accidents with reference to the tracks, so it is impossible to determine how many would have been avoided by the enforcement of any specific limits; but it is certain that some of these accidents would not have been prevented by the enactment of any reasonable legislation which could be enforced.

Rock Island Interlocking Plant at Joliet

New Design of Tower and Derails; Storage Battery Reduced from 400 to 160 Ampere-hours Capacity

A 224-lever all-electric interlocking plant was recently installed at the crossing of the Chicago, Rock Island & Pacific with the Atchison, Topeka & Santa Fe, and the Chicago & Alton, at Joliet, Ill. Aside from the fact that this is one of the largest interlocking machines west of Chicago, if not the largest, the original features in the design make the installation of considerable interest.

Fig. 1—Signal Bridge with Dwarf Signal Mounted Above Lower Chord

High signals are three-position, upper quadrant, operating from zero to 45 to 90 deg., and dwarf signals are two-position, upper quadrant, operating from zero to 45 deg. High signals are in general mounted on signal bridges, as are also the dwarf signals which protect the pocket derails. The difference in the visibility of the suspended dwarf and the dwarf mounted above the chord of the signal bridge is well shown in the illustrations of the two signal bridges, Figs. 1 and 3.

POCKET DERAILS

Because of the location of the crossing directly in front of the passenger station, it was necessary to provide additional derails nearer the crossing than the standard 500 ft. required by the Illinois law. These pocket derails are located only 50 ft. from the crossing, and in order to give rapid and positive action, a derail was devised which is quite similar to a movable-point frog. The frog-point is 7 ft. 2 13/16 in. long and the stock-rail from the point to the end is 13 ft. 4 in., the angle of departure being 9 deg. 1 min. The frog point has a 5-in. throw and when open the gage side is supported and reinforced by rail braces placed at the proper angle so that when the point is open each brace gives support and strength to the point. This bracing is necessary, of course, as the point is subjected to considerable

Fig. 3—Signal Bridge with Suspended Dwarf Signal

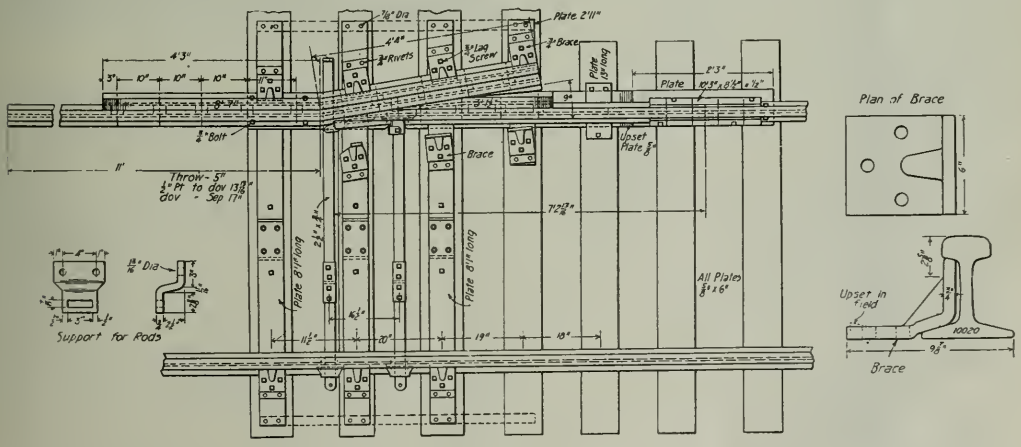


Fig. 2—Quick-Action Pocket Derail. Movable Point Frog Type

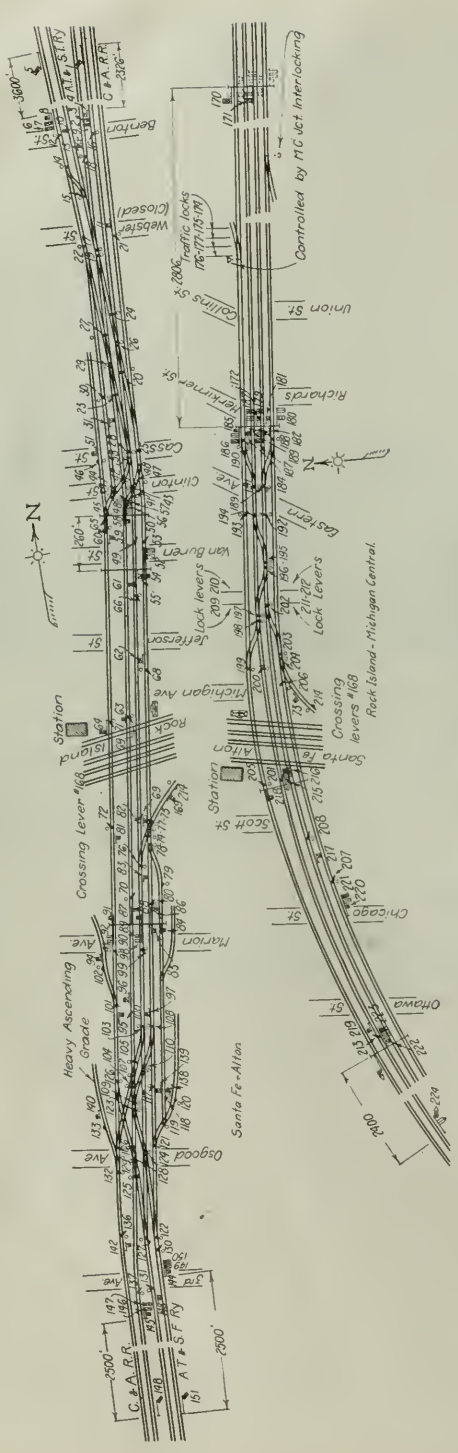


Fig. 4—General Layout of Tracks, Joliet Interlocking, Chicago, Rock Island & Pacific Railway

side thrust in deflecting the wheel to the ground. The rail braces are all upset in the field in order to allow for a certain amount of adjustment after wear takes place.

INTERLOCKING TOWER

The interlocking tower is of plaster on hollow tile, supported on a concrete wall foundation. The outside dimensions are 17 ft. 2 in. x 57 ft. 2 in. the tower having two stories and a basement.

Beneath the interlocking machine and extending its whole length is a pit, deep enough so that a man can stand in it upright when wiring, repairing or inspecting. This greatly facilitates the maintainer's work and assures better and quicker service.

Another feature which is worth noting is the tunnels, which are used for cable ducts. These are immediately beneath the ground floor; that is, in the upper part of the basement. There are two of these tunnels, built at right angles to each other. The one running lengthwise of the tower is 7 ft. wide and 10 in. deep and is used for Rock Island cables; the other is 6 ft. wide and 10 in. deep and runs out into a manhole between tracks extending some distance away from the tower. The latter tunnel is for the Santa Fe and the Alton wires.

The interlocking tower presents a neat and attractive appearance, the wide eaves contributing to a graceful design. The building is fire-proof, with the exception of the finish above the second floor. The hollow tile used was a recently perfected "National" type, having rough, wedge-shaped ribs on the outside. As the outer edge of the ribs is the thicker part the shape constitutes a good mechanical bond. The plastering was "Stonecote," made by the Garden City Sand Company, Chicago. Two coats of the plaster were used, a scratch coat applied directly to the tile and a finishing coat applied to the scratch coat. The face of the coating was marked, before it had set, to resemble the Bedford stone in the station across the tracks.

Fig. 5 Tile and Cement Tower

PROVISIONS FOR REVERSING TRAFFIC

Traffic levers are provided for each of the tracks on the Rock Island road. These are operated in connection with a like number of levers in the adjacent Michigan Central Junction interlocking tower to the north. The home signals of one plant are the distant signals of the other.

If it becomes necessary to reverse traffic, the towerman who wishes to do so communicates with the other towerman, asking him to reverse the traffic-lever for the desired track. If the latter can allow this movement, he reverses the lever, which operation mechanically locks all levers controlling signals for movements opposed to the direction of traffic desired by the first towerman. The first towerman will then be able to reverse his lever. The

reversing of this lever mechanically unlocks the levers controlling signals for traffic in the direction desired.

POWER

Normally, and according to R. S. A. specifications, a storage battery of 400 ampere-hours would be required for this plant. To reduce the storage battery required, an auxiliary gasolene engine was installed in the tower. This will not furnish enough power to run the entire plant, but in connection with a small storage battery it furnishes a sufficient supply.

This arrangement requires an emergency signal lighting apparatus consisting of a motor-generator set, 110-volt d. c. motor, driven by power received from the 110-volt storage battery. This motor drives a one-half k. v. a. single-phase, 110-volt, 60-cycle a. c. generator, which furnishes current for lighting the signal lamps. It is equipped with a centrifugal governor which controls the alternating current within 5 per cent of the desired frequency, this being necessary on account of the voltage variations which take place in the storage battery.

Normally, power is furnished by the Public Service Company at 220 volts, 60 cycles, three-phase. This current drives a three-unit motor-generator set. A duplicate set is provided. Each set has a motor and two generators mounted on the same shaft. One generator has a capacity of 40 amperes, at 15 volts, d. c., and is used with five cells of storage battery for the track circuits. The other generator has a capacity of 15 amperes at 10 volts and is used with three cells of storage battery for line circuit current.

The power for the 110-volt storage battery used for operating the interlocking section is supplied from a 110-volt d. c. generator driven by a three-phase, 220-volt, 60-cycle, a. c. motor. The 7½ h. p. gasolene engine and generator is used with the 110-volt storage battery to generate current for operating the interlocking section in case of failure of the commercial power.

The interlocking was designed by the Chicago, Rock Island & Pacific signal department, H. K. Lowry, signal engineer. The construction was done under the supervision of C. Hartvig, foreman, and L. Wyant, superintendent of construction. All the interlocking apparatus was supplied by the General Railway Signal Company, Rochester, N. Y.

SIR GEORGE PAISH ON SAVINGS UNDER GOVERNMENT OWNERSHIP IN THE UNITED STATES

The following letters which were published in the last issue of The Saturday Evening Post are self-explanatory.

Chicago, July 6, 1914.

Editor The Saturday Evening Post:

Dear Sir: One of the principal arguments of ex-Governor Stubbs and others who have advocated in this country the government ownership of railroads has been that vast savings could be effected by the use of government credit. Mr. Clifford Thorne goes so far as to estimate the saving at $400,000,000, on the assumption that government could finance the properties on a 3 per cent basis; but ex-Governor Stubbs figures it at four.

Being very much in doubt as to these estimates and wishing for expert opinion I wrote to Sir George Paish, editor of the London Statist, and well known all over the world as an authority on financial matters. I inclose his reply, from which it appears that there might be a possible economy of sixty millions, and a later and ultimate saving of seventy millions, or one hundred and thirty millions in all, arising from the ability of government to raise money on better terms than can the railroads under present conditions.

But when this possible saving is put over against the inevitable extravagance and waste and loss of every government enterprise, it would melt so rapidly as to leave hardly a trace.

Yours truly. E. P. Ripley,
President The Atchison, Topeka & Santa Fe Railway System.

The letter to which Mr. Ripley refers in the above follows:

June 23, 1914.

Dear Mr. Ripley: I have been very much interested in your letter of the sixth of June. According to the return of the Interstate Commerce Commission for the year ended June 30, 1911, the funded debt of the railways of the United States was $9,816,079,405 and the interest accrued on the funded debt for the year was $410,326,852. Thus the average rate of interest paid by American railways on their funded debt was only 4.18 per cent. Were the railways to be purchased by the government the money could not be raised on better terms than this. Indeed, if the government were to purchase the railways they would, in my judgment, leave these underlying bonds untouched. To issue nearly $10,000,000,000 of government bonds to investors would be an impractical operation unless the bonds were taken in exchange for existing bonds. To induce the existing holders to exchange their present bonds for government bonds the latter would have to be offered at an attractive price. In purchasing the railways there would, of course, be no necessity for the government to take over the existing bonds, and I imagine that no attempt would be made to do so. Hence, there would be no saving of interest from government purchase as regards the funded debt, although later on it might or it might not be feasible to refund the existing debt into 3½ per cents as the bonds fell due for payment.

If refunding were possible the saving would ultimately be about $70,000,000 per annum.

The amount of the capital stock of the railways at the end of June, 1911, was $8,364,419,520, and the dividend distributed upon this stock from current income was $302,037,778, or an average return of 3.61 per cent. From surplus, dividends amounting to $158,157,598 were distributed. The total sum distributed from income and from surplus was $460,195,376, or an average return upon the share capital of 5.5 per cent. Here again it would be quite impossible for the American or any other government to sell bonds to investors sufficient to provide cash to buy this vast quantity of railway stock from the existing holders. Ability to carry the transaction through would be governed by the price at which the government would offer bonds in exchange for stock. If the price were attractive, stockholders would take payment in bonds; but if it were not tempting, the government bonds would not be taken in payment, and the transaction could not be carried through. Possibly by offering to sell a 4 per cent United States government bond at par, and to take in exchange railway stocks on a 5 per cent basis (par for a 5 per cent stock), would be sufficient inducement. One must not forget, however, that many stocks are receiving no dividends whatever, and that substantial prices would have to be paid for these nondividend-paying stocks. When allowance is made for these various factors it would probably be found that the advantage in the matter of interest from government ownership would be much less than 1 per cent upon the total amount of common stock outstanding.

In brief, there would be no immediate profit from government ownership as regards the bonded debt of the railways, and as to the stock of the railways the advantage would be probably not more than about $60,000,000 a year.

As to the undivided profits, the public gets the advantage of these anyway. When the surplus profits are put into the roads (as they are at present) the capital account is kept down, and it is not necessary to charge as high freight rates and passenger fares as otherwise would be necessary to pay interest and dividends. I imagine that under government ownership the policy of applying surplus profits to betterments would be much the same as the policy pursued by the companies hitherto.

Thus one cannot safely calculate a greater immediate profit from government ownership than about $60,000,000 per annum—excluding, of course, subsequent economies, or subsequent greater cost of operation under government than under company ownership, and excluding a possible ultimate economy of $70,000,000 per annum from the conversion of the funded debt upon the maturity of the existing bonds.

Yours very truly,

George Paish.

E. P. Ripley, Esq.,
President, Atchison, Topeka & Santa Fe Railway.

DARIUS MILLER

Darius Miller, president of the Chicago, Burlington & Quincy and of the Colorado & Southern, died at Glacier Park, Mont., on August 23, after an operation for appendicitis. Mr. Miller had been on a trip to Denver and Glacier Park, on which he had been accompanied by Mrs. Miller and Vice-President Hale Holden. The party had been joined at Glacier Park by President Louis W. Hill of the Great Northern; and in response to the summons of President Hill, special trains carried medical help for Mr. Miller from Spokane, Wash., and Havre, Mont., and later James J. Hill personally took surgeons on a special train from St. Paul, Minn. But before the party from St. Paul arrived it was necessary to operate; and even then the operation proved to be too late.

Mr. Miller's death removes from the railway field of America one of its ablest and most remarkable men. He was an extraordinary example of perfect tact, great geniality, fine social qualities and consummate diplomatic skill united with tireless bodily and mental energy, great business sagacity, ambition, a resolute will, rare courage, and administrative capacity of the first order.

Darius Miller

He impressed everybody who came in contact with him with his accessibility, his suavity, his kindliness, his pleasantness and the perfect poise of his manner. Even after he became president of the great Burlington system, with its almost 10,500 miles of line, he received in his office almost all who called on him and listened smilingly and patiently to all they had to say. He never seemed ruffled, never seemed in a hurry, never seemed to have a single worry. If his visitor had a favor to ask, Mr. Miller was pretty sure to grant it, if he could, for he had a sincere liking for taking the time and trouble in his busy life to do nice things for others.

But this was only one side of his character. Those who saw much of him soon found that back of his easy-going manner he was a ceaseless, indefatigable laborer. The lowliest employee of the road did not put in any longer hours. During all of the year, except the summer months, his working day at his office was from about 9:30 a. m. to 7 p. m. Even after he went home it was a very common thing for him to sit up till midnight or later reading hour after hour reports, newspaper articles, magazine articles and books on subjects pertaining to transportation, and business and political matters in general. The same energy he put into the work he did himself he put into that of directing the labors of his subordinates. It was so when he was a traffic man, and even more so after he became president of the Burlington.

Mr. Miller was essentially and eminently pacific in his attitude toward competing lines, toward regulating authorities and toward the labor organizations. He was always anxious not to do or say anything which it was not fair to do or say or that might provoke reprisals from concerns or persons that were attacked. But when there was occasion for it, he displayed an amount of courage that was hardly likely to be expected from one with his pleasant, urbane exterior. He met the attacks of aggressive competitors half-way, and no railway man in the country was more vigorously outspoken than he was during the last years of his life in replying in letters or through the press to persons or publications that indulged in unjust criticism of the Burlington in particular, or the railways in general.

One of the most interesting features of his career was his relationship with that great master of railroad transportation, James J. Hill. Mr. Hill's powerful, dominating personality has made it hard for some men to work with him; but Mr. Miller, from the time he went to the Great Northern as vice-president in charge of traffic in 1898, seemed to get along perfectly with Mr. Hill, and to none of his lieutenants, except his son, Louis W. Hill, did James J. Hill apparently give quite such unreserved confidence and support as to Mr. Miller. Probably this was due to Mr. Miller's remarkable combination of tact with courage, and urbanity with strength. With characteristic modesty, he always gave Mr. Hill the lion's share of the credit for the policies so successfully carried out on the Burlington; but doubtless Mr. Hill would be the first to give Mr. Miller full credit both for the part he took in shaping the Burlington's policies, and the equally important work he did in carrying them out.

Mr. Miller's experience until he became the road's president was that of a traffic man. He was so pre-eminently a good traffic man that it was expected when he left the Great Northern to become first vice-president of the Burlington he would have charge of the traffic of the entire Hill system. This plan, it is understood, was defeated by the proceedings of the federal government for the dissolution of the Northern Securities Company. The methods which traffic men had to use to get business were quite different in the earlier part of Mr. Miller's career from those which legislation and concerted action by the railways themselves have finally established. In those days railways competed in the same way and by the same means that other industrial and commercial concerns did. But while Mr. Miller was as skillful as anybody in using the older methods, his success as a traffic man always was due mainly to his clear-headed recognition of the fact that a railway's profits are derived chiefly, not from the business which it wrests from its competitors, but from the business which it develops on its own lines; and it was as a creator of traffic that he first established himself with that greatest of all traffic creators, Mr. Hill.

His reputation as a traffic officer was such that some curiosity was felt as to how successful a president he would make. That curiosity was soon satisfied. The Burlington property

under the presidency of George B. Harris, with Daniel Willard as vice-president in charge of operation, and Mr. Miller as vice-president in charge of traffic, had been put in fine shape. Coming to Mr. Miller, as president, in this condition, it presented him with a rare opportunity; and he and his able lieutenants took advantage of that opportunity to the fullest extent. Mr. Hill was the father of the tonnage system on American railways. He must, therefore, have regarded with satisfaction the advance in the Burlington's revenue freight trainload from 381 tons in 1910, the first year of Mr. Miller's administration, to 484 tons in 1913, an increase in three years of 103 tons, or 26 per cent.

Mr. Miller had a marked capacity for impressing on those who reported to him exactly what he wanted done and for then leaving them a free hand to do it. While he seldom interfered with them, he watched the results of their work closely and keenly, and his influence was felt in every department. Certainly, if his 3½ years' administration as president is a criterion he was one of the ablest railroad administrators that this country has had. Few other railroads have come through the last four years of business stress and strain as well off physically and financially as the Burlington, and the remarkable increase in its average freight trainload, with the economies in operation which it represented, is one of the chief explanations of its present relatively strong position.

A man with Mr. Miller's personality was bound to be popular with his business associates. But his circle of warm friends and admirers extended far outside to other railways, to other businesses, and embraced men in every walk of life.

When he was vice-president of the Burlington he served for years on the Traffic Committee of the Chicago Association of Commerce. When the Chicago Association of Commerce Committee of Investigation on Smoke Abatement and Electrification of Railway Terminals was appointed he was designated as one of its railway members. His railroad activities extended beyond his own lines. He was chairman of the executive committee of the Kansas City Terminal Railway Company, a director of the Union Station Company of Chicago, a director in the Union Station Company of Denver and a member of the committee of presidents having charge of the work of the Bureau of Railway Economics at Washington. His tact and influence were largely instrumental in securing finally the passage of the Union Station ordinance in Chicago last spring. He was a director in the Continental Commercial National Bank and the Union Trust Company of Chicago.

He was a self-made man in the best sense. Born at Princeton, Ill., on April 3, 1859, he was but 55 years old when he died. He entered railway service at 18 as a stenographer in the general freight office of the Michigan Central. From June, 1880, to February, 1881, he was a clerk in the general freight office of the St. Louis, Iron Mountain & Southern; from February, 1881, to October, 1883, chief clerk to the general manager of the Memphis & Little Rock, and from October, 1883, to June, 1887, general freight agent and ticket agent of the same road. From June, 1887, to July, 1889, he was general freight and passenger agent of the St. Louis, Arkansas & Texas, and from July, 1889, to December, 1890, traffic manager of the same road, being, it will be noted, only 30 years old when he was appointed traffic manager. From December, 1890, to May, 1893, he was traffic manager of the Queen & Crescent; from May, 1893, to September, 1896, he was traffic manager of the Missouri, Kansas & Texas system; and from September, 1896, to November, 1898, vice-president. He then became second vice-president of the Great Northern. James J. Hill himself was then, and for some years later, president of the Great Northern, and it was thus that Mr. Miller's business association with him began. He came to the Burlington as first vice-president on January 1, 1902, and succeeded George B. Harris as president on January 31, 1910. He at the same time became president of the Colorado & Southern.

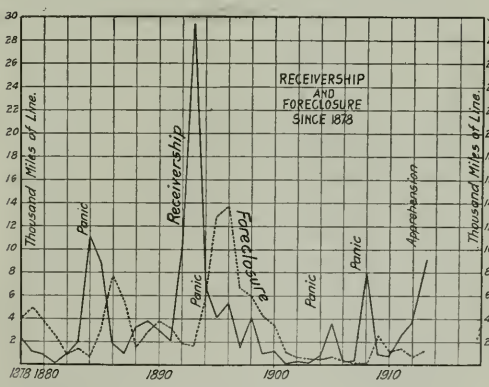
Mr. Miller's funeral was held at Trinity Episcopal Church in Chicago on Thursday afternoon at two o'clock. The active pallbearers were all officers of the Burlington and were as follows: W. W. Baldwin, C. G. Burnham, C. M. Dawes, E. A. Howard, H. E. Byram, G. W. Holdredge, E. P. Bracken, Hale Holden, T. S. Howland and C. I. Sturgis.

RAILROAD RECEIVERSHIP AND REORGANIZATION

By William Z. Ripley
Ropes Professor of Economics, Harvard University

The *Railway Age Gazette* has for a number of years annually reviewed the statistics concerning receivership and foreclosure, regarding them as one of the best available criteria of the general condition of the transportation business. This subject is one of peculiar interest at the present time in view of the fact, as will appear, that almost 25,000 miles of line are now undergoing reorganization as a result of financial breakdown. The facts, year by year, are graphically presented upon the accompanying diagram.

The intimate relationship between railroad failure and industrial depression is matter of common knowledge. An outcrop of receivership for the weaker members of the railroad fraternity is one of the first signs of trouble. Such an announcement for the Erie Railroad, as Sprague puts it in his admirable study of



Miles of Line in Receivership and Foreclosure 1878-1913

panics for the United States Monetary Commission, "has been a customary feature of our commercial crises for half a century." In 1857, in 1873, with the Grant and Ward failure in 1884, in 1893, and again within a hair's breadth of it in 1907, has this historic property served notice upon the community of widespread financial distress. The Northern Pacific went down with Jay Cooke in 1873, and again twenty years later. The Philadelphia & Reading was in receivership in 1884, and nine years thereafter a second time. All along the line, to be sure, are scattered sporadic failures of important companies during time of fair weather, such as the Rock Island, the Reading again and the Union Pacific in 1880; the row-of-bricks downfall of the Gould roads in 1888-91; and the Chicago Great Western affair in 1909. These independent collapses, however, may be regarded as local phenomena due to individual mismanagement or inherent weakness. In the main, railroad failure, as of course one might expect, characterizes and concentrates about panic years. What is the situation at the present time?

The diagram of railroad receivership and foreclosure for a period of almost forty years, is based upon the miles of line

affected. The outstanding feature has already been mentioned, namely, the close connection between transportation and commercial or industrial distress. This is first noticeable on a generous scale in 1884, when 11,000 miles of line were precipitated into receivership; and again in the fall of 1907 (1908), when 18,000 miles of road succumbed. The short, sharp panic of 1903 alone stands forth upon this record by way of contrast, as practically unproductive of railroad disorder. It well deserves the name of a "rich man's panic." Interest at this particular time focuses naturally upon 1913-14. It appears as a time of "apprehension"; but that it is a period of "realization" of trouble as well, is indicated by the rising mileage of railroads in distress. Judged by this standard, the present day bears definite earmarks of severe depression. Yet the fact deserves mention, of course, that the railroads seem peculiarly marked out for suffering, for the well understood reason of steadily rising costs of operation along with fixity under governmental regulation of the rates chargeable for service rendered.

A notable feature of the diagram is the extraordinary prominence of railroad distress in 1893-94. All records in this regard —it is to be hoped forever—were broken when the control of an unprecedented mileage was handed over to officers of the state and federal courts. On June 30, 1894, 192 companies were in the hands of receivers, of which 126 had been consigned thereto during the preceding year. The total mileage operated by these defaulting roads was 40,818. The stocks and bonds affected by receivership aggregated two and one-half billion dollars—that is to say, one-fourth of the total railroad capitalization of the United States at that time. Thus was a dire penalty exacted for the violation of inexorable economic laws throughout a large part of the preceding decade of development.

Yet another point, while we are about it, is emphasized by this chart. This is the sequence in point of time of the allied phenomena of receivership and foreclosure. The latter follows the former in frequency like a shadow after an interval of about two years. This will be observed in 1884, 1893 and 1907. Events are now shaping themselves to bring about a similar sequence in 1914. Almost 23,000 miles of line, principally in the Gould and (old) Rock Island systems, are just now either in process or in need of reorganization. Most of the other properties in distress consist of a half dozen independent enterprises, such as the Kansas City, Mexico & Orient; the Atlanta, Birmingham & Atlantic; and the Moffatt road in Colorado. The troubles of these last named railroads are somewhat peculiar, and are, in the main, due to local circumstances; for most of them represent invasion of territories in which great banking and railroad interests were already firmly intrenched. Undoubtedly the hostility of the great powers to these independent companies has been an appreciable factor contributing to their downfall.

One feature of the present situation contrasts rather strikingly with past experience. A larger proportion than usual of these properties in distress seems likely to pass directly into reorganization without the intervention of receivership at all. On the whole, despite the recent distress there has been a relative decline in judicial interference with embarrassed roads. Decade by decade, a decided subsidence in the railroad mileage thrown into the hands of receivers has taken place. According to recent evidence in the *Railway Age Gazette*, as set forth in the following table, judged by any of the three standards, number of companies, mileage or aggregate stocks and stocks and bonds, the last decade compares most favorably with either of the other two. The contrast with the 80's is even more striking, when one considers these figures in the light of the relative size of the railway net at that time. With all our phenomenal development, receivership still is absolutely less, and very substantially so, than ever before in a similar period of time.

	Receivership		
	First Decade, 1882-91	Second Decade, 1892-01	Third Decade, 1902-11
Companies	279	222	86
Mileage	37,816	62,266	17,574
Capitalization	$1,884,000,000	$3,543,000,000	$1,245,000,000

Nor is this condition of diminishing receivership due to a mere change of fashion in procedure. Substantial economic forces are at work. In the first place, a rigorous process of natural selection has weeded out many of the feeble and unfit roads. A railroad seldom perishes from the face of the earth. It finds refuge instead in alliance with stronger companies. A more powerful and definitely organized banking support is also probably in some measure accountable for the greatly improved record. The prejudicial effect upon the prestige of official bankers is sufficient to make it worth their while to ward off receivership even at heavy cost. It is the railroads without banking friends, such as the Gould roads, which are taken most readily out of the hands of their stockholders and given over to the mercy of an officer of the court. But undoubtedly the most important influence of all in lessening the frequency of receivership, decade by decade, has been the growth and filling up of the country—traffic having developed, that is to say, more in proportion to the facilities for transportation provided. For it is one of the fundamental axioms in the economics of transportation that a growing density of traffic is the most certain panacea for the financial ills to which railroad flesh has fallen heir. All of which lends added interest to the record now in the making. Have we seen the end of present troubles? Or are there more receiverships yet to come? It is our prediction that already the worst is known and that better things will soon be in sight.

A QUESTIONNAIRE FOR STATION AGENTS

Did you—

See that brakes were set on those cars when you went home?
Lock those stock chute gates when last used?
Clean those batteries when they needed it?
Let that guy get off with your hatchet?
Turn in that extra impression book?
Lock those trucks after being used?
Put locks on those toilets?
Fill that red light?
Turn in that extra stationery?
Make that broom last another month?
Break that black lamp chimney, or clean it?
Scrub the waiting room and office this week?
Mark that shipment or guess it off with the shipper?
Put that freight inside to keep from being pilfered?
Look at switch stand after train passed to see if locked?
Sign that bill of lading before you looked at the freight?
Act courteously to that passenger, or snap his head off?
Use a new lamp burner when that old one could have served?
Remove that chunk from platform so no one would be injured?
Put those stove legs and shovels where you could find them next year?
Answer that telephone or make a customer wait for his information?
Accept that shipment of household goods with pasteboard tags, or make them use linen tags?
Leave the cork out of your ink bottle so it would evaporate, causing you to order again next month?
Did You?

—*M. K. & T. Employes' Magazine.*

British Railways in Venezuela.—It is reported that the new branch line of the so-called Bolivar Railway from Palma Sola to San Felipe is approaching completion, and that this railway paid in 1913 for the first time a small dividend on its common stock. The main line runs from Tucacas to Barquisimeto, with a branch to Aroa, where the South American Copper Syndicate, a British company, is working the copper mines very successfully. The Central Railway is extending its line which runs from Caracas inland, from Santa Teresa to Ocumare and Cuan and the work is progressing satisfactorily. The Caracas & La Guaira Railway had a successful year, though traffic on that and on all other lines was affected in the latter half of 1913 by political unrest.

Chicago, Burlington & Quincy 2-10-2 Freight Locomotive

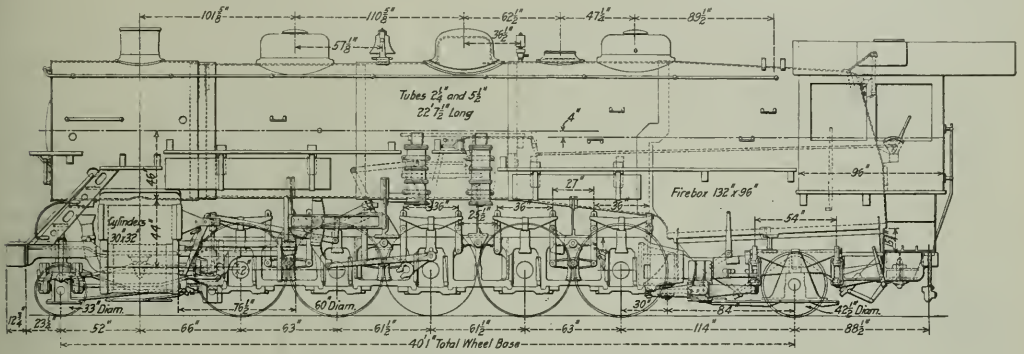
Second Order Includes Refinements in Design Effecting a Reduction of 16 Per Cent in Reciprocating Weights

Ten locomotives of the 2-10-2 type have recently been built by the Baldwin Locomotive Works for the Chicago, Burlington & Quincy. In the spring of 1912 the Burlington received five engines of the same type which were described and illustrated on page 1006 of the *Railway Age Gazette* for May 3, 1912. They have proved efficient and economical in handling heavy coal traffic, and the general design of the new locomotives closely follows that of the original order. The rated tractive effort of all these locomotives is 71,500 lb., and with a large number of interchangeable parts, they constitute a notable group of unusually large units.

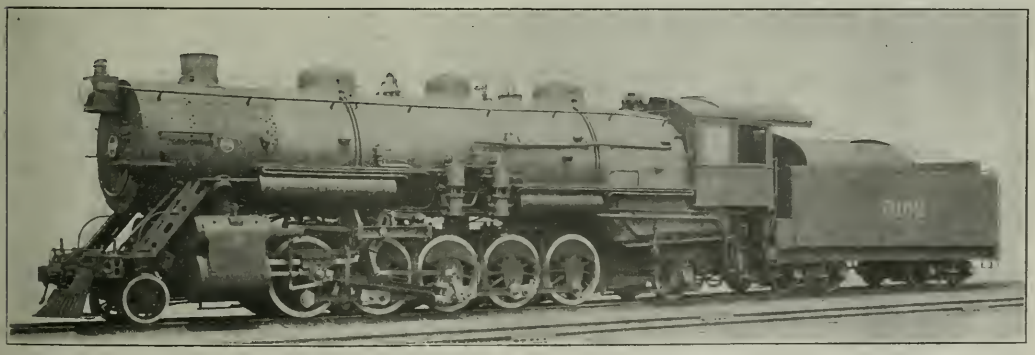
One of the most difficult problems, in designing large locomotives with comparatively small driving wheels, is to properly counterbalance the reciprocating and revolving weights. A number of eight and ten-coupled locomotives built by the Baldwin Locomotive Works have been fitted with counterweights keyed to the main axle; and these, in conjunction with the usual weights in the wheel centers, have balanced a sufficiently large proportion of the reciprocating and revolving parts to avoid destructive effects at the speeds at which these engines are run. This arrangement is used in eight of the ten new Burlington locomotives. In the two remaining locomotives, the weights of the reciprocating parts have been sufficiently reduced, by the use of special steels, to avoid the necessity of applying additional counterweights. The illustration shows one of the two locomotives equipped with the lighter parts.

The pistons of this locomotive have dished bodies of .40 per cent carbon steel, annealed. These are riveted to cast iron bull rings, which are 6 in. in width, widened to 8 in. at the bottom to give ample bearing area. The packing rings are also of cast iron. The piston rods are of nickel-chrome steel, annealed. They have a diameter of 4¾ in., with a 2½ in. diameter hole in the center. The crosshead is of the Laird type, with an unusually light section. The body is of .40 per cent carbon steel annealed, and the bearing shoe is of bronze. The piston rod has a taper fit in the crosshead, and is secured by an oil-tempered steel key; while the crosshead pin is of nickel steel. The main and side rods, stub straps, and main crank pins are of nickel chrome steel, annealed. The main pin has a fit in the wheel center 9 in. in diameter, and is drilled with a 4 in. hole. The main driving axle is of vanadium steel. All the rods are channeled to an I-section. The eccentric crank has been lightened, to reduce the weight on the main pin. It weighs 125 lb., as against 160 lb. for the cranks used on the previous engines.

The use of special materials, as described above, has effected a saving in weight of reciprocating parts on each side, amount-



Elevation of Burlington 2-10-2 Type Freight Locomotive

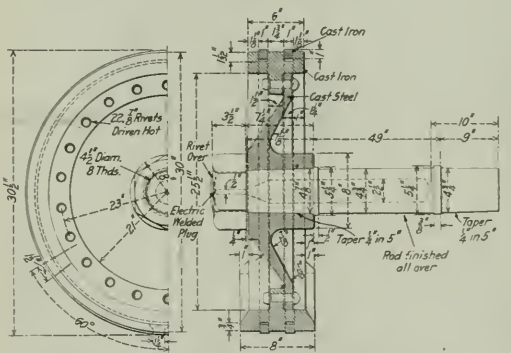


Heavy 2-10-2 Type Freight Locomotive for the Chicago, Burlington & Quincy

ing to 379 lb., or 16 per cent, as compared with the other locomotives using heavier parts. The balancing of the main wheels is greatly improved, and there is a material reduction in the amount of excess weight to be applied to the other wheels. The result is less wear and tear on the locomotive and track, while the lighter parts are more easily handled in the shop when making repairs.

The frames are 6 in. wide, each main frame being cast in one piece with a single rail front section; while the rear sections are separate, and of slab form. The frames on the original order of five engines had double rail front sections, both rails being separate from the main frames; and the rear sections were of bar construction with pedestals through which the trailer axles passed. The rear truck is of the Hodges type, and is equalized with the fourth and fifth pairs of driving wheels. The back truck spring hangers are pinned to brackets, which are bolted to the engine frames. These brackets, together with the foot plate, serve as supports for a wide expansion plate which carries the back end of the firebox. The front end of the firebox is also supported on an expansion plate. This is bolted to a steel casting, which supports the radius bar pin for the trailer truck, and also braces the frame at the splice between the main and rear sections.

The boilers of the ten new locomotives are all alike and are



Dished Piston with Hollow Rod of Nickle-Chrome Steel

of the same general dimensions as those of the 1912 order. The firebox is equipped with a Security sectional arch supported on four 3½ in. tubes, and a Street mechanical stoker is applied. The longitudinal seams on the barrel rings are all placed on the top center line. The main dome is placed on the second ring and the auxiliary dome on the third, and the seams on these rings are welded throughout their entire length. The opening under the auxiliary dome is 16 in. in diameter, so that a man can enter the boiler to make an inspection, without dismantling the fittings in the main dome. The superheater is of the Schmidt top-header type, with 45 elements, and a superheating surface of 1,232 sq. ft. With ample grate area and heating surface, mechanical stoking, and high superheat, this boiler is considered fully capable of supplying all the steam needed for the most severe class of service.

The continued use of this design of locomotive on the Burlington, after thorough service tests of the locomotives built two years ago, indicates the adaptability of the 2-10-2 type for heavy freight service. With 25 per cent greater hauling capacity than a Mikado type locomotive carrying the same weight per pair of driving wheels, this type will, under favorable conditions, effect a material reduction in the cost per ton mile of moving freight.

The principal dimensions and ratios are given in the following table:

General Data

Gage	4 ft. 8½ in.
Service	Freight
Fuel	Bit. coal
Tractive power	71,500 lb.
Weight in working order	370,000 lb.
Weight on drivers	293,000 lb.
Weight on leading truck	27,900 lb.
Weight on trailing truck	49,100 lb.
Weight of engine and tender in working order	about 555,000 lb.
Wheel base, driving	20 ft. 9 in.
Wheel base, total	40 ft. 1 in.
Wheel base, engine and tender	74 ft. 9¼ in.

Ratios

Weight on drivers ÷ tractive effort	4.1
Total weight ÷ tractive effort	5.2
Tractive effort × diam. drivers ÷ total equivalent* heating surface	596.1
Total equivalent* heating surface ÷ grate area	81.8
Firebox heating surface ÷ total equivalent* heating surface, per cent.	18.8
Weight on drivers ÷ total equivalent* heating surface	40.7
Total weight ÷ total equivalent* heating surface	51.4
Volume both cylinders	26.2 cu. ft.
Total equivalent* heating surface ÷ vol. cylinders	549.8
Grate area ÷ vol. cylinders	6.7

Cylinders

Kind	Simple
Diameter and stroke	30 in. by 32 in.

Valves

Kind	Piston
Diameter	15 in.
Lead in full gear	¼ in.

Wheels

Driving, diameter over tires	60 in.
Driving, thickness of tires	4 in.
Driving journals, main, diameter and length	12 in. by 12 in.
Driving journals, others, diameter and length	11 in. by 12 in.
Engine truck wheels, diameter	33 in.
Engine truck, journals	6 in. by 10 in.
Trailing truck wheels, diameter	42½ in.
Trailing truck, journals	8 in. by 14 in.

Boiler

Style	Straight
Working pressure	175 lb.
Outside diameter of first ring	88½ in.
Firebox, length and width	132 in.
Firebox plates, thickness	Sides, back and crown—⅜ in.; tube—⅝ in.
Firebox, water space	F.—6 in.; S.—4 to 6 in.; B.—4 in.
Tubes, number and outside diameter	264—2¼ in.
Flues, number and outside diameter	45—5½ in.
Tubes, length	22 ft. 7½ in.
Heating surface, tubes and flues	4,966 sq. ft.
Heating surface, firehox†	383 sq. ft.
Heating surface, total	5,349 sq. ft.
Superheater heating surface	1,332 sq. ft.
Heating surface, total equivalent*	7,197 sq. ft.
Grate area	88 sq. ft.

Tender

Tank	Water bottom
Wheels, diameter	33 in.
Journals, diameter and length	6 in. by 11 in.
Water capacity	10,000 gal.
Coal capacity	15 tons

*Total equivalent heating surface = evaporating heating surface + 1½ times the superheating surface.
†Includes brick arch tube heating surface.

INDIAN AMBULANCE TRAIN.—Certain portions of the North Western State Railway of India were constructed almost entirely for strategic purposes, which would be much assisted by a traveling hospital. The company has therefore built an ambulance train at its Lahore shops with this end in view. The train includes a hospital car, a kitchen car, a dispensary and staff car, and a medical officers' car. Each of these cars has a 61 ft. 9 in. body, and is carried on two four-wheeled trucks. The hospital staff car, which is 64 ft. 2 in. in length over the buffers, is divided into two sections. In one section are three compartments, of which one contains berths for two hospital assistants, another contains berths for four ward servants, while a third and larger compartment has berths for two Indian N. C. O.'s and four Sepoy ward orderlies. The other section contains four compartments, having four berths each, respectively, to accommodate four dhabies, eight cooks, and four sweepers. The hospital car is also divided into two sections, each of which contains a bath and lavatory and berths for 12 sick persons. The kitchen-car is divided into British kitchen and pantry, store, Hindu and Mahommedan kitchens. In the dispensary and staff car there are berths for two British N. C. O.'s and eight men, while the other half of the car contains dispensary and office, and beds for two assistant surgeons. Accommodation is provided in the medical officers' car for two lady nurses and two medical officers, and there is also the officers' mess and accommodation for four native servants.

Annual Meeting of Superintendents' Association

Discussions on Freight Transportation, Train Rules, Personnel; and Addresses by Two Veteran Officers

The twenty-seventh annual meeting of the American Association of Railroad Superintendents was held at the Hotel Cumberland, New York City, on Thursday and Friday, August 20 and 21, with President Charles Burlingame (Wiggins Ferry Co.) in the chair. The members of the association, nearly all of whom were from places west of Buffalo, were welcomed to New York by J. C. Lincoln, traffic manager of the Merchants' Association of New York. Mr. Lincoln was formerly a railroad traffic officer, and assured the superintendents that their society would have the cordial co-operation of the New York merchants.

President Burlingame, in his opening address, exhorted the members to put their best efforts into the committee work, with a view to sending sound and well-considered conclusions to the American Railway Association. The superintendents should never fear to recommend a new thing if it has merit. This association should back up its sister associations in every reasonable way. For example, the recommendation that rubber stamps be used to stamp the name of the shipping point on every package of freight should receive the attention of all superintendents; and if it is an economical and useful idea, it should be endorsed. The local freight agents' association has recommended that a standard board be put on steel cars for carrying cards; the superintendents should be able to say whether or not this proposal merits approval. The American Railway Association, with its co-ordinate associations of subordinate officers, ought to be developed into a strong law-making body. The railroad world is so extensive and important that it should be a law unto itself; and there is much work to do.

Mr. Burlingame, in working up interest for this meeting, had written to the general managers of railroads with which association members are connected, and of 50 such letters 41 had elicited favorable replies. Superintendents who may be in doubt as to whether they are justified, in their own interest, and that of their employers, in devoting time and energy to this co-operative work may be assured by this fact that the work of the association is appreciated among the higher officers.

Mr. Burlingame had received invitations from the Central of New Jersey, the New York Central & Hudson River and the Long Island roads requesting the members to avail themselves of all facilities and to inspect features of interest. On Saturday, following the close of the convention, many members accepted these invitations.

The report of the Secretary showed a membership of 266, an increase of 121 over the number reported one year ago. The members come from 135 different roads.

At this point the association listened to an address by R. V. Taylor, vice-president and general manager of the Mobile & Ohio, on "Organization." Mr. Taylor said in part:

"If I should be called upon for my opinion as to the official most important to the success of any railroad organization, I am certain that I could with perfect truthfulness say the superintendent. His duties are of a manifold character. They have to do not only with the maintenance of the property and the movement of the traffic, by which he is brought in touch with its actual working forces, but they bring him into close relationship with the patrons of the company from which it draws its life blood. Upon his good judgment and tact depends the relationship of the corporation to the municipalities, and every part of the management must rely upon his intelligence, integrity and industry.

"The subject of organization is a great one, and I can hardly hope to express in a condensed form some of the general views founded on 37 years of active railroad experience. . . . The grand divisions pertaining to the maintenance and operation of a railroad's property, the roadway, the equipment, the transportation, the traffic, the legal, the accounting and the treasury departments are merely convenient groupings of individual factors which still retain their relationship to the whole, and are so divided only that the managing head may be enabled to quickly and fully understand the part which each unit is performing, and that he may be able to direct in the most effective way the forces at his command.

"I have been much impressed by the accounts of the hurried preparation for the great war which is now being waged beyond the sea; how as the successive grades of the reserves have been called for, each man responded by number, to find his uniform already provided and stored at a convenient central point and with the exact part he was expected to play, as well as the terrible purpose of the aggregate, grimly but clearly before him.

"In the creation of a railroad organization, the ruling purpose should always be to provide by a methodical and orderly arrangement of forces, the means by which the guiding hand may, in the most direct and effective way, reach down through each successive form of supervision to the man who actually does the work. . . . The managing man should never permit any delegation of authority on his part to destroy a direct and positive relationship between himself and each one of the individual units under his control. Napoleon Bonaparte, who was probably the greatest organizer of men the world has ever seen, prized his title of "Little Corporal," which he won upon the bridge at Lodi by leaving his position of command to fight in the ranks, more than all of the honors with which his imperial brow was crowned: and the connection he maintained with the individuals constituting his army is impressively illustrated in the picture which shows a sleeping sentry awakening to find the emperor keeping watch while he slept.

"Napoleon's best lesson, however, to any organizer of men, lies in the fact that he taught each of his soldiers to feel that he carried a marshal's baton in his knapsack. Any railroad manager who does not impress upon his men the fact that all promotions will be made from their own ranks, fails to employ the greatest power at his command to create enthusiasm and solidarity among his forces.

"In administering discipline, courage and consideration, firmness and fairness, should go hand in hand. As long as we deal with human agencies we must consider human imperfections. Weakness in the application of discipline brings the management into contempt, while extreme harshness creates a feeling of resentment scarcely less destructive to best organization.

"Esprit de corps is of the highest value. 'It implies sympathy, enthusiasm, devotion and jealous regard for the honor of the body as a whole.' It cannot, however, exist when discipline is absent. It is to the organization what the spirit is to the body; it is all-pervading and ever-present; it acts alike upon the highest and lowest; it makes the president of an organization speak with swelling pride of *his* officers and *his* men; it makes the call boy at the roundhouse couple himself and the president under the common word 'us.' . . ."

Speaking of the value of co-operation and hearty loyalty, Mr. Taylor gave examples from his own experience. Being away from home on the occasion of a great flood, he was gratified to find on returning that his subordinates had worked with great efficiency and had saved many thousands

of dollars for the company, by each doing his part in a well ordered plan. Every manager should have an organization which will work well in his absence. When the late Samuel Spencer expressed regret at the resignations of certain officers, Mr. Taylor assured him that his (Taylor's) single section of the Southern Railway system was prepared to supply the required number of officers to fill all vacancies, and, moreover, that there were understudies in the service ready to take the place of the men who might be thus promoted.

Continuing, Mr. Taylor said:

"It is popular in these days to criticize railroad management and railroad managers, and while I hold no brief for the misdoings, either large or small, which have crept into the management of some of the railroads of this country, I am certain that there never was a more courageous, honest, intelligent and industrious set of men, as a whole, engaged in any business, than those who are devoting their lives to the transportation service of this country; and whether for the purposes of peace or war, I do not believe there ever has been a more effective organization of men than that under which these great affairs are managed and controlled."

NEXT YEAR

The executive committee reported in favor of holding the meeting of the association next year at San Francisco, on Thursday and Friday of the third week in May; and this recommendation was adopted unanimously.

The nominating committee, W. L. Booth, W. J. Blizzard and J. H. Abrams, reported in favor of the re-election of all of the present officers and members of committees, and this conclusion was adopted by the association. It was based on the general feeling that the policies of the present administration ought not to be interrupted. The office of second vice-president, being vacant, was filled by the election of W. S. Williams (Illinois Central). The other officers are as follows: President, Charles Burlingame (Wiggins Ferry Company), St. Louis, Mo.; vice-president, H. R. Saunders (C. R. I. & P.), Kansas City; secretary, E. H. Harmon, St. Louis. Chairmen of committees: Transportation, E. H. Shaughnessey (C. & N. W.); Interchange Car Inspection, M. Marea (St. Louis T. & E.); Arbitration, A. E. Boughner (M. K. & T.); Train Rules, J. E. Scott (G. C. & S. F.); Executive, A. G. Smart (C. B. & Q.); Arrangements, G. J. Shreeve (Belt Ry. of Chicago).

THURSDAY AFTERNOON

The election finished the forenoon session. In the afternoon the first discussion was on the report of the committee on transportation, E. H. Shaughnessey, chairman. The report first took up the subject of marking, packing and stowing freight, and summarized what had been done by other associations. The committee recommended that the rules on this subject be rigidly enforced. The closest supervision is necessary everywhere, and yet no two roads appear to have the same instructions. A considerable number of roads have traveling inspectors to educate agents, but very few have printed instructions. A committee of the American Railway Association has formulated a code of rules, 89 in number, and the best thing that this association could do would be to devise ways of properly enforcing these rules, when promulgated. Continuing, the committee said:

"A division office should be created for the purpose of supervising the marking, packing and handling of freight and enforcing the rules in relation thereto. This officer should have authority equal to that of a trainmaster. If the business on the division does not warrant an additional officer, the duties assigned to the trainmaster or his assistants should be adjusted so that he can make this feature a part of his work without loss of efficiency along other lines. On one of the large western roads out of Chicago, just recently the trainmasters have been relieved of all routine office work so that their entire time could be given to supervision on the road, specializing in loss and damage matters; and good results have been secured, principally along educational lines. Education is the prime necessity. The loyal conductor or brakeman who would not think of violating an operating rule will through ignorance cause continual damage to freight through improper loading. This also applies to the freight house forces. The only satisfactory way to correct them is to do so on the ground by a responsible representative. Admonition suited to the disposition of the person at fault, delivered verbally, is worth countless circulars.

"Reports on over, short and damaged freight should be handled by a higher priced clerk than is generally the practice at present. It is customary on some roads to delegate this work to a clerk once removed from an office boy, whereas it should be handled by a person of good judgment who can draw logical conclusions and compile satisfactory statistics for the superintendent and for the man on the road.

"This organization should be permanent and not dependent on crop reports. . . . Good results can only be obtained by constant energetic efforts throughout the year."

This part of the report was discussed at length by Messrs. Williams (I. C.), Smart (C. B. & Q.), Cox (Atlanta & West Point) and others. The Illinois Central made a great reduction in reports of irregularities by beginning, about five months ago, to rigidly enforce the rule that consignees shall receipt for all freight immediately on delivery. Mr. Farley (A. T. & S. F.) told of the work of the inspectors on the different divisions of that road, as described in the *Railway Age Gazette*, August 7, last. On the Burlington, the investigation of losses has been so improved that now, in 70 per cent of the cases, the claim agent has his data well in hand before the claim reaches him. On the Atlanta & West Point, by the employment of a special man, at $110 a month, acting as the special traveling representative of the superintendent, information concerning losses is now promptly gathered and the work of the claim department has been almost revolutionized.

Vigorous expression was given to the idea that the superintendents' association, as soon as it becomes strong enough, should fight out with the traffic department the question of requiring more substantial packages. To accept goods in paper boxes of insufficient strength and at the same time try to move freight in trains of 100 cars each is an impossible task. The paper boxes now furnished by many shippers cannot be put in the bottom of a car, to be subsequently covered by other freight, and therefore it is impossible to load freight in station order. The weighing and inspection bureaus should be made use of in the enforcement of rules about packages and about marking, as the bureaus usually have a higher class of employees than do the roads. It pays to have enough men of the right quality to handle freight properly.

Mr. Farley thought that paper boxes of approved design caused little trouble. They are better than 75 per cent of the wooden boxes.

IDENTITY OF MEN EMPLOYED IN TRAIN AND YARD SERVICE

On this subject the committee reported additional information in connection with a paper read at the last annual meeting. In Chicago the street railways, employing large numbers of men, have photographs taken of all applicants. The same method is employed in St. Louis, Kansas City, Milwaukee and Los Angeles. A photographer contracts to make pictures of men at 7 for 15 cents or 11 for 25 cents. Photographs are attached to letters of inquiry sent out to learn about an applicant's record. In Chicago, a hundred undesirable characters were detected in two years by means of photographs. The committee believes the plan of requiring photographs of all applicants for employment would be entirely feasible and not expensive, and it would have a good moral effect from the beginning.

On this part of the report there was a long discussion in which were brought out many facts concerning difficulties dealing with "boomers" and others who apply for work in

freight yards and on freight trains when there is a rush of business, and who do not intend to remain permanently in the service. There are men who will send substitutes to the medical examiner, if this trick is not carefully guarded against, and, no doubt, the photograph safeguard would be circumvented if there were any possible way to do it. Sale of counterfeit letters of recommendation is said to be flourishing in more than one city. It was stated that in Oklahoma there is a law requiring that "service letters" given to employees shall be written on plain white paper, to be furnished by the employee himself. For reasons that can be readily understood, a rule calling for photographs would at once be objected to on the ground that the roads were preparing a "rogues' gallery."

Some members have had trouble with dishonest men applying for the position of telegrapher, and there was a demand that the photograph rule, if adopted, should be made to apply to that department as well as to the train-service department.

This part of the report contained no recommendation for any specific action and as the committee intends to continue its studies the report was referred back.

EFFICIENCY OF DIVISION ORGANIZATIONS

The secretary next read that part of the report dealing with the question of efficiency of division organizations. This consisted of mainly a strong plea for a regular assembling of the different subordinates of the division superintendent for consultation and for inspection trips. The committee described at length what was done on the Illinois Central last winter as reported in the *Railway Age Gazette*, April 17, 1914. Mr. Williams, superintendent of the Illinois Central division referred to, said that his road had adopted the plan of a special train, to run over the division, periodically, to be put in effect throughout the company's lines.

Mr. Boughner (M. K. & T.) told of the practice on his road. An inspection train is run over the road each month, carrying two cars to collect scrap; one oil car; one stationery car, and one with track supplies. Where there is not much scrap to be collected the cars are run on the local freight, but then no picking up is done. So far as the collection of scrap is concerned, the speaker thought that the use of such a train, in a business-like manner, ought soon to remove the necessity for it, but it is a great educational opportunity for each department to have a chance to check, at every station, the work in which he is interested.

On the Belt Railway of Chicago a special train is run every Monday to pick up scrap. Mr. Burlingame (St. Louis) has scrap thrown into large boxes, and a derrick car is sent out periodically to pick up these boxes and put them on platform cars. He thought that the piece-work method might be applied to this work.

This part of the report also was referred back to the committee, the chairman having been obliged to present it to the meeting without full consultation with all of the members.

In connection with the suggestion for further investigation by this committee the point was brought up by Mr Cuineen (C. N. E.) that every railroad superintendent could do a good turn, when traveling on other roads, by reporting to the superintendent of such other roads any observations which he might make, looking to the good of the service. That many irregularities flourish because the superintendent cannot have his eye on all parts of the road at all times is too well known to need mention; but in addition to this, the mere fact that the superintendent-passenger is unacquainted with the road will often make his observations instructive to the man on the ground.

INCREASED EFFICIENCY OF FREIGHT CARS

Reporting on this subject the committee presented the usual arguments in favor of pooling freight cars. Mention was made of an arrangement, said to be in effect in Peoria, under which two roads having a heavy interchange business have put on a joint crew to do all of the transferring, the expense being equally divided. Reporting on the handling of explosives, the committee recommended that the Bureau of Explosives have more lecturers and that all employees whose duties make it necessary or desirable should be required to attend the lectures. Most violations of the rules are discovered by the inspectors of the bureau, indicating that there is not sufficiently minute supervision by the officers directly in charge. Failure to remove placards from a car which has been used to carry explosives is one of the prominent causes of carelessness. The men come to have insufficient respect for the cards.

MR. UNDERWOOD ON THE QUALIFICATIONS OF THE SUPERINTENDENT

At the close of the foregoing discussion the meeting listened to a paper by F. D. Underwood, president of the Erie Railroad. Mr. Underwood began by recounting his own recollections of the time when he was an assistant superintendent and later a superintendent. Looking back he felt sure that in those days he fell far short of the essential qualifications which he was now describing and, said he, "I should like a chance on a busy superintendent's division, to prove that I could now be a better superintendent than I was then." The paper then went on to summarize the main qualifications that a good superintendent should possess, in substance as follows:

"A superintendent should not do physical acts that can be done by someone else. The bawling and hauling that we old-timers did is unwise from several points of view. A real superintendent is around, about, over and under the job; but never conspicuous. By this I do not mean 'gum shoe' methods.

"Reticence is a great quality. Hear everybody on *any subject they have a mind to exhibit* Sort out what is useful; but say nothing. A silent man commands both respect and admiration. When one has to speak, speak low. A man who is never angry is not an efficient boss; but the spur of anger (and it is a good one) should be concealed. It should be used but to stimulate the stroke, never paraded.

"There are on all sides those who bluster, plead, lie and bring pressure to move a superintendent to undo really essential things. . . . Quietly sidetrack them when you are *sure* you are right; never willingly recede from a position that is fair. Be slow to take a position that contains a probability of retreat.

In the doing of all official things be open and frank. Many of your staff and all of the rank and file think that there are tricks in the trade. Show them that there are none. There is no more transparent business than operating a railway.

"Breaking a rule, or doing something outside of the rules is many times an offense to be condoned—provided the offender has brains. His action showed him fearless and perhaps resourceful. There are the seeds of a good man in every rebel. Mentally pussy-footed men are not desirable from a 100 per cent efficiency standpoint. Even the 'argufyer' has his uses.

"In the disciplining of employees some things had better remain unseen. Seek to instil into every employee the truth that each year of his service improves and cements his relationship with the company; that the aim is to have men permanent; to have them grow old in the service. Bear in mind that permanency makes for efficiency. . . .

"A superintendent is necessarily a go-between; between the public, the company and the employees. From distant headquarters he may be directed many times to do things that when done are misfits. He should be on such terms of confidence with headquarters that his opinion would be sought in advance, and should carry weight. Or, when action is taken without his knowledge or recommendation, his suggestion should have weight as a stay.

"You cannot do better than to stick close to the proverb: 'Wisdom is the principal thing; therefore get wisdom.' I sometimes think all cautionary signs should come down

and have painted in their place 'Wisdom.' Figuratively, it should be the last and the first word in every rule. . . ."

FRIDAY

The first business on Friday was a discussion of the report on train rules. Numerous proposed changes in the standard code have been under discussion for more than a year past by a committee of members of this association and of the Train Despatchers' Association. A report was made at the annual meeting one year ago; and the same subject was discussed by the train despatchers at their last annual meeting at Jacksonville, Fla. Considerable work has been done by the committee since then, and the present discussion was to explain the details of this work for the members of the superintendents' association. The report was in the nature of a progress report, as the proposed changes were not of such a nature as to be susceptible of discussion by the association in a general meeting, and no formal recommendation was presented by the committee.

The subject was presented by J. E. Scott (G. C. & S. F.), chairman of the train despatchers' committee. Mr. Scott presented cogent arguments in favor of certain changes designed to facilitate the movement of trains under circumstances where the conductor and engineman have to act without consultation with the despatcher, and pointed out certain features of the rules applicable to double-track operation which could be made applicable also to single-track. He also spoke in favor of the proposal to use green signals on the last train of a number of trains running on the same schedule, instead of using that signal on all the trains except the last. The discussion of the report of the committee also brought out an interesting discussion on the proposal to modify rule 93 so as to allow passenger extra trains to run through yards without reducing speed. The present rule is not interpreted alike by all railroad officers.

The discussion on train rules was followed by a short paper by E. H. De Groot (C. & E. I.) on "The superintendent, past, present and future." Mr. De Groot gave an interesting description of the old-time superintendent, the benevolent autocrat who accomplished great things with small resources. For the superintendent of today he recommended assiduous study, and he named a number of useful books which the railroad officer ought to read. His ideal for the future, while lofty in conception, called only for those qualifications which the ambitious and high principled superintendent can acquire by taking advantage of facilities for learning which are everywhere available.

The committee on interchange car inspection, M. Marea, chairman, presented a report recommending that the doors of freight cars be lettered, C on one side and D on the other, so as to facilitate the securing of accurate seal records. The proper identification of doors also would facilitate checking of bills for doors which are lost. Sometimes a number of bills are made for a single loss.

The committee favors a change in A. R. A. rule 15. Delivering lines should not be charged for transferring a carload of freight unless the car from which the goods are taken is delivered with a combination of defects as set forth in the M. C. B. rules. The committee declares that A. R. A. rule 15 should be printed in the code of the Master Car Builders' Association.

The committee discusses the standardization of side doors on box and refrigerator cars in the interest of greater safety and better economy. It also recommends that all end doors be made near the top of the car and be made to close and fasten on the inside. With doors thus arranged the danger and inconvenience incident to securing seal records of end doors would eventually be done away with.

This report was not discussed at great length, and it was finally referred back to the committee for further consideration. One of the members made a dissenting report, objecting to the recommendation concerning the lettering of side doors and also concerning a change in rule 15. On motion of J. M. Walsh (I. C.) it was voted that the recommendation concerning side doors be referred to the American Railway Association for its information.

Mr. Walsh next moved that all end doors be declared unnecessary, with a view to having them done away with. This led to considerable discussion. A strong argument in favor of abolishing end doors is found in the fact that many unlocated losses are due to thefts at end doors. It was said, however, that if there are no cars with end doors shippers will cut openings for themselves. Mr. Walsh declared that this would be better than having the large number of cars with end doors which we now have; it would be cheaper to repair the damage done by the shippers. A claim was made that long pieces of freight are delayed at large freight houses waiting for cars with end doors; but on the other hand, certain members testified that in their experience this inconvenience had not been of serious moment. It was observed that locking the doors on the inside would not clear up all of the difficulties, for consignees frequently would force open a door with an iron bar. Again, the absence of a lock on the outside would not make the seal taker's record unnecessary, for he should look to see if the door had been tampered with.

MASTER BLACKSMITHS' CONVENTION

The twenty-second annual convention of the International Railroad Master Blacksmiths' Association was held in the Hotel Wisconsin at Milwaukee, Wis., August 18-20, as mentioned in the *Railway Age Gazette* of August 21, on page 361.

President H. E. Gamble, in his address, laid particular stress on the vastly important part the master blacksmiths play in the "safety first" propaganda. The master smith must not only make the conditions in his shop safe, but he should also see that all work passing through his shop is capable of passing the most severe inspection. The work of the blacksmith makes possible the building and operating of railroads, and every means should be taken to perform the work in a safe and efficient manner. No work that is at all questionable should be allowed to pass out of the blacksmith shop or its jurisdiction. A special smith is employed on the Pennsylvania Railroad to take care of tools and keep them in a good, safe condition, thereby protecting the workmen. By doing this the responsibility is placed on one man and better all-around results are obtained. The members were exhorted to enter freely into the discussion and give their ideas on the various subjects presented for the good of the association and the railroads represented by the members in attendance.

ADDRESS BY A. E. MANCHESTER

A. E. Manchester, superintendent of motive power, Chicago, Milwaukee & St. Paul, addressed the convention in part as follows:

Your association is one of those that has helped, by better methods and management, to make up for some of the losses in the earnings due to increased taxes and higher rates for material and wages, railroading standing almost alone among the industries as the one that has steadily and constantly reduced the rates on the thing it had for sale, namely transportation, and at the same time has to a large extent improved its quality. But the unfortunate feature of this all is that the public, the purchasers and users of this commodity, fail to appreciate the fact that they are receiving the best and cheapest transportation in the world, and it ought to be one of the aims and efforts of every association to work for the bettering of the methods of railroad building, maintenance, and operation, and to let their lights so shine that wherever an opportunity affords they will bring forth these thoughts in a form that will help to bring a better understanding of true conditions to the minds of the general public.

To illustrate, the railroad with which I am associated has, since the year 1875, reduced its average rate of transportation from 2.5 cents per ton per mile to a rate of 0.79 cents per ton per mile for the year which closed June 30, 1913. You will see from this that the road now receives an amount equal to one-third for the unit of service as compared with 1875.

Can you think of any other commodity that is today sold at any such a depreciated rate? When these matters are referred to, the answer will probably be that your railroad is vastly over-capitalized, and that you are looking for a return on a fictitious capital, but these statements are made without a true knowledge of the facts. As to the rate received for transportation, a year ago the average rate for all the railroads in the United States was 0.75 cents per ton per mile for moving freight. In England they received 2.5 cents, in Germany 1.44 cents, and in France 1.39 cents. If the rates received in the United States were equal to those paid in the European countries, the railroads here could readily meet almost any demand that might be made upon them so far as taxation, rates of pay, etc., went and still pay a reasonable dividend on the investment in the property.

I recall a few years ago attending a political meeting, in which the speaker was trying to show what great things his party had done for the good of the people of Wisconsin. He said, "We are building in Madison a new capitol building; it will be one of the finest in the United States, and will cost about $6,000,000 to build. You will not have to pay one penny of the cost of erecting that building; it will all be taken out of the railroads." And the people cheered; that was a great hit. The party was getting something for nothing and they were to get the benefits. It is such a feeling and spirit as this that has got to be corrected and better understood before railroads will have a fair chance to maintain or improve their conditions.

FROGS AND CROSSINGS

W. F. Stanton, of the J. A. Fay & Egan Company, stated that railroads using manganese for the points in frogs and crossings realize that the work will not give the maximum service unless the bolts will prevent the moving or racking of the parts. In order to overcome the stretching and breaking of ordinary bolts, one road has resorted to heat-treating them, requiring the following physical characteristics of the metal: Tensile strength, 100,000 lb. per sq. in.; elastic limit, 75,000 lb. per sq. in.; elongation in 2 in., 15 per cent; reduction in area, 40 per cent. These bolts are hardened and tempered and have given very good results. In the discussion it was mentioned that the Oregon Short Line sends out a crew with a couple of cars fitted up to repair frogs and crossings on the line, such as putting in new rivets, bolts, etc. This has been found to be very satisfactory.

CARBON AND HIGH-SPEED STEEL

George F. Hinkens (Westinghouse Air Brake Company) spoke of the necessity for the tool smith to know definitely just the process to use in tempering each different kind of steel. All the different alloy steels, tungsten, chromium, vanadium, etc., will require different treatment, which can be best obtained by experimenting, as they will all require special processes. The furnace used for hardening high-speed steel should be so constructed that the oxygen of the air from the blast and fuel openings will not attack the metal. A furnace within heated from a furnace without would be ideal. Special care must be taken in not working high-speed steel at too low a heat.

H. A. Hatfield (Canadian Car & Foundry Company) believed that when ordering steel much better results will be obtained by giving full information as to what it is to be used for rather than by ordering by specification. In this way there can be no misunderstanding of what grade of steel is required, and the manufacturer will be in a better position to furnish it. After the steel has been received each tool made from each specific kind should be marked and the hardness noted so as to guide the tool smith in performing his work. The hardness testing machine is of particular value in establishing standard tools and its constant use is advisable for this end. The location of the hardening plant should be given careful consideration and should be far enough away from heavy machinery to prevent vibration of the temperature recording instruments. A direct vision spectroscope has been found advantageous in this work.

TOOLS AND FORMERS

H. G. Sharpley (Lima Locomotive Corporation) spoke of the importance of equipping smith shops with modern smith shop machines where the amount of work warrants their installation. Where these machines are installed it is the duty of the smith shop foreman to devise suitable tools and formers to be used in them so that they may be used to their greatest efficiency. There is no question that in many shops the cost of production could be materially decreased by the use of satisfactory machines and special formers.

Other papers were presented illustrating various types of formers that have been used on forging machines, that materially reduced the cost of production.

DROP FORGING

F. F. Hoeffle (Louisville & Nashville) spoke of the good work that may be accomplished by the use of drop forging machines. However, he mentioned that in many cases where the quantity of work did not permit of buying one of these machines, very good results could be obtained with drop forging dies under the steam hammer. For small jobs and those not requiring very accurate finish he has had very good success with cast iron dies. It was pointed out in the discussion, however, that these dies would not give entire satisfaction and steel dies would give much better service. Some members stated that they were forced to use cast iron dies in order to get any dies at all as they experienced considerable difficulty in getting the machine shop to provide the dies required. Scrap axles were recommended for making dies, but .50 to .60 per cent carbon steel was believed to give the best result. The main point in making dies for drop forging machines is to so design them that the metal will flow freely. In this respect, it was stated that where forgings of irregular shape are made the heavy offset should be made in the upper die, as the metal would flow much easier into that die than the bottom die.

SPRING-MAKING AND REPAIRING

F. F. Hoeffle (Louisville & Nashville) laid particular stress on the importance of obtaining the proper grade and kind of steel for springs, and in tempering, the amount of carbon contained in the steel must be considered. Springs should be set so that when they bear the greatest load they will carry it in an almost straight position. The life of springs depends a great deal upon the roadbed, flat wheels, low rail joints, design of spring rigging, etc. The spring leaves should be of equal thickness so that the load will be distributed proportionately on all plates. Other members pointed out that it is an excellent plan to punch the date when a spring is placed in service on the band so that an accurate record may be kept of their mileage. Vanadium steel has been used by a few of the members with great success, but it was pointed out that when tempering, a pyrometer should be used so that the temperature may be accurately regulated.

John Carruthers (Duluth, Missabe & Northern) gave the following process for tempering vanadium steel springs: The springs are first heated to a temperature of 1,700 deg. F. and set to shape, then cooled in oil. They are again heated to 1,650 deg. F., cooled in oil and then drawn in a tin bath to 1,000 deg. F. The tin bath is used instead of lead as it has been found vanadium steel will float in a lead bath. Pyrometers are used for all operations. The carbon steel springs are heated to 1,600 deg. F., and tempered in a 750-deg. F. bath. He has also found that by heat-treating old springs that have lost their elasticity they can be reclaimed and used very satisfactorily.

Other members stated that they eliminated the first quenching of the vanadium steel springs, as mentioned by Mr. Carruthers.

T. E. Williams (Chicago & North Western) stated that all the springs are made for the system at the Chicago shops, where they are tested for deflection and permanent set. The aim on that road is to keep all springs standard and standard spring hangers are used on all of the power. The North Western uses carbon steel for springs.

FRAME-MAKING

George Hutton (New York Central & Hudson River) stated that by means of the electric welding and oxy-acetylene processes it was now possible to make almost any frame weld without taking the frame from the engine. During the past eight months on the New York Central no frames have been removed from engines on account of breakage and only three have been removed in two years, all the frame welding being done by electricity. He also stated that he believed much less frame breakage would occur if all frames were properly heat-treated as well as annealed.

Many of the members contended that the best way, where possible, to weld a frame is at the forge, but granted that oftentimes it is not expedient to remove the frame from the engine, and in this case careful judgment must be used in making the weld. Considerable success has been obtained with both oil welds and thermit welds, and mention was made that there are many frame breaks that can be better welded with thermit than with oil. All frames should be annealed after welding, leaving the furnaces on until the frame has become cool.

J. M. Poland (Richmond, Fredericksburg & Potomac) said that out of 65 frames welded by electricity only one has broken, and that was on account of being made too close to a thermit weld. He has not found it possible to make a satisfactory electric weld next to thermit metal. On that road two men weld the frame at the same time, one on each side. The frame is heated before starting and the welding is done as quickly as possible to avoid too much expansion. Among the causes mentioned for frame breakages are ill-fitting pedestal caps and the improper alinement of turntables. Oftentimes it has been found that an engine will drop three inches in running on to a turntable. It was also believed that the practice of applying braces to frames rather than welding them at once is a bad practice, as it will cause the frame to break in other places.

HEAT TREATMENT OF STEEL

John F. Keiler (Purdue University), chairman of the committee, submitted the practice recommended by the American Society for Testing Materials for annealing miscellaneous rolled and forged steel objects.

H. E. Gamble (Pennsylvania Railroad) described the plant for heat-treating the reciprocating parts of locomotives at the Juniata shops of that road. This company heat-treats the main rods, side rods, axles, crank pins, piston rods and valve motion parts, as well as a varied line of miscellaneous work. Their method of treating carbon steel axles is as follows: The axles are heated in vertical furnaces eight hours after the furnace assumes a constant temperature of 1,550 deg. F. and are quenched in water of 70 deg. F. for eight minutes. They are again reheated in a horizontal furnace for eight hours, after it has assumed a constant temperature of from 1,100 to 1,200 deg. F., and cooled in air, being placed on rails in a pyramid so that they will cool slowly. A physical test is made on all heat-treated parts. The sample is taken with a hollow drill which cuts the core 7/8 in. in diameter and 6 in. long. The axles, if they pass the physical test, are put through a drop test. The following are the physical characteristics required: 50,000 lb. per sq. in. elastic limit; 80,000 lb. per sq. in. ultimate strength; 20 per cent elongation; 40 per cent reduction in area. The chrome-vanadium axles are heated to 1,650 deg. F., then quenched in water at 70 deg. F., reheated to about 1,200 deg. F., and cooled in air. The physical tests require an elastic limit of 85,000 lb. per sq. in., and an ultimate tensile strength of 120,000 lb. per sq. in., with 20 per cent elongation and 50 per cent reduction in area. Mayari axles are heated to 1,500 deg. F., quenched in water at 70 deg., and reheated to 1,055 deg. F., and allowed to cool in air. The physical tests require a 70,000 lb. per sq. in. elastic limit, a 100,000 lb. per sq. in. ultimate tensile strength, with 20 per cent elongation and 50 per cent reduction in area. In connection with their heat-treating work, the steels are chemically analyzed in a laboratory and the physical tests are made on a 100,000-lb. tensile machine. He strongly recommended pyrometers in handling the work.

OTHER BUSINESS

Among other papers presented at the convention were a number of shop kinks with drawings describing them. Thomas F. Keane (Ramapo Iron Works) read a paper on electric welding, in which he described different systems. T. E. Williams (Chicago & North Western) presented a similar paper on oxy-acetylene welding and cutting processes.

The following officers were elected: President, T. F. Buckley, Delaware, Lackawanna & Western; first vice-president, T. E. Williams, Chicago & North Western; second vice-president, W. B. Scofield, Illinois Central; secretary-treasurer, A. L. Woodworth, Cincinnati, Hamilton & Dayton, and assistant secretary-treasurer, George P. White, Missouri, Kansas & Texas.

Philadelphia, Pa., received the highest number of votes for the next place of meeting. The members of the association were invited to visit the shops of the Chicago, Milwaukee & St. Paul and the Allis-Chalmers Manufacturing Company while they were in Milwaukee.

NEW SHOP BUILDING CONSTRUCTION ON SUNSET LINES

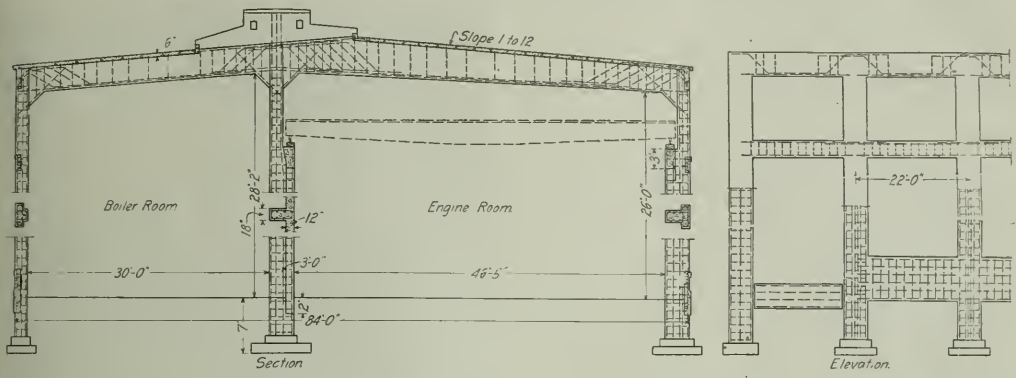
The Sunset-Central Lines have recently completed several shop buildings at Houston which are of somewhat unusual construction. When building shop structures or other buildings, where it is necessary to avoid columns and where panel openings

Powerhouse After Completion Showing Temporary End Construction Arranged for Ready Removal When Necessary to Extend the Building

over 25 ft. are required, the general practice has been to use I-beams, girders or trusses. However, the Houston buildings are entirely of reinforced concrete, including the long roof girders and the runway girders supporting the heavy 150-ton bridge cranes.

It was at first feared that the use of concrete would create the effect of clumsy members in the column and girder construction, but it was found that these worked out with very satisfactory proportions.

The principal buildings erected are the boiler shop, the power house and the combination machine and locomotive erecting shop. So far as is known, the roof spans are the longest that

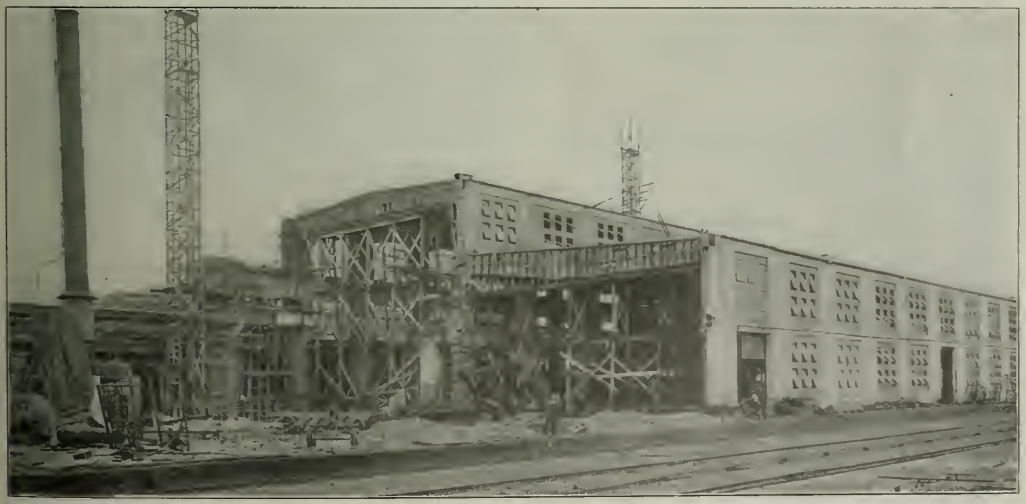


Section and Elevation of Power House Showing Concrete Construction

have been attempted in shop building work. All of the buildings shown were built without expansion joints, and as they have gone through both extremes of temperature without developing cracks anywhere, it is evident that the expansion has been well taken care of by the reinforcing steel in the concrete.

The entire building load is carried by the column foundations which are of the slab type. It was feared unequal settlement might occur if the cranes were permitted to lie at isolated points over night or when not in motion. To overcome this, the area of the footings was increased to reduce the soil value under the footings with the heaviest crane load added to what was thought would not cause indenture of the soil. The dead load unit pressure was then determined and all footings designed for the reduced dead load only, the live loads being disregarded. Investigation was also made to determine the bending stresses in the columns due to eccentric loads resulting from the crane supports, but it was found that this effect was not serious from any possible condition of loading.

One of the most difficult things to contend with was the fact that the buildings had to be erected over the site of existing buildings, that shop operations could not be interrupted and that interference must be as little as possible. A number of machines occupied spaces of the new columns and one of the old walls had to be replaced by the new. Shafting had to be temporarily supported and as the footings covered large areas, they were mostly put in at night and on Sundays. Vertical supports for slab and girder centering were made into towers, and trussed upper supporting members had to be provided. The roof is much higher than in the old buildings and holes were cut through the old to pass the vertical supports and column centering through, the old roof being left practically intact for the protection of the men and machines against rain and falling building material. Notwithstanding hundreds of mechanics were working underneath the building operations all during their construction, not a single personal injury resulted from falling material.



Machine and Erecting Shop Showing Nine Bays Completed and the Old Shop Cleared Away to Make Room for the New Construction

Owing to the crowded condition of the building site, due to the

immense amount of timber required for centering and the necessity of leaving space for shop materials adjacent to the work, the concrete materials had to be prepared under great difficulty and handled by towers and chutes quite a distance, much of it being handled through two tower lifts. Yet with all these disadvantages, very low unit cost figures were secured. The shops were built in sections of three and four panels at a time, and as fast as the centering could safely be removed the completed sections were put into service.

To economize in the false work and centering, panel lengths of all buildings were made uniform, and as far as possible the members in various buildings were made of the same or similar dimensions to permit using the centering oftener. In this way some of the centering was used as often as six times, and while not as smooth appearing concrete was possible with the last work done, it was successful as to appearance throughout and the cost of centering was reduced to a minimum. Crude oil was applied to the centering, and no trouble was experienced in the removal of forms.

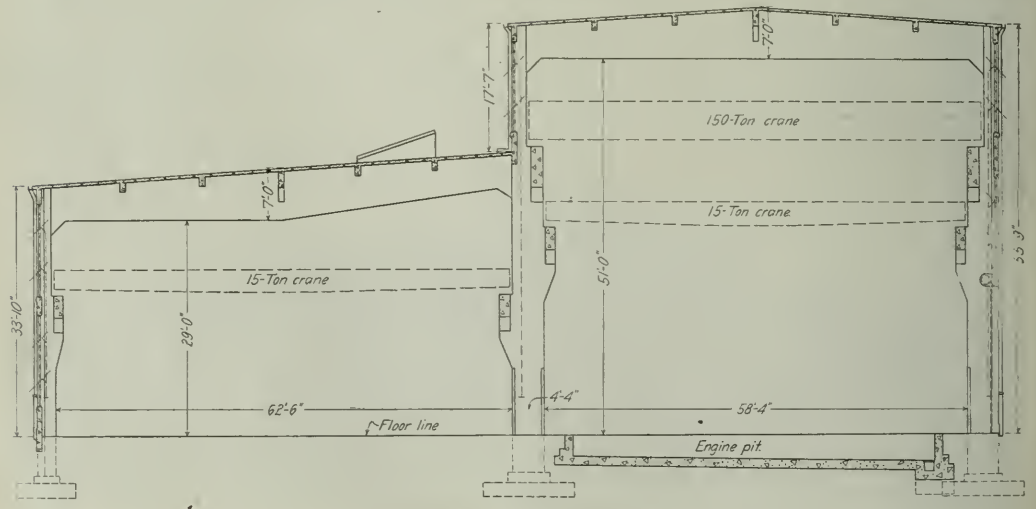
All lighting wires were run in metal conduits embedded in the concrete work and to prevent mutilation of concrete members for the purpose of bolting pipe and other fixtures after the completion of the buildings which could not be anticipated by the motive power department, plate shapes were provided at intervals on the walls, columns and girders during the process of pouring the concrete. These were anchored into the concrete flush with the finish, and of such thickness as to permit tap bolting.

Only preliminary and general plans had been completed when information was received that the funds had been appropriated for the work and the officers were asked how quickly actual construction could be gotten under way. As all computations had been completed and foundation investigations had been made, it was only a question of how quickly concrete material and reinforcing steel could be assembled. It was found that the reinforcing rods for foundation work could be secured from stock and that cement, sand and gravel were immediately available. Hence actual construction work was under way within two weeks after instructions were received to proceed. As the foundation and preliminary work necessarily consumed considerable time, ample opportunity for detailing of the superstructure was allowed.

Had the buildings been made of structural steel, it was estimated that six months' time would have been consumed in designing and getting sufficient material on the ground to begin work. It is believed that concrete is a more suitable material for buildings exposed to the fumes of locomotive smoke than structural steel and because of the difficulty of protecting steel and the cost of this maintenance charge. Also in addition to being the more permanent, concrete is more fireproof, and for these reasons much of the recent construction work on this road has been of concrete, including a roundhouse, small machine shop and an oil house at Beaumont.

Interior View of Boiler Shop Showing the Completed Building and Machinery and Fixtures Being Moved In

What is considered a very cheap warehouse building was built about four years ago at Galveston, on the property of the Southern Pacific Terminal Company. This structure is 1,000 ft. long, and is entirely of reinforced concrete. It is divided into four compartments, and otherwise satisfies conditions imposed by the underwriters, and was built at a cost slightly less than $1 per sq. ft. of floor area. Although occupying a site which was dredge filled with quicksand from Galveston bay, this building is supported entirely on floating foundations.



Section of Machine and Erecting Shop

The machine and erecting shop consists of 14 panels each 22 ft. long, with a total length of 312 ft. over all. In cross section

and arrangement, the building is of the type generally followed for this kind of shop. The erecting wing is 51 ft. high from the engine pit rail to the underside of the main roof girder and permits of the movement of the heaviest locomotive from the entrance track to position in any stall in the building by means of a 150-ton capacity Niles bridge crane. The roof girder span is 67 ft. long over all, or 65 ft. between centers of supports. A 15-ton Niles crane is also provided which travels below the 150-ton crane for use in handling parts of locomotives. This also clears the tops of locomotives standing under repair. In the machine room section, there is another 15-ton crane. The machine room is the same width as the erecting room, but is only 29 ft. high to the underside of the roof girders.

The runway rails for cranes are all carried on reinforced concrete girders; the one for the 150-ton crane which has a dead weight of 205,000 lb. has a direct support on the columns, while the smaller cranes have supports for runway girders bracketed beyond face of the columns which construction was followed to hold down the size of the columns.

The boiler shop is 120 ft. wide by 314 ft. long outside and is divided into two longitudinal bays 56 ft. 2 in., and 53 ft.

Interior View of Machine and Erecting Shop Showing the Building Practically Completed

in the clear between columns. One bay is served with a 15-ton, and the other with a 50-ton crane. There are 14 transverse bays, 22 ft. center to center, opposite the corresponding bays of the machine and erecting shop with tracks running through between the two buildings.

The oil house is 35 ft. wide by 72 ft. 6 in. long, with a basement the full size of the building for receiving the oil storage tanks. There are five 8,000-gal., two 1,000-gal., and two 480-gal. tanks in the basement, and one 8,000-gal. and two 2,000-gal. tanks buried outside of the building for storing gasolene and distillate. All of the tanks are connected to self-registering pumps, located in a convenient position in the oil house.

The power house is 84 ft. wide by 90 ft. long outside, having a boiler room 32 ft. 6 in. wide inside. It is of sectional construction, provided with a temporary end construction so that additional sections may be annexed when required. The boiler room is proportioned to suit the type of boilers installed, but is unlike other modern boiler rooms, in that it is not arranged with coal bins and ash pits; as crude oil fuel is used exclusively by both for road and stationary service and its supply seems so extensive that the use of coal is not contemplated. The stack, which is also of reinforced concrete construction, is 6 ft. 6 in. in diameter and 125 ft. high. Under average conditions in coal plants this would mean a stack capacity of about 800 h. p., but serving as it does, the crude oil furnaces of the boilers, the capacity is easily 1,400 h. p.

One interesting feature in the erection of the boilers and power house machinery was the pipe work. Detail drawings of all steam, water and air piping were prepared and the pipes and fittings were ordered from a Chicago manufacturer completely bent and fitted for erection. The placing of boilers and machinery and the cutting and bending of pipes by the manufacturer were accomplished so accurately, in accordance with the design, that it was necessary to cut only one length of straight pipe in the assembly of the complete equipment.

TRAIN ACCIDENTS IN JULY[1]

Following is a list of the most notable train accidents that occurred on railways of the United States in the month of July, 1914:

Collisions.

Date.	Road.	Place.	Kind of Accident.	Kind of train.	Kil'd.	Inj'd.
3.	Southern	Roysters, S. C.	rc.	P. & F.	1	6
3.	G. S. & Florida	Tamworth.	bc.	P. & P.	0	35

Derailments.

Date.	Road.	Place.	Cause of Derailm't.	Kind of train.	Kil'd.	Inj'd.
7.	Central Vermont	Sheldon Spgs.	washout	P.	0	9
11.	Chicago, M. & St. P.	Tacoma.	fire	F.	3	13
22.	Mobile & Ohio	Artesia	unk.	F.	3	0
26.	Galv. H. & S. A.	Spofford.	fire	P.	0	1
27.	Cin. N. O. & T. P.	Rockwood.	acc. obst.	P.	1	4
29.	Central N. E.	Holmes, N. Y.	d. eq.	F.	1	2

The collision at Roysters, S. C., on the 3rd of July resulted in the death of the engineman of the passenger train. Passenger No. 114 ran into engine No. 701. Three passengers and five trainmen were slightly injured. The collision was due to the negligence of the man in charge of the light engine, which was on the main track without right.

The trains in collision at Tamworth, near Macon, Ga., on the third were northbound passenger No. 2, second section, and southbound passenger No. 7 of the Macon & Birmingham. The trains met on a trestle 30 ft. high, but neither train was running very fast and the engines, though badly damaged, were not thrown off the track, except the front wheels. A carload of beer on the southbound train next to the engine was wrecked. About 30 passengers were injured, but all of the injuries except six were slight. Five trainmen were injured. The collision was due to the negligence of the men in charge of the southbound train, who miscalculated time and encroached on the time of the northbound.

The train derailed near Sheldon Springs, Vt., on the evening of the 7th, was a southbound passenger. The fireman was badly scalded and seven passengers, one mail clerk and two trainmen were injured. The derailment was due to a heavy rain storm which washed out the roadbed.

The train derailed at Tacoma, Wash., on the night of the 11th, was a switching freight, and the cause of the derailment was the distortion of the rails of the track by the heat of a fire in a lumber mill. The switching crew risked their engine and their lives in running a gauntlet of flame to save some loaded lumber cars in the mill yards from a fire that was rapidly burning up two large mills; but the engine ran off the track in the midst of the flames; and of the 17 men on it 3 were killed and 13 injured.

The train derailed near Artesia, Miss., on the night of July 22, was a northbound freight, and twelve freight cars broke through

[1]Abbreviations and marks used in Accident List:
rc, Rear collision——bc, Butting collision——xc, Other collisions——b, Broken——d, Defective——unf, Unforeseen obstruction——unx, Unexplained——derail, Open derailing switch——ms, Misplaced switch——acc. obst., Accidental obstruction——malice, Malicious obstruction of track, etc.——boiler, Explosion of locomotive on road——fire, Cars burned while running——P. or Pass., Passenger train——F. or Ft., Freight train (including empty engines, work trains, etc.)——Asterisk, Wreck wholly or partly destroyed by fire——Dagger, One or more passengers killed.

a trestle bridge and were wrecked. Three trespassers riding in a box car were killed. The cause of the derailment was not discovered.

The train derailed near Spofford, Tex., on the 26th, was a westbound through passenger. The engine and first car fell through a bridge which had been weakened by a fire. The engineman was seriously injured.

The train derailed at Rockwood, Tenn., on the 27th, was southbound passenger No. 1. The engine struck a hay-baling machine on a highway crossing and was ditched; and the engine and first three cars were overturned. The baggageman was killed and two passengers and the two men on the engine were injured.

The train derailed at Holmes, N. Y., on the 29th, consisted only of a locomotive, which was running backward. It was overturned. The fireman was fatally scalded and the engineman and flagman were badly injured. The cause of the derailment was the breaking of a pin, disarranging a brake beam of the tender.

Electric Car Accidents.—Of the half dozen serious accidents to electric cars reported as occurring in the United States in July, three were attended with fatal results. Elyria, Ohio, 7th, collision with work train; nine persons injured, one of them fatally. Norfolk, Va., 17th, electric cars ran into side of freight train; four killed, many injured. Westport, Conn., 23rd, collision, four killed, many injured. Collisions at Lynn, Mass., and Faribault, Minn., injured a score each.

A LOOK AHEAD

The New York Evening Post, over a hundred years old, gives variety to its miscellany by reprinting from day to day items which appeared in its columns in the year 1814. In like manner we give below some extracts from the columns of the *Railway Age Gazette* of 1919. They are in the shape of letters stolen from the files of a railway general manager:

State of Busybodies.
Railway Regulation Commission,
Mephistophelia, Bb., January 21, 1919.

General Managers,
All Railroads under Jurisdiction of State of Busybodies.

Gentlemen: I would respectfully call your attention to the following legislation which has been enacted by the Commission, which is retro-active, being made effective January 1, 1918. I also desire to inform you that it will be the duty of the Commission to exact the fullest penalty of the law for the violations of this Statute which have already been committed by your Company.

"Be it enacted, This the 1st day of January, A. D. 1919, by the Railway Regulation Commission of the State of Busybodies, in conference assembled,

"Whereas, Certain devout and well meaning busybodies have in good faith represented that certain railways are wantonly abusing and otherwise tampering with God's pure air by compressing, storing and otherwise manipulating such air in the compressors, reservoirs, cylinders and pipes of air brake systems—

"Wherefore be it enacted, That on and after the 1st day of January, 1918, all railways subject to the jurisdiction of this State shall discontinue the use of all and every brake systems involving the use of air in a compressed, confined, rarefied or otherwise unnatural form, and shall equip all engines, cars and trains with the 'No-Slip Patent Automatic Shoestring Brake' recently patented by the Chairman of this Commission.

"Wherefore he it further enacted, That the penalty for the violation of this Statute shall be $1,000 for each and every day on which each and every car not conforming to this statute shall be operated. Such penalty to be collected for and in the name of the Retrogressive Campaign Fund of the State of Busybodies."

I am, gentlemen, your very obedient servant,

X. Brown,
Chairman.

State of Busybodies.
Department of Public Health,
Mephistophelia, Bb., January 20, 1919.

General Manager,
O. & D. T. RR.; Darktown, Bb.

Dear Sir: It having been represented to this Department that the explosion of certain of the torpedoes in use upon your railroad produces certain vapors said to be deleterious to the cultivation of Jamaican Radishes, I would therefore request that within ten days you will furnish me with complete information upon the following subjects:

(1.) What type of torpedoes do you use? (Give detailed chemical analysis and photograph of each.)
(2.) How many torpedoes do you furnish to each flagman? (Differentiate between passenger, freight and work.)
(3.) How many flagmen do you employ? (Differentiate between passenger, freight and work.)
(4.) How many flagmen do you estimate you will employ ten years hence?
(5.) Have you any age limit for flagmen? (State if minors are employed.)
(6.) Are flagmen instructed in train rules before being appointed? (Make special reference to any rules regarding the use of torpedoes.)
(7.) Have any tests been made of exploding torpedoes close to the nose, in order to detect any gases which may emanate from them?
(8.) Have you any laboratory for the chemical determination of gases? (If so, give photograph of same and also of chemist and his assistants.)
(9.) Have you studied the culture of Jamaican Radishes and the probable effects upon same which might result from the continued operation of your railroad?

Your replies should be as complete and as concise as possible as it will probably be necessary to introduce several measures before the forthcoming session of the legislature upon this subject.

Yours respectfully,

Y. Jones,
Chief Surgeon.

State of Busybodies.
Railway Regulation Commission,
Mephistophelia, Bb., January 21, 1919.

General Manager,
O. & D. T. RR.; Darktown, Bb.

Dear Sir: I shall esteem it a favor if you will kindly forward me transportation for myself, wife and seven friends who will travel as servants, from this city to Utopia and return, good for ninety days.

You are of course aware that the laws of this State prohibit the issuance of any free transportation whatsoever, and it will therefore be necessary for you to send me regular tickets, crediting the tariff charges for same to passenger revenue in order that operating revenues may duly reflect the value of such tickets. The expense should be disposed of through your operating expense accounts under General Expenses Account "Relief Department Expenses."

It might be well to have this transportation forwarded before the vote is taken in the recently introduced measure to limit the salaries of railway officials, but this, of course, is purely a matter of suggestion.

I am, dear sir, yours very truly,

A. Grafter.

State of Busybodies.
Office of the Attorney General,
Mephistophelia, Bb., January 19, 1919.

General Manager,
O. & D. T. RR.; Darktown, Bb.

Dear Sir: Complaint has been filed in my office by Mr. D. Foole of this city, in which the following serious allegations are made against your Company, to wit:

> That on the nineteenth day of December, A. D. nineteen eighteen the Oppressed & Downtrodden Railroad did sell to the said Mr. D. Foole for the sum of two and one-quarter cents United States currency, at its duly and legally appointed ticket office in the township of Desert, a certain and sundry passenger ticket to be used for travel by the said Mr. D. Foole or his assigns from Desert to Drearyville. And that upon the back of said passenger ticket, embodied in the regulations for the use thereof, the word "the" appeared misprinted "The," thereby causing complainant much mental annoyance and perturbation.

Section 641 of the Act to Regulate Railroad Corporations, 1917, provides as follows: "Railways shall be held responsible for the safety and comfort of passengers whilst on their trains, stations or other property, and any railroad company causing unnecessary annoyance to any passenger or passengers shall be guilty of misdemeanor."

It would therefore seem clear that your Company acted illegally in this matter, and before taking such steps as may seem proper to enforce the above-quoted statute I am writing you as a mere matter of form to enquire whether you wish to enter any defense, although you will of course be aware that such could only result in increasing the costs to be assessed against your Company.

I am, dear sir, your obedient servant,

Z. Smith.

The South Manchuria Railway's New Hotel.—The South Manchuria has recently opened to the public its new Tamato Hotel at Dalny. The hotel, which is said to be one of the finest in the Far East, was built by the railway at a cost of $480,000. It is four stories high and has 88 rooms, 53 of which are with bath. It is doubtful, however, if the hotel will pay for some years.

General News Department

The Canadian Northern has opened its passenger line between Toronto and Ottawa and has made a contract for the use of tracks in the Grand Trunk station in Ottawa.

The Western Maryland, in connection with the Pittsburgh & Lake Erie and the Lake Shore & Michigan Southern, has put on a through mail car to run between Baltimore and Chicago. The passenger traffic over this line is increasing.

The Delaware & Hudson has increased the pay of the 1,500 employees in the company's shop at Watervliet, N. Y., by from 1 cent to 4 cents an hour. All men who have received less than 32 cents an hour will receive an increase of 1½ cents.

The Nashville, Chattanooga & St. Louis has given annual passes, good throughout the lines of the company, to all train despatchers, agents, operators, enginemen, firemen, conductors, yardmasters, shop and roadway foremen, brakemen and clerks, who have been continuously in the service for fifteen years. Fully 1,000 men will receive this favor.

The House committee on interstate and foreign commerce reported to the House on Tuesday of this week the Stevens bill, conferring on the Interstate Commerce Commission extensive powers of regulation and investigation concerning block signals, steel cars, high power headlights, and, in general, all matters affecting safety. Mr. Stevens' bill, as introduced, May 27, was summarized in the *Railway Age Gazette*, June 12, page 1342.

The Railway Business Association calls attention to the fact that a million-dollar error was made in transmitting the Moon bill, regulating postal expenditures, from the House to the Senate. In the Senate print the maximum rate for a 60-foot car has been altered to "not exceeding 20 cents a mile," while the bill as it passed the House reads 21 cents. If the bill passes the Senate at the 20-cent rate it will mean for the railroads a loss of $1,000,000 a year, as compared with the income at 21 cents.

The headings of the Snoqualmie tunnel, which the Chicago, Milwaukee & St. Paul is driving through the Cascade mountains, about 60 miles east of Seattle, met on August 4. The lines checked within 0.15 ft., the elevations checked within 0.13 ft., and the actual distance through the tunnel checked that measured over the summit within 6 ft. While this latter error might be considered large, it is not excessive in view of the fact that no special effort was made to secure refinements in measuring the surface line and there was from 12 to 14 ft. of snow over the summit at each time the line was measured. The construction of this tunnel was described in detail in the *Railway Age Gazette* of May 29.

A Big Opportunity to Correct a Big Mistake

John M. Glenn, secretary of the Illinois Manufacturers' Association, is sending out the following circular letter:

"Many members of the Illinois Manufacturers' Association are writing letters to their senators and to representatives in the lower house urging the adoption of a joint resolution directing the Interstate Commerce Commission to review and revise its decision in the recent application of the eastern railroads for a 5 per cent advance in freight rates.

"It is contended that our financial situation is under a severe pressure because it is threatened by the unloading of railroad securities held by Europe and that the break is only temporarily halted by the close of the public markets. It is claimed that the small advance which the Interstate Commerce Commission has given the carriers will have no effect in restoring and establishing the confidence of the large investor and the holders of American securities abroad, which it is maintained will be sent over as soon as it is possible to do so to draw our gold or its equivalent.

"The Interstate Commerce Commission will have a big opportunity to take a big view of a big question if Congress will take the action requested; and it will take it if enough people appeal to it to act."

New York to Boston by "Continuous Trolley"

This is the announcement which has been made in connection with the running of a street car through from Boston to New York and back last week; though on the return trip the experimental excursionists went by a high-speed railway as far as New Rochelle, 17 miles east of New York. This trip was made to further a project of the Bay State Railway Company, to promote through travel between these cities, especially by pleasure-seekers. This proposal follows the recent completion of a line 30 miles long through a thinly settled country between Danielson, Conn., and Providence, R. I. Hitherto, the traveler wishing to go from New York to Boston by electric cars has had to go by way of Springfield and Worcester. The present line is through New London and Providence.

The party who made the initial trip went from New York to New Rochelle by the New York, Westchester & Boston. Thence to New Haven the trolley lines parallel the New York, New Haven & Hartford. From New Haven to New London the course is even nearer to the ocean, running between that railroad and the Sound. From New London the route is up the beautiful Thames River to Norwich; thence northeast up the Quinebaug river to Danielson, whence the line turns east and makes a bee line through the wilderness to Providence. From that city to Boston, the fifty-mile run is within smelling distance of salt water for the most part, through Taunton, Brockton and the famous Blue Hill district. The total distance traveled was about 280 miles each way, and two days was the schedule time for the trip. Leaving New York at 8:15 a. m. the car arrived at 7 o'clock in the evening at New London, where the passengers remained for the night.

Resuming the journey at 9 o'clock next morning, the car reached the post office in Boston before 6 o'clock that evening. The passengers were surprised at the beauty and fertility of the farms and great estates never seen or heard of by ordinary railroad travelers.

Interchange Inspectors and Car Foremen's Association

The fourteenth annual convention of the Chief Interchange Car Inspectors and Car Foremen's Association was held in the Hotel Sinton, Cincinnati, Ohio, August 25-27. The meeting was presided over by F. C. Schultz, chief interchange inspector at Chicago and president of the association. The invocation was offered by Rev. Henry C. Martin of the St. Luke's Methodist Church, and the association was welcomed to the city by Mayor Spiegel. After the address of the president the secretary reported a cash balance of $31.19 and a total membership of 422. The discussion of the M. C. B. rules of interchange constituted the work of the convention. The following is the list of exhibitors:

American Steel Foundries (Simplex Railway Appliance Company), Chicago.—Models of the Economy draft arm and Simplex coupler. Represented by W. C. Walsh and W. G. Wallace.

Acme Supply Company, Chicago.—Diaphragms, safety tread and Chanarch flooring. Represented by R. C. Munro.

Grip Nut Company, Chicago. Represented by B. C. Hooper and J. Roberts.

Hale & Kilburn, Philadelphia, Pa.—All-steel car seats. Represented by J. K. Hoffman.

McCord & Co., Chicago.—McCord journal box. Represented by H. E. Creer.

Newkirk, W. P., Portsmouth, Ohio.—Newkirk's blue flag rail.

International Association for the Prevention of Smoke

This association, consisting of smoke inspectors for the various cities and railroads, will hold its ninth annual convention at Grand Rapids, Mich., on September 9, 10 and 11. The program includes an illustrated lecture on "Cinder Production and Cinder Catchers," by C. H. Bromley of New York; an address and discussion on "Railroad Smoke Elimination," by Charles W. Corning, secretary of the Chicago Railroad Smoke Inspectors' Association; an illustrated lecture on "The Effect of the Smoke Nuisance on Health, Building Materials, Vegetation, Weather, Etc.," by John O'Connor, Jr., of the University of Pittsburgh;

an address on "Smoke and Its Commercial Relations to Boilers and Stokers," by Lloyd R. Strong of St. Louis, and an address on "Gas Analysis as an Aid to Smoke Elimination," by Joseph W. Hays of Chicago, Ill.

MEETINGS AND CONVENTIONS

The following list gives names of secretaries, dates of next or regular meetings, and places of meeting.

Air Brake Association.—F. M. Nellis, 53 State St., Boston, Mass. Next convention, May 4-7, 1915, Hotel Sherman, Chicago.

American Association of Demurrage Officers.—A. G. Thomason, Demurrage Commissioner, Boston, Mass. Annual convention in April.

American Association of Dining Car Superintendents.—H. C. Boardman, D. L. & W., Hoboken, N. J. Next convention, October 22-24, Washington, D. C.

American Association of Freight Agents.—R. O. Wells, Illinois Central, East St. Louis, Ill. Annual meeting, May 21-24, 1915, Richmond, Va.

American Association of General Passenger and Ticket Agents.—W. C. Hope, C. R. R. of N. J., 143 Liberty St., New York. Annual meeting, September 15-16, Boston, Mass.

American Association of Railroad Superintendents.—E. H. Harman, Room 101, Union Station, St. Louis, Mo. Next convention, August 20-21, New York.

American Electric Railway Association.—E. B. Burritt, 29 W. 39th St., New York. Annual convention, October 12-16, Atlantic City, N. J.

American Electric Railway Manufacturers' Association.—H. G. McConnaughy, 165 Broadway, New York. Meetings with American Electric Railway Association.

American Railway Association.—W. F. Allen, 75 Church St., New York. Semi-annual meeting, November 18, Chicago.

American Railway Bridge and Building Association.—C. A. Lichty, C. & N. W., Chicago. Next convention, October 20-22, 1914, Los Angeles, Cal.

American Railway Engineering Association.—E. H. Fritch, 900 S. Michigan Ave., Chicago. Next convention, March 16-18, 1915, Chicago.

American Railway Master Mechanics' Association.—J. W. Taylor, 1112 Karpen Bldg., Chicago. Annual meeting, June, 1915.

American Railway Safety Association.—L. F. Shedd, C. R. I. & P., Chicago. Next meeting, November, Chicago.

American Railway Tool Foremen's Association.—A. R. Davis, Central of Georgia, Macon, Ga. Annual meeting, July, 1915.

American Society for Testing Materials.—Prof. E. Marburg, University of Pennsylvania, Philadelphia, Pa.

American Society of Civil Engineers.—Chas. W. Hunt, 220 W. 57th St., New York. Regular meetings, 1st and 3d Wednesday in month, except, June, July and August, 220 W. 57th St., New York.

American Society of Engineering Contractors.—J. R. Wemlinger, 11 Broadway, New York. Regular meetings, 2d Thursday in month, at 2 P. M., 11 Broadway, New York.

American Society of Mechanical Engineers.—Calvin W. Rice, 29 W. 39th St., New York. Annual meeting, December 1-4, 1914, New York.

American Wood Preservers' Association.—F. J. Angier, B. & O., Mt. Royal Sta., Baltimore, Md. Next convention, January 19-21, 1915, Chicago.

Association of American Railway Accounting Officers.—E. R. Woodson, 1300 Pennsylvania Ave., N. W., Washington, D. C. Annual convention, April 28, 1915, Atlanta, Ga.

Association of Manufacturers of Chilled Car Wheels.—George W. Lyndon, 1214 McCormick Bldg., Chicago. Annual meeting, second Tuesday in October, New York.

Association of Railway Claim Agents.—C. W. Egan, B. & O., Baltimore, Md. Annual meeting, 3rd week in May, 1915, Galveston, Tex.

Association of Railway Electrical Engineers.—Jos. A. Andreucetti, C. & N. W., Room 411, C. & N. W. Sta., Chicago. Annual convention, October 26-30, 1914, Chicago.

Association of Railway Telegraph Superintendents.—P. W. Drew, Soo Line, 112 West Adams St., Chicago. Annual meeting, June 22-25, Rochester, N. Y.

Association of Transportation and Car Accounting Officers.—G. P. Conard, 75 Church St., New York. Next meeting, December 8-9, 1914, Richmond, Va.

Bridge and Building Supply Men's Association.—L. D. Mitchell, Detroit Graphite Co., Chicago, Ill. Meetings with American Railway Bridge and Building Association.

Canadian Railway Club.—James Powell, Grand Trunk, P. O. Box 7, St. Lambert (near Montreal), Que. Regular meetings, 2d Tuesday in month, except June, July and August, Windsor Hotel, Montreal, Que.

Canadian Society of Civil Engineers.—Clement H. McLeod, 176 Mansfield St., Montreal, Que. Regular meetings, 1st Thursday in October, November, December, February, March and April. Annual meeting, January, Montreal.

Car Foremen's Association of Chicago.—Aaron Kline, 841 Lawler Ave., Chicago. Regular meetings, 2d Monday in month, except July and August, Lytton Bldg., Chicago.

Central Railway Club.—H. D. Vought, 95 Liberty St., New York. Regular meetings, 2d Friday in January, May, September and November. Annual meeting, 2d Thursday in March, Hotel Statler, Buffalo, N. Y.

Civil Engineers' Society of St. Paul.—Edw. J. Dugan, P. O. Box 654, August and September, Old State Capitol Bldg., St. Paul.

Engineers' Society of Pennsylvania.—Edw. R. Dasher, Box 75, Harrisburg, Pa. Regular meetings, 1st Friday after 10th of each month, except July and August, 31 So. Front St., Harrisburg, Pa.

Engineers' Society of Western Pennsylvania.—Elmer K. Hiles, 2511 Oliver Bldg., Pittsburgh, Pa. Regular meetings, 1st and 3d Tuesday, Pittsburgh.

Freight Claim Association.—Warren P. Taylor, R. F. & P., Richmond, Va. Annual meeting, June 16, 1915, Chicago.

General Superintendents' Association of Chicago.—A. M. Hunter, 321 Grand Central Station, Chicago. Regular meetings, Wednesday preceding 3d Thursday in month, Room 1856, Transportation Bldg., Chicago.

International Railway Congress.—Executive Committee, 11, Rue de Louvain, Brussels, Belgium. Next convention, June 23 to July 6, 1915, Berlin.

International Railway Fuel Association.—C. G. Hall, C. & E. I., 922 McCormick Bldg., Chicago. Annual meeting, May 17-20, 1915, Chicago.

International Railway General Foremen's Association.—Wm. Hall, 829 W. Broadway, Winona, Minn. Next convention, July 14-17, 1915, Sherman House, Chicago.

International Railroad Master Blacksmiths' Association.—A. L. Woodworth, C. H. & D., Lima, Ohio.

Maintenance of Way and Master Painters' Association of the United States and Canada.—T. L. Goodwin, C. R. I. & P., Eldon, Mo. Next convention, November 17-19, 1914, Detroit, Mich.

Master Boiler Makers' Association.—Harry D. Vought, 95 Liberty St., New York. Annual convention, May, 1915.

Master Car and Locomotive Painters' Association of the United States and Canada.—A. P. Dane, B. & M., Reading, Mass. Next convention, September 8-11, Nashville, Tenn.

Master Car Builders' Association.—J. W. Taylor, 1112 Karpen Bldg., Chicago. Annual meeting, June, 1915.

National Railway Appliances Association.—Bruce V. Crandall, 537 So. Dearborn St. Chicago. Next convention, March 15-19, 1915, Chicago.

New England Railroad Club.—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass. Regular meetings, 2d Tuesday in month, except June, July, August and September, Boston.

New York Railroad Club.—Harry D. Vought, 95 Liberty St., New York. Regular meetings, 3d Friday in month, except June, July and August, 29 W. 39th St., New York.

Niagara Frontier Car Men's Association.—E. Frankenberger, 623 Brisbane Bldg., Buffalo, N. Y. Meetings monthly.

Peoria Association of Railroad Officers.—M. W. Rotchford, Union Station, Peoria, Ill. Regular meetings, 2d Thursday in month, Jefferson Hotel, Peoria.

Railroad Club of Kansas City.—C. Manlove, 1008 Walnut St., Kansas City, Mo. Regular meetings, 3d Friday in month, Kansas City.

Railroad Master Tinners, Coppersmiths and Pipefitters' Association.—U. G. Thompson, C. & E. I., Danville, Ill. Annual meeting, May, 1915.

Railway Business Association.—Frank W. Noxon, 30 Church St., New York. Annual meeting, December 10, 1914, Waldorf-Astoria Hotel, New York.

Railway Club of Pittsburgh.—J. B. Anderson, Room 207, P. R. R. Sta., Pittsburgh, Pa. Regular meetings, 4th Friday in month, except June, July and August, Monongahela House, Pittsburgh.

Railway Electrical Supply Manufacturers' Association.—J. Scribner, 1021 Monadnock Block, Chicago. Meetings with Association of Railway Electrical Engineers.

Railway Fire Protection Association.—C. B. Edwards, Fire Ins. Agt., Mobile & Ohio, Mobile, Ala. Annual meeting, October 6, 1914, Washington, D. C.

Railway Signal Association.—C. C. Rosenberg, Times Bldg., Bethlehem, Pa. Annual meeting, September 22-24, 1914, Bluff Point, N. Y.

Railway Storekeepers' Association.—J. P. Murphy, L. S. & M. S., Box C, Collinwood, Ohio. Annual meeting, May, 1915.

Railway Supply Manufacturers' Association.—J. D. Conway, 2136 Oliver Bldg., Pittsburgh, Pa. Meetings with M. C. B. and M. M. Associations.

Railway Telegraph and Telephone Appliance Association.—G. A. Nelson, 50 Church St., New York. Meetings with Association of Railway Telegraph Superintendents.

Richmond Railroad Club.—F. O. Robinson, C. & O., Richmond, Va. Regular meetings, 2d Monday in month, except June, July and August.

Roadmasters' and Maintenance of Way Association.—L. C. Ryan, C. & N. W., Sterling, Ill. Next convention, September 8-10, 1914, Chicago.

St. Louis Railway Club.—B. W. Frauenthal, Union Station, St. Louis, Mo. Regular meetings, 2d Friday in month, except June, July and August, St. Louis.

Salt Lake City Transportation Club.—R. E. Rowland, Hotel Utah Bldg., Salt Lake City, Utah. Regular meetings, 1st Saturday of each month, Salt Lake City.

Signal Appliance Association.—F. W. Edmunds, 3868 Park Ave., New York. Meeting with annual convention Railway Signal Association.

Society of Railway Financial Officers.—Carl Nyquist, C. R. I. & P., La Salle St. Sta., Chicago. Annual meeting, September 15-17, Hotel Aspinwall, Lenox, Mass.

Southern Association of Car Service Officers.—E. W. Sandwich, A. & W. P. Ry., Atlanta, Ga.

Southern and Southwestern Railway Club.—A. J. Merrill, Grant Bldg., Atlanta, Ga. Regular meetings, 3d Thursday, January, March, May, July, September, November, 10 A. M., Candler Bldg., Atlanta.

Toledo Transportation Club.—J. S. Marks, Agent, Interstate Despatch, Toledo, Ohio. Regular meetings, 1st Saturday in month, Boody House, Toledo.

Track Supply Association.—W. C. Kidd, Ramapo Iron Works, Hillsburn, N. Y. Meetings with Roadmasters' and Maintenance of Way Association.

Traffic Club of Chicago.—W. H. Wharton, La Salle Hotel, Chicago.

Traffic Club of New York.—C. A. Swope, 291 Broadway, New York. Regular meetings, last Tuesday in month, except June, July and August, Waldorf-Astoria, New York.

Traffic Club of Pittsburgh.—D. L. Wells, Erie R. R., Pittsburgh, Pa. Meetings bimonthly, Pittsburgh. Annual meeting, 2d Monday in June.

Traffic Club of St. Louis.—A. F. Versen, Mercantile Library Bldg., St. Louis, Mo. Annual meeting in November. Noonday meetings October to May.

Train Despatchers' Association of America.—J. F. Mackie, 7122 Stewart Ave., Chicago. Annual meeting June 15, 1915, Minneapolis, Minn.

Transportation Club of Detroit.—W. R. Hurley, Superintendent's office, L. S. & M. S., Detroit, Mich. Meetings monthly, Normandie Hotel, Detroit.

Traveling Engineers' Association.—W. O. Thompson, N. Y. C. & H. R., East Buffalo, N. Y. Next meeting, September 15-18, Hotel Sherman, Chicago.

Utah Society of Engineers.—Frank W. Moore, Newhouse Bldg., Salt Lake City, Utah. Regular meetings, 3d Friday in month, except July and August, Consolidated Music Hall, Salt Lake City.

Western Canada Railway Club.—W. H. Rosevear, P. O. Box 1707, Winnipeg, Man. Regular meetings, 2d Monday, except June, July and August, Winnipeg.

Western Railway Club.—J. W. Taylor, 1112 Karpen Bldg., Chicago. Regular meetings, 3d Tuesday in month, except June, July and August, Karpen Bldg., Chicago.

Western Society of Engineers.—J. H. Warder, 1735 Monadnock Block, Chicago. Regular meetings, 1st Monday in month, except January, July and August, Chicago. Extra meetings, except in July and August, generally on other Monday evenings.

Traffic News

The House committee on interstate and foreign commerce has introduced in Congress a bill to provide for uniform freight classification throughout the United States.

The Canadian Pacific has announced that it will make a special rate of one cent a mile for farm laborers destined for the Saskatchewan farms to take care of this year's large harvest. It is also announced that those unable to pay will be transported by the railway company free.

In reply to various rumors that the Panama-Pacific Exposition to be held next year at San Francisco might be postponed on account of the European war, Charles B. Moore, president of the organization, has announced that the exposition will positively open on the scheduled date, February 20, 1915, and that the work is more than 90 per cent completed.

The railways in Western Trunk Line, trans-Missouri and Southwestern territories have announced that at the end of September all arrangements for concentration of butter and eggs and other dairy products, also live and dressed poultry, will be discontinued, except at the assessment of the full classification rate into the concentration point and the full tariff rate therefrom.

Senator Thomas introduced in Congress on Monday last a resolution calling on the Interstate Commerce Commission to inquire into an order which has been issued by the Union Pacific, to the effect that after the end of September it will not accept through tickets held by passengers from the east arriving at Salt Lake and Ogden, destined to points in the Pacific northwest.

The Southern Railway is to make displays this year at three big expositions and thirty-six district and county fairs throughout the north and west. Southern farm products will be shown in great profusion. There will be four circuits of exhibits taking in county and district fairs in Iowa, Minnesota, Wisconsin, Illinois, Indiana, Michigan, New York, Pennsylvania and Connecticut, while special displays on a more elaborate scale will be made at the great Canadian National Exposition at Toronto, Canada, and at other expositions.

Following the recent action of the Chicago & North Western, the Chicago railways have given notice that at the end of September they will discontinue absorbing tunnel and lighterage charges in Chicago. This means the cancellation of tariffs with the Merchants' Lighterage Company, the Chicago Lighterage Company, and the Chicago Warehouse & Terminal Company. The Chicago Association of Commerce last week filed a petition with the Interstate Commerce Commission and the Illinois Public Utilities Commission asking the suspension of the North Western's cancellation.

The Texas Tariff Bureau has prepared and expects to issue within a few days a circular including tables showing the short line mileage by various routes between all Texas junction points. This will be a great convenience, both to the railways and to the shippers, as under many of the railroad-commission tariffs rates are made by using the shortest mileage by any practicable route.

Governor Colquitt of Texas has authorized the state railroad commission to employ N. A. Stedman of Ogden, and S. H. Cowan of Ft. Worth, as attorneys to represent the commission in the interrogation of witnesses and development of facts in the hearing to be held by the railroad commission in response to the petition of the railroads for a general advance in freight rates. The governor is said to have told the railroad commissioners that he believed the railroads were entitled to have some of their rates advanced, as he considered a few of them too low. The governor said that the roads had been heavily hit by the flood, decreases in traffic and earnings, and that they are entitled to a readjustment, although he did not believe the rates on cotton or on some other staple articles should be changed.

The Missouri railways are preparing statistical evidence to be presented before the Missouri Public Service Commission on September 15 in support of an application for advances in both freight and passenger rates. This action is being taken in accordance with the decision recently rendered by the Missouri Supreme Court in the Missouri Southern case, holding that the power of the commission to prescribe just and reasonable rates is not limited by the maximum freight and passenger rate laws, which preceded the law creating the commission, and that therefore the commission may consider evidence bearing on the reasonableness of rates exceeding the statutory rates. The roads are compiling passenger fares on a basis of about three cents a mile.

Car Location

The accompanying table which was taken from bulletin No. 20 of the American Railway Association, gives a summary of freight car location by groups on July 1, 1914:

Car Location on July 1, 1914

	New England.	N.Y., N.J., Del., Md., Eastern Pa.	Ohio, Ind., Mich., Western Pa.	Va., W. Va., No. & So. Carolina.	Ky., Tenn., Miss., Ala., Ga., Fla.	Iowa, Ill., Wis., Minn.	Mont., Wyo., Neb., Dakotas.	Kans., Colo., Okla., Mo., Ark.	Texas, La., New Mexico.	Oregon, Idaho, Nev., Cal., Ariz.	Canadian Lines.	Grand Total.
Total Cars Owned	87,905	687,548	264,223	207,827	177,420	495,292	22,333	155,761	28,845	143,150	154,327	2,424,631
Home Cars on Home Roads	54,572	485,065	124,009	140,869	115,710	272,957	12,801	108,042	15,941	91,291	111,821	1,633,078
Home Cars on Foreign Roads	33,333	202,483	140,214	66,958	61,710	122,335	9,532	47,719	12,904	51,859	42,506	791,553
Foreign Cars on Home Roads	40,515	205,460	161,503	59,531	43,284	127,579	10,496	50,820	20,515	49,449	26,669	795,821
Total Cars on Line	95,087	690,525	285,512	200,400	158,994	500,536	23,297	158,862	36,456	140,740	138,490	2,428,899
Excess or Deficiency	7,182	2,977	21,289	*7,427	*18,426	5,244	964	3,101	7,611	*2,410	*15,837	4,268
Surplus	2,521	30,752	52,751	16,636	13,745	29,678	5,592	19,784	2,152	28,590	18,674	220,875
Shortage	153	33	238	17	293	195	0	360	22	22	0	1,333
Shop Cars—												
Home Cars in Home Shops	8,089	60,745	23,342	20,795	18,832	35,050	808	15,332	3,283	7,052	6,528	199,856
Foreign Cars in Home Shops	1,050	5,237	4,726	1,457	1,255	3,476	500	1,418	904	2,621	140	22,784
Total Cars in Shop	9,139	65,982	28,068	22,252	20,087	39,664	1,308	16,750	4,187	9,673	6,668	223,778
Per Cent. to Total Cars Owned—												
Home Cars on Home Roads	62.08	70.55	46.93	67.78	65.22	75.30	57.32	69.36	55.26	63.77	72.46	67.35
Total Cars on Line	105.41	100.43	108.06	96.43	89.66	101.06	104.32	100.92	126.38	98.32	89.74	100.02
Home Cars in Home Shops	9.20	8.84	8.83	10.01	10.61	7.08	3.62	9.84	11.38	4.93	4.23	8.24
Foreign Cars in Home Shops	.83	.76	1.79	.70	.71	.70	2.24	.85	3.13	1.83	.09	.92
Total Cars in Shops	10.03	9.60	10.62	10.71	11.32	8.01	5.86	10.69	14.51	6.76	4.32	9.21

*Denotes deficiency.

Advances in Passenger Fares Proposed

Railways in Central Passenger Association and Trunk Line territories are working on plans for advancing interstate passenger fares, in accordance with the suggestions made by the Interstate Commerce Commission in the eastern rate advance case. While the interstate rates in these territories have not been reduced to the two-cents-a-mile basis which prevails for intrastate traffic in Illinois, Indiana, Ohio and the southern peninsula of Michigan, the interstate fares have been influenced by the low state rates, although on May 1 many of the interstate basing fares were placed on a 2½-cent basis. It is now proposed to advance interstate fares to approximately 2½ cents wherever possible, which would involve increases in many of the long-distance through fares such as that between Chicago and New York. It is also proposed to equalize rates between points which now take different rates in opposite directions. Rate

clerks have been meeting in Chicago to figure the possibilities of a readjustment, and a joint meeting of the rate clerks of the Trunk Line and Central Passenger Associations was called for Wednesday of this week at Niagara Falls. The Western Passenger Association roads have also discussed plans for advancing interstate fares. Passenger officers of the Southwestern lines called a meeting, to be held on Tuesday at St. Louis, to discuss the situation created by the Interstate Commerce Commission's decision in the Oklahoma, Arkansas and Missouri case, upholding the three-cent interstate fare. The St. Louis Southwestern had reduced the interstate rate to two cents. The roads are confronted with the problem of dealing with passengers who buy tickets at the state lines in order to get the advantage of the lower rate, a practice that has attained large proportions because the Oklahoma commission has ordered the roads to hold trains at stations near the state line and has prohibited a higher charge for fares paid on trains.

Car Surpluses and Shortages

Arthur Hale, chairman of the committee on relations between railroads of the American Railway Association, in presenting statistical bulletin No. 173-A, giving a summary of car surpluses and shortages by groups from April 15, 1913, to August 15, 1914, says: The total surplus on August 15, 1914, was 174,260 cars; on August 1, 1914, 198,998 cars, and on August 15, 1913, 69,253 cars.

There is a further decrease of 24,738 cars in surplus, bringing the total down to 174,260.

The principal reduction in surplus is in coal and gondola cars in central freight association territory, where the surplus of August 1 is reduced almost one-half, although the decrease in this class of equipment is general throughout all states east of the Mississippi river.

Box cars show a net increase of 2,881, the greater part of which is in the middle Atlantic and southern states (groups 4 and 5), with lesser increases in the winter wheat states and on the Pacific coast. There is a slight decrease in surplus box cars in the northwestern grain states (groups 6 and 7) and on the Canadian roads.

The total shortage on August 15, 1914, was 2,115 cars; on August 1, 1914, 2,333 cars, and on August 15, 1913, 14,828 cars.

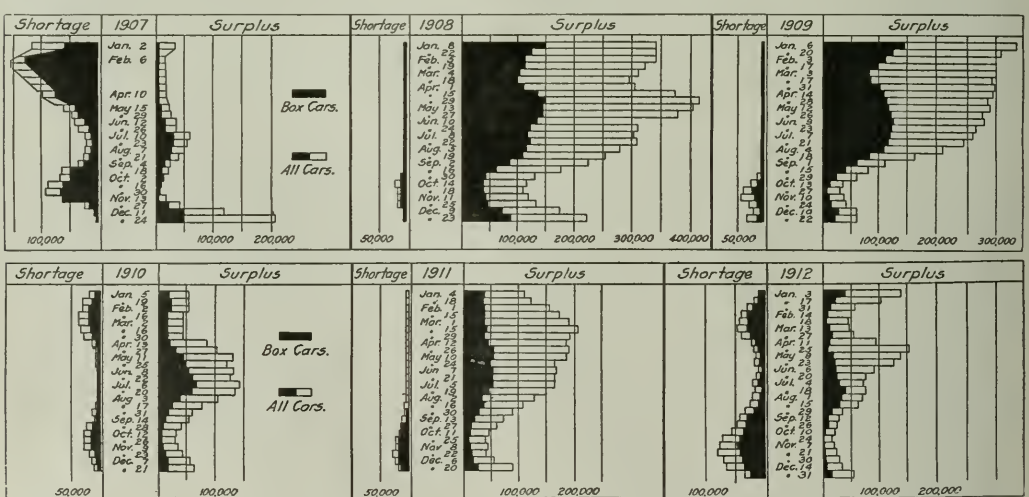
There is very little change in the total shortage, which stands at 2,115—a decrease of 218 under the figures in our last bulletin.

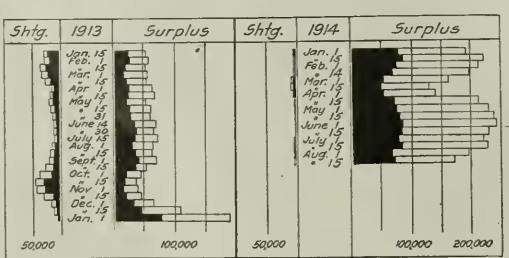
The accompanying table gives car surplus and shortage figures by groups for the last period covered in the report and the diagram shows total bi-weekly surpluses and shortages 1907 to 1914.

CAR SURPLUSES AND SHORTAGES

Date	No. of roads.	Surpluses Box.	Surpluses Flat.	Surpluses Coal, gondola and hopper.	Surpluses Other kinds.	Surpluses Total.	Shortages Box.	Shortages Flat.	Shortages Coal, gondola and hopper.	Shortages Other kinds.	Shortages Total.
Group *1.—August 15, 1914	7	1,574	535	985	711	3,805	134	10	0	16	160
" 2.— " 15, 1914	32	2,287	175	15,866	7,637	25,965	16	0	0	0	16
" 3.— " 15, 1914	30	2,780	784	24,963	3,306	31,833	412	100	0	203	715
" 4.— " 15, 1914	12	6,725	991	2,552	1,355	11,623	50	0	0	0	50
" 5.— " 15, 1914	24	2,352	359	2,954	2,530	8,195	0	2	0	30	32
" 6.— " 15, 1914	26	17,375	1,380	3,153	4,175	26,083	258	17	18	2	295
" 7.— " 15, 1914	4	1,883	33	656	981	3,553	0	0	0	50	50
" 8.— " 15, 1914	15	6,580	336	1,861	3,031	11,808	0	7	472	0	479
" 9.— " 15, 1914	12	1,602	124	266	1,032	3,024	6	4	4	7	21
" 10.— " 15, 1914	21	7,893	1,419	3,304	7,749	20,365	204	14	2	77	297
" 11.— " 15, 1914	5	24,201	1,053	0	2,752	28,006	0	0	0	0	0
Total	188	75,272	7,189	56,560	35,259	174,260	1,080	154	496	385	2,115

*Group 1 is composed of New England lines; Group 2—New York, New Jersey, Delaware, Maryland and Eastern Pennsylvania lines; Group 3—Ohio, Indiana, Michigan and Western Pennsylvania lines; Group 4—West Virginia, Virginia, North and South Carolina lines; Group 5—Kentucky, Tennessee, Mississippi, Alabama, Georgia and Florida lines; Group 6—Iowa, Illinois, Wisconsin and Minnesota lines; Group 7—Montana, Wyoming, Nebraska, North Dakota and South Dakota lines; Group 8—Kansas, Colorado, Missouri, Arkansas and Oklahoma lines; Group 9—Texas, Louisiana and New Mexico lines; Group 10—Washington, Oregon, Idaho, California, Nevada and Arizona lines; Group 11—Canadian lines.





Car Surpluses and Shortages, 1907 to 1914

Commission and Court News

INTERSTATE COMMERCE COMMISSION

California-Nevada Lumber Rates

Opinion by Commissioner Hall:

The commission, upon a re-argument of this case, the original report of which was given in 28 I. C. C., 313, re-affirms its former decision that the Southern Pacific should be required to cancel certain proposed advance rates on carload lumber from Newcastle, New England Mills, Colfax, and Gold Run, Cal., to Verdi and Reno, Nev., thus leaving in effect the present rates. (31 I. C. C., 464.)

Bills of Lading on Reconsigned Shipments

Jung & Sons Company v. Louisville & Nashville Opinion by the commission:

The commission finds that defendants' practice of refusing to issue new bills of lading, concealing the names of the original shippers, in exchange for old bills of lading, in cases where cars are reconsigned at the terminals of their lines, is not unreasonable. (31 I. C. C., 455.)

Rates on Fertilizer from Norfolk, Va.

F. S. Royster Guano Company v. Atlantic Coast Line et al. Opinion by the Commission:

The commission finds that the rates charged by the Atlantic Coast Line and the Seaboard Air Line on fertilizers from Norfolk to certain points in North Carolina are unreasonable and discriminatory as compared with rates to the same points and to points equally distant from Wilmington, N. C. A new schedule of rates on commercial fertilizers in carloads from Norfolk to points in North Carolina is therefore prescribed, these rates being based on a distance scale varying from $1.50 for 30 to 50 miles to $3.25 for 325 to 350 miles, carload minimum 20,000 lb. (31 I. C. C., 458.)

The Tap Line Case

Second supplemental report of the commission. Opinion by Commissioner Harlan.

In accordance with the decision of the United States Supreme Court in the Tap Line Cases (234 U. S. 1), which held that the five tap lines appealing from the commission's findings in 23 I. C. C., 277, 549, were common carriers with respect both to proprietary and nonproprietary traffic and that the commission had exceeded its powers in preventing the divisions previously allowed them, the commission now restores all the through routes and joint rates which were in effect prior to May 1, 1912, between the trunk lines and the 57 tap lines involved in the instant case.

It is held, however, that the divisons out of the through rate on interstate shipments of lumber and forest products, from points on such of these tap lines as file tariffs and have otherwise complied with the commission's accounting rules, etc., should not exceed the following maximum amounts: For switching a distance of 1 mile or less from the junction, $2 per car; over 1 mile and up to 3 miles from the junction, $3 per car; on shipments from points over 3 miles and not more than 6 miles from the junction, 1½ cents per 100 lb.; over 6 miles and not more than 10 miles from the junction, 2 cents per 100 lb.; over 10 miles and not more than 20 miles from the junction, 2½ cents per 100 lb.; over 20 miles and not more than 30 miles from the junction, 3 cents per 100 lb.; over 30 miles and not more than 40 miles from the junction, 3½ cents per 100 lb.; over 40 miles from the junction, 4 cents per 100 lb. These divisions are the net amounts that may be paid out of the trunk line rates from the junctions, and when the rates from points on the tap line are made by the addition of an arbitrary, such arbitrary shall accrue to the tap line.

These divisions are to be applied to all interstate shipments of lumber and forest products that moved from points on the tap lines since May 1, 1912, and the tap line carriers are allowed reparation accordingly.

In case the delivery of lumber and forest products to a trunk line involves a haul over two or more tap lines, the divisions herein fixed should be applied to the aggregate haul, and not to the separate service of each of the tap lines.

With respect to the milling-in-transit rate on logs as formerly practised on the tap lines, the commission adheres to its original conclusion that the rate on lumber at the junction or mill point may not lawfully be extended back to the point on the tap line where the logs originate, and that any division out of the through lumber rate on account of the log haul can not be sanctioned.

The commission reaffirms its conference ruling to the effect that it is its view "that the law does not prohibit the use of interstate free passes by such officials and employees who devote substantially all their time to the service of the tap line and where by the use of such free passes no unlawful discriminations are effected." (31 I. C. C. 490.)

Rates on Sugar from New Orleans

In re sugar rates from New Orleans, La., and points taking same rates to Ohio river crossings, Memphis, Tenn., St. Louis, Mo., and intermediate points. Opinion by the commission:

The carriers transporting sugar in carloads from New Orleans, La., and points taking the same rates to Ohio river crossings, Memphis, Tenn., St. Louis, Mo., and other Mississippi river points, and points intermediate thereto, have in effect many rates which violate the fourth section, and have filed applications asking to be allowed to continue these lower rates to the river points and certain various intermediate low rate points on the routes operating to the river crossings than are concurrently in effect on like traffic to intermediate stations. The commission follows its ruling in previous cases that "insofar as the Ohio river itself, by affording a means of transportation, gives to these cities upon its banks lower rates than would otherwise be obtainable, they should be accorded the benefit of their location." It does not agree, however, that the relief should be granted to the extent prayed by all the applicants. The Queen & Crescent constitutes the direct short line from New Orleans to Cincinnati, which is the most distant of the river crossings involved. The distance via this route is 836 miles. There are in effect blanket rates of 23 cents in carloads to all points on this line between Chattanooga and Cincinnati except to Lexington, which is accorded the Cincinnati rate; and these blanket rates are applied to a certain territory approximately 300 miles in length for distances ranging from 498 to 833 miles. These voluntary blanket rates to the non-competitive points bear a reasonable relation to the competitive rates which would warrant relief to the Queen & Crescent from the rule of the fourth section to the extent prayed to Cincinnati. The commission finds, therefore, that the Queen & Crescent route should be permitted to continue to charge lower rates on sugar from New Orleans to Cincinnati than are concurrently in effect to intermediate points between Chattanooga and Cincinnati, provided the present intermediate rates of 23 cents per 100 lb. in carloads and 28 cents for less than carloads are not exceeded.

It is also held that no justification has been shown by the other applicant carriers for the maintenance of higher rates to points south of the river crossings than the rates to the local points between Chattanooga and Cincinnati on the Queen & Crescent and similar findings are made to apply. Relief is granted to Lexington to the same extent as to Cincinnati.

The commission also finds that the Illinois Central should be allowed to charge lower rates to Memphis than to intermediate points, provided the rates to the latter do not exceed 20 cents per 100 lb. on carloads and 25 cents on less than carloads. The Yazoo & Mississippi Valley is allowed relief with reference to rates on sugar to river points on its line, provided the rates to intermediate points not on the river do not exceed 17 and 20 cents per 100 lb. on carload and less than carload lots respectively.

The commission holds that the Louisville & Nashville should be allowed to continue to charge lower rates on sugar from New Orleans to Nashville and Bowling Green than are concurrently in effect on like traffic to intermediate points, provided the rates to the said intermediate points do not exceed 23 cents per 100 lb. in carloads, and 28 cents in less than carloads.

That portion of the Louisville & Nashville's application to be allowed to increase its rate to Montgomery from 17 to 20 cents per 100 lb. is denied. With reference to the rates of the same carrier to Mobile relief is granted provided the rates to intermediate points do not exceed 15 cents per 100 lb. on carload and 20 cents on less than carload shipments.

The Queen & Crescent has proposed to increase its rates on

sugar from New Orleans to Chattanooga from 20 and 23 cents to 23 and 28 cents on carloads and less than carloads respectively in conformance with a decision in a previous case. It can be allowed, therefore, to charge higher rates to intermediate points.

Relief is denied with reference to the rates on sugar to such points as Tuscaloosa, Attalla, Holt, Akron and Birmingham.

The commission also holds that whatever local rate on sugar is made by the direct line from New Orleans to any interior point south of the rivers, must not be exceeded by any rate to any point intermediate thereto upon the direct line. Carriers having indirect routes to all points to which lower rates may be charged than to intermediate points will be authorized to meet the rates on sugar established over the direct route from New Orleans in those instances where the indirect route is not less than 15 per cent longer than the direct line between the same points, and to maintain higher rates on like traffic to points intermediate thereto, provided the rates to said intermediate points on the indirect routes do not exceed 15 and 20 cents for carloads and less than carloads respectively for distances not in excess of 200 miles, 17 and 22 cents for distances not exceeding 300 miles, 20 and 25 cents for distances not exceeding 400 miles, 23 and 28 cents for distances not exceeding 700 miles, and 25 and 30 cents for distances greater than 700 miles. (31 I. C. C., 495.)

STATE COMMISSIONS

George A. Henshaw, of the Oklahoma Corporation Commission, has announced that application will probably be made by the commissions of Missouri, Arkansas and Oklahoma for a rehearing of the case before the Interstate Commerce Commission in which the commission decided last week that three cents a mile is not an unreasonable rate for interstate passenger travel in those states, in spite of the fact that the state rate is two cents a mile. Commissioner Henshaw says that such an application will be made by the Oklahoma commission even if the other states do not join.

Representatives of the state commissions of Idaho, Montana, Nevada, Utah, Arizona and Colorado, have called a meeting to be held in Denver on August 28, to prepare their cases for hearings which are to be held in Chicago on October 6, at which the Interstate Commerce Commission will consider a petition filed by the transcontinental railways asking for modifications of the federal commission's order in the intermountain rate case as to 107 commodities which meet heavy water competition on the Pacific coast, and on which the roads desire to charge rates at variance with a strict interpretation of the long and short haul clause without making similar reductions to interior points. It is said that the state commissions are planning to oppose this application of the roads.

The Railroad Commission of Texas has announced that it has decided to accord the railroads of the State a hearing on their application, presented on January 26, asking for a horizontal advance of 15 per cent in freight rates in the state. At the time the application was presented the commission declined to give a hearing on the petition, saying that it had no merit. As reported in last week's issue, the railroads recently held a meeting at which it was decided to make further efforts to obtain an advance in rates. This was followed by the commission's announcement that it would give a hearing. The plan recently considered by the railroads has not, however, contemplated a horizontal general advance in rates, such as was proposed in January, but a general readjustment of rates, which would advance a large number. No date has yet been set for the hearing, but Commissioner Williams has suggested that before this is decided upon an agreement should be had if possible with the principal carriers for the preparation of statistical evidence from their records for investigations along certain lines preceding the hearing.

PERSONNEL OF COMMISSIONS

John W. Flintham has been appointed secretary of the new Colorado Public Utilities Commission, with office at Denver, Colo.

W. A. Mitchell of Sedalia, Mo., has been appointed an inspector of car equipment, Division of Valuation, Interstate Commerce Commission.

Railway Officers

Executive, Financial, Legal and Accounting

W. O. Wall has been appointed general claim agent of the Georgia & Florida, with office at Augusta, Ga., and the office of freight claim agent has been discontinued.

T. V. Pomar, auditor of the Florida East Coast, at St. Augustine, Fla., has been appointed general auditor and assistant treasurer, with headquarters at St. Augustine.

E. B. Pierce, having resigned as auditor of the Missouri, Kansas & Texas on account of ill health, all communications heretofore forwarded to him should be addressed to the controller until further notice.

W. F. Ingram, assistant auditor of the Southern Pacific, at San Francisco, Cal., has been appointed assistant treasurer, with headquarters at San Francisco, succeeding H. A. Jones, resigned on account of failing health, and the position of assistant auditor is abolished.

William C. Tomkins, whose appointment as assistant to vice-president of the Grand Trunk, and the Grand Trunk Pacific, with headquarters at Montreal, Que., has already been announced in these columns, entered the service of the Grand Trunk on September 1, 1885, in the office of the auditor of pay rolls. Two years later he was transferred to the office of the general manager, and subsequently served in the president's office of the same road. In May, 1908, he became secretary to the late Martin M. Reynolds, vice-president in charge of finance and accounting of the Grand Trunk and the Grand Trunk Pacific, with headquarters at Montreal. Mr. Tomkins remained in that position until the death of Mr. Reynolds, which occurred on June 17, of this year. On August 1 Mr. Tomkins was appointed assistant to vice-president of the same roads as above noted.

W. C. Tomkins

Thornwell Fay has been appointed assistant to the receivers of the International & Great Northern, with jurisdiction over all departments of the receivership, with headquarters at Houston, Tex. A. G. Whittington has been appointed general manager for the receivers, with jurisdiction over the operating, mechanical and maintenance departments, with headquarters at Houston. He has been second vice-president and general manager.

Operating

D. E. Nichols has been appointed trainmaster of the Minnesota division of the Northern Pacific at Staples, Minn.

H. E. Allen, until recently superintendent of the Trinity & Brazos Valley at Teague, Tex., has been appointed superintendent of the Louisiana division of the Chicago, Rock Island & Pacific, with headquarters at Eldorado, Ark., succeeding A. E. Walker, who has been appointed superintendent of the Arkansas division, with office at Little Rock, Ark., vice A. B. Copley, promoted.

George Collins, whose appointment as superintendent of the Ottawa division of the Canadian Northern with headquarters at Trenton, Ont., has been announced in these columns, was born on July 20, 1860, at Carrying Place, near Trenton, and was edu-

cated in the public schools of Trenton. He began railway work in June, 1882, on the Central Ontario, and has been in the continuous service of that road ever since. From 1884, to 1890, he was agent at Trenton, and during the next two years served as a train despatcher. He was then to 1894, secretary, treasurer and assistant superintendent, and from 1894, to 1902, was general superintendent and secretary. From 1902, to 1906, he was receiver and manager, and since that time was general manager and secretary of the same road until his recent appointment as superintendent of the Ottawa division of the Canadian Northern. Mr. Collins was also a director of the Central Ontario from 1903, to 1914, when the road was taken over by the Canadian Northern.

Traffic

V. D. Fort, assistant freight traffic manager of the Illinois Central at Chicago, has been transferred to Memphis, Tenn.

J. T. Graffis, traveling freight agent of the Minneapolis & St. Louis, with headquarters at Indianapolis, Ind., has been appointed general agent traffic department at that place succeeding A. E. Lee, resigned.

Frank B. Townsend, whose appointment as traffic manager of the Minneapolis & St. Louis, with headquarters at Minneapolis, Minn., has already been announced, was born October 22, 1875, at Kirbyville, Mo. He was educated in the public schools of Marshalltown, Iowa, and began railway work in February, 1892. He was for ten years in the accounting and traffic departments of the Iowa Central, and in 1904 he became traveling freight agent of that road and the Minneapolis & St. Louis, with headquarters at Indianapolis, Ind. From December, 1906, to January, 1909, he was commercial agent, and the following year was general agent at Chicago. From January, 1910, to January, 1911, he was coal freight agent of the same roads and the Chicago & Alton and the Toledo, St. Louis & Western. On the latter date he was appointed assistant general freight agent of the Minneapolis & St. Louis, from which position he was recently promoted to that of traffic manager, as above mentioned.

F. B. Townsend

Purchasing

C. B. Williams, general storekeeper of the Central of New Jersey, at Elizabethport, N. J., has been appointed purchasing agent, with office at New York City, and LeRoy Cooley, chief clerk in the office of the superintendent of motive power, has been appointed general storekeeper, with headquarters at Elizabethport, succeeding Mr. Williams. Mr. Cooley was born on July 19, 1877, at Flemington, N. J., and began railway work in 1899, as a clerk in the office of the superintendent of motive power of the Central of New Jersey, and has been in the continuous service of that road ever since. He held various positions until September, 1908, when he was appointed chief clerk of the same office.

Engineering and Rolling Stock

John A. Marshall has been appointed road foreman of engines of the Northern Pacific at Duluth, Minn.

Joseph Billingham has been appointed superintendent of motive power of the Grand Trunk Pacific, with headquarters at Transcona, Man., succeeding G. W. Robb, resigned.

T. S. Lowe, road foreman of engines of the Canadian Northern at Limoilou, Que., has been appointed master mechanic of the Lake St. John division, with office at Limoilou.

T. C. Hudson, master mechanic of the Canadian Northern at Joliette, Que., has been appointed division master mechanic of the Quebec Grand division, with office at Joliette.

D. W. Gross, chairman of the valuation committee of the Atlantic Coast Line, at Wilmington, N. C., has been appointed valuation engineer, and has been relieved of all duties as engineer of construction.

William O'Brien has been appointed master mechanic of the Springfield division of the Illinois Central, with headquarters at Clinton, Ill., succeeding Fred M. Baumgardner, resigned to accept a position with the Interstate Commerce Commission, Division of Valuation.

Morgan King Barnum, general mechanical inspector of the Baltimore & Ohio, at Baltimore, Md., has been appointed superintendent of motive power of the Baltimore & Ohio proper, with headquarters at Baltimore, effective September 1. This position, which was abolished about a year ago, when A. P. Prendergast left the B. & O., has now been restored. Mr. Barnum was born on April 6, 1861, and was graduated from Syracuse University in 1884, with the degree of A. B., and later received the degree of A. M. He began railway work in 1884, as a special apprentice in the shops of the New York, Lake Erie & Western, now the Erie, at Susquehanna, Pa. He was then consecutively machinist and mechanical inspector, and later general foreman of the same road in Salamanca, N. Y., general foreman of the Louisville & Nashville shops at New Decatur, Ala.; assistant master mechanic of the Atchison, Topeka & Santa Fe at Argentine, Kan.; superintendent of shops at Cheyenne, Wyo.; district foreman at North Platte, Neb., and then division master mechanic at Omaha, Neb., on the Union Pacific; assistant mechanical superintendent of the Southern Railway. In February, 1903, he was made superintendent of motive power of the Chicago, Rock Island & Pacific, and in April of the following year was appointed mechanical expert of the Chicago, Burlington & Quincy; in 1907 he was appointed general inspector of machinery and equipment, of the same road. He left that road in April, 1910, to become general superintendent of motive power of the Illinois Central and the Yazoo & Mississippi Valley, remaining in that position until July 1, 1913, when he became general mechanical inspector of the Baltimore & Ohio, and now becomes superintendent of motive power of the same road as above noted.

M. K. Barnum

OBITUARY

William Tinkham, formerly president of the Providence & Springfield, now a part of the New York, New Haven & Hartford, died on August 20, at Providence, R. I., at the age of 92.

William E. Harwig, formerly, from 1902 to 1912, supervisor of bridges and buildings on the Lehigh Valley, died on August 24, at his home in Phillipsburg, N. J. Mr. Harwig entered the service of the Lehigh Valley in 1878, and about two years ago left that company to become supervisor of bridges and buildings on the Lehigh & New England.

John Player, formerly superintendent of machinery of the Atchison, Topeka & Santa Fe, died at Chicago on August 14, aged 67 years. Mr. Player began railway work in June, 1873, and until September, 1887, was with the Central Iowa consecutively as machinist, general foreman of shops, master mechanic and also in charge of the car department. He then became superintendent of motive power of the Wisconsin Central, leav-

ing that road in June, 1890, to go to the Atchison, Topeka & Santa Fe as superintendent of machinery, which position he held until January, 1902, when he was appointed consulting superintendent of motive power. In June of that year he retired from active railway service on account of ill health.

Isaac Duell Barton, formerly from 1881 to 1892 general superintendent of the Long Island, died on August 21, at his home in Flushing, N. Y., at the age of 80. He began railway work in 1852, as a station agent on the New York & Harlem, now a part of the New York Central & Hudson River, and was then consecutively freight conductor, passenger conductor, general freight agent and assistant superintendent of the same road. He was then superintendent of the Long Island, and subsequently became superintendent of the United States Rolling Stock Company. He then served consecutively as general superintendent of the Atlantic & Great Western, superintendent of the North Shore & Central of Long Island, superintendent of construction of the Manhattan Beach Railroad, general superintendent of the Indiana, Bloomington & Western, and general superintendent of the Manhattan Beach Railroad. On January 1, 1881, he was appointed general superintendent of the Long Island, remaining in that position until January, 1892, and then was general superintendent of the New York & New England. Mr. Barton was general superintendent of the Brooklyn Elevated Railroad from February, 1894 to 1900, and then retired from active service.

Edgar Thaddeus Welles, vice-president of the Wabash Railroad, with headquarters at New York, died on August 22, at his home in that city. He was born on August 29, 1843, at Hartford, Conn., and was a son of Gideon Welles, who was secretary of the navy in President Lincoln's cabinet. Mr. Welles was graduated from the high school of his native town, and then from Yale College, in the class of 1864. Shortly after leaving college Mr. Welles was admitted to the bar, but never practiced. He was vice-president of the Wabash Railroad since its reorganization and was, previous to that time, vice-president of the Wabash Western Railway. He was formerly president of the Peninsular Railway of Lower California, and in addition was a director of the Ohio & Mississippi, now a part of the Baltimore & Ohio Southwestern, the Wabash and the Peoria & Pekin Union.

E. T. Welles

Rolling Stock for Argentine Railway—The Central Argentine Railway has recently ordered the following rolling stock in England: 40 freight engines, 20 passenger engines, 25 switch engines, 14 sleeping cars, 4 first-class passenger cars, 50 first-class motor cars for the electric line from Buenos Aires to the Tigre, 20 second-class motor cars, 50 trailers, 1 dining car, 15 baggage cars for passenger trains, 15 baggage cars for freight trains, 100 ballast cars, 745 closed freight cars, and 300 freight cars for live stock. With these orders, the total rolling stock of the Central Argentine Railway will be as follows: 265 freight engines, 353 passenger engines, 125 switch engines, 102 sleeping cars, 226 first-class passenger cars, 158 second-class passenger cars, 109 passenger cars for both first and second class, 100 first-class motor cars, 70 second-class motor cars, 100 trailers, 30 dining cars, 11 restaurant cars, 168 baggage cars for passenger trains, 353 baggage cars for freight trains, 334 ballast cars, 11,310 closed freight cars, 1,250 freight cars for live stock, 1,465 flat cars, 2,675 open cars with high sides, 1,841 open cars with low sides, 552 cars with grating, and 38 refrigerator cars.

Equipment and Supplies

LOCOMOTIVE BUILDING

The Detroit, Toledo & Ironton is in the market for 10 locomotives.

The Atlanta, Birmingham & Atlantic has ordered five Mikado type locomotives from the Baldwin Locomotive Works.

The Central of Georgia has indefinitely postponed its inquiry for four locomotives reported in the *Railway Age Gazette* of July 24.

The Illinois Central has withdrawn for an indefinite time its inquiry for three hump switching locomotives reported in the *Railway Age Gazette* of July 24.

The Cincinnati, Hamilton & Dayton, as reported in the *Railway Age Gazette* of last week, has ordered 30 Mikado and 5 Pacific type locomotives from Lima Locomotive Corporation. The Mikado type locomotives will have 64 in. driving wheels, 26 by 32 in. cylinders, a weight on the drivers of 223,600 lb., a total weight in working order of 282,200 lb., a boiler pressure of 190 lb., and a tractive effort of 54,587 lb. The Pacific type locomotives will have 76 in. driving wheels, 24 by 28 in. cylinders, a weight on the drivers of 159,200 lb., a total weight in working order of 248,600 lb., a boiler pressure of 190 lb., and a tractive effort of 34,272 lb.

CAR BUILDING

The Carolina & North Western is in the market for 100 30-ton box cars.

The Winston-Salem Southbound is in the market for about 35 freight cars.

The Chesapeake & Ohio is in the market for 30 eight-wheel steel underframe caboose cars.

The Havana Central has ordered 6 steam and 6 electric passenger cars from the Wason Manufacturing Company. The same company has also placed orders for 315 freight cars.

The Baltimore & Ohio, reported in the *Railway Age Gazette* of August 7 as being in the market for 29 passenger cars for the Cincinnati, Hamilton & Dayton, is in the market for 12 70-ft. coaches and one 73-ft. steel dining, 8 70-ft. passenger and baggage, 5 70-ft. baggage and mail and 4 70-ft. baggage cars.

IRON AND STEEL

The Chicago Surface Lines have ordered 574 tons of steel for underframes for its cars from the J. G. Brill Company.

SIGNALING

The Illinois Central has recently appropriated $14,000 for the equipment of a telephone system of train despatching between Clinton and Centralia, Ill., a distance of 115 miles. Work will be begun immediately, and the date of completion is set as October 1, 1914. This company has just put in operation the Coalfield train despatching telephone system on the St. Louis division. This system extends between Carbondale, Eldorado, Johnston City and Marion, Ill., a total distance of 95 miles.

The Union Switch & Signal Company has taken an order from the Baltimore & Ohio for furnishing the material and installing a type "F" electric interlocking plant at Calumet River Draw; one from the Missouri, Kansas & Texas, for installing a mechanical interlocking plant at Whiteright, Tex., and one from the Nashville, Chattanooga & St. Louis for installing an electro-mechanical interlocking plant at Cravens Yard. This machine will consist of 16 mechanical levers and 16 style "S" electric levers.

Supply Trade News

The C & C Electric & Manufacturing Company, Garwood, N. J., has opened a branch sales office, in charge of R. L. Wells, in the Security building, Minneapolis, Minn.

Graham Dedge, assistant sales manager of the Edgar Steel Seal & Manufacturing Company, Chicago, has been appointed assistant general manager, in addition to his present duties.

R. L. Brown has resigned as sales agent of The Barney & Smith Car Company, Dayton, Ohio, to become associated with Hotchkiss-Blue & Co., Ltd., Railway Exchange building, Chicago.

The Chicago Car Heating Company, Chicago, on August 22, removed its southern office from 521 Realty Trust building, Atlanta, Ga., to 829 Munsey building, Washington, D. C. This office will still be known as the company's southern office and will remain in charge of Harry F. Lowman as southern manager.

C. W. Rhoades has been appointed manager of sales of the Daniels Safety Device Company, manufacturer of the "Bulldog" nut, with office in the Webster building, 327 South La Salle street, Chicago. Mr. Rhoades was formerly assistant sales manager of Valentine & Co., Chicago, and previously was with the St. Louis Surfacer Company.

Wm. Wharton, Jr., & Co., Inc., Philadelphia, Pa., have appointed R. T. Hoffman & Co., Inc., their representatives for the southern Atlantic coast states, effective August 1. The latter company has main offices in the Continental Bank building, Baltimore, Md., and an Atlanta, Ga., office in charge of H. F. McDermott in the Candler building.

H. D. Shute has been elected treasurer of the Westinghouse Electric & Manufacturing Company, to succeed T. W. Siemon, who recently resigned to become secretary and treasurer of the Union Switch & Signal Company. J. J. Hanauer has been elected a director to succeed Paul M. Warburg, resigned, and T. P. Gaylord has been elected vice-president, succeeding Mr. Shute.

W. L. Rickard, of Rickard & Sloan, Inc., New York, will leave that city in the latter part of September to make an extended trip, lasting possibly between four and five months, through South America. He will visit the principal cities on both coasts and will make a thorough investigation of the markets and the best methods of selling machinery and mechanical materials and devices in the Latin-American countries.

Judge Killitts of the United States District Court of the Northern District of Ohio, Western division, on August 15 handed down a decision finding that the Baker valve gear patents Nos. 721, 994 and 1,008,405 of the Pilliod Company are valid and that the Pilliod Brothers Company and Charles J. Pilliod in the manufacture and sale of their so-called B valve gear infringe claim 8 of patent No. 721,994 and claims 1 and 2 of patent 1,008,405. Both defendants are estopped from denying the validity of the latter patent, it being stated in the decision that: "It is quite plain that, while Charles J. Pilliod was still a member of the complainant company, Baker was under obligation to give to that company and did give thereto the benefit of his inventions which crystallized in Baker patent No. 1,008,405, and that the complainant company's interest in this invention was one of the property incidents with which Charles J. Pilliod parted for a valuable consideration when he sold his interest in complainant company."

TRADE PUBLICATIONS

Washers.—The National Malleable Castings Company, Cleveland, Ohio, has recently issued circular No. 52, descriptive of its line of malleable iron washers and bridge pin nuts.

Air Compressors.—Ingersoll-Rand Company, New York, has recently issued Form No. 3030 descriptive of Ingersoll-Rogler class ER-1, power driven single stage straight line air compressors and Form No. 3024 descriptive of Ingersoll-Rogler valves for air compressing cylinders.

Union Pacific.—The passenger department has issued a very attractive folder entitled "The Scenic Columbia River Route to the Great Pacific Northwest," for the purpose of influencing travel to Alaska and the northwest, and also treating of the circle tours of the West.

Tours to the East.—The Great Northern Steamship Company has recently published an interesting folder containing a description and illustrations of numerous points of interest in Japan, China and the Philippines. The booklet also gives detailed information regarding the schedules of the steamer Minnesota, and the accommodations for passengers.

Metal Sheets.—"Evidence" is the title of an interesting booklet recently issued by the Stark Rolling Mill Company, Canton, O., containing testimonial letters from various firms and also views of a large number of buildings upon which Toncan metal corrosion resisting sheets and products were used. The buildings shown are of many varieties, several railway stations and shops being included in the number.

Magneto Telephones.—The Western Electric Company has recently issued a detailed catalogue descriptive of its line of magneto telephones and supplies. The same company has also issued a similar booklet illustrating and describing the various telephone cords which it manufactures. In this it is stated that the Western Electric Company during 1913 shipped 1,218,718 desk stand cords, 1,380,609 switchboard cords, 2,077,513 receiver cords and 1,108,700 transmitter cords.

Rail Reports.—The Titanium Alloy Manufacturing Company has issued bulletin No. 7 of its series of rail reports, giving the results of tests of three additional Titanium treated open hearth and three plain open hearth rails in addition to the 14 similar comparisons published in previous reports. The report is accompanied by sulphur prints, etched sections and photographs of magnified sections. These reports are of more than ordinary interest to students of the rail problem.

Ball Bearings.—The S. K. F. Ball Bearing Company of New York has recently issued bulletin No. 16 dealing with the use of ball bearings as applied to electric motors. The booklet, which contains 36 pages, gives views of ball bearings and of different machines on which they have been installed. The reading matter deals largely with the advantages to be obtained from the use of S. K. F. bearings and names such items as improvements in motor efficiency, lubrication, maintenance charges, compactness, etc.

Pumping Machinery.—The National Transit Company, Oil City, Pa., has recently issued bulletins Nos. 10 and 11 descriptive of the company's line of pumping machinery. The bulletins contain a number of views of the company's shop. There are also illustrations of a number of the pumps which the company makes, a table of sizes and capacities being given in connection with each. Bulletin No. 10, in addition, indicates the information that is necesary in ordering and contains a number of directions for setting up and operating the pumps.

The Young Man and the Electrical Industry.—This is the title of a story written by James H. Collins which has recently been issued in pamphlet form by the Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa. The little book contains an article reprinted from the Scientific American of May 16, 1914, which deals with the opportunities afforded a young man in this industry and the different lines in which he may direct his activities, particular reference being given to the way in which the problem is solved in the work of the Westinghouse company.

Modern Methods in Train Despatching.—The Western Electric Company has issued an attractive 16-page booklet by this name containing a brief history of train despatching and showing wherein telephones are superior to the telegraph. The booklet contains a list of the railroads on which telephones are used. It also contains views of a typical train despatcher's office, a tower, etc., as well as illustrations of the various kinds of equipment used. There is also a very interesting inset in the form of a photographic copy of the Pittsburgh & Lake Erie train despatching sheet for April 19, 1913, on which day the road was able to handle a record-breaking movement by means of its telephone despatching, even though the line was only partly re-established after the floods.

Railway Construction

Beaver, Meade & Englewood.—We are told that grading work has been finished on the section from Beaver, Okla., north to Forgan, 6.5 miles, and contracts have been let to John L. Love, Oskaloosa, Iowa, for the track laying, and to R. F. Baker, Oskaloosa, for building a pile bridge over the Beaver river. The plans call for building from Beaver north to Meade, Kan., 40 miles. Frank McKillips, president, Beaver. (April 17, p. 927.)

Boston Elevated.—The Boston Transit Commission has given a contract to the Hugh Nawn Contracting Company at $673,780 for building section D of the Dorchester tunnel, at Boston, Mass. This contract covers about 800 lineal feet, one-half of which will be tunnel excavation and the other half open cut work.

Canadian Northern.—An officer writes that grading work is about finished on the line from Bienfait, Sask., west to Estevan, about 8.5 miles. The work was carried out by the Western Canada Construction Company, Winnipeg, Man. The only grading yet to be done is a small section at Bienfait, which is now being carried out by H. Nicholson, Estevan, Sask. (August 14, p. 310.)

Canadian Pacific.—The report of this company for the year ended June 30, 1914, shows that the company has 941.5 miles of new line under construction, on which work is now under way, as follows:

Name	Miles
Ontario Division	
Campbellford, Lake Ontario & Western; Glen Tay, Ont., to Agincourt	182.3
Lake Superior Division	
Interprovincial & James Bay; Kipawa, Que., north	10.0
Manitoba Division	
Selkirk branch; Gimli, Man., north	26.0
Snowflake branch; Snowflake, Man., west	10.0
Saskatchewan Division	
Weyburn branch; Shaunavon, Sask., to mile 317	87.7
Moose Jaw Southwest branch; Mileage 35 to 50	15.0
Alberta Division	
Swift Current North branch; Swift Current, Sask., north	23.4
Swift Current North branch; Coronation, Alta., northwest	25.0
Stirling East branch; Stirling, Alta., east	75.0
Bassano East branch; Bassano, Alta., to Empress	118.3
Suffield branch; Suffield, Alta., southwest	27.0
Gleichen branch; Gleichen-Shepard	40.0
Alberta Central; Red Deer, Alta., west	64.5
Kootenay Central; Fort Steele North branch	81.3
Calgary & Edmonton; Lacombe, Alta., east	72.1
British Columbia Division	
Kootenay Central; Golden, B. C., south	18.0
Kaslo & Slocan; Whitewater to Kaslo	17.5
Esquimalt & Nanaimo; Osborne Bay Junction to Crofton	3.4
Esquimalt & Nanaimo; McBride Junction to Courtenay	45.0
Total	941.5

Chehalis & Cowlitz.—See Washington Electric.

Erie & Ontario.—See Toronto, Hamilton & Buffalo.

Glengarry & Stormont.—Work is now under way building from a point about a mile west of Polycarpe station, Quebec, on the Canadian Pacific to Cornwall, Ont., 28 miles. The Glengarry Construction Company, Montreal, Que., has the general contract and sub-contracts have been let for most of the work. A. A. Mellor, chief engineer. (May 1, p. 1011.)

Lehigh Valley.—The report of this company for the year ended June 30, 1914, shows that the extension of the Seneca Falls branch for 5.7 miles to a connection with the New York Central & Hudson River, also the rebuilding of the Cayuga branch and the installation of a "wye" connection with the Auburn & Ithaca branch at Cayuga Junction, N. Y., were completed. Work on a third track from Pittsburgh & Lehigh Junction, N. Y., to North LeRoy 4.98 miles was also finished. During the year the company laid 40.39 miles of company's sidings and 3.81 miles of industrial sidings. Work was finished on the excavation of the rock cut and building the necessary concrete walls to provide room for the construction of a switching lead from Florence yard, and construction of the track will be started soon. An additional switching lead and tracks were constructed at Richards, and a trestle for the necessary tracks for transferring bulk freight was built at Suspension Bridge. Tracks with a capacity of forty cars to provide for the transferring of freight from crippled cars were constructed at Tifft Farm, Buffalo. The yards at Plainsville, Delano and South Plainfield were enlarged; the yard at Sterling was rearranged and the capacity slightly increased, and the yard tracks at Ithaca were moved to a new location.

Missouri, Arkansas & Southwestern.—An officer writes that this company has been incorporated in Arkansas with $2,500,000 capital, to build from Mena, Ark., east to Hot Springs, about 80 miles. The general contract has been given to the Century Construction Company, Mena. A. H. Scoggin, president; J. H. Hamilton, vice-president; Minor Pippin, secretary; J. W. Bradley, treasurer, and George D. Thayer, chief engineer, Mena. (August 21, p. 369.)

Nashville, Shiloh & Corinth.—An officer writes that this company has been given a charter to build from Corinth, Miss., in a general northeasterly direction, via Savannah, Tenn., Waynesboro, Linden and Centerville to Nashville, about 160 miles. Bonds for a total of $750,000 in aid of the project have been voted by several counties along the proposed route. About October 1, the city of Nashville and the county of Davidson will vote on the question of issuing $1,250,000 additional bonds, and if carried the construction of the line will be started at once. The plans include building a drawbridge over the Tennessee river, and also two other bridges over the Buffalo river. The company expects to develop a traffic in iron ore, phosphate and timber, also agricultural products. Allen W. Jones, president, Midville, Ga., and Clopton Thomas, secretary, Corinth, Miss. (August 7, p. 268.)

New York Subways.—The New York Public Service Commission, First district, has given a contract to the Flinn-O'Rourke Company, Inc., for building Section 3 of Route No. 33, the Montague street section of the Whitehall-Montague street tunnel in the borough of Brooklyn. This firm was the lowest bidder at $3,395,152. The commission is asking for bids until September 15, for building Section 2 of Route No. 48, the William street section of the Park place, William and Clark street subway.

Norfolk & Western.—An officer writes that a contract has been given to W. W. Boxley & Co., Roanoke, Va., to build the Tug River & Kentucky up Blackberry creek to the mouth of Peters creek, in Pike county, Ky., about 1.4 miles, also for building the masonry of a bridge over Tug river.

Pennsylvania Railroad.—We are told that a contract has been given to A. L. Anderson & Brothers, Inc., Altoona, Pa., to build a 3.5-mile single track extension of the Homer & Cherrytree branch of the Conemaugh division to coal lands in Indiana county, Pennsylvania.

Salt River Valley (Electric).—An officer writes that a contract will be let within thirty days to build from Phoenix, Ariz., south thence east via Tempe to Mesa thence south to Chandler. The company plans to build one steel bridge, a car-barn, power house and also a number of sub-stations, and expects to develop a traffic in local freight, alfalfa, dairy products, fruit, vegetables and live stock. The headquarters of the company are at Phoenix.

San Diego & Arizona.—Bids were recently received by this company, it is said, to build about 46 miles of line through San Diego county, Cal. The lowest bidder was the Utah Construction Company, Ogden, Utah. This company is building from Seeley, Cal., west through California and Mexico to San Diego, Cal., 139 miles, of which about 65 miles has been completed. (April 24, p. 967.)

Savannah Western.—Incorporated in South Carolina with headquarters at Columbia to build from Estill, northeast through Hampton, Colleton, Bamburg, Orangeburg and Clarendon counties to St. Paul, about 90 miles. The incorporators include G. H. Milligan, Charleston, S. C., Virgil Walker and Adrian M. Rea of Newbern, N. C.

Southern Railway.—An officer writes that contracts have just been let for the construction of 36 miles of double track on the Danville division between Greensboro, N. C., and Pelham. The contract from mile post 248 to 263 was let to the Parker Brooks Construction Company, Greenville, S. C., and from mile post 263 to 284 to the Morrow Contracting Company, Atlanta, Ga. This makes a total of 75 miles of double track work on the Washington-Atlanta line which the Southern has placed under contract recently.

Texas Roads.—I. H. Fetty of Kansas City, Mo., and associates will build a 15-mile railroad from Conroe, Tex., to timber lands, which they control. It is said that the line will be operated chiefly in the interest of the Delta Land & Lumber Company and will be extended later to a point in eastern Texas.

Toronto, Hamilton & Buffalo.—An officer of the Erie & Ontario writes that this company has been incorporated in Canada and the general location from Smithville, Ont., via Dunnville to Port Maitland about 20 miles has been approved. Contracts were let recently to Fitch & Douglas, Oshawa, and to Robert Bennett, Dunnville, and construction work is well under way between Smithville and Dunnville which is on the Grand river, 4.5 miles from Port Maitland. The grading work involves handling about 8,000 cu. yd. to the mile. The maximum grades will be 0.4 per cent and maximum curvature 3 deg. on the main line and 8 deg. on branch lines to the terminals. The plans call for building an 87-ft. steel bridge over Twenty Mile creek; two 160-ft. trestles over Welland river and Oswego creek, and a passenger station with a freight shed at Dunnville. The principal commodities the line will carry are manufactured articles, farm produce and merchandise. The prospects of making Dunnville an industrial center is largely the reason for building the line. J. N. Beckley, president, Rochester, N. Y., and R. L. Latham, chief engineer, Hamilton, Ont. (August 7, p. 269.)

Washington Electric.—Work is now under way on the 10-mile extension of the Chehalis & Cowlitz, it is said, along the south fork of the Newaukum river to a point beyond Onalaska. (May 22, p. 1171.)

RAILWAY STRUCTURES

Chicago, Ill.—Plans are being made for beginning work on the new union station soon after September 20. The roads have until that date to accept the ordinances providing for the erection of the station. The Union Station Company has decreased its capital stock from $50,000,000 to $3,500,000.

Gunpowder, Md.—The Pennsylvania Railroad has given a contract to the J. T. Gorsuch Construction Company, Baltimore, Md., for renewal work on the concrete bridge at Gunpowder falls.

Mortonville, Pa.—The Philadelphia & Reading has given a contract to Enos L. Seeds, Philadelphia, Pa., it is said, to build a re-inforced concrete bridge at Mortonville.

San Diego, Cal.—The new passenger station of the Atchison, Topeka & Santa Fe at San Diego, Cal., which is being erected at the foot of Broadway, on the site of the old station, is about one-third completed. The new building is 55 ft. by 292 ft. in area and one story high. It is of steel frame construction with a brick veneer and finished in stucco. There will be four additional tracks leading to the station. Work was begun in March, and it is planned to complete it by January 1, 1915. The estimated cost, including the laying of the new tracks, is $325,000. The William Simpson Construction Company, San Diego, has the general contract for the erection of this station.

Railway Extension in the Shantung Province of China.—At the present time there are 946 miles of railway in the Chinese Shantung Province, 256 miles of which are included in the Shantung railway and 690 miles in the Tientsin-Pukow line. It has also been proposed to construct three new lines as follows: From Tehchow on the Tientsin-Pukow line to Shuntefu on the Peking Hankow Railway, about 150 miles distant; from Kaomi on the Shantung Railway southwest to Hsuchowfu also on the Tientsin-Pukow line, about 300 miles distant, and from Chefoo to Weihsien on the Shantung Railway, 200 miles. It was reported a short while ago that arrangements were being perfected in Peking between the German commissioners and the Chinese Government for the construction of the first two lines. It was presumed that they would be constructed by German capital and under German superintendence, eventually to be turned over to the Chinese Government for operation by the Chinese in a similar fashion to the Tientsin-Pukow line. The matter of constructing the projected Chefoo-Weihsien line was likewise receiving the consideration of the Chinese Government, and it was reported that the road would probably be constructed with German capital and German materials also.

Railway Financial News

Michigan Central.—The company announced last week that one year 6 per cent notes, maturing this week, to the amount of $2,000,000 would be paid off.

Mobile & Ohio.—A special meeting of stockholders has been called, to be held at Mobile, September 25, to vote on a proposal to authorize the issuance of bonds to the amount of $50,000,000. The company has abandoned the proposed note issue of $3,000,000, which was part of the financial plan announced recently to provide for real estate, improvements and equipment. The present proposal is to issue bonds as the market may be found to be favorable. Among the items for which money is needed in the immediate future are $1,200,000 to reimburse the company's treasury for expenditures for additional real estate in Birmingham and Mobile, new yard facilities at Meridian, Miss., and other improvements; $1,200,000 for additional passing and other tracks, double-tracking 57 miles of main line, additional water and coal stations, and additional shop facilities.

New Jersey & Pennsylvania.—See Northern Central of New Jersey.

New York, New Haven & Hartford.—This company has issued a brief statement of the financial results for the 12 months ended June 30, which shows balances over fixed charges, for the several companies in which the New Haven is interested, as follows:

New York, New Haven & Hartford, surplus	$268,662
Central New England, surplus	230,020
New York, Ontario & Western, surplus	663,692
New England Steamship Company, *deficit*	77,802
Hartford & New York Transp'n Co., surplus	85,965
New Bedford, M. V. & N. Steamboat Co., surplus	62,708
The Connecticut Company, surplus	1,501,072
The Rhode Island Company, surplus	347,642
Berkshire Street Railway Company, *deficit*	72,507
New York & Stamford Railroad Company, *deficit*	5,824
Westchester Street Railway Company, surplus	4,883
New York, Westchester & Boston, *deficit*	246,923
Housatonic Power Company, surplus	78,506
Westport Water Company, surplus	1,664

The New Haven's interest in the Ontario & Western is only 50.1 per cent. The statement says:

"Every property in which the New Haven is interested earned all fixed obligations except The New England Steamship Company and that company showed improved results, in that the shortage of $355,070 for the fiscal year ending June 30, 1913, was reduced to $77,802. The Berkshire Street Railroad shows an improvement of $19,354. The New York & Stamford reduced a deficit last year of $36,556 to $5,824 this year. The New York, Westchester & Boston (apart from the interest on its bonds and notes) reduced its deficit from $334,554 to $246,923, an improvement of $87,630. The Rhode Island trolleys had a new wage scale on a much higher basis than a year ago, in addition to heavy maintenance expenses. The steamer lines all did a little better in net than last year."

For the New Haven proper the statement is as follows (cents omitted):

	Month of June		Twelve months to June 30	
	1914	1913	1914	1913
Operating Revenue, including net results of Outside Operations	$5,775,784	$5,386,488	$66,703,172	$69,258,950
Operating Expenses and Taxes	4,447,427	3,592,801	52,083,568	50,942,094
Operating Income	$1,328,356	$1,793,687	$14,619,604	$18,316,855
Other Income	2,086,708	5,472,262	7,247,989	10,063,784
Gross Income	$3,415,065	$7,265,950	$21,867,593	$28,380,640
Deductions—interest, rentals, etc.	1,848,499	1,636,310	21,598,931	19,458,402
Net Corporate Income	$1,566,566	$5,629,639	$268,662	$8,922,237

Northern Central Railroad of New Jersey.—This is the name of a company which is being organized to take over the New Jersey & Pennsylvania Railroad, which is being rehabilitated by the Central New Jersey Construction Company. The president of the new company is Frank W. Patterson of Bound Brook, N. J. The line of the road is from White House, on the Central of New Jersey, northward, 27 miles, to Morristown.

ANNUAL REPORTS

SIXTIETH ANNUAL REPORT OF THE LEHIGH VALLEY RAILROAD COMPANY

PHILADELPHIA, August 12, 1914.

To the Stockholders of the
LEHIGH VALLEY RAILROAD COMPANY.

The Board of Directors herewith submit the annual report of the business and condition of your Company for the fiscal year ended June 30, 1914.

MILEAGE

The first track mileage owned or controlled and operated by the Lehigh Valley Railroad Company, the main line of which is double track, extending from Jersey City, N. J., to Buffalo and Suspension Bridge, N. Y., is as follows:—

	Miles
Lehigh Valley Railroad Company	316.90
Controlled by ownership of entire capital stock	938.90
Controlled by ownership of majority of capital stock and lease	115.37
Operated under lease	27.73
Total mileage operated (owned or controlled)	1,398.90
Trackage rights over railroads owned by other companies	44.84
Total first track mileage	1,443.74

In addition to the above there are 595.36 miles, or 41.24 per cent., of second track, 99.51 miles of third track, 44.84 miles of fourth track and 1,207.56 miles of yard tracks and sidings, a total of 3,391.01 miles of track in operation at the close of the year. A detailed statement of track mileage is shown on pages 49 to 51. The average number of miles of railway operated for the year was 1,439.99, upon which the mileage statistics in certain tables submitted in this report are based.

The total increase of 36.18 track miles over the preceding year is due, in the main, to the construction of the Seneca Falls Branch, extension of third track and additional sidings at terminals and important yards.

OPERATING REVENUES AND EXPENSES

The following statements sets forth the total revenues and expenses and net revenue from operation for the fiscal year, not including outside operations and other income, compared with similar figures for the fiscal year 1913. The complete income account appears on page 26.

OPERATING REVENUES

FROM	1914	1913	INCREASE	DECREASE
Coal freight	$18,492,683.35	$20,385,389.09	.....	$1,892,705.74
Merchandise freight	15,026,684.11	16,339,748.97	.....	1,313,064.86
Passenger	4,795,147.44	4,867,554.03	.....	72,406.59
Mail	195,052.87	191,821.11	$3,231.76	.....
Express	443,971.75	506,191.11	.....	62,219.36
Other transportation	478,453.44	415,731.71	62,721.73	.....
Miscellaneous	351,570.99	336,935.87	14,635.12	.....
Total operating revenues	$39,783,563.95	$43,043,371.89	.....	$3,259,807.94

OPERATING EXPENSES.

	1914	1913	INCREASE	DECREASE
Maintenance of way and structures	$4,575,061.96	$5,694,422.24	.....	$1,119,360.28
Maintenance of equipment	7,011,946.34	7,561,270.87	.....	549,324.53
Traffic expenses	1,002,872.11	982,857.66	$20,014.45	.....
Transportation expenses	14,071,182.70	13,993,617.35	77,565.35	.....
General expenses	948,098.72	875,651.45	72,447.27	.....
Total operating expenses	$27,609,161.83	$29,107,819.57	.....	$1,498,657.74
NET OPERATING REVENUE	$12,174,402.12	$13,935,552.32	.....	$1,761,150.20
Ratio of operating expenses to operating revenues	69.40%	67.62%	1.78%	.....

OPERATING REVENUES.

COAL FREIGHT.

The transportation of coal and coke produced a revenue of $18,492,683.35, a decrease of $1,892,705.74, or 9.28 per cent., as compared with the preceding twelve months.

The percentage of coal freight revenue to total operating revenues was 46.48 per cent., a decrease of .88 per cent.

The coal and coke transported, excluding the Company's supply coal, was 16,464,948 tons, a decrease of 1,430,459 tons, or 7.99 per cent.

This class of tonnage was 55.02 per cent. of the total tonnage hauled during the year, a decrease of .27 per cent.

MERCHANDISE FREIGHT.

The revenue received from the transportation of merchandise freight was $15,026,684.11, a decrease of $1,313,064.86, or 8.04 per cent., as compared with the preceding year.

The revenue derived from the transportation of merchandise freight was 37.77 per cent. of the total operating revenues, a decrease of .19 per cent.

The tonnage moved, excluding Company's material, was 13,459,171 tons, a decrease of 7.00 per cent.

GENERAL FREIGHT.

The total revenue from both coal and merchandise freight was $33,519,367.46, a decrease of $3,205,770.60, or 8.73 per cent., as compared with the preceding twelve months.

The entire freight traffic amounted to 29,924,119 tons, a decrease of 2,443,677 tons, or 7.55 per cent.

The number of tons carried one mile was 5,218,751,555, a decrease of 593,633,362 ton miles, or 10.21 per cent.

The average haul was 174.40 miles, a decrease of 5.17 miles, or 2.88 per cent.

The average revenue per ton was 112.01 cents, as compared with 113.46 cents last year, a decrease of 1.45 cents, or 1.28 per cent.

Company's freight, not included in the above, amounted to 3,135,755 tons, a decrease of 186,286 tons, or 5.61 per cent.

The total freight train mileage was 8,768,300 miles, a decrease of 935,011 miles, or 9.64 per cent.

The revenue received per freight train mile was $3.82, an increase of $0.04, or 1.06 per cent.

The average trainload of revenue freight was 595.18 tons, a decrease of 3.83 tons, or .64 per cent. Including Company's freight, the average trainload was 617.13 tons, a decrease of 3.58 tons, or .58 per cent.

PASSENGER.

The earnings from passenger traffic amounted to $4,795,147.44, a decrease of $72,406.59, or 1.49 per cent., compared with the preceding year.

The total number of passengers carried was 5,729,042, an increase of 210,518, or 3.81 per cent.

The number of passengers carried one mile decreased 6,353,172, or 2.34 per cent.

The average revenue per passenger was 83.70 cents, a decrease of 4.50 cents, or 5.10 per cent.

The average revenue per passenger per mile was 1.807 cents, an increase of .015 cent, or .84 per cent.

The average distance traveled by each passenger was 46.31 miles, a decrease of 2.92 miles, or 5.93 per cent.

Passenger train mileage was 4,340,095, a decrease of 150,918 miles, or 3.36 per cent., as compared with a decrease in this revenue of 1.49 per cent.

The average revenue from passengers per passenger train mile was 110.48 cents, an increase of 2.10 cents, or 1.94 per cent.

MAIL.

The sum of $195,052.87 was received from the Federal Government for the transportation of United States mails, an increase of $3,231.76.

EXPRESS.

The revenue from this class of business amounted to $443,971.75, a decrease of $62,219.36.

OTHER TRANSPORTATION.

The earnings derived from transportation other than shown under the preceding headings were $478,453.44, an increase of $62,721.73.

MISCELLANEOUS.

Miscellaneous revenue amounted to $351,570.99, an increase of $14,635.12.

OPERATING EXPENSES.

MAINTENANCE OF WAY.

The expenditures for maintenance of way and structures amounted to $4,575,061.96, a decrease of $1,119,360.28, or 19.66 per cent., as compared with the preceding year.

Seven steel bridges, one concrete-steel bridge and seven steel reinforced concrete culverts were built in connection with additional track construction. Eighteen steel bridges and six concrete-steel bridges were placed in the track, replacing light iron or wooden bridges and seven iron bridges were strengthened. Seven bridges were replaced by pipe culverts and three iron bridges were abandoned and the openings filled. One steel highway bridge with concrete floor was built to eliminate a grade crossing, one wooden highway bridge was replaced by a steel structure and one iron highway bridge was replaced by a new steel bridge with concrete floor. One arch culvert was extended for two additional tracks and another was filled up and abandoned.

4,203 tons of 110-pound rail, 21,440 tons of 100-pound rail and 31 tons of 90 pound rail, together with necessary frogs, switches, etc., were placed in the track.

1,146,583 tie plates and 238,649 anti-rail creepers were used.

809,663 cross ties, 2,323,285 feet B. M. switch ties, 615,754 feet B. M. bridge ties and lumber amounting to 4,139,088 feet B. M. were used.

537,952 of the cross ties, 1,882,832 feet B. M. of switch ties and 560,112 feet B. M. of bridge ties were treated with creosote.

40,761 cubic yards of crushed stone were used in ballasting track. 40,512 feet of drain tile were placed in the roadbed.

1,630.47 miles of copper and 148.76 miles of iron wire were used in extending and renewing the telephone, telegraph and signal wires on the system.

MAINTENANCE OF EQUIPMENT.

The sum of $7,011,946.34 was expended for the maintenance of equipment, a decrease of $549,324.53, or 7.26 per cent., as compared with the preceding twelve months. Included therein is a charge of $1,234,729.16 for the depreciation of equipment, as called for by the accounting requirements of the Interstate Commerce Commission.

Sixteen worn-out locomotives, one combined passenger and baggage car, one express car, 730 freight equipment cars and forty-two road service cars were condemned and either sold or destroyed during the year and their value written off the books by appropriate charges through operating expenses.

Three library buffet cars were converted into combined passenger and baggage cars, one baggage and express car into a combined baggage and mail car, three passenger coaches and one combined passenger and baggage car into workmen's cars and 169 produce cars into ice cars. Three combined passenger and baggage cars were transferred to caboose service and 140 freight equipment cars to road service.

One light passenger engine has been converted into an inspection engine. Seventy-six locomotives have been equipped with additional air pumps and fifty-two with bull's-eye lubricators, replacing old tubular lubricators, to meet the requirements of the Interstate Commerce Commission. 1,044 locomotives received heavy and general repairs.

411 passenger equipment cars received heavy repairs, 252 were painted and varnished and thirty-six equipped with electric lighting apparatus. Two dining cars, twelve wooden coaches and one milk car were equipped with steel underframes.

Steel underframes were applied to 1,779 wooden freight and coal cars, making a total of 12,372 cars so equipped during the last six years. 9,643 freight equipment cars, 154 passenger equipment cars and thirty-nine road service cars were equipped with safety appliances to conform to the requirements of the Interstate Commerce Commission. 261 steel coal cars and high side gondolas, of 100,000 pounds capacity each, were equipped with solid steel wheels. 27,480 freight equipment cars received heavy and general repairs.

The total number of locomotives on hand at the close of the year was 947, with a tractive power of 30,231,790 pounds. The total number of freight equipment cars was 46,080, with a capacity of 1,710,000 tons.

TRAFFIC EXPENSES.

The expenditures under this heading amounted to $1,002,872.11, an increase of $20,014.45, as compared with the preceding twelve months.

TRANSPORTATION EXPENSES.

The cost of conducting transportation was $14,071,182.70, an increase of $77,565.35, or .55 per cent., over the preceding year.

The ratio of transportation expenses to total operating revenues was 35.37 per cent., as compared with 32.51 per cent. last year, an increase of 2.86 per cent.

GENERAL EXPENSES

This class of expenses amounted to $948,098.72, or 2.38 per cent. of the total operating revenues. The increase of $72,447.27, compared with the preceding year, is due almost entirely to the expenses incurred in valuing the Company's property.

TAXES.

The taxes accrued on your property, capital and business during the year amounted to $1,691,241.47, an increase of $82,090.08 over the preceding year.

ADDITIONS AND BETTERMENTS.

There was expended during the year, for the acquisition of new property and for the improvement and development of existing property, the sum of $7,647,524.25, which was charged to Additions and Betterments. A statement of these expenditures, classified as required by the Interstate Commerce Commission, appears on page 46. The more important expenditures are here specifically referred to:—

The new equipment purchased and added to the property during the year is as follows: Thirty-eight freight locomotives, seven passenger locomotives, fifteen switching locomotives, seven locomotive tenders, thirty-five steel passenger coaches, one thousand 80,000-pound steel underframe box cars, two thousand 100,000-pound steel coal cars, twenty-six 100,000-pound flat cars, three steel well cars of 220,000 pounds capacity each, one hundred eight-wheel cabooses, two locomotive cranes and one 120-ton steam derrick. A portion of this equipment is covered by the Equipment Trusts mentioned in detail under the heading "Financial."

In addition to the foregoing, orders have been placed for three passenger locomotives, ten switching locomotives, thirty steel passenger coaches, ten steel smoking cars, twenty-five steel baggage cars, twenty-five 80,000-pound flat cars and twenty-four 100,000-pound flat cars.

Construction work in connection with the passenger and freight terminals at Buffalo is being advanced as rapidly as possible. The raising and lengthening of the viaducts carrying the several streets over the right of way was practically completed June 30th. Detail plans for the station structures are in course of preparation and work will be started thereon at an early date, as provided in the contract with the City of Buffalo.

The extension of the Seneca Falls Branch for a distance of 5.7 miles to a connection with the New York Central and Hudson River Railroad, the rebuilding of the Cayuga Branch and the installation of the necessary "Y" connection with the Auburn and Ithaca Branch at Cayuga Junction were completed and the line placed in operation on July 1, 1914. These improvements, together with trackage rights over the New York Central and Hudson River Railroad for a distance of 2.2 miles, mentioned in the preceding annual report, will shorten the haul from Auburn and points north to Geneva and points west by 55.2 miles.

The third track from Pittsburg and Lehigh Junction to North LeRoy, a distance of 4.98 miles, referred to in the last annual report, was completed, making a continuous third-track system of 12.07 miles on an ascending grade between the former point and Stafford. This improvement will greatly facilitate the movement of freight trains.

213,259 feet, or 40.39 miles, of Company's sidings and 20,117 feet, or 3.81 miles, of industrial sidings were constructed during the year.

The excavation of the rock cut and the building of the necessary concrete retaining walls to provide room for the construction of a switching lead from Florence Yard, mentioned in the preceding annual report, have been completed and the construction of the track will be undertaken shortly. An additional switching lead and tracks for crippled cars were constructed at Richards. A trestle with the necessary tracks for transferring light freight was built at Suspension Bridge and tracks with a capacity of forty cars to provide for the transferring of freight from crippled cars were constructed at Tifft Farm, Buffalo. The yards at Plainsville, Delano and South Plainfield were shipped, resulting in increased capacities of 205, 93 and 80 cars, respectively, and the yard for the interchange of business with the New York Central and Hudson River Railroad at Sterling was re-arranged and the capacity slightly increased. The yard tracks at Ithaca were moved to a new location, the land on which they formerly laid having been transferred to the State of New York for barge canal purposes.

Additional freight delivery tracks, with paved driveways, were constructed at East 22nd Street, Bayonne, and the driveways leading to the freight house at Elmira, the passenger and freight stations at Cortland and the passenger station at Hazleton were paved.

The concrete and steel platforms, with necessary office and other buildings at Manchester, mentioned in the last annual report, have been completed and placed in operation. To facilitate the transferring of freight, electrically operated trucks are used.

Seventeen stalls of reinforced concrete construction, each 102 feet in length, were added to the Coxton roundhouse, making a total of thirty-two stalls, and in connection therewith a steel and brick machine shop was constructed.

To improve the method of cleaning the interior of freight cars used in the transportation of grain and grain products, a track with platform and hot water connections was installed at Tifft Farm, Buffalo. The rebuilding of the ore dock at that point, mentioned in the preceding annual report, was completed and an electric car haulage system was installed on the coal shipping trestle.

Hollow tile and concrete structures were erected as follows: A passenger and freight station at Gorham; a passenger station at Lehighton; a freight house at East 22nd Street, Bayonne; and a tool and bunk house at Vosburg.

An ice house of 1,000 tons capacity was erected at Mauch Chunk. The ice house at Jutland was enlarged and the freight station and platform at Rochester were extended. At Warren Street, Jersey City, the milk platform was extended and the driveway paved. Improvements were made to the milk shipping stations at Jutland, Wysox, Springville, Freeville, Truxton and Fair Haven.

At Wilkes-Barre, Cortland, Auburn and Canastota 46-ft. track scales were installed, replacing 38-ft. scales, and the track scales at National Stores were strengthened and moved to a new location.

An air-testing plant was installed in the Claremont Yard, Jersey City, and air compressors were placed in the enginehouse at Lehighton and the machine shop at Hazleton. A new air compressor, with necessary extensions of the pipe lines, and an electric generator for lighting the buildings and yard, were installed at Delano. A thirty-ton electric derrick was erected at Easton.

At Coxton and Lehighton 100-ft. electrically operated turntables were installed and the 75-ft. turntable replaced at Coxton was moved to Towanda. The 60-ft. turntable at Auburn was replaced with a 70-ft. table and an electric tractor was installed on the one at Cortland.

Eighteen gasoline motor cars were purchased for use of section, bridge, signal and telegraph gangs, making a total of ninety-nine now in service.

Two 40,000-gallon standard steel water tanks were erected at the Lehighton enginehouse, replacing one wooden tank, and a new 50,000-gallon wooden tank on concrete foundation was erected at Richford. A brick addition is being made to the pumphouse at Manchester and new large capacity steam pumps with boilers are being installed. Owing to the recurring shortage of water on the Mountain Cut-Off during the summer season, an emergency pumping system was installed in connection with the Gardner's Run water station, drawing water from another source. Extensive improvements are being made in connection with the water supply at Lehighton and Packerton, comprising the construction of a reservoir of 5,000,000 gallons capacity on Beaver Run and a dam across Mahoning Creek, together with electric pumping machinery and necessary pipe lines, which will afford an independent and ample supply of water for the locomotives and shops at those points.

Mechanical interlocking plants were installed at the coal docks at Perth Amboy and at the ends of the third and fourth tracks west of Flagtown. A complete revision of the interlocking at Pittsburg and Lehigh Junction was made in connection with the third track work in that vicinity. Improvements were made to the interlocking plants at East Penn Junction, Packerton, Black Creek Junction, Hazle Creek Junction, Pittston Junction and Tifft Farm Junction.

The Lehigh and Lake Erie and Ithaca Branches have been completely equipped with three-position upper-quadrant automatic acetylene gas lighted signals and the new third track from Pittsburg and Lehigh Junction to North LeRoy with two-position lower-quadrant automatic signals. The automatic disc signals between Slatington and Phillipsburg have been replaced by three-position upper-quadrant signals, acetylene gas lighted, and the automatic disc signals between Athens and Laceyville have been replaced by two-position lower-quadrant signals. Mechanical signals were installed at Gerhard's, Stewarts and Quakake to protect crossovers at those points. Controlled absolute electric block signals were placed at New Boston Junction and manual absolute block signals were installed at Mt. Carmel.

Visible and audible crossing signals were installed at nine highway crossings at grade and at three crossings visible features were added to the audible signals already in service.

New telegraph and telephone pole lines were erected for a distance of 1.50 miles on the New Jersey and Lehigh Division, .33 mile on the Mahanoy and Hazleton Division, 5.70 miles on the Auburn Division and .35 mile on the Buffalo Division. Telegraph and telephone lines were rebuilt for a distance of 1.58 miles on the New York Division, 14.65 miles on the New Jersey and Lehigh Division, 10.65 miles on the Wyoming Division, one mile on the Auburn Division and 22.35 miles on the Buffalo Division. Poles were reset for a distance of 38.55 miles on the New Jersey and Lehigh Division and 18.30 miles on the Wyoming Division.

FINANCIAL

To provide cash funds for the retirement of $2,000,000 Elmira, Cortland and Northern Railroad Company Five and Six Per Cent. Bonds, which matured April 1, 1914, the purchase of additional equipment and the prosecution of needed improvements to the property, your Company issued, under its General Consolidated Mortgage dated September 30, 1903, $10,000,000 Four and One-half Per Cent. Gold Bonds, maturing May 1, 2003, which were sold and the proceeds used or will be used for the purposes stated. The mortgage in question provides for the issuance of bonds bearing interest at such rate as the Company may, from time to time, determine, up to but not exceeding five per cent. per annum. Although previous issues of bonds under that mortgage have been at the interest rate of four per cent., after careful reflection by the Board of Directors, it was deemed advisable to have the above issue bear interest at the rate of four and one-half per cent. per annum, in view of the existing condition of the market for railroad securities.

These $10,000,000 bonds represent the only new capital obligations issued and sold by your Company to provide it with funds for capital expenditures since the sale to stockholders, in 1910, of 403,338 shares of capital stock at par, which produced funds of $20,166,900. Since then, viz., July 1, 1910, the Company has made capital expenditures (referred to in the yearly reports) for the retirement of obligations in the hands of the public, acquisition of new property and improvements to existing property, as follows:—

SECURITIES IN HANDS OF PUBLIC RETIRED:—

Bonds:—		
Lehigh Valley Railroad Company Second Mortgage 7%	$6,000,000.00	
Lehigh Valley Railroad Company Collateral Trust 4% (matured)	4,000,000.00	
Lehigh Valley Railroad Company Collateral Trust 4% (purchased)	1,255,592.89	
Elmira, Cortland and Northern Railroad Company First Mortgage Preferred 6%	750,000.00	
Elmira, Cortland and Northern Railroad Company First Mortgage 5%	1,250,000.00	
Equipment Trust, Series J, Certificates 4½%	2,000,000.00	
		$15,255,592.89
Capital Stock Guaranteed by Lehigh Valley Railroad Company:—		
Morris Canal and Banking Company Preferred 10%	$1,476,917.65	
Morris Canal and Banking Company Consolidated 4%	472,027.12	
		1,948,944.77
Real Estate Mortgage		115,000.00
EXPENDITURES FOR PROPERTY:—		
Construction Hays Creek and Buck Mountain Branches		1,069,889.74
New property and additions and betterments chargeable to Capital Accounts of Lehigh Valley Railroad and subsidiary companies		9,911,766.73
Rolling stock and floating equipment		12,028,267.86
Total July 1, 1910, to June 30, 1914, inclusive		$40,329,461.99
Proceeds of increase in capital stock in 1910		20,166,900.00
Balance		$20,162,561.99

From the foregoing it will be observed that up to the close of the present fiscal year the Company has expended $20,162,561.99 in excess of the funds raised by the increase in the capital stock. That portion of the funds representing this balance, not derived from the sale of the $10,000,000 of bonds referred to, has been provided out of the cash resources of the Company.

The following capital obligations of your Company matured and were retired during the year:—

DESCRIPTION	INTEREST RATE	MATURITY	AMOUNT
Collateral Trust Bonds	4%	Feb. and Aug.	$1,000,000
Equipment Trust, Series I, Certificates	4%	September	400,000
Equipment Trust, Series J, Certificates	4½%	Mar. and Sept.	500,000
Equipment Trust, Series K, Certificates	4%	Mar. and Sept.	300,000
Elmira, Cortland and Northern Railroad Company Bonds:—			
First Mortgage Preferred	6%	April	750,000
First Mortgage	5%	April	1,250,000
Total			$4,200,000

An Equipment Trust, designated Series L, was created during the year, under which were issued $2,400,000 Four and One-half Per Cent. Certificates, maturing in semi-annual installments April 1st and October 1st, each year, the final maturity being October 1, 1919. $200,000 matured April 1st and the remainder, $2,200,000, have been placed in the treasury and are available for sale or other disposition as occasion may require. This trust is a

lien upon one thousand self-clearing double hopper steel coal cars of 100,000 pounds capacity each, one thousand steel underframe box cars of 80,000 pounds capacity each and twenty-five freight locomotives.

An additional Equipment Trust, known as Series M, covering the issue of $1,800,000 Four and One-half Per Cent. Certificates, was also authorized and will be a lien upon one thousand self-clearing double hopper steel coal cars of 100,000 pounds capacity each, sixty-five steel passenger coaches, twenty-five steel baggage and express and ten steel smoking cars. This equipment is now under construction and delivery will be completed in the near future, at which time the certificates will be executed and placed in the treasury. These certificates will mature in annual installments of $200,000 on March 1st each year, commencing March 1, 1915, the last installment falling due March 1, 1923.

The advances made by the Lehigh Valley Railroad Company to subsidiary companies, of which it owns the entire capital stock, were reimbursed by the issuance of Fifty-Year Five Per Cent. Gold Debentures, as follows:

The Lehigh Valley Rail Way Company	$3,000,000
Lehigh Valley Railroad Company of New Jersey	275,000
Lehigh Valley Transportation Company	175,000
Pennsylvania and New York Canal and Railroad Company	135,000
National Storage Company	35,000
Easton and Northern Railroad Company	18,000
Montrose Railroad Company	3,000

These securities, with the exception of those issued by the Montrose Railroad Company which are in your treasury, have been deposited with the Trustee as required by the terms of the General Consolidated Mortgage. Included in the advances to The Lehigh Valley Rail Way Company, for which $3,000,000 of debentures as above were received, is the sum of $2,000,000 which was used to retire a like amount of bonds of the Elmira, Cortland and Northern Railroad Company which matured April 1, 1914, that company having been merged with The Lehigh Valley Rail Way Company in February, 1905.

There have also been received and placed in the treasury of your Company $30,000 Wyoming Valley Water Supply Company First Mortgage Five Per Cent. Bonds, in reimbursement of advances made to that company for capital expenditures.

The account "Advances to Subsidiary Real Estate Companies" shows an increase of $117,020.74 over the preceding year, due to additional real estate acquired for terminal and other improvements.

The charter of the Penn Haven Junction and Glen Onoko Railroad Company, organized in 1902 to project a branch line from Penn Haven Junction to Glen Onoko, was allowed to lapse, as there was no further necessity for maintaining that corporation. The nominal amount of capital stock issued has been written off the books.

In accordance with the practice in preceding years the book value of the capital stock of Coxe Brothers & Company, Incorporated, has been reduced by the sum of $1,000,000, Profit and Loss having been charged with that amount.

Materials and Supplies on hand at the close of the year amounted to $3,373,260.78, a decrease of $492,084.99.

Working Assets are $3,077,353.61 in excess of Working Liabilities.

Semi-annual dividends of five per cent. each on the preferred and common capital stocks of the Company were declared in December, 1913, payable in January, 1914, and quarterly dividends of two and one-half per cent. each were declared in March and June, 1914, payable in April and July, 1914, respectively.

Certified public accountants have verified the cash and security balances of the Company for the year and furnished a certificate as to the correctness of the same, which is given on page 21.

GENERAL REMARKS

The Company has experienced a sharp decline in its earnings for the year under review from practically all sources of revenue as a result of the general business depression throughout the country. In addition, the earnings from the transportation of anthracite coal have been adversely affected by dull trade conditions in that commodity incident to the exceptionally mild winter, particularly in the Northwest. Some reduction was effected in the operating expenses, but with the high rates of wages paid and high prices of all commodities required in railroad operation it was impossible to reduce expenses proportionately to the falling off in earnings. The increase due to compliance with the so-called "Full Crew Laws" of the States through which your Company's lines pass and the increase granted labor amounted to approximately $375,000 for the year. All work not immediately necessary for safety and economy of operation or to maintain the property in its usual high state of efficiency, together with such improvements and extensions as could be deferred, has, of course, been suspended until general business improves.

In order to establish a closer relationship in the operation of the Lehigh Valley Railroad Company of New Jersey, which is owned by your Company, it was deemed advisable to effect a lease of the property and appurtenances of the New Jersey Company. Accordingly, by proper action of both Companies and with the approval of the Board of Public Utility Commissioners of New Jersey, a lease has been consummated for a term of ninety-nine years from July 1, 1914, the consideration being the cost of maintenance, taxes, the payment of interest on all bonded and other indebtedness and providing also for reimbursement, by the issue of securities to your company, for amounts expended for additions and betterments to the property.

The Lehigh Valley Transportation Company, the entire capital stock of which is owned by your Company, has fully maintained its floating equipment and has, in fact, added to the same during the year by the purchase of one steel tug, one steam lighter, one steel car float, two steam hoisting barges, five covered refrigerator barges, five covered house barges and five open lighters equipped with gasoline hoists. In addition to the above, five covered house barges were ordered but have not as yet been delivered. One covered barge was converted into a cattle boat, one fuel lighter was sold, and nine barges, unfit for further service, were condemned and sold. The inventory of equipment on page 48 shows in detail the floating equipment used by your Company and its affiliated companies.

Thus far the Legislature of the State of New Jersey has failed to pass any bill which would relieve the Company from the necessity of operating the Morris Canal and settle the various matters in dispute with the State, although every effort has been made in that direction by your Company. Further efforts to bring about a satisfactory adjustment of the points at issue are being made.

Your Company entered into a contract with the American Express Company covering the handling of express business over your lines beginning July 1, 1914, the United States Express Company, which formerly handled this business, having served notice terminating its contract with your Company, effective June 30, 1914.

A loss of $199,598.04 for the year was experienced in the operation of the Lehigh and New York Railroad under the lease made in 1895.

Fifty-nine new industries were located on the system during the year, of which forty-nine have direct track connections with your Company's lines.

There were no fatalities to the 5,729,042 passengers carried during the year, resulting from a train accident. There has further been a very gratifying decrease in the injuries to employes as a result of the Safety Committee work conducted by the Company and its men.

The total payments direct to labor for the year amounted to $17,120,151.82, or 56.30 per cent. of the total operating expenses, including outside operations, the same having been distributed among an average of 22,017 employes.

Your Company contributed $59,677.13 to its Employes' Relief Fund.

Mr. Morris L. Clothier, of Philadelphia, and Mr. William P. Clyde, of New York, were elected Directors to fill the vacancies caused by the resignations of Mr. George F. Baer and Mr. Charles Steele.

The Directors thank the officers and employes for their faithful and efficient services rendered during the year.

E. B. THOMAS,
President.

COMPARATIVE INCOME ACCOUNT FOR THE YEARS ENDED JUNE 30, 1914 AND 1913

	1914	1913	Increase or Decrease
Operating Revenues:—			
Coal freight revenue	$18,492,683.35	$20,385,389.09	—$1,892,705.74
Merchandise freight revenue	15,026,684.11	16,339,748.97	—1,313,064.86
Passenger revenue	4,795,147.44	4,867,554.03	—72,406.59
Mail revenue	195,052.87	191,821.11	3,231.76
Express revenue	443,971.75	506,191.11	—62,219.36
Other transportation revenue	478,453.44	415,731.71	62,721.73
Miscellaneous revenue	351,570.99	336,935.87	14,635.12
Total operating revenues	$39,783,563.95	$43,043,371.89	—$3,259,807.94
Operating Expenses:—			
Maintenance of way and structures	$4,575,061.96	$5,694,422.24	—$1,119,360.28
Maintenance of equipment	7,011,946.34	7,561,270.87	—549,324.53
Traffic expenses	1,002,872.11	982,857.66	20,014.45
Transportation expenses	14,071,182.70	13,993,617.35	77,565.35
General expenses	948,098.72	875,651.45	72,447.27
Total operating expenses	$27,609,161.83	$29,107,819.57	—$1,498,657.74
Ratio of operating expenses to operating revenues	69.40%	67.62%	1.78%
Net operating revenue	$12,174,402.12	$13,935,552.32	—$1,761,150.20
Outside Operations, Net	*280,244.11	*280,210.32	—33.79
Total Net Revenue	$11,894,158.01	$13,655,342.00	—$1,761,183.99
Railway Tax Accruals	1,549,895.38	1,447,205.04	102,690.34
Operating Income	$10,344,262.63	$12,208,136.96	—$1,863,874.33
Other Income:—			
Hire of equipment—Balance	$327,655.51	$286,732.93	$40,922.58
Joint facility rent income	402,957.70	416,543.34	—13,585.64
Dividend income	†1,241,034.58	666,123.10	574,911.48
Income from funded securities	423,060.00	382,314.16	40,745.84
Miscellaneous income	469,564.64	552,041.07	—82,476.43
Total other income	$2,864,272.43	$2,303,754.60	$560,517.83
Total Income	$13,208,535.06	$14,511,891.56	—$1,303,356.50
Deductions from Income:—			
Interest deductions for funded debt	$3,308,428.49	$3,127,360.15	$181,068.34
Deductions for lease of other roads	2,212,420.00	2,239,295.00	—26,875.00
Joint facility rent deductions	210,322.40	167,062.33	43,260.07
Miscellaneous tax accruals	141,346.09	161,946.35	—20,600.26
Miscellaneous deductions	279,358.39	54,399.51	224,958.88
Total deductions from income	$6,151,875.37	$5,750,063.34	$401,812.03
Net Income	$7,056,659.69	$8,761,828.22	—$1,705,168.53

*Deficit.

†Includes dividend of $685,080.00 on stock of Temple Iron Co.

PROFIT AND LOSS ACCOUNT FOR THE YEAR ENDED JUNE 30, 1914.

	Dr.	Cr.
Balance, July 1, 1913		$25,066,231.42
Net income for year ended June 30, 1914		7,056,659.69
Reduction of book value of capital stock of Coxe Brothers & Co., Inc.	$1,000,000.00	
Discount on general consolidated mortgage bonds sold	1,000,000.00	
Property abandoned	78,492.83	
Miscellaneous adjustments	84,914.53	
Dividends:		
Five per cent. on preferred stock, paid Jan. 10, 1914 $5,315.00		
Five per cent. on common stock, paid Jan. 10, 1914 3,025,085.00		
Two and one-half per cent. on preferred stock, paid April 11, 1914 2,657.50		
Two and one-half per cent. on common stock, paid April 11, 1914 1,512,542.50		
Two and one-half per cent. on preferred stock, due July 11, 1914 2,657.50		
Two and one-half per cent. on common stock, due July 11, 1914 1,512,542.50		
	6,060,800.00	
Balance, June 30, 1914	23,898,683.75	
	$32,122,891.11	$32,122,891.11
Balance brought forward, July 1, 1914		$23,898,683.75

GENERAL BALANCE SHEET, JUNE 30, 1914.

DR.

ASSETS.

ROAD AND EQUIPMENT:—		
Investment to June 30, 1907	$54,365,714.13	
Investment since June 30, 1907	24,065,602.97	
	$78,431,317.10	
Less reserve for accrued depreciation	7,167,563.18	
		$71,263,753.92
SECURITIES:—		
Securities of proprietary, affiliated, and controlled companies—pledged	$35,717,451.58	
Securities of proprietary, affiliated, and controlled companies—unpledged	3,978,432.83	
		39,695,884.41
OTHER INVESTMENTS:—		
Advances to proprietary, affiliated, and controlled companies for construction, equipment and betterments	$211,036.79	
Real estate	479,785.99	
Advances to subsidiary real estate companies	3,325,381.40	
Securities—pledged	26,911,855.93	
Securities—unpledged	8,424,332.93	
		39,352,393.04
WORKING ASSETS:—		
Cash	$11,020,820.79	
Securities issued or assumed—held in treasury	18,711,000.00	
Marketable securities	325,000.00	
Traffic and car-service balances due from other companies	198,666.03	
Net balance due from agents and conductors	804,100.06	
Miscellaneous accounts receivable	2,556,328.63	
Materials and supplies	3,373,260.78	
Other working assets	162,763.03	
		37,151,939.32
ACCRUED INCOME NOT DUE:—		
Unmatured interest, dividends and rents receivable		233,149.97
DEFERRED DEBIT ITEMS:—		
Advances	$1,116,597.55	
Rents and insurance paid in advance	147,007.58	
Other deferred debit items	1,345,342.99	
		2,608,948.12
TOTAL ASSETS		$190,306,068.78

CR.

LIABILITIES

CAPITAL STOCK:—		
1,210,034 shares common stock, par $50	$60,501,700.00	
2,126 shares preferred stock, par $50	106,300.00	
		$60,608,000.00
*FUNDED DEBT:—		
Mortgage bonds	$77,639,000.00	
Collateral trust bonds	12,000,000.00	
Equipment trust obligations	6,200,000.00	
Mortgage on real estate	1,669.18	
		95,840,669.18
WORKING LIABILITIES:—		
Traffic and car-service balances due to other companies	$29,681.68	
Audited vouchers and wages unpaid	2,985,982.79	
Miscellaneous accounts payable	182,702.14	
Matured interest, dividends and rents unpaid	413,396.75	
Other working liabilities	462,822.35	
		4,074,585.71
ACCRUED LIABILITIES NOT DUE:—		
Unmatured interest and rents payable	$933,041.33	
Dividends declared June 17, due July 11, 1914	1,515,200.00	
Taxes accrued	505,778.60	
		2,954,019.93
DEFERRED CREDIT ITEMS:—		
Other deferred credit items		2,930,110.21
PROFIT AND LOSS		23,898,683.75
TOTAL LIABILITIES		$190,306,068.78

*$18,711,000.00 held in the treasury of the Company.

THE LEHIGH VALLEY COAL COMPANY

REPORT OF OPERATIONS

PHILADELPHIA, August 12, 1914.

The annual report of the operations conducted by The Lehigh Valley Coal Company for the fiscal year ended June 30, 1914, and statements indicating its financial condition at the close of the year, are herewith submitted.

The total net income of the Company from all sources, after deducting charges for royalties, sinking funds, depreciation of the property and interest on the funded debt, amounted to $564,859.44, a decrease of $906,415.43 as compared with the preceding year. The shrinkage in the net earnings of the Company is due almost entirely to the restricted demand for anthracite coal as a result of the mild winter. This not only reduced the profits by reason of the smaller volume of business done, but also added materially to the cost per ton of mining such coal as was shipped.

The production of anthracite coal from the lands owned and leased by The Lehigh Valley Coal Company, including that mined by tenants, was 7,877,390 gross tons, a decrease of 982,642 tons.

The percentage of sizes above pea produced by the mining operations of the Company was 66.46 per cent., a decrease of 2.22 per cent.

The number of breaker hours worked was 41,218, a decrease of 5,796 hours.

Mining operations conducted on the Snow Shoe lands, located in Centre County, Pennsylvania, produced 252,731 gross tons of bituminous coal, a decrease of 97,373 tons.

Ample expenditures have been made to fully maintain the property of your Company. Additions and betterments amounting to the sum of $344,785 were made during the year.

The new breaker at Franklin Colliery, referred to in the last annual report, has been completed and is now in successful operation. In connection therewith certain improvements have been made in outside operating conditions to minimize the danger of fire.

Additions have been made to the pumping plants at Prospect and Dorrance Collieries and certain changes and improvements effected in the methods to enable the flowing of silt into the mines. These expenditures were necessary to comply with legislative enactments regarding the pollution of streams in that vicinity.

In order to provide for additional pumping at Exeter Colliery, a substantial addition has been made to the steam plant by the installation of high pressure boilers to replace old-fashioned return tubular boilers installed many years ago. The boiler plant at Heidelberg Colliery has also been renewed and improved.

The developments at Park Colliery have been continued throughout the year in order to place the colliery on a better operating basis and conditions are now becoming more satisfactory. The unwatering of the old workings at the western end of the property, so that mining can be undertaken in that territory, is under way.

Extensive renewals and improvements to Centralia Breaker have been made during the year in order to maintain its efficiency and modernize its methods.

The erection of the washery at Springdale for the purpose of re-working the culm banks on the Delano lands has been completed and it is now in operation.

The shaft at Blackwood Colliery has been sunk so that mining can be conducted on a lower level and, upon the completion of the necessary tunnels and gangways, operating conditions at that colliery will be improved.

At all collieries very considerable sums have been expended to reduce the fire risks and safeguard the lives of employes.

The prospecting done on the Snow Shoe property has demonstrated that there is sufficient coal in the lower or "A" vein to warrant the construction of a plant to mine the same. Accordingly an expenditure was authorized to carry on the necessary construction work and the same is now under way.

The leases with the Girard Estate, under which your Company has for many years been conducting operations at the Packer and Continental Collieries, expired by limitation December 31, 1913. After protracted negotiations a renewal was effected for a further period of fifteen years—the maximum term that could be obtained—but at higher rates of royalty than those paid heretofore. Owing to the uncertainty with respect to the renewal of these leases various contemplated improvements and development work on the property had been held in abeyance until the question of renewal was definitely settled. As soon as the new leases were executed, expenditures were authorized and work is now under way for the construction of a new steel fireproof breaker at Packer No. 5 Colliery and extensive alterations and betterments at Packer No. 4. Many important underground developments and mining improvements are also being prosecuted. These expenditures will place the operations at the Packer Collieries on the most scientific and economical basis possible and are the more necessary because of the high rates of royalty which the Company is required to pay under the new leases.

The general offices of the Company have for a long time been located in rented quarters in the City of Wilkes-Barre, an arrangement which of late years has been very unsatisfactory because of the growth of the Company. The space occupied was utterly inadequate, and failed to provide proper facilities for the storage of the very valuable maps and records and prevent their destruction in case of fire. The Company has, therefore, erected a modern office building, of fireproof construction, on North River Street, Wilkes-Barre, with sufficient space, not only for its present needs but also for future requirements. The building was completed and occupied before the close of the fiscal year.

The tax assessments upon the property and business of your Company increased very heavily in recent years. The taxes for the fiscal year under review are approximately twenty-five per cent. greater than the preceding year. This does not include the special tax levied by the State of Pennsylvania of two and one-half per cent. of the value of the coal mined. The question of the constitutionality of the law imposing this tax is now before the courts for determination.

The Company has issued no new capital obligations during the year. In fact, the obligations appearing on the balance sheet as "Deferred Real Estate Payments," representing short term notes given for the purchase of property in prior years, have been reduced by the sum of $100,000.

Payments, amounting to $111,136, were made to the sinking funds of the various mortgages on the Company's property.

Current Assets are $2,543,103 in excess of Current Liabilities.

The books and accounts of the Company have been verified by certified public accountants and a copy of the certificate as to the correctness thereof is appended.

F. M. CHASE,
Vice President and General Manager.

LEHIGH VALLEY COAL COMPANY PROFIT AND LOSS ACCOUNT FOR THE YEAR ENDED JUNE 30, 1914.

	DR.	CR.
Credit balance, July 1, 1913		$3,714,239.01
Net income for year ended June 30, 1914		564,859.44
Miscellaneous adjustments	$ 53,413.17	
Balance, June 30, 1914	4,225,685.28	
	$4,279,098.45	$4,279,098.45
Credit balance brought forward, July 1, 1914		$4,225,685.28

CANADIAN PACIFIC RAILWAY COMPANY

THIRTY-THIRD ANNUAL REPORT
OF THE
DIRECTORS OF THE CANADIAN PACIFIC RAILWAY COMPANY.
YEAR ENDED JUNE 30TH, 1914.

To the Shareholders.

The accounts of the Company for the year ended June 30th, 1914, show the following results:—

Gross Earnings		$129,814,823.83
Working Expenses		87,388,896.15
Net Earnings		$ 42,425,927.68
Deduct Fixed Charges		10,227,311.17
Surplus		$ 32,198,616.51
Contribution to Pension Fund		125,000.00
		$ 32,073,616.51
Deduct Net Earnings of Pacific Coast Steamships, Commercial Telegraph, and News Department, transferred to Special Income Account		2,115,842.15
		$ 29,957,774.36
From this there has been charged a half yearly dividend on Preference Stock of 2 per cent., paid April 1st, 1914	$1,545,026.80	
And three quarterly dividends on Ordinary Stock of 1¾ per cent. each, paid January 2nd, 1914, April 1st, 1914, and June 30th, 1914	12,600,000.00	
		14,145,026.80
		$ 15,812,747.56
From this there has been declared a second half yearly dividend on Preference Stock, payable October 1st, 1914	$1,564,493.46	
And a fourth quarterly dividend on Ordinary Stock of 1¾ per cent., payable October 1st, 1914	4,550,000.00	
		6,114,493.46
Leaving net surplus for the year		$ 9,698,254.10

In addition to the above dividends on Ordinary Stock, three per cent. was paid from Special Income.

THE FOLLOWING ARE THE DETAILS OF SPECIAL INCOME FOR YEAR ENDED JUNE 30th, 1914.

Balance at June 30th, 1913	$3,358,941.93	
Less Dividend paid October 1st, 1913	1,500,000.00	
		$1,858,941.93
Interest on Proceeds Land Sales to October 31st, 1913		492,136.05
Interest on Deposits and Loans		1,139,461.48
Interest from Minneapolis, St. Paul & Sault Ste. Marie Ry. Bonds		159,720.00
Interest from Mineral Range Ry. Bonds		50,160.00
Interest from Toronto, Hamilton & Buffalo Ry. Bonds		10,840.00
Interest from Dominion Government Bonds for half year		91,250.00
Interest from Ontario Government Bonds for half year		24,000.00
Interest from British Consols for half year		57,284.72
Interest from Montreal & Atlantic Ry. Bonds, and on other Securities		348,472.18
Interest from Berlin, Waterloo, Wellesley & Lake Huron Ry. Bonds		17,040.00
Interest from St. John Bridge & Ry. Extension Co. Bonds.		5,437.50
Interest from Esquimalt & Nanaimo Ry. Bonds		193,280.00
Interest from Dominion Atlantic Ry. Extension Debenture Stock		50,068.27
Interest from Dominion Atlantic Ry. 2nd Debenture Stock.		36,986.67
Dividend on Esquimalt & Nanaimo Ry. Stock		125,000.00
Dividend on St. John Bridge & Ry. Extension Co. Stock		70,000.00
Dividends on Dominion Express Co. Stock		200,000.00
Dividends on Minneapolis, St. Paul & S.S.M. Ry. Common Stock		890,645.00
Dividends on Minneapolis, St. Paul & S.S.M. Ry. Preferred Stock		445,326.00
Dividends on West Kootenay Power & Light Co. Common Stock		52,250.00
Dividends on West Kootenay Power & Light Co. Preferred Stock		3,850.00
Dividends on Toronto, Hamilton & Buffalo Ry. Stock		57,012.00
Dividends on Consolidated Mining & Smelting Co. Stock		140,912.00
Dividend on Berlin, Waterloo, Wellesley & Lake Huron Ry. Stock		12,500.00
Earnings from Ocean Steamships		783,677.93
Revenue from Company's interest in Coal Mine Properties.		294,857.17
Cash Proceeds from Townsites Sales		550,303.49
Net Earnings of Pacific Coast Steamships, Commercial Telegraph, News Department and Hotels		2,134,255.21
Received for space rented in Office Buildings		151,144.86
		$10,446,812.46
Less:—Payments to Shareholders in dividends; January 2nd, 1914, April 1st, 1914, and June 30th, 1914		5,400,000.00
		$ 5,046,812.46
From this a dividend has been declared, payable October 1st, 1914		1,950,000.00

2. The working expenses for the year amounted to 67.32 per cent. of the gross earnings, and the net earnings to 32.68 per cent., as compared with 66.82 and 33.18 per cent. respectively in 1913.

3. Four per cent. Consolidated Debenture Stock to the amount of £2,065,119 was created and sold, and of the proceeds the sum of £239,000 was applied to the construction of authorized branch lines, and £1,826,119 was devoted to the acquisition of the securities of other railway companies whose lines constitute a portion of your system, the interest on which had, with your sanction, been guaranteed by your Company.

4. Four per cent. Preference Stock to the amount of £800.000 was created and sold for the purpose of meeting capital expenditures that had previously been sanctioned by you.

5. Your guarantee of interest was endorsed on the Four per cent. Consolidated Bonds of the Minneapolis, St. Paul and Sault Ste. Marie Railway Company, to the amount of $1,947,000 issued and sold to cover the cost of 97.35 miles of railway added to that company's system.

6. During the year 259,371 acres of agricultural land were sold for $4,618,420, being an average of $17.80 per acre. Included in this area there were 6,318 acres of irrigated land which brought $66.93 per acre, so that the average price of the balance was $16.57 per acre.

7. To give effect to an agreement with the City of Toronto, and to an order of the Board of Railway Commissioners requiring the railway companies to provide a Union Passenger Station and Joint Terminals commensurate with the passenger traffic of the City, and to eliminate grade crossings by the elevation of their tracks in the Joint Terminals on the water front, the Toronto Terminals Railway Company has been organized with the sanction of Parliament, and a contract has been made between your Company, the Grand Trunk Railway Company of Canada, and the Toronto Terminals Railway Company, for the construction and operation of the Union Passenger Station and Terminals, which fixes the rental to be paid by each company for the use of the facilities at five per cent. per annum on one half the amount of the Terminals Railway Company securities outstanding at any time, provides for the joint and several guarantee by your Company and the Grand Trunk Railway Company of Canada of the payment both as to principal and interest of the said securities, and establishes the basis on which the expense of operating the station and terminals shall be divided between the companies. The Dominion Government and the City of Toronto will participate in the expense of carrying out these works on a basis to be determined by agreement between the parties, or to be settled by the Railway Commissioners of Canada, but it is estimated that the portion of the cost to be borne by the Terminals Company will be approximately $12,000,000. The contract will be submitted for your consideration and approval.

8. An agreement has been reached between the Kettle Valley Railway Company and the Vancouver, Victoria & Eastern Railway Company, covering the use, by the latter company for its trains, of the Kettle Valley line between Otter Summit and Hope, a distance of about 54 miles, and for the like use by the Kettle Valley Company of the Vancouver, Victoria & Eastern Company's line between Princeton and Otter Summit, a distance of about 38 miles, all in British Columbia. In each case the lessee undertakes to pay a rental equal to two and one-half per cent. per annum on the cost of the other company's line used in common, and its proportion of the cost of maintenance. By this means the unnecessary duplication of 92 miles of railway through a difficult country is avoided. Inasmuch as the Kettle Valley Railway Company has been leased to your company, your consent is required to make the arrangement effective, and therefore, the agreement will be submitted for your sanction.

9. A lease for 999 years of the Lake Erie & Northern Railway, extending from Port Dover on Lake Erie through Simcoe, Waterford, Brantford, and Paris in Ontario, to a connection with your railway at Galt, a distance of approximately 51 miles, at an annual rental equivalent to the interest on bonds issued or to be issued by the Lake Erie and Northern Railway Company with the consent of your company, will be submitted for your approval. This line will provide access to territory that is not now served by your railway, and will at a later stage be equipped for operation by electricity, in connection with your Galt, Berlin and Waterloo branch.

10. There will be submitted for your consideration and approval a lease of the Southampton Railway from a point on the Gibson Branch of this Company's railway between Millville Station and the Railway Bridge crossing the Northeast Nackawick Stream to a point in the vicinity of the Pokiok Bridge in the County of York, all in the Province of New Brunswick, a distance of approximately 13 miles, for a term of ninety-nine years, on the basis of a rental of forty per cent. of the gross earnings as defined in the said proposed lease; a lease for that portion of the Fredericton and Grand Lake Coal and Railway from a point on the Intercolonial Railway at or near Gibson, in the County of York, to a point at or near Minto, in the County of Sunbury, to connect with the present line of the New Brunswick Coal and Railway, a distance of approximately 31 miles, for a term of nine hundred and ninety-nine years, on the basis of a rental of forty per cent. of the gross earnings as defined in the said proposed lease; and a lease from the Glengarry and Stormont Railway Company of the whole of the Railway which that company has been by law authorized to construct, whether constructed or to be constructed, from a point on this Company's railway at or near the station known as St. Polycarpe Junction, in the County of Soulanges in the Province of Quebec, to the Town of Cornwall, in the County of Stormont, in the Province of Ontario, a distance of approximately 27 miles, together with the appurtenances of the said railway, for a term of ninety-nine years from the date of completion of the said railway, on the basis of a rental of forty per cent. of the gross earnings and other terms more fully set out in the said proposed lease.

11. The capital expenditure of over $60,000,000 for cars and locomotives in the years 1910-1913 was so very large that your Directors decided that it would be proper to spread the payments for this year's deliveries, about $14,000,000, over a period of fifteen years, under the terms of an ordinary Equipment Trust Agreement, and, therefore, a contract was made with the Victoria Rolling Stock and Realty Company to provide the equipment and receive payment in 15 annual instalments, with interest at four and one-half per cent. per annum. All of the equipment has been delivered, and the cost has been advanced by your Company pending the sale of the Rolling Stock Company's bonds, when your Treasury will be reconped.

12. The accounts for the year show that $35,571,959.97 had been advanced from your current funds to meet the cost of additional railway mileage and ocean steamers against which no securities have been issued or sold. In ordinary course, Four per cent. Consolidated Debenture Stock would have been utilized to meet this expenditure, but market conditions were not favourable to the sale of this security in large amounts without unduly depressing the market price.

In these circumstances your Directors decided to create a Special Investment Fund composed of the deferred payments on land sold, and securities in which land funds had been invested, to the amount of $55,000,000, and to issue against this fund and the Company's credit ten-year Note Certificates to the amount of $52,000,000, carrying interest at the rate of 6% per annum, to be offered to the shareholders at 80% of their face value, thus providing all the money required for the present purposes of the Company, and at the same time giving the Shareholders participation in the proceeds of land sales to the amount of about $10,000,000.

The issue was entirely successful. The Note Certificates, with interest, will be paid off in instalments without any encroachment on your revenue from traffic, and of the Four per cent. Consolidated Debenture Stock can be marketed in such amounts and at such times as may be most advantageous.

13. Since the close of the last fiscal year First Mortgage 5% Bonds to the amount of only £64,700 or $314,873.33 have been taken up and cancelled, because the holders were unwilling to surrender their bonds at a premium satisfactory to your Directors. The outstanding Bonds, amounting to £2,638,900 or $12,842,646.67, will mature July 1st, 1915, and on or before that date they will be paid off and cancelled with funds set aside for the purpose.

14. As mentioned in the notice to Shareholders, the Annual General meeting will be made Special for the purpose of authorizing, if approved, an increase of the Company's Ordinary Capital Stock by the amount of $75,000,000, namely, from $260,000,000 to $335,000,000, in order to make it accord with the amount for which the Company has the sanction of Government. Although with the curtailment of capital expenditure no necessity exists for issuing any additional Ordinary Stock at this time, and there will be no resumption of works requiring any large amount of money until a decided improvement in business conditions furnishes ample warrant, your Directors are convinced of the prudence of making provision at this time for your capital requirements covering a considerable period in the future. No portion of this increased amount will, of course, be issued by the Directors until the sanction of the Shareholders has been obtained at a Special General Meeting called for the purpose.

15. The death in January last of the Right Hon. Lord Strathcona and Mount Royal, G.C.M.G., was a source of sincere sorrow to your Directors. Lord Strathcona was one of the prominent founders of the Company, and he remained a member of the Board of Directors until the time of his death.

Your Directors also report with regret the death, in April of this year, of Sir William Whyte who had occupied a position of importance in the Company's affairs for many years. As Vice-President in charge of the Company's interests West of Lake Superior he proved himself a most capable and useful officer, and on his retirement from active service in 1911 he became a member of the Board of Directors.

Mr. A. M. Nanton of Winnipeg has been elected a Director in place of the late Sir William Whyte. The vacancy caused by the death of Lord Strathcona has not as yet been filled.

16. As foreshadowed at the last Annual Meeting, the General Balance Sheet has been recast so as to show in more specific form the active and inactive assets of the Company. In the schedule of these assets which appears in the Annual Report the estimated value per acre of the unsold agricultural lands has been placed at lower figures than had been mentioned, in order that it might be quite on the safe side, but your Directors and the officers of the Land Department are satisfied that your unsold lands will eventually command much higher average prices per acre than those given in the schedule.

The values fixed for the townsites and other lands and properties available for sale are on a conservative basis, and the active assets taken into the schedule at cost could be readily disposed of at figures very much higher than those given.

17. Some years ago, for the purpose of securing access to the State of Washington and other important territory in the North Western United States, the Company entered into a working arrangement with the Spokane International Railway Company, extending from Kingsgate, on the line of your railway in British Columbia, to Spokane, Washington, a distance of 141 miles, with branch lines 22 miles in length. The volume of traffic secured to your lines by this connection has become so important that a more permanent arrangement is very desirable. Your Directors have not as yet decided whether this could be best accomplished by the acquisition of the Capital Stock of the Spokane International Railway Company, by a guarantee of interest on its bonds or by some other means, and therefore they will ask your authority to exercise their discretion in carrying out such a transaction for closer and more permanent relations with the Spokane International Railway Company as may appear to be most desirable in your interest.

18. The net revenue of the Commercial Telegraph System, Pacific Coast Steamers, and News Department, that in previous years had been incorporated in the revenue of the railway, is deducted from the surplus shown in the Revenue Statement this year and transferred to Special Income Account.

19. The undermentioned Directors will retire from office at the approaching Annual Meeting. They are eligible for re-election:—

Sir Thomas G. Shaughnessy, K.C.V.O.
Sir Thomas Skinner, Bart.

For the Directors,
T. G. SHAUGHNESSY,
President.

Montreal, August 10th, 1914.

GENERAL BALANCE SHEET, JUNE 30TH, 1914.

ASSETS.

Property Investment:		
Railway	$338,084,064.89	
Rolling Stock Equipment	153,256,394.79	
Ocean, Lake, and River Steamships	24,171,162.30	
		$515,511,621.98
Acquired Securities (Cost):		
Schedule "A"		107,867,740.63
Advances to Lines and Steamships Under Construction		35,571,959.97
Advances and Investments		12,330,195.22
Deferred Payments on Lands and Townsite Sales		4,140,413.83
***Special Investment Fund:**		
Deferred Payments on Land and Townsites	$42,666,510.87	
Government Securities	10,088,734.86	
Deposited with Trustee	3,790,225.53	
		56,545,471.26
Working Assets:		
Material and Supplies on Hand	$17,686,235.53	
Agents and Conductors Balances	3,221,350.07	
Net Traffic Balances	533,996.70	
Miscellaneous Accounts Receivable	10,511,665.82	
Cash in Hand	36,777,725.02	
		68,730,973.14
Other Assets:		
Schedule "B"		133,022,494.74
		$933,720,870.77

*Security for issue of Note Certificates, $52,000,000.

LIABILITIES.

Capital Stock:		
Ordinary Stock	$260,000,000.00	
Four Per Cent. Preference Stock	78,224,673.03	
		$338,224,673.03
Four Per Cent. Consolidated Debenture Stock		173,307,470.09
Mortgage Bonds:		
Canadian Pacific Ry. 1st Mortgage 5 per cent.	$12,842,646.67	
Algoma Branch 1st Mortgage 5 per cent.	3,650,000.00	
		16,492,646.67
Note Certificates 6 Per Cent.		52,000,000.00
Prémium on Ordinary Capital Stock Sold.		45,000,000.00
Current:		
Audited Vouchers	$7,809,598.58	
Pay Rolls	5,177,754.16	
Miscellaneous Accounts Payable	9,048,037.42	
		22,035,390.16
Accrued:		
Coupons due July 1st, 1914, and including Coupons overdue not presented	$757,204.67	
Rentals of Leased Lines	189,810.72	
		947,015.39
Equipment Obligations	14,350,000.00	
Less Victoria Rolling Stock and Realty Co. Bonds on hand	13,630,000.00	
		720,000.00
Reserves and Appropriations:		
Equipment Replacement	2,491,518.64	
Steamship Replacement	6,682,068.87	
Reserve Fund for Contingencies	2,083,942.12	
		11,257,529.63
Net Proceeds Lands and Townsites		66,771,271.19
Surplus Revenue from Operation		79,711,091.66
Surplus in Other Assets		127,253,782.95
		$933,720,870.77

I. G. OGDEN,
Vice-President.

Auditors' Certificate.

We have examined the Books and Records of the Canadian Pacific Railway Co., for the fiscal year ending June 30, 1914, and having compared the annexed Balance Sheet and Income Account therewith, we certify that, in our opinion, the Balance Sheet is properly drawn up so as to show the true financial position of the Company at that date, and that the relative Income Account for the year is correct.

PRICE, WATERHOUSE & CO.,
Montreal, August 8th, 1914 Chartered Accountants (England).

SCHEDULE "C"

Details of Expenditure on Additions and Improvements from July 1st, 1913, to June 30th, 1914.

EASTERN LINES:		
Additional Sidings, Buildings, Stations and Yards	$664,882.11	
Permanent Bridges and Improvements of Line	1,164,100.35	
Double Tracking	4,045,223.88	
Right of Way	7,127.46	
		$5,881,333.80
Montreal Terminals		890,847.90
Windsor St. Station Extension		391,771.73
Double Track Bridge over St. Lawrence River		128,923.90
WESTERN LINES:		
Additional Sidings, Buildings, Stations and Yards	$1,329,064.58	
Permanent Bridges and Improvements of Line	548,176.83	
Fort William Terminals, including Coaling Plant	1,007,816.09	
East Winnipeg Yard	1,456,849.78	
Winnipeg New Elevator	203,178.78	
Winnipeg Station and Hotel	1,255,926.24	
Calgary Hotel	1,289,923.92	
Vancouver Terminals	1,760,041.33	
Double Tracking	7,549,677.45	
Right of Way	8,993.04	
		16,409,648.04
Additions to Office Buildings and Hotels		1,776,268.64
Rented and Temporary Sidings		317,075.47
Telegraph Extensions and Additions		95,403.36
		$25,891,272.84

SCHEDULE "D"

Details of Expenditures on Leased and acquired Lines, from July 1st, 1913, to June 30th, 1914.

NEW BRUNSWICK RAILWAY:		
Additional Sidings, Buildings, Stations and Yards	$132,483.38	
Permanent Bridges and Improvements of Line	205,913.96	
St. John Terminals	475,154.25	
		$813,551.59
ATLANTIC & NORTH WEST RAILWAY:		
Additional Sidings, Buildings, Stations and Yards	93,186.36	
Permanent Bridges and Improvements of Line	189,452.00	
Double Tracking	268,650.79	
		551,289.15
MONTREAL & OTTAWA RAILWAY:		
Additional Sidings, Buildings, Stations and Yards	8,485.45	
Permanent Bridges and Improvements of Line	42,973.06	
		51,458.51

MONTREAL & WESTERN RAILWAY:		
Additional Sidings, Buildings, Stations and Yards	7,033.37	
Permanent Bridges and Improvements of Line	27,901.53	
Account Purchase of Road	13,731.90	
		48,666.80
ONTARIO & QUEBEC RAILWAY:		
Additional Sidings, Buildings, Stations and Yards	449,617.15	
Permanent Bridges and Improvements of Line	155,983.37	
Double Tracking	1,076,480.55	
Toronto Terminals	1,243,638.31	
Right of Way	7,650.65	
		2,933,370.03
MANITOBA & NORTH WESTERN RAILWAY:		
Additional Sidings, Buildings, Stations and Yards	48,111.55	
Permanent Bridges and Improvements of Line	47,948.53	
Right of Way	1,956.09	
		98,016.17
MANITOBA SOUTH WESTERN COLONIZATION RAILWAY:		
Additional Sidings, Buildings, Stations and Yards	19,348.52	
Permanent Bridges and Improvements of Line	22,355.58	
		41,704.10
CALGARY & EDMONTON RAILWAY:		
Additional Sidings, Buildings, Stations and Yards	238,543.64	
Permanent Bridges and Improvements of Line	55,517.87	
Right of Way	709.38	
		294,770.89
COLUMBIA & KOOTENAY RAILWAY:		
Additional Sidings, Buildings, Stations and Yards	2,596.14	
Permanent Bridges and Improvements of Line	944.50	
		3,540.64
COLUMBIA & WESTERN RAILWAY:		
Additional Sidings, Buildings, Stations and Yards	6,024.28	
Permanent Bridges and Improvements of Line	182,145.17	
Right of Way	339.79	
		188,509.24
NEW BRUNSWICK SOUTHERN RY.		11,106.12
CAP DE LA MADELEINE RAILWAY		3,811.94
ST. MAURICE VALLEY RAILWAY		30,800.56
JOLIETTE & BRANDON RAILWAY		3,316.91
OTTAWA, NORTHERN & WESTERN RY.		28,990.47
LINDSAY, BOBCAYGEON & PONTYPOOL RAILWAY		2,952.57
GEORGIAN BAY & SEABOARD RAILWAY		63,989.90
GUELPH & GODERICH RAILWAY		41,393.40
TILSONBURG, LAKE ERIE & PACIFIC RAILWAY		25,045.32
WALKERTON & LUCKNOW RAILWAY		12,885.13
GREAT NORTH WEST CENTRAL RY.		7.75
NICOLA, KAMLOOPS & SIMILKAMEEN RAILWAY		6,848.01
KASLO & SLOCAN RAILWAY		225,796.37
		$5,481,821.57

STATEMENT OF EARNINGS FOR THE YEAR ENDED JUNE 30TH, 1914.

From Passengers	$ 32,478,146.58
" Freight	81,135,295.12
" Mails	1,132,714.91
" Sleeping Cars, Express, Telegraph and Miscellaneous.	15,068,667.22
Total	$129,814,823.83

STATEMENT OF WORKING EXPENSES FOR THE YEAR ENDED JUNE 30TH, 1914.

Transportation Expenses	$ 42,250,286.37
Maintenance of Way and Structures	16,426,582.05
Maintenance of Equipment	16,617,247.21
Traffic Expenses	3,626,612.08
Parlor and Sleeping Car Expenses	1,348,979.47
Expenses of Lake and River Steamers	1,183,397.40
General Expenses	4,322,103.93
Commercial Telegraph	1,613,687.64
Total	$ 87,388,896.15

STATEMENT OF SURPLUS INCOME ACCOUNT, JUNE 30TH, 1914.

Balance at June 30th, 1913		$77,597,100.36
Net Earnings of Railway	$29,957,774.36	
Special Income	8,587,870.53	
		38,545,644.89
		116,142,745.25
Less: Dividends on Preference Stock paid October 1st, 1913, and April 1st, 1914	3,031,653.59	
Dividends on Ordinary Stock paid October 1st, 1913, January 2nd, 1914, April 1st, 1914, and June 30th, 1914	23,000,000.00	
Discount on Issue of $52,000,000 Six per cent. Note Certificates	10,400,000.00	
		36,431,653.59
		$79,711,091.66
From this there have been declared the dividends on Preference and Ordinary Stock payable October 1st, 1914, amounting to		$ 8,064,493.46

APPROPRIATION FOR ADDITIONS AND IMPROVEMENTS.

Balance at June 30th, 1913	$17,912,996.41
Expended during year, included in Schedules "C" and "D," and written off Coal Mining and other properties	$17,912,996.41

TRAIN TRAFFIC STATISTICS—FOR TWELVE MONTHS ENDED JUNE 30TH, 1914 AND 1913.

(Earnings of Lake and River Steamers not included in this Statement.)

	Year ended June 30th, 1914.	Year ended June 30th, 1913.	Increase or Decrease Amount or number.	Increase or Decrease Per Cent
TRAIN MILEAGE.				
Passenger trains	21,523,630	22,333,592	*809,962*	*3.63*
Freight trains	24,164,242	27,611,103	*3,446,861*	*12.48*
Mixed trains	1,890,364	1,888,095	2,269	.12
Total trains	47,578,236	51,832,790	*4,254,554*	*8.21*
CAR MILEAGE.				
PASSENGER.				
Coaches and P. D. and S. cars	106,852,513	110,347,064	*3,494,551*	*3.17*
Combination cars	2,904,782	3,206,048	*301,266*	*9.40*
Baggage, Mail and Express cars	47,355,009	46,677,110	677,899	1.45
Total Passenger cars	157,112,304	160,230,222	*3,117,918*	*1.95*
FREIGHT.				
Loaded	526,194,125	581,397,285	*55,203,160*	*9.49*
Empty	169,768,349	165,627,992	4,140,357	2.50
Caboose	26,196,664	30,617,975	*4,421,311*	*14.44*
Total Freight cars	722,159,138	777,643,252	*55,484,114*	*7.13*
Passenger cars per Traffic Train Mile	6.71	6.62	.09	1.36
Freight cars per Traffic Train Mile	27.72	26.36	1.36	5.16
PASSENGER TRAFFIC.				
Passengers carried (earning revenue)	15,449,849	15,298,048	151,801	.99
Passengers carried (earn. rev.) one mile	1,570,758,210	1,766,982,013	*196,223,803*	*11.11*
Passengers carried (earn. rev.) one mile per mile of road	132,825	155,451	*22.626*	*14.56*
Average journey per passenger ....miles	101.67	115.51	*13.84*	*11.98*
Average amount received per passenger .....$	2.06	2.28	*.22*	*9.65*
Average amount received per passenger mile .....cts.	2.03	1.97	.06	3.05
Average number of passengers per train mile	67.09	72.95	*5.86*	*8.03*
Average number of passengers per car mile	14.31	15.56	*1.25*	*8.03*
Revenue from passengers per passenger car mile.....cts.	29.05	30.72	*1.67*	*5.44*
Total passenger train earnings per train mile .....$	1.69	1.75	.06	3.43
Total passenger train earnings per mile of road .....$	3,345.11	3,724.92	*379.81*	*10.20*
FREIGHT TRAFFIC.				
Tons of revenue freight carried one mile	10,601,426,321	11,242,690,998	*641,264,677*	*5.70*
Tons of non-revenue freight carried one mile	1,497,306,046	1,743,928,157	*246,622,111*	*14.14*
Total tons (all classes) freight carried one mile	12,098,732,367	12,986,619,155	*887,886,788*	*6.84*
Tons of revenue freight carried one mile per mile of road	896,470	989,081	*92,611*	*9.36*
Tons of non-revenue freight carried one mile per mile of road	126,514	153,423	*26,809*	*17.47*
Total tons (all classes) freight carried one mile per mile of road	1,023,084	1,142,504	*119,420*	*10.45*
Average amount received per ton per mile of revenue freight .....cts.	0.753	0.784	*.031*	*3.95*
Average No. of tons of revenue freight per train mile	406.89	381.12	25.77	6.76
Average No. of tons of non-rev. freight per train mile	57.47	59.12	*1.65*	*2.79*
Average No. of tons of (all classes) freight per train mile	464.36	440.24	24.12	5.48
Average No. of tons of revenue freight per loaded car mile	20.15	19.34	.81	4.19
Average No. of tons of non-rev. freight per loaded car mile	2.84	3.00	*.16*	*5.33*
Average No. of tons of (all classes) freight per loaded car mile	22.99	22.34	.65	2.91
Freight train earnings per loaded car mile .....cts.	15.17	15.15	.02	.13
Freight train earnings per train mile.....$	3.06	2.99	.07	2.34
Freight train earnings per mile of road...$	6,749.41	7,750.78	*1,001.37*	*12.92*

Railway Age Gazette

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VOLUME 57 SEPTEMBER 4, 1914 NUMBER 10

Contents

*Illustrated.

Eliminating Free Services

The western railways before applying for advances in rates apparently have adopted the policy of following some of the suggestions made by the Interstate Commerce Commission in the eastern rate decision in reference to eliminating certain free services. As mentioned last week, the lines in Western Trunk Line, trans-Missouri and Southwestern territories have filed tariffs cancelling the dunnage allowance, effective September 15; and it is now announced that, effective October 1, all arrangements for concentration of poultry, butter and eggs and other dairy products will be discontinued, except on the basis of full rates in and out of the concentrating points. The Chicago roads also have given notice that they will discontinue the practice of absorbing tunnel and lighterage charges at Chicago. The fight against the dunnage allowance was made some time ago, and its elimination in Southwestern territory has already been approved by the Interstate Commerce Commission. This will add to the revenues of the carriers, and some shippers protest against it as an advance in rates. But it means simply the withdrawal of a concession that has been made to the shippers during the past two years amounting to the freight rate on the weight of packing that would otherwise be required. The commission said: "If shippers elect to dispense with the use of boxes, crates and other packing which might be available for further use and upon the full weight of which the carriers would receive freight charges, we think the carrier offering equipment which would otherwise adequately take care of the shipment is entitled to revenue for the gross weight transported." The practice of allowing the shipper for the actual weight of dunnage used, not to exceed 500 lb., was introduced about two years ago by one road and spread rapidly through the West. The carriers are to be congratulated on having been able to get rid of it so promptly, before it attained the prestige of a time-honored custom. The lighterage question is likely to develop a heated controversy, but if the railways file tariffs at the suggestion of the commission, which the commission afterward suspends, the commission can hardly criticize them for failure to make the effort to eliminate the lighterage allowance.

The Katy Freight House Experiment

The substitution of trucks and elevators for the telphers in the Missouri, Kansas & Texas freight station at St. Louis marks the close of one of the most interesting and instructive experiments ever made in freight house operation, and the failure is in this case fully as instructive as any success could have been. There has been a great deal of criticism of the hesitation shown by the railways in applying mechanical equipment to freight house operation. Some of this may have been justified. But in many cases the criticisms have been made without an accurate knowledge of the actual problems involved. In this connection it will be recalled that in the rate advance hearing three years ago wide publicity was given to statements regarding this lack of mechanical facilities in freight houses, and suggestions were made which the installations at St. Louis have shown were impractical. Mechanical apparatus of some type will undoubtedly be developed which, when conditions warrant its installation, will reduce the amount of labor required and also the cost of handling freight, and at the same time will be sufficiently flexible to enable it to deal with the wide variety of packages encountered, and the experience gained at St. Louis will go far towards avoiding many of the difficulties now evident, but not realized three years ago. It is certain that had not this important experiment been made here it would have been made at some other point, and the railways of the entire country have benefited by it.

The Supply Man and the Purchasing Agent

A prominent railway supply man has written a letter which is published elsewhere in this issue, suggesting that the purchasing agents of the railways adopt a plan of arranging for interviews with representatives of the supply concerns which will save time and annoyance to both of them. The exact plan suggested by the writer of this letter may not be the very best one that could be adopted, but there unquestionably is merit in his contention that railway officers should co-operate with the supply men in some way that would save the time of both. The fact cannot be too strongly emphasized that the railway supply fraternity of this country plays a most important part in connection with the railway business, and that its members are entitled to be treated by their patrons with every consideration that the de-

mands on the time of railway officers will permit. As a purely practical business matter railway officers should always bear in mind that in the long run the railways have to pay in the form of the cost of railway supplies for every expense which the supply concerns incur and that therefore to put the railway supply concerns to needless expense is to put the railways themselves to needless expense. There is no question that the supply concerns are put to needless expense in the way that our correspondent points out. While, however, the supply men complain that they are often compelled to waste time cooling their heels outside the doors of railway officers, the purchasing agents and other railway officers complain that a great deal of their time is taken by the calls of the railway supply men. There is room for improvement on both sides. The best way to make the improvement would be for representatives of both sides to get together and adopt some common sense plan. If our correspondent's letter should start a discussion which should lead to this result he would be a benefactor of both the railways and the supply concerns.

CHANGING SENTIMENT TOWARD THE COMMISSION

It is very plain to all close students of public affairs that an extraordinary change in public sentiment regarding the regulation of business is taking place in the United States. The public believes the kind of regulation which we have been having has been doing more harm than good, and that that is one of the main things that is the matter with business. Therefore, the spirit of radicalism is rapidly being supplanted by a spirit of conservatism; and those public men and public bodies that until recently were popular because of the part played by them in regulation are fast becoming unpopular for precisely the same reason.

No phase of the change that is taking place is more interesting and significant than the part of it which affects the Interstate Commerce Commission. Until recently the commission could do nothing that the majority of the public, and the part of the press which reflected its views, did not defend and commend. Now it can do hardly anything that the same parts of the public and press do not criticize and condemn. One of the most significant utterances we have seen lately is an editorial in Collier's Weekly for September 5. Collier's has long been recognized as a radical magazine. "Big business," including railways, has fared ill at its hands. It has been a thick-and-thin advocate of railway regulation and usually a strong supporter of the Interstate Commerce Commission. Listen, now, to an editorial on the recent rate advance decision, which it publishes under the caption, "A Poor Halfway Measure."

There has now been time for the thoughtful to look into the long-expected freight rate decision by the Interstate Commerce Commission. It proves to be a half-baked, shuffling piece of business which settles nothing very much and distinctly unsettles confidence in the commission. The decision is based upon what we believe to be an unsound conception of the commission's powers and of the nature of the railroad business. A regulative body of this sort is useful in proportion as it keeps in touch with facts and acts with quick decision on matters brought before it. (The recent decision was six months overdue.) Regulative bodies are obstructive and inefficient in proportion as they assume to themselves the tardy dignity and stuffy bureaucratic fussiness of the wrong sort of courts. When, in addition, they wait on events and balance up what they want the railroads to do against what they are willing to concede to the railroads, the whole thing tends to become a messy sort of farce. The railroads of this country constitute a great national service and must be treated as such. Rates must be based on what is best for the country's development, not on arbitrary and meaningless apportionments of expenses between freight and passenger traffic. Service is the goal of regulation; cost is a delusion. The Interstate Commerce Commission, in this decision, has shown itself to be, as compared with the Supreme Court, very distinctly on the wrong track and very distinctly employing the wrong methods. The final misfortune would be to have this sort of bureaucracy in full charge of our railroad operations as it would be under government ownership. We want more and better regulation of the railroad problem.

In view of such utterances as this Congress, the administration and the Interstate Commerce Commission had better begin to wake up and look around. Such utterances are not very important in themselves, perhaps. And a barometer is not as important as a storm. But as an indicator of the approach of a storm, a barometer is mighty important.

RAILWAY MAIL PAY

SUCH satisfaction as railway men may derive from the report of the Congressional Committee on Railway Mail Pay, an abstract of which is published elsewhere in this issue, will be due entirely to an appreciation of the fact that half a loaf is better than no bread. The committee recommends the adoption of car space used in the carriage of mails as the sole basis of compensation. If the postoffice department should make heavy economies in the space now used the mail pay might be reduced even though the rates fixed for the various amounts of space used were just. Furthermore, the rates suggested, which include both charges for terminal service and charges for line service, are experimental and might yield less revenue in proportion than the committee estimates.

If the rates did yield what the committee estimates, it would not follow that they were remunerative, because the committee concedes that if they were applied the space in passenger trains used for the transportation of mails would yield less revenue in proportion than the space occupied by passengers; and it was clearly demonstrated in the recent rate advance case, and conceded by the Interstate Commerce Commission, that passenger train earnings, even in eastern territory, are far lower relatively to passenger train expenses than are freight earnings relatively to freight train expenses, which means that passenger train earnings as a whole are unremunerative. This being true, it must follow that mail pay rates relatively lower than passenger rates would be decidedly unremunerative. Finally, it is not certain that Congress will adopt rates as favorable even as those recommended, and which the joint committee estimates would increase the total mail compensation of the railways by about $3,000,000 a year.

But the report has its good as well as its bad features. For years the postoffice department officials have been giving the nation the impression that the railways have been overpaid for carrying the mails. The joint committee severely criticizes them for this. It shows that the statistics prepared and estimates made by the postoffice department have been worse than valueless; that they have not only been inaccurate but have been cooked up for the express purpose of misrepresenting the situation; that the postoffice officials have been living in blissful ignorance of the facts regarding the operations of their own department; that the truth is, that the railways have for years been underpaid for their services; that the system of computing mail compensation which has been followed has been wholly unscientific and unjust; and that the plans for readjusting mail pay which officials of the postoffice department have proposed have been crude and unfair and apparently have been intended to cause the railways to haul the mails at a heavy loss in order that the postoffice department might make a fallacious and dishonest showing of profit from its own operations. It is something to have finally got a committee appointed by Congress to tell Congress and the country the truth about the statistics which the department has prepared; about the incompetency which prevails in the department; and about the reckless way in which it has sought to deal with the subject of railway mail pay. It is also something to have the truth regarding the unremunerativeness of the mail compensation which the railways have been receiving laid before Congress and the public by a congressional committee.

While the recommendation that all mail pay be put on a space basis will not be satisfactory to the railways, those who have studied the subject most believe that the space basis is the most scientific, and that if properly used it will work out the fairest results. As to the rates which the committee suggests, while they may not be high enough, the committee recognizes the fact that they are experimental and provides for a reference of the question of their reasonableness to the Interstate Commerce Commission after they have been tried for two years.

Finally, a great point would be gained if, instead of granting the postoffice department the additional arbitrary authority over rates which it has sought, Congress should, as the committee recommends, take from it even such arbitrary authority as it now has and delegate the entire fixing of mail pay rates to the Interstate Commerce Commission. The commission fixes freight, passenger and express rates, and there is neither reason nor justice in an arrangement under which the regulation of mail pay rates is withheld from it and largely delegated to the postoffice department. That department is, in effect, the purchaser of mail transportation; and it would be just as reasonable and fair to let shippers determine what rates they should pay to the railways as to let the postoffice department determine what rates it shall pay to them.

The report of the joint committee may prove a long step toward the solution of the difficult and vexatious problem with which it deals. Will the present Congress, with the information which is now available, proceed to deal with the problem fairly, or will demagogism prevail and an attempt be made to continue, and even increase, the spoliation which the government has been practicing on the railways? Public opinion recently has undergone a great change. The public has come to a realization of the fact that the railways are being dealt with unjustly and in a way that is seriously hurting business in general. Therefore, it is but a matter of time until the long-eared gentlemen who now arise in Congress to bray every time a railway question comes up will be replaced by others of some intelligence, fairness and brains. Of all those in Congress who in recent years have tried to further their political ambitions by attacking the railways none has been more persistently and irritatingly pestiferous than Senator Bristow, of Kansas. Mr. Bristow recently was defeated at the primaries in Kansas, which assures his retirement from the Senate; and the country is in a mood to send a lot of other statesmen of like caliber and views to join him. If, therefore, the present Congress does not do justice to the railways it will simply increase the prospects of the election this fall of candidates for Congress who have some business sense and some notion of what it is decent, just and expedient for the government to do in dealing with railways and other business concerns.

ELECTRIC FEEDERS FOR STEAM ROADS

THE steam railways of this country have been slow to realize the importance of electric interurban lines either as competitors for passenger and freight business or as feeders for their trunk lines. As a result fairly extensive systems of electric roads have been developed in various parts of the country without attracting the serious attention of steam railroad men before they had begun to make serious inroads on their traffic. Naturally their competition was first felt in the local passenger business, but as the electric lines have increased their mileage they have had an effect on the long haul passenger business, and on both l. c. l. and c. l. freight traffic.

In several localities on the Pacific coast the steam railways, instead of allowing interurban lines to become active competitors, have built such lines themselves as feeders for the parent systems. In this way they have become able to give communities local passenger service, which it would not be practical to render with steam road methods of operation, and at the same time have controlled the through routing of passenger and freight traffic competitive with other lines. If interurban roads throughout the country which have had no arrangements for the through billing of freight have been able to operate successfully, it would seem that similar lines operating in conjunction with large roads, and receiving divisions of their through rates should be even more successful financially.

The Spokane & Inland Empire, and the Oregon Electric lines, which are described elsewhere in this issue, are good examples of electric line feeders. They are owned by the Hill roads, and are operated in close harmony with the controlling properties. Since the Oregon Electric is the newer line, and was built by these interests, it more nearly represents their standards of construction for such lines. It is built to steam road standards, modified only where necessary to permit electric operation. It extends for 125 miles down the center of the Willamette Valley, which had previously been served exclusively by the Southern Pacific. One immediate effect of its invasion of this valley was the announcement by the Southern Pacific that it would electrify and extend its branch lines in the same territory, which work has been under way for the past two years.

The development of a system of electric line feeders has brought forward a number of new problems of more or less seriousness. One of these is due to the attitude of organized labor. While the electric lines conform closely to steam road in their methods of operation, the qualifications that they require of men in the train service are, as is the case on similar roads throughout the country, considerably below those required of men on steam roads, and a correspondingly smaller wage is paid. But because of the ownership of the electric lines by the steam roads the employees of the electric lines have sought to secure the standard steam road rates. Doubtless their thought is that once these rates have been put in effect on the electric lines owned by steam roads, they can be more easily established on all electric lines. If the employees succeed in getting steam road wages adopted on electric lines one of the important economies of electric operation will be lost, and the further development of such lines will be hindered.

"PERMANENCY MAKES FOR EFFICIENCY"

MR. UNDERWOOD, president of the Erie Railroad, in that highly condensed lecture which he gave the superintendents at their New York meeting, and which was reported in our issue of August 28, touched, in a dozen words, on one of the most important yet most difficult features of discipline: "Seek to instil into every employee the truth that each year of his service improves and cements his relationship with the company . . .; permanency makes for efficiency." We have called this important because every superintendent desires to have employees with whom his friendship, as he represents the company, is "cemented"; and that this is difficult goes without saying, for railroad officers everywhere deplore the fact that their practice in this respect is much below their ideals.

This state of things is not strange. In all walks of life, words of censure for misconduct are necessary and are familiar in everybody's experience; while words of commendation for good conduct freeze on our lips—if they get so far as the lips. Cementing things together is a process not always easy to explain. Chemists tell us that in old brick walls the mortar and the bricks are found to have united in a way which cannot be explained, so that the union between the mortar and the bricks is stronger than the cohesion in the brick itself, or in the mortar, by itself. So in the relations between employer and employee; there is not a new cementing each year, but the strength of the original union should increase. In notable instances, which every reader can recall, this strengthening does occur; and usually its causes are as hard to define as is the mysterious condition of the brick wall.

A superintendent has, let us say, 100 men of a certain class. Ten of them have been reprimanded or otherwise talked with during the past year concerning derelictions (and, incidentally, their good qualities or good acts have perhaps been mentioned); five have been commended for some specific act; and 85 do not appear on the record; there has been no formal communication concerning the quality of their work or conduct. It must be presumed that their services were satisfactory. What can be done to better encourage this larger number. They may feel as though they had been ignored. To strengthen their loyalty something more definite is needed.

Everybody admits that something ought to be done; but what, when and how?

One superintendent says that the pay envelope answers the question. Agreeing, for the moment, with this view, it is safe to say that the great majority of officers would like to add something more, even if there be nothing owing to the employee. Should a letter or message go with every pay envelope? That would make the thing too common. The three-line paragraph from the directors, at the end of their annual report to the stockholders, stands at the opposite extreme. This expression of appreciation is so very general that it has no effect at all. A circular from the general manager, sent separately in envelopes, one to each employee, is an improvement on the directors' method; but still it is pretty vague. Speeches at meetings for "safety-first," or other purposes, are also unsatisfactory.

The need is for an individual communication; a letter or message known by the recipient to be based on thoughts concerning him, and referring to no other employee. On one road, the name of which we do not recall, a brief commendatory letter was sent, one December, to each employee whose record for 12 months was clear, and the result was very gratifying. Credits for specially meritorious acts, to be entered in a printed monthly bulletin, are now common on many roads. These seem to be quite generally liked; but one hears frequently the objection that it is not good practice to commend a man for doing his simple duty. To make a distinction between what is in the line of duty and what is not, is often difficult. And there is the more serious objection that the rewards are very unequal. The most vigilant telegraph operator may wait five years, or even ten, before he sees a fallen brakebeam in a passing freight train; while some comparatively lazy young novice may in the meantime get his name in the record by good luck. The publication of these commendatory bulletins, however, is a move in the right direction. If any ill effects shall result from their use, the need will be not for abolition but for correction. Can this feature be improved?

The reader will recall the paragraph, printed in our account of discipline without suspension on the Baltimore & Ohio, on January 16 last, which tells of a conductor who had a clear record—a blank page—and who procured a copy of that page and framed it, to hang up in his home, where the eloquent emptiness of the sheet would be a constant incentive to him to keep it empty. That is a very good idea. Would it not be a good stimulus for any conductor to make use of?

What can a superintendent do to improve on a blank sheet as a record of satisfaction with a conductor's or an engineman's service. This is not being written with the expectation of answering this question, but rather to give prominence to the subject with the hope that it may cause railway men to give the matter increased attention. But it is easy to imagine a superintendent, one who has the constant aid of two or three trainmasters and a dozen active inspectors, who at least once a year would have the material for a brief letter to each employee—at least to each of, say, the 20, 30 or 40 best men in the supposed hundred—in which should be made definite mention of the work that that employee has done.

Is this a fantastic ideal, outside the range of practical railroading? Would the expenditure of time and money be any more of an extravagance than the inspection (and the accompanying reporting) that is expended on rails, locomotives, air brakes, lawsuits and other things?

The following paragraph is an extract from the plea made by a veteran conductor who recently went before his superintendent as spokesman of a committee to ask for the adoption of some plan by which adverse entries might be offset by—something; presumably by a series of months showing nothing unfavorable. It voices a feeling that is very common:

> When a man is young he is careless, and he treats suspensions and reprimands, fines and cautions lightly. Why? Because he has not reached that age yet where he sits down to think. But when he reaches my age, and possibly a little younger, that foolishness has all left him, and I tell you it is not a question of a day, nor is it a question of a week, or of the loss of the time; it is the humiliating feeling that comes to a man, who is striving to do his best. . . . There is only one side of the ledger when you go to look at your record—and I am ashamed of mine. I have seen it; three pages, representing 30 years. A man sees nothing there but his shortcomings; no matter what he has done that may be commendable, it does not appear. It has appeared in some way in times gone by, but either it has been lost, or has been carried out by the scrubwoman; it is not there now. In such a situation a man feels sore. Can there not be some rule adopted whereby discipline could be imposed and yet the men given a chance to wipe some of it out? We have thought from time to time it would be an excellent thing if we were permitted in some way to clear up the record. I feel satisfied that if Mr. X., the superintendent, got my record and looked it over he would he fair enough to ascertain whether I was improving, or whether I was going back; and I think he would give me an opportunity if I showed a disposition to brighten that record; but Mr. X. may leave here and some other gentleman may come to take charge, and not seeing anything good on that record, nor knowing anything more about it, he might not be as liberal as Mr. X. He would see that record, three pages in thirty years, and say at once, why, that man is not fit for the service at all. And I might have got all the unfavorable entries in the first ten years.

Cannot some definite response be made to such a plea? It is the general understanding that those roads where Brown's discipline is in effect and where demerits are regularly wiped out by the lapse of time—a certain number of clear months for a certain number of "days"—have not been so thoroughly satisfied with the plan as to lead other roads to adopt it. What is the reason for this?

BUFFALO, ROCHESTER & PITTSBURGH

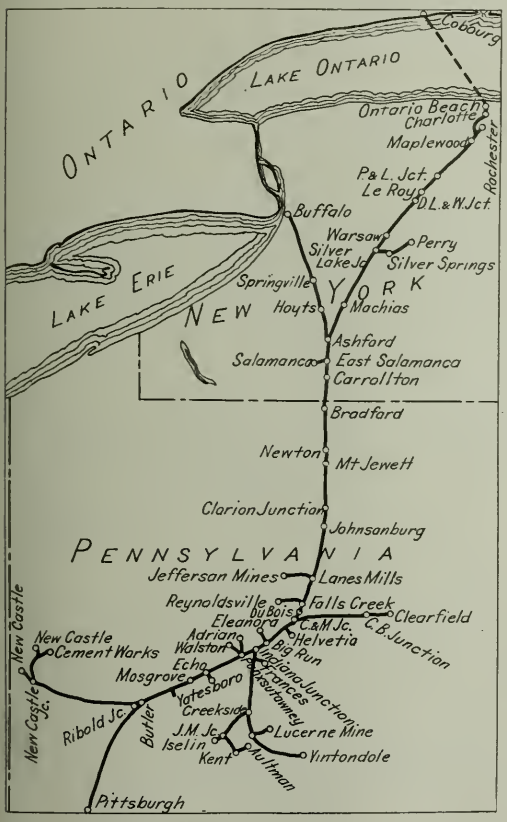
INSOFAR as gross and net earnings were concerned, the fiscal year ended June 30, 1914, interrupted the quite remarkably steady growth in prosperity that has been shown by the Buffalo, Rochester & Pittsburgh since 1909. Insofar as the development of the property, improvement in organization and the fundamentals of progress were concerned, there was no interruption. In brief, the Buffalo, Rochester & Pittsburgh in 1914 earned gross a quarter of a million less than in 1913, due to loss in coke and general merchandise traffic; spent in operating expenses a quarter of a million more than in 1913, due to increased transportation expenses; and had about $200,000 less other income, finishing the year, therefore, with net corporate income of $1,355,000, as compared with $2,127,000 in 1913. Dividend requirements, with both common and preferred on a 6 per cent annual basis call for $990,000. Six per cent was paid on both the common and preferred in the 1914 fiscal year, but since the close of the year the rate on the common has been reduced from 3 per cent semi-annually to 2 per cent. This reduction in the dividend rate reflected, however, the conservatism of Buffalo, Rochester & Pittsburgh policy rather than necessity.

The company operates a total of 586 miles of line, of which 207 miles are double track. The road is an independent north and south line, running between the Pittsburgh district and Lake Erie via the bituminous coal and coke fields of Pennsylvania, and in active competition with the Pennsylvania Railroad and, to a less extent, with the New York Central Lines. It is, as would be expected in this territory, a line with rather heavy grades, a large percentage of coal and coke traffic, and a quite heavy density of passenger business. The mileage of line operated has increased since 1909 by only 13 miles, while the earnings have been as follows: $7,608,000 in 1909, $9,486,000 in 1910, $9,973,000 in 1911, $10,322,000 in 1912, $11,959,000 in 1913 and $11,528,000 in 1914.

The Buffalo, Rochester & Pittsburgh has, moreover, succeeded in doing what comparatively few roads in eastern United States have done, namely, conserved to the owners of the property a portion of the increase in gross. Thus net earnings in 1909 were $2,810,000; in 1910, $3,394,000; in 1911, $3,615,000; in 1912, $3,654,000; in 1913, $4,077,000, and in 1914, $3,356,000.

One of the most important elements in this growth of net earnings, despite the annually increased cost of doing business, has been the equal development of each part of the property to fit into a general scheme of betterment. The development, of course,

has been intensive. The extensions which have been made since 1909 were extensions of branches into the coal fields necessitated by the exhaustion or partial exhaustion of the more readily accessible mines. It is impossible to go into a detailed description of this carefully carried out general scheme of development, and yet the scheme itself consists of a great mass of detail. In 1909 and 1910 the management began replacing Consolidation locomotives with Mikados, but before this purchase had been made, heavier rail and ballast had been installed, so that by the time the Mikados were delivered the districts for which they were destined were in shape to utilize them to the fullest extent. Since then, while no spectacular expenditures were made for additions and betterments, a comprehensive plan of relaying with heavier rails, bringing bridges up to Cooper E 60,



The Buffalo, Rochester & Pittsburgh

strengthening embankments and increasing engine house facilities has been going on.

In 1914 the Buffalo, Rochester & Pittsburgh for the first time ordered Mallet locomotives. This illustrates quite well, although it does not begin to describe, the policy which the management of the property has pursued. With the grades which the road has there was no doubt probably in the minds of the management, even earlier than 1909, that Mikados could be used economically on nearly the entire line and that on considerable portions of the line for certain classes of traffic Mallets could be made to effect a saving; but the company had its Consolidation locomotives. It was able, through improvement in organization to earn an increased profit with the increase in business, and instead of selling a large issue of securities to buy heavier locomotives and then to strengthen the road so that these locomotives could be used, the change was made gradually, so that the value of the older and lighter locomotives in service was gotten out of them before they were retired, and the increase in traffic was made to more than pay for the increased interest charges resulting from improvement to roadway and track.

The reduction of dividends is another aspect of this same progressive conservatism. It was thought better for stockholders to sacrifice a part of their present income rather than to narrow the margin of safety between dividend requirements and amounts available for dividends which for a number of years on the Buffalo, Rochester & Pittsburgh have been kept ample.

Of the $10,710,000 operating revenues in 1914, 85 per cent was from freight and 11 per cent from passengers. Freight revenue was less in 1914 by $258,000 than in 1913 and passenger revenue more by $57,000, the net loss in total operating revenues amounting to but slightly over 2 per cent. This loss was almost entirely due to a decreased tonnage of coke carried and to decreases in the tonnage of iron ore and manufactures. Bituminous coal furnishes the largest proportion of the traffic, and in 1914 8,176,000 tons of coal were carried out of a total tonnage handled by the road of 12,295,000 tons. In 1913 the coal tonnage was 7,980,000 tons and the total tonnage handled 12,490,000 tons. The increase in coal tonnage was despite the fact that most of the collieries on the road were idle for all of April and nearly two weeks of May, due to a cessation of work during an adjustment of the miners' wage scale. The loss in coke traffic was, of course, because of the depression in the iron and steel trade. It is indicative of the soundness on which the growth of Buffalo, Rochester & Pittsburgh business rests that in a year of very marked depression freight traffic earnings should have fallen off only about 2 per cent and passenger earnings actually increased.

The increase in expenses amounted to 3.55 per cent. The following table shows the percentage of each class of expenses to total operating revenues:

	1914	1913
Maintenance of way and structures	13.52	14.23
Maintenance of equipment	20.69	19.74
Traffic expenses	1.41	1.30
Transportation expenses	36.23	32.71
General expenses	2.27	2.05
Total	74.12	70.03

It will be noticed that the larger part of the increase in expenses came in transportation expenses. Detailed expense accounts throw some light on this increase in transportation expenses in the face of a decrease of 2.96 per cent in the ton mileage hauled. Fuel for road locomotives cost $773,000 in 1914 as against $795,000 in 1913, a decrease of between 2 and 3 per cent. Wages of road trainmen amounted to $563,000 in 1914 and $494,000 in 1913; in other words, where economy could effect a saving, a saving was made, and where the full-crew bill compelled a useless expenditure it was necessary to show a loss.

Despite the slight increase in passenger business there was a decrease in the mileage of revenue passenger trains from 1,378,000 in 1913 to 1,367,000 in 1914; but in freight service, with a decrease of over 2 per cent in ton mileage there was a very slight decrease —from 2,837,000 to 2,816,000—in the mileage of revenue freight trains. Stated in another way, the average revenue trainload in 1913 was 710 tons, and in 1914, 694 tons. This decrease in trainload was due entirely to changes in the direction and character of the traffic. The number of tons of freight per loaded car was 35.74 in 1914 as against 34.61 in 1913. Car loading, which has been improved steadily on the Buffalo, Rochester & Pittsburgh since 1909 and which is high, was still further improved in 1914. On the other hand, loaded cars were but 58 per cent of the cars in freight train in 1914 as against 60 per cent in 1913. Mention has already been made of the loss in the tonnage of iron ore. Iron ore moves south in coal cars and the utilization of these cars, which would otherwise have to run empty south-

bound, has been one of the very important factors in the larger revenue trainload in recent years. A falling off in iron ore traffic, therefore, with an increase in coal traffic, automatically increases the empty car mileage and decreases the average revenue trainload.

There is another factor which has probably increased transportation expenses, and that is the fact that a larger proportion of the coal each year comes from mines further away from the main line. This is not reflected in a longer average haul of all freight, probably because of other changes in traffic conditions which offset it, but it is nevertheless a cause of increases in the transportation expenses.

In 1914 the Buffalo, Rochester & Pittsburgh spent $1,629,030 for new equipment and $1,893,000 for additions and betterments to roadway and structures. The company appropriated out of income $348,000 for equipment agreement sinking funds, and sold $2,000,000 equipment trust certificates dated July 1, 1913; $887,000 equipment trust bonds authorized in 1910, and $1,400,000 consolidated mortgage 4½ per cent bonds, retiring various amounts of equipment trust bonds maturing under the trust agreements, with the net result of an increase of $3,068,000 on the outstanding funded debt of the company, with no increase in the amount of outstanding stock. At the beginning of the year there were no loans and bills payable, and at the end of the year there were $47,000 loans and bills payable. Cash on hand at the beginning of the year amounted to $1,620,000, and at the end of the year to $1,228,000.

The following table shows the principal figures for operation in 1914 as compared with 1913:

	1914	1913
Mileage operated	586	576
Freight revenue	$9,153,942	$9,411,879
Passenger revenue	1,184,417	1,127,612
Total operating revenue	10,709,535	10,947,246
Maint. of way and structures	1,447,953	1,557,963
Maint. of equipment	2,216,194	2,161,210
Traffic expenses	150,553	141,659
Transportation expenses	3,880,160	3,580,617
General expenses	243,202	224,441
Total operating expenses	7,938,063	7,665,891
Taxes	234,000	216,000
Operating income	2,534,575	3,057,960
Gross corporate income	3,355,798	4,076,708
Net corporate income	1,354,784	2,126,994
Appropriated for pension and insurance funds	16,432	1,498
Appropriated for new equipment	74,104	125,796
Appropriated for retirement of equipment bonds	274,247	323,000
Dividends	990,000	990,000
Surplus	.....	686,701

NEW BOOKS

Poor's Manual of Industrials for 1914. 2,500 pages. Published by Poor's Railroad Manual Company, 535 Pearl street, New York.

The publication of this fifth edition of Poor's Manual of Industrials completes the Poor's Manual for 1914, which is in three volumes, the Manual of Railroads, the Manual of Public Utilities and the Manual of Industrials. Long before the Interstate Commerce Commission or any other government body had begun to collect scientific and intelligible figures in regard to railroads, Poor's published an authoritative and comprehensive manual of statistics of railroads in the United States that was indispensable to bankers and investors. With the great growth in industrial corporations within the past ten years there has grown up a need for an accurate and comprehensive manual of industrials comparable to the need for statistics in regard to railroads in the eighties. While, of course, it is far more difficult to get uniform and comprehensive figures for industrial corporations than for public utility and railroad corporations, the Poor's Industrial Manual contains a really remarkably accurate set of income accounts and balance sheets, many of them in comparative form.

Letters to the Editor

CO-OPERATION BETWEEN SUPPLY MEN AND PURCHASING AGENTS

Chicago, Ill., August 7, 1914.

To the Editor of the Railway Age Gazette:

At the present time when economy is being preached and practiced by the railroads, and of necessity also by the concerns engaged in the railroad supply business, a practice exists on the part of the railroads which puts the supply companies to a heavy, needless expense.

I refer to the fact that a majority of the railway purchasing agents, especially those with offices in Chicago, are not willing or able to make definite appointments for interviews. It is therefore necessary for a supply company representative, desirous of an interview, to call at the purchasing agent's office and wait an indefinite length of time. A wait of an hour is, I am sure, considerably less than the average. When it is considered that frequently the callers are executive officers of their companies, and that almost all of them are high salaried men, it will be seen that an hour wasted out of a day is a large waste, and that when this is multiplied by the number of officers and the number of men waiting, the total waste is enormous.

This is not intended to apply to the chief clerks of purchasing agents, who see many representatives on questions of detail.

As a remedy for the condition cited, I would suggest that the purchasing agent set aside an hour and a half in the morning, say from 10:30 to 12:00, and the same length of time in the afternoon, say from 2 to 3:30, for interviews. This time could be divided up into ten minute intervals on a sheet and put into the hands of a secretary; these appointments to be adhered to strictly, not only by the caller but by the purchasing agent; the interview to be terminated at the expiration of the time allotted.

I appreciate the fact that the purchasing agent at present is frequently interrupted by other officials of his own road and by the telephone, but I do not believe it would be difficult to get the co-operation of other railroad officers, and undoubtedly the telephone messages could be handled for the purchasing agent during the time set apart for interviews.

The advantage to the purchasing agent would be that he would always know in advance who was calling and could prepare himself by reference to his files, etc., when necessary.

I understand that some time ago one of the large railroads contemplated moving its purchasing agent's office to a location considerably removed from the business section of Chicago. A protest was made to the officials by the purchasing agent on the ground that the heads of the various supply companies would not call on him at that distant location, and that he considered frequent interviews with them very essential. On this account the change of location was not made.

I am confident that there are at present many executive officers of supply companies who would like to call on the railroads, but are deterred by the long waits necessary and the uncertainty of being able to get any interviews.

I believe some plan of the kind suggested would be to the advantage of both the railroads and the supply companies, and I am sure it would result in a great saving of time and money to the supply companies.

Railway Supply Man.

Railway Extension in Argentina.—The Argentine chamber of deputies has sanctioned a bill granting a concession for a railway from Rosario to Rufino.

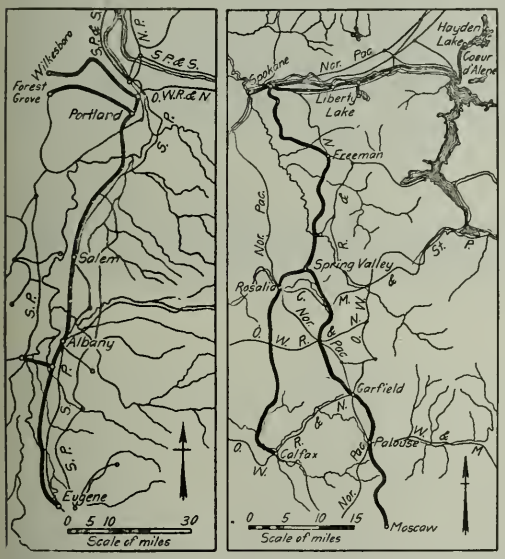
Rolling Stock for Italian State Railways.—Contracts aggregating $10,446,974 have just been awarded to 17 Italian firms for building 885 baggage and passenger cars and 4,481 freight cars for the Italian State Railways.

Hill System Electric Lines in the Northwest

The Development of High Grade Interurbans as Freight and Passenger Feeders for Trunk Roads

In spite of the rapid development of electric interurban lines throughout the country, the railroads, especially in the eastern and central states, have given relatively little attention to the possibilities of such lines as feeders for their main trunk lines. The roads on the Pacific coast have been the first to realize the opportunity for development in this direction on a large scale, and it is here that the greatest progress has been made. Over 1,500 miles of such lines are now in active operation under the control of the Southern Pacific and the Hill Lines, the former in the vicinity of Los Angeles, San Francisco and Portland, and the latter near Portland and Spokane. These lines are more than the ordinary interurbans in that they compete actively for all classes of freight as well as passenger traffic, and have the same standards of equipment and construction as steam roads.

The lines of this nature most nearly approaching steam road standards of construction, operation and traffic, are the Spokane & Inland Empire system, extending south and east from Spokane, and the Oregon Electric-United Railways line, in the Willamette Valley south and west of Portland of which are Hill properties. These systems compete actively with the steam roads for all classes of traffic in highly competitive territory and participate in through rates with the owning and other companies.



Maps Showing Lines of Oregon Electric and United Railways on Left and Spokane and Inland Empire on Right

PHYSICAL CHARACTERISTICS OF THE INLAND EMPIRE

The Inland Empire is the older of the two lines, and extends from Spokane south to Colfax, Wash., and to Moscow, Ida., and also east to Coeur d'Alene, Ida., and Hayden Lake, with a total of 177 miles of main line. In addition, this company also operates 36 miles of street railway lines in Spokane, which, however, will be excluded from this study. The lines south, commonly termed the Inland division, are single track throughout, while 18 out of 41 miles of the Coeur d'Alene division is double track. These two lines were built separately in 1906, and were consolidated under one management in 1908. They were acquired by the Great Northern and Northern Pacific in 1911. They are operated entirely separately from the parent companies, but are under the executive control of the Spokane, Portland & Seattle.

The Inland division crosses a rolling country with a maximum grade of 2 per cent and a maximum curvature of 12 deg., although only a few curves of this high degree are found. The longest grade is nine miles against southbound traffic a short distance out of Spokane. The maximum grade on the Coeur d'Alene division is one per cent. No reduction of grades has been undertaken since the present owners assumed control of the property, although numerous high timber trestles have been filled. Passing tracks are placed at intervals of about three miles with numerous intermediate spurs. The track is laid with 70 lb. rail on gravel ballast.

For the first 20 miles the Inland division traverses a rapidly developing fruit country, which merges south of Freeman into the wheat area known as the Palouse country. The Coeur d'Alene division traverses a country devoted largely to fruit raising, with many summer resorts in the vicinity of Coeur d'Alene and Hayden Lake. The territory south of Spokane is competitive with the Oregon-Washington Railroad & Navigation Company and the Northern Pacific, while the line east is paralleled by the Chicago, Milwaukee & St. Paul and the Northern Pacific.

At Spokane the passenger trains proceed over city streets for about a mile to a terminal in the center of the city, shown in one of the accompanying photographs. Freight trains are assembled in a separate freight yard located between the yards of the St. Paul and the Great Northern, with transfer connections with all roads. Physical connection is also made with the Northern Pacific and the Oregon-Washington Railroad & Navigation Company at Moscow. The terminals at Spokane are adapted for the handling of all classes of traffic ordinarily found on steam roads, while the station facilities at the smaller towns, including combination freight and passenger stations, house tracks and side tracks, are also similar.

All trains are operated electrically. The company has its own hydro-electric power plant on the Spokane river, nine miles below Spokane, where it now generates about 11,000 h. p., about 4,500 h. p. of which is sold to outside parties. The Inland division is operated on 6,600 volts, alternating current, while the Coeur d'Alene division uses 650 volts, d. c. A 46,000-volt line supplies current to substations spaced at intervals of 12 miles along the Inland division. The overhead line is of catenary construction.

The motive power consists of six 47-ton and five 72-ton single phase, a. c., and two 37-ton d. c.—600 volt locomotives. On the Inland division, two locomotives are commonly operated in multiple on freight trains, two of the lighter ones hauling 450 tons and two of the larger ones 630 tons on the maximum grade. On the Coeur d'Alene division they are operated singly, a 37-ton locomotive hauling as high as 725 tons. Two of the a. c. locomotives make the trip from Spokane to Moscow and return, 180 miles, with a local freight carrying full tonnage daily, in 12 hours and 45 min. regularly.

INLAND EMPIRE TRAFFIC

An average of over 3,000 passengers are handled daily on the Spokane & Inland Empire, and the number exceeds 4,000 on Sundays during the summer. The passenger receipts last year were over $565,000, forming practically half the total revenue. Three trains are operated each way daily from Spokane to Colfax and to Moscow and nine to Coeur d'Alene. The passenger business is especially heavy on this latter line with a considerable com-

muter traffic and two daily boat trains each way during the season of navigation which connect with steamers for Harrison and St. Maries. These latter trains run through without stops, making the 32 miles in 55 min., including crossing nine streets at grade entering Spokane. As indicating the heavy passenger traffic handled at certain times, 1,085 special trains were run on this line during the 55 day racing season at Coeur d'Alene in 1912. Parlor cars are operated on the four limited trains on this division. Great Northern express and United States mail are carried on several trains on each line.

However, it is the freight traffic which presents the greatest opportunity for development. About 75 carloads of freight are handled daily, two-thirds of which originates on the Inland division. This traffic consists principally of grain, lumber, fruit, stock and merchandise. One regular freight train leaves Spokane about midnight daily for each branch of the Inland division, making the round trip in about 12 hours, while two freights are operated each way daily to Coeur d'Alene. Extra freights are run as required, an average of three being operated daily on the Inland division during the fall wheat rush. Previous to their acquisition by the Hill lines, through carload freight originating on these lines was turned over to different roads at Spokane indiscriminately. Now, however, as much of it as possible is routed over the Great Northern or the Northern Pacific, from 15 to 20 cars being given these two roads daily, aside from the heavy wheat business, most of which is also long haul traffic.

The heaviest carload traffic consists of wheat from the Palouse country, about 3,000 cars being brought into Spokane last year, most of which were billed to Tacoma, Seattle and Portland. Forty-two warehouses have been erected at various points along the line with a capacity of over 4,000,000 bu. Considerable lumber is also hauled out for eastern points, an average of about 10 cars being turned over to the Inland Empire by the Washington, Idaho & Montana at Palouse daily, in addition to some at other points.

The carload fruit business is growing rapidly, in addition to which much is handled by express and l. c. l. As indicating the possibilities along this line, 13 cars of berries and several cars of cherries were shipped in one week from one station, while a special train consisting of 12 cars of fruit was brought from Moscow to Spokane. To accommodate the heavy l. c. l. fruit business, a tri-weekly refrigerator service is operated on all lines, generally requiring two or more cars on each train.

About 18 cars of l. c. l. freight are loaded at Spokane daily. Freight received up to 5 p. m. is despatched on night trains for delivery at all stations along the line at 6 o'clock the following morning. In addition, local freight received up to 11 a. m. daily at Spokane is delivered at Coeur d'Alene at 1 o'clock the same afternoon. Solid cars are loaded for Colfax, Moscow, Palouse and Coeur d'Alene, while two solid cars are loaded for points on the Washington, Idaho & Montana points via Palouse,

Passenger Terminal at Spokane One Block North of the Post Office

Main Freight Terminal in Spokane

Typical Combination Passenger and Freight Station on the Inland Empire at Palouse, Wash.

and peddler cars serve other points. During the season of navigation at least three cars of l. c. l. traffic are also delivered daily to the boats at Coeur d'Alene for St. Joe, St. Maries and intermediate points. As indicating the extent to which this road is

Typical View on Inland Division Showing Track and Single Catenary Construction for a. c. Operation

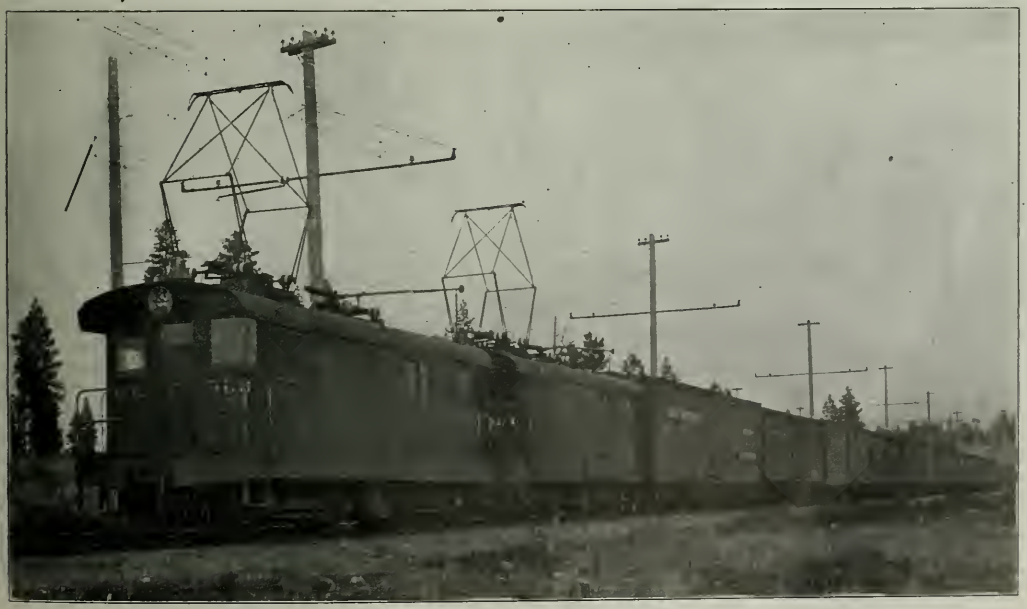
enabled to meet competition, it secures over 90 per cent of the l. c. l. business from Coeur d'Alene in competition with two other lines.

PHYSICAL CHARACTERISTICS OF THE OREGON ELECTRIC

The Oregon Electric is a more recent development of the Hill lines, and is another example of the competition existing between the Hill and Harriman interests in the northwest, as it extends up the productive Willamette valley, long a stronghold of the Southern Pacific. The Oregon Electric operates from Portland south through Salem and Albany to Eugene, Ore., a distance of 122 miles, with a branch from Garden Home to Forest Grove 19 miles long. It was originally built to Salem and to Forest Grove as an interurban road and was purchased by the Hill lines in 1910. Work was immediately begun on an extension to Eugene, which was completed in October, 1912. At the same time the Oregon Electric was purchased, the Hill lines also secured control of the United Railways operating from Portland west into the Tulatin valley, and have since extended it west 12 miles to Wilkesboro. The United Railways also possess valuable franchises for operation over city streets in Portland. While both lines are now owned by the same interests, they are still operated independently in all except executive matters.

Since taking control, the new owners have built these extensions and have revised the old line so that they now conform to steam road standards of construction. The line to Eugene is located with long tangents and light curves, having one 24-mile tangent south of Albany and another 17 miles long north of Salem. South of Salem the maximum curve is 3 deg. and the maximum grade 0.4 per cent., while it is planned to revise the grade north of Salem to a maximum of 0.5 per cent. As indicating the character of construction, the Willamette river is crossed south of Harrisburg with three 200 ft. through truss spans and a 100 ft. through girder span at each end, and a trestle approach across the low lands, while the Santiam river is crossed with seven 175-ft. truss spans and 3,000 ft. of trestle at each end. The track is laid with 75-lb. rails with heavy angle bars, with welded bonds. Eighteen ties, full tie plated, are used per rail with 8 in. of gravel ballast under the ties. South of Salem 2,000 ft. sidings are provided at intervals of four miles. Except in cities, the line is built throughout on private right of way of 100 ft. width.

Power is purchased by contract from hydro-electric plants with auxiliary steam units and 33-cycle current is transmitted at 60,000 volts for a maximum distance of 120 miles. It is de-



A Freight Train on the Inland Division

livered to the cars and locomotives from a trolley, carrying 1,200 volts d. c. by means of a trolley pole rather than a pantograph. This line was changed over from 600 volts d. c. in 1912, at which time the spacing of sub-stations was increased from 12 to 18 miles. The United Railways was changed over to the same system in July, 1913. The sub-stations are of concrete construction and contain one 500 k. w. generator with room for another whenever it may be needed. A triple cottage is provided at each station for the three attendants and their families. One 500 k. w. portable sub-station has been built on a steel car

Delivering Wheat to an Inland Empire Warehouse in the Palouse Country

for use at burn-outs and in handling peak loads. It was also used when changing over from 600 to 1,200 volts.

Eight locomotives weighing 60 tons each with 19,000 lb. tractive effort when running, and 32,000 lb. when starting, are required on the Oregon Electric and one on the United Railways. These locomotives haul 500 tons on the ruling grades.

The overhead construction consists of a single 45 ft. pole with a bracket supporting a catenary, which in turn carries the aluminum strand transmission wire. Guy poles are placed on curves. A telephone line was built independently at one side of the right of way. As a means of increasing the life of the poles the Orr system of reinforcement is used, consisting of a

One of the Larger Bridges on the Oregon Electric

concrete collar reinforced at the ground line and costing about $9 per pole. All pole butts are treated with creosote or carbolineum before setting and each pole is inspected annually.

Among the numerous improvements which have been made on this line during the past few years is a five mile cut-off between Orenco on the Oregon Electric and Helvetia on the United Railways, which will eliminate the necessity of hauling freight through the streets of Portland, and gives direct access to the common yard of the Hill lines at that point. At Salem a detour line two miles long for freight traffic passes through the wholesale district and removes this traffic from the main residence streets, while a similar line has also been built at Albany. A second track was also built south to Garden Home last year. In connection with the construction of this second track, alternating current, automatic signals were installed.

TRAFFIC ON THE OREGON ELECTRIC

Both passenger and freight traffic is actively solicited in competition with the Southern Pacific and its subsidiary, the Portland, Eugene & Eastern. Five passenger trains are operated each way daily between Portland and Eugene, two of which are limited trains making the run of 122 miles in four hours. Two additional trains are run from Portland as far as Albany, and three more to Salem. All these trains carry at least two cars and most of them three cars. Buffet parlor cars are carried on the limited trains, and one sleeping car is operated each

Automatic Signals at Entrance to Passing Track on the Oregon Electric

way between Portland and Eugene nightly. All through trains carry express, the Great Northern having replaced Wells Fargo & Company on August 1, 1913. The express business has developed very rapidly, especially in milk and berry traffic, and six express cars have recently been purchased for this special use. Although most of this line has been in operation less than

Oregon Electric 60 Ton Freight Locomotive

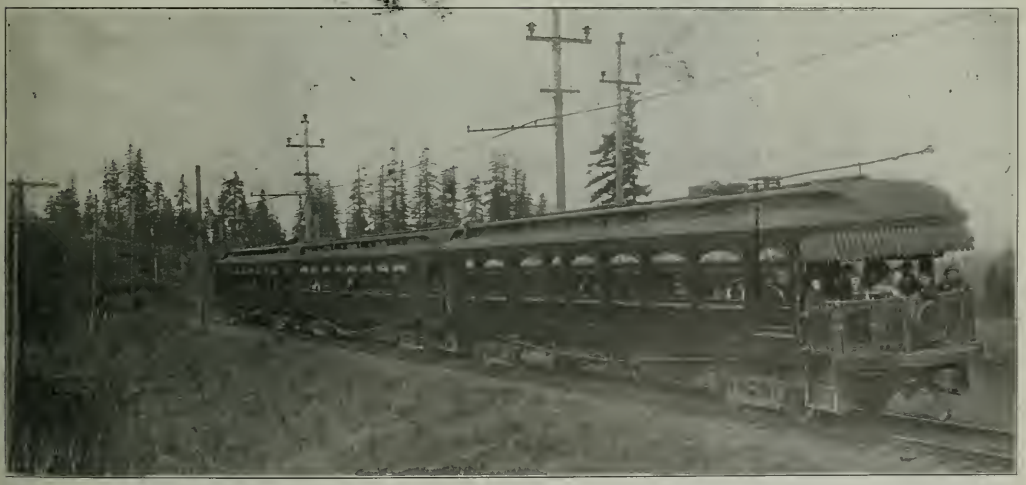
two years, a very satisfactory passenger business has already been developed.

Equally promising with the rapid development of the passenger traffic is the growth in both l. c. l. and carload freight traffic. One through freight train is operated each way nightly between Portland and Eugene, and another between Portland and Forest Grove, while a local freight is operated between Portland and Salem three times weekly. Merchandise is accepted at Portland up to 5:30 p. m. for these trains leaving at 8 o'clock and is unloaded at all stations for delivery at 7 o'clock the following morning. Full cars of l. c. l. freight are loaded for Salem, Albany and Eugene with peddler cars for other points. In addition to Portland, freight houses have been built at Salem and Eugene with team tracks, eight such tracks with a capacity of 25 cars being provided at Eugene. The regular night freights place the cars on these tracks, and on the industry spurs, so as to require no further switching.

The principal commodities shipped in carload lots are: cord wood, hops, fruit and lumber. The hop movement is especially heavy, and is rapidly growing, over 200 cars being shipped during the fall of 1912, shortly after the line was opened and before complete facilities could be provided. Hop warehouses have since been built at several points along the line. Much cord wood is also shipped locally to Portland for fuel, while considerable quantities of fruit are handled for Portland and for eastern points. Practically all of the hops go to New York and other eastern points, the Hill lines securing the through routing to Chicago. This illustrates an important advantage resulting from the control of these lines as feeders, over 25 per cent. of the carload freight handled on the Oregon Electric being billed through over the other Hill lines. In this connection it is instructive to note that, whereas, the Hill lines secured only 40 per cent. of the freight moving through Portland a few years ago, they now secure over 60 per cent. of all this traffic. On the Oregon Electric proper about 50 cars of freight are being handled daily.

In addition to this road business, the United Railways does a switching business among industries along its tracks in Portland for all roads. Several tracks are laid in the city streets, through the wholesale district, and two electric locomotives are employed in switching here during the night. Cars are placed opposite the different warehouses during the evening, and are removed early in the morning. In this way these industries are given railway facilities without noticeable inconvenience to street traffic, and cars can be loaded or unloaded without the necessity of trucking through the street. From 15 to 20 cars are handled nightly in this way, this switching service being performed for all roads.

All trains on the Oregon Electric, the United Railways and the Spokane & Inland Empire are operated under standard steam road rules, modified where necessary to adapt them to electric operation. Many of the employees were transferred directly from steam road service, while others were recruited directly for this work. The trains are dispatched by telephone with auxiliary telegraph.



Limited Passenger Train With Parlor Car on the Oregon Electric

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Sicilian Transport Conditions.—The state-owned Sicilian railway system has a total length of 839 miles. This is all of standard gage except for 46 miles of 3 ft. 1 in. gage. A train ferry service is also maintained across the Straits of Messina, a distance of 14 miles.

HALE HOLDEN

Hale Holden, vice-president of the Chicago, Burlington & Quincy, was elected president of the company to succeed the late Darius Miller, at a meeting of the directors held in Chicago on August 27, immediately following Mr. Miller's funeral.

Mr. Holden has been directly connected with the Burlington only since July, 1907. But for several years before he had practiced law in Kansas City as a member of the firm of Warner, Dean, McLeod & Holden, who were local attorneys for the Burlington. It was during this time that he attracted the attention of the management of the road, and in July, 1907, went to Chicago to take the office of general attorney in charge of its interstate commerce litigation.

His later promotions have come rapidly, but naturally. In January, 1910, Daniel Willard, vice-president in charge of operation, left the Burlington to become president of the Baltimore & Ohio. The jurisdiction of Darius Miller, who was vice-president in charge of traffic, was then extended over all departments, the operating department being placed in direct charge of H. E. Byram, who had been Mr. Willard's assistant, and the traffic department in charge of C. G. Burnham, who had been Mr. Miller's assistant. A few weeks later George B. Harris retired, and Mr. Miller was made president; Mr. Holden, assistant to the president; Mr. Byram, vice-president in charge of operation, and Mr. Burnham vice-president in charge of traffic. On November 8, Mr. Holden was promoted to vice-president and also made a director of the company.

Hale Holden

Both as assistant to the president and as vice-president Mr. Holden performed duties assigned to him by Mr. Miller, and was very closely associated with him in devising and carrying out the broad but general policies of the company. He was Mr. Miller's right-hand man, relieving his chief of the details of administration of various departments, and steadily demonstrating his increasing usefulness and executive ability. He owes his very rapid promotion and his election to the presidency of this great system to the fact that he has shown the possession of remarkable natural executive ability and driving power; to the broad knowledge he has gained and the broad training he has received; to the fact that as Mr. Miller's "understudy," if such a term may be used in such a connection, he had become very fully conversant with his chief's methods, plans and policies, and to the fact that his election would least disturb the organization built up by Mr. Miller and his predecessor, George B. Harris. The wonderful record made by the Burlington in recent years has been achieved by an organization in which very few changes have been made and which undoubtedly owes much of its success to that fact, and Mr. Holden's election made necessary fewer other changes in the official personnel than would have been necessitated by the election of any of the other higher officers of the company.

Mr. Holden was picked for president of the Burlington in a deathbed suggestion of Mr. Miller himself. In his last hours Mr. Miller asked Louis W. Hill to say to his father, James J. Hill, that he need not worry about the future of the Burlington, that he had left him three men, any one of whom was big enough for the presidency; but that Mr. Holden should be given the place, so that the work of the Burlington organization might continue without interruption. Mr. Miller's choice was approved as logical by the directors, and is popular with the other officers of the road.

In character, ability and personality, Mr. Holden long has been recognized as a big and coming man. His railway work has commanded the attention both of his superiors and other railway men for its thorough, painstaking and brilliant qualities. As general attorney of the Burlington he represented it in some of the most important cases ever before the Interstate Commerce Commission and in the subsequent litigation before the courts. Among these were the Missouri river rate case and the Pacific coast lumber rate case. He also represented the stockholders of the Great Northern and was in charge of the litigation extending over 3½ years of the Minnesota rate case, involving the reduction of state freight and passenger rates in Minnesota, in which the roads, while technically losing the case, really established the principle subsequently explicitly upheld in the Shreveport case, that the paramount power of congress over interstate commerce may not be nullified by state action.

Mr. Holden's work in this case is said to have commended him especially to James J. Hill. His experience in commerce cases gave him a broad schooling in the workings of the various departments of railroading, of which he took advantage to acquire a sound and enlightened perception of the relations of the railroad to the public and to the regulating authority of the government.

The Minnesota rate case, as well as others in whose handling he participated, involved a physical valuation of the railways, and he became such a recognized expert on this subject that he was made chairman of the western presidents' committee on relations to the Interstate Commerce Commission's valuation, a position which he held until recently. He also represented the Burlington in the recent arbitration of the wage demands of the trainmen and conductors of the road.

A strong and vigorous man in appearance, direct in his methods, plain and unassuming in manner, accessible to everybody who has any business with him, keenly appreciating the importance of maintaining good relations between the railways and the right way in which to do it, Mr. Holden will prove a popular as well as an able railway president.

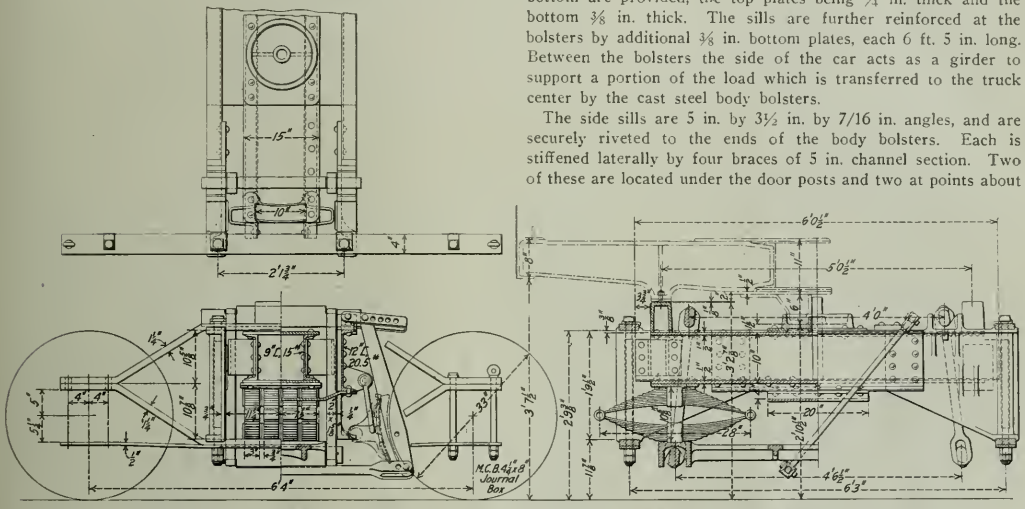
The new head of the Burlington was born at Kansas City, Mo., on August 11, 1869, and was educated at Williams College and the Harvard Law School.

Short Steel Baggage Car for the Long Island

An Exceptionally Light 40 Ft. Car Having Arch Bar Trucks with Swing Bolsters and Self-Centering Couplers

The Long Island has recently placed in service 20 steel baggage cars of a design possessing a number of notable features well suited to the service conditions under which the cars operate. They are 40 ft. in length over the end sheathing and have an average weight of 50,600 lb.

Over a number of its lines the Long Island handles a heavy



Arch Bar Truck with Swing Bolster Used Under Long Island Baggage Car

baggage and express business, in many cases the consignments to two or three stations completely filling a long baggage car. The consignments for such a station may be loaded into one of the short cars, which is set out at its destination. The delays to passenger train service incidental to unloading express are thus materially reduced. A large part of this traffic moves during the summer only and advantage has been taken of this fact to build a car of exceptionally light weight and low first cost. During the winter, when many of these cars are out of service, a minimum investment is thus tied up in idle equipment.

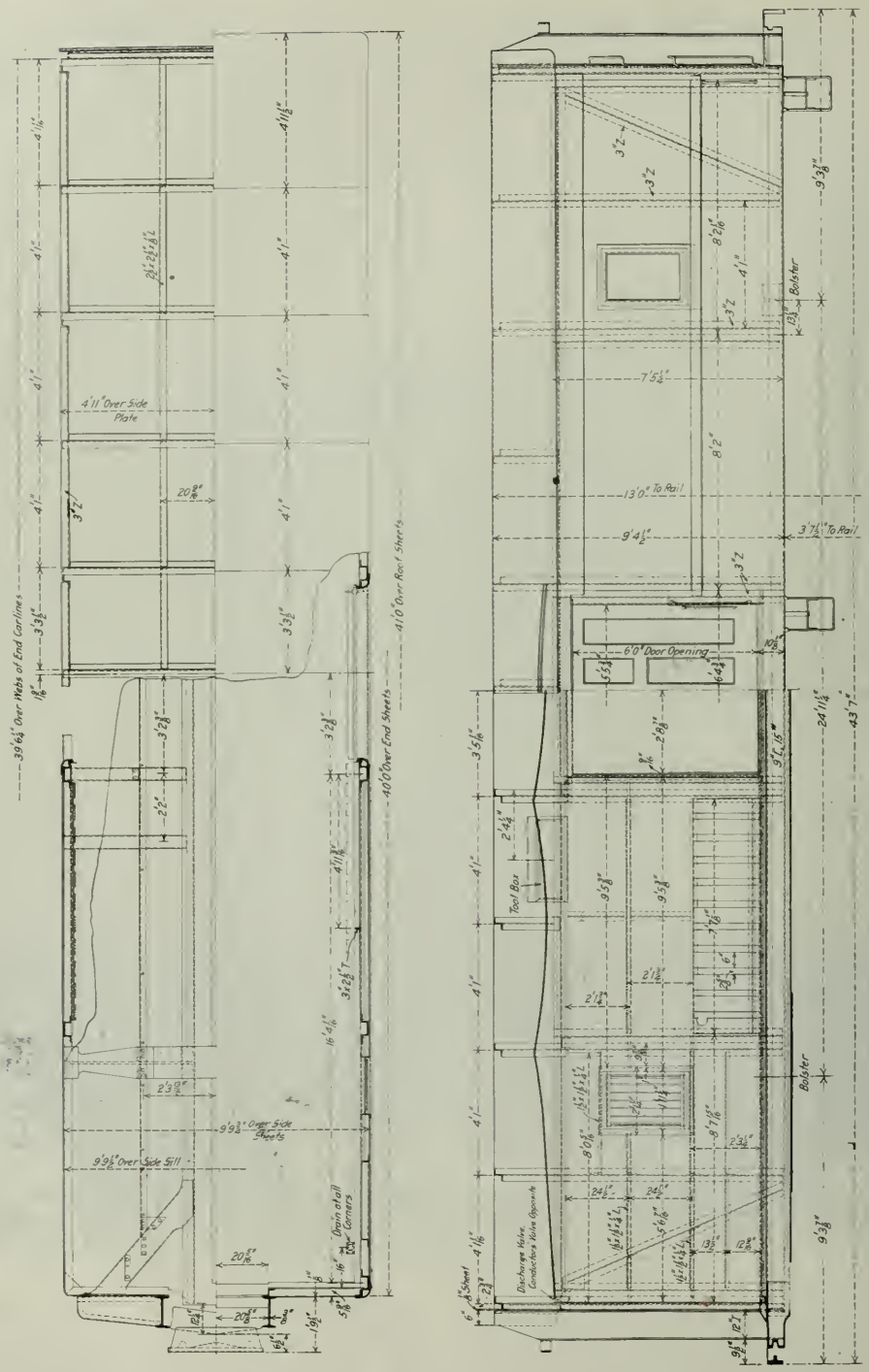
UNDERFRAMES

The center sills are 9 in. channels extending continuously between the end sills. Continuous cover plates both top and bottom are provided, the top plates being ¼ in. thick and the bottom ⅜ in. thick. The sills are further reinforced at the bolsters by additional ⅜ in. bottom plates, each 6 ft. 5 in. long. Between the bolsters the side of the car acts as a girder to support a portion of the load which is transferred to the truck center by the cast steel body bolsters.

The side sills are 5 in. by 3½ in. by 7/16 in. angles, and are securely riveted to the ends of the body bolsters. Each is stiffened laterally by four braces of 5 in. channel section. Two of these are located under the door posts and two at points about 26 in. from the door posts. They extend from the top flange of the center sill to the lower flange of the side sill and are placed with the flanges downward. The side sills are stiffened under the side doorway by 7 in. channels riveted to the inside flanges of the Z-bar posts.

Light Baggage Car of Steel Construction for the Long Island

The frame is designed to be equivalent in strength to the requirements of the railway mail service. In order to meet these requirements two 12 in. I-beam end posts have been included in

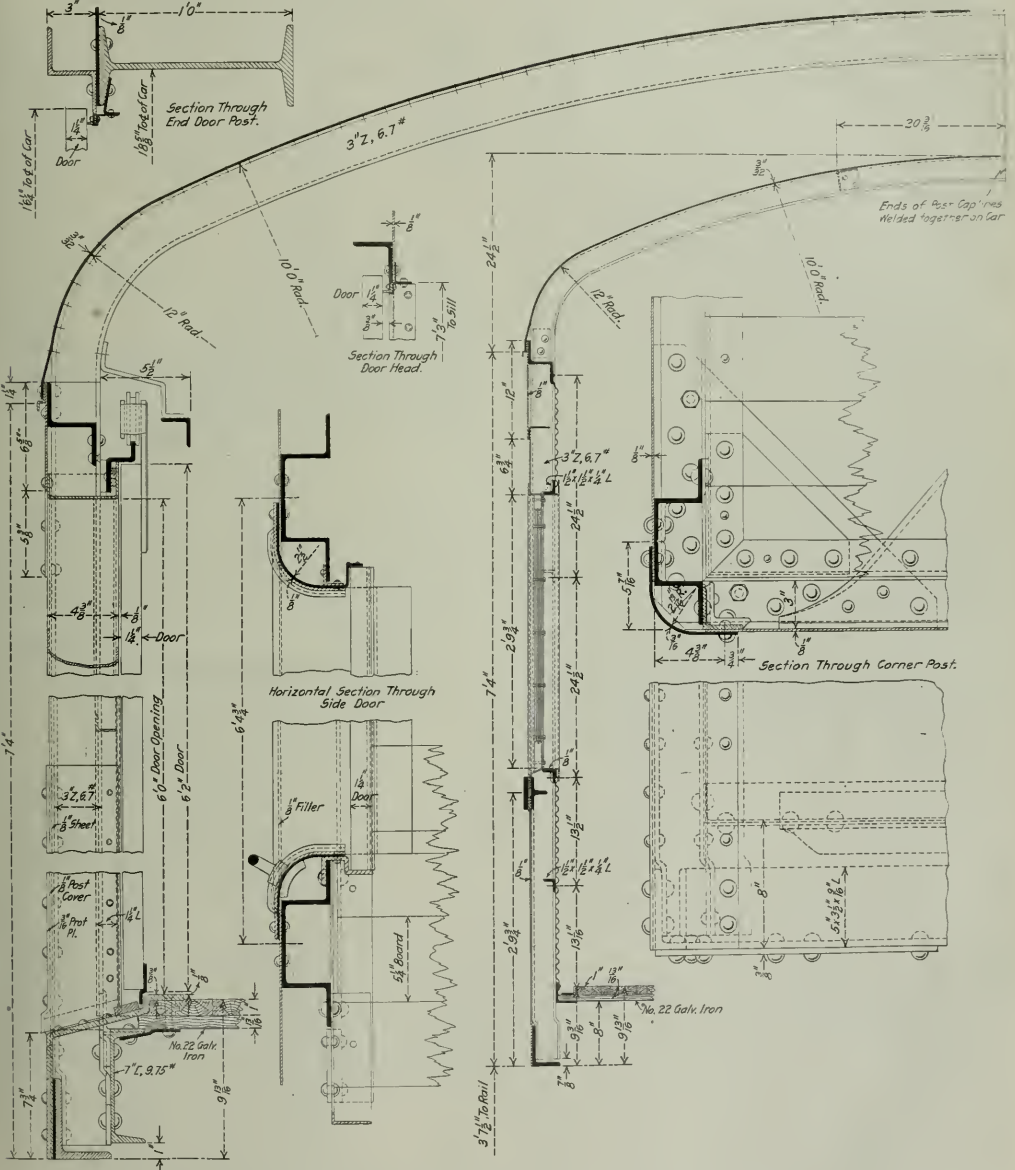


Plan and Elevation of Long Island 40-ft. Baggage Car

the construction of the end frame. These are framed into a steel bumper casting at their lower ends and are secured to the carlines at their upper ends. They are located at points 20⅝ in. on either side of the center line. The center sills are also attached to the steel bumper castings, thus securely tying the end

SUPERSTRUCTURE

The body frame members are 3 in. Z-bars. The roof is U-shaped without clerestory. The carlines are extensions of the corner and side posts, being formed in two parts and welded at the center of the roof when placed on the car. A Z-bar plate



Sections Showing the Door and Window Framing, and Section Through the Corner Post

frame to the underframe and making a very rigid construction.

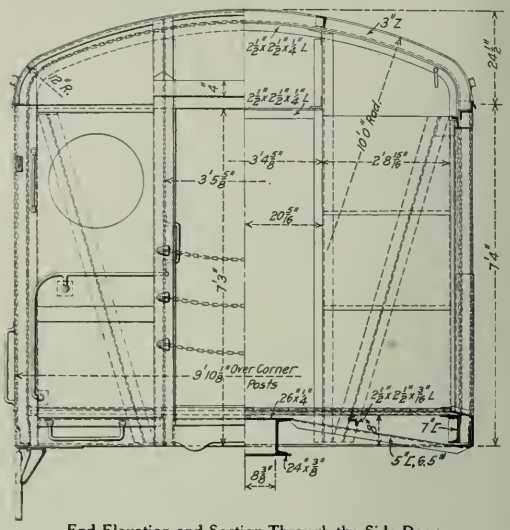
Extending from the corner of the car to the end post on either side are 5 in. by 3½ in. by 7/16 in. angle sills, to which the end sheathing is secured.

extends continuously from corner post to corner post except where the web and one flange are cut away to allow the continuous side posts to pass through. The corner, transom and door posts are made up of two Z-bars, one of which extends

from the side sill to the plate only. The outside sheathing is ⅛ in. steel plate, four pieces being required for each side of the car. These pieces extend continuously from the end to the side door casing and are joined horizontally by a cover plate at the belt rail, which is located just under the windows. Longitudinal stiffness is secured by means of a T-bar riveted behind the belt rail. The inside of the car is lined with corrugated sheet steel, the corrugations running lengthwise. Considerable longitudinal stiffness is secured in this manner and no vertical stiffeners are required between the posts. The outside and inside window casings are each flanged in one piece from ⅛ in. plate to form a Z-section. The outer flange of the outside section is riveted to the side sheet and the inner flanges of the two sections are placed back to back. The window is held in place in the outside casing by means of bolts passing through both inner flanges. The inner casing is secured to a 1½ in. by 1½ in. by ¼ in. angle both at the top and bottom; these angles extend between the two adjacent side posts, with the backs of the vertical flanges flush with the inside flanges of the side posts. Similar stiffeners are placed longitudinally at points 24½ in. and 49 in. below the side plate, at which points the corrugated lining sheets are joined.

The side door casing is made up of post covers formed from ⅛ in. plate, which overlap the side sheets and are riveted to the outside flanges of the posts. They extend to the inside of the car and are secured to the inner flanges of the side posts by means of angle connectors. On one side of the doorway a connector of special form is used which serves as a door stop. On the other side the post cover is bent around parallel to the side wall of the car, where its edge forms a seat for the weather strip on the back side of the door. The door is supported by rollers, the track for which is a special Z-section flanged from ¼ in. plate. This is secured to the flanges of the side posts. In order that the top casing may extend inside the car flush with the side post cover, ⅜ in. filler blocks are included on either side of the door track.

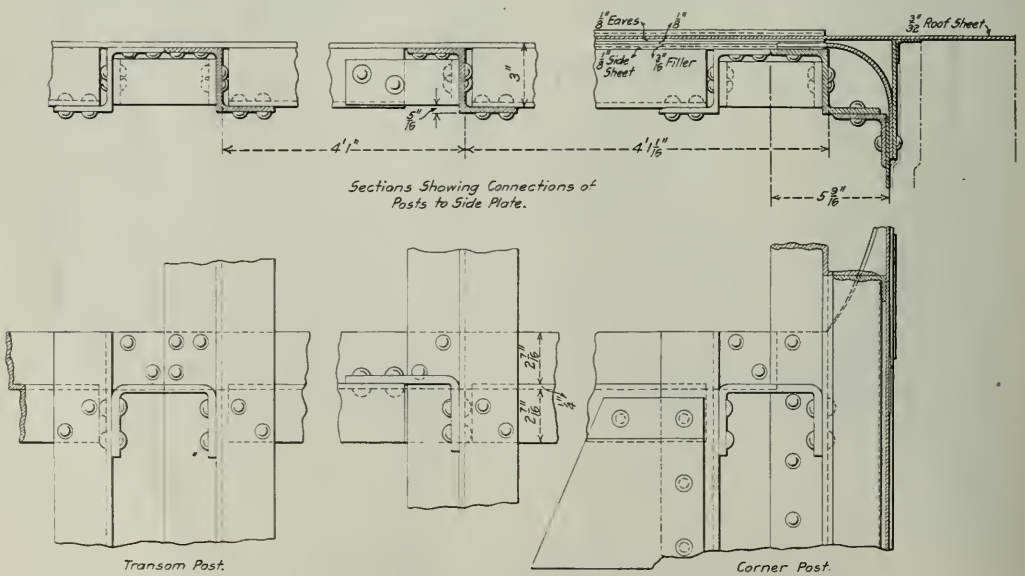
The floor is made up of two thicknesses of wood flooring, the under side of which is protected by one thickness of No. 22 galvanized iron. The ends of the first course of flooring are supported by angles which are riveted to the inner flanges of the side posts. A wood nailing strip secured to the top cover plate of the center sills on the center line of the car supports the floor at this point. Intermediate nailing strips located about 28 in. on either side of the center line are supported by 2½ in. by



End Elevation and Section Through the Side Door

2½ in. by 3/16 in. angles secured to the diagonal end braces and to the top flanges of the cast steel bolsters.

The roof is covered with 3/32 in. steel plate. Longitudinal roof supports of 2½ in. by 2½ in. by ⅛ in. angle section are



Sections Through the Side Posts, Showing the Connections to the Side Plate

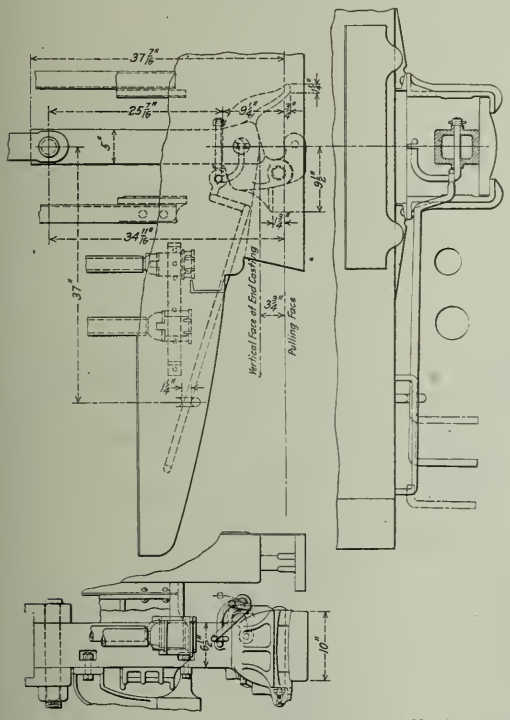
placed between the carlines at points about 20 in. on either side of the center line; these serve to stiffen the roof sheets, but the sheets are riveted only to the carlines.

TRUCK

The truck applied to these cars is of a design unusual for passenger equipment. It is of the unequalized arch bar type having a wheel base of 6 ft. 4 in., but has been modified to include a swing bolster. The cross frame is made up of two 12 in., 20½ lb. channels securely riveted to the truck columns. A cast steel spring plank is suspended from the frame by means of swinging hangers, from which the truck bolster is supported on elliptical springs. The wheels are cast iron, 33 in. in diameter and are mounted on standard M. C. B. 4¼ in. by 8 in. axles. Standard 4¼ in. by 8 in. freight car journal boxes are used.

OTHER DETAILS

The cars are equipped with special Sharon couplers designed to be self-centering. The drawbar is of the usual long shank



Coupler with Centering Lug on the Side of the Head

type used in passenger service. A special lug is cast on the coupler body which acts as a stop to the guard arm of the engaging coupler and thus limits the angle between the center lines of the two drawbars.

In designing these cars full advantage has been taken of the requirements of the service to build a car having a capacity of 50,000 lb. and weighing but little more than 50,000 lb., and one which meets the service conditions much better than would a heavier car of more expensive construction.

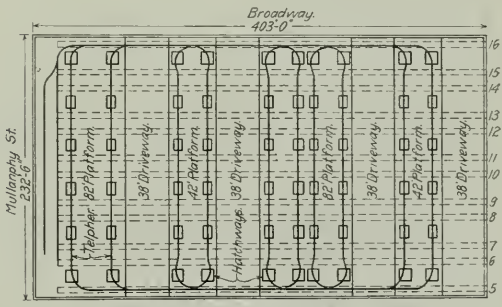
MOTOR OMNIBUS SERVICE IN SOUTH AMERICA.—The Argentine Minister of the Interior has under consideration a project to establish a motor omnibus service in the national territories of Argentina. It is proposed to initiate a service in the tobacco-growing districts of San Javier and Tacaruare in the territory of Misiones, where tobacco cultivators frequently suffer losses because of lack of transportation facilities.

THE REARRANGEMENT OF THE M. K. & T. FREIGHT HOUSE, ST. LOUIS

The construction of the Missouri, Kansas & Texas freight house at St. Louis, a description of which was published in the *Railway Age Gazette* of June 23, 1911, excited a great deal of interest among railway men because of the novel features in its construction and the mechanical equipment installed for handling freight. After the house was put in service it was visited by many engineers and other railway men interested in the handling of l. c. l. freight who desired to see whether the telpher system installed was a success when handling the wide variety of freight commonly received at the ordinary freight house of this character.

This installation of the telpher system was an exceedingly courageous experiment involving, as it did, the expenditure of a large amount of money for equipment. While the outcome was unfortunate, and the telphers were abandoned late last year, the experiment should prove of great benefit to the railways of the country at large because the results secured definitely disproved the claims made for this class of equipment in this particular kind of service.

It will be recalled that the Missouri, Kansas & Texas freight house at St. Louis is a two-level house with the upper or street level floor devoted to the delivery and receipt of freight by wagons, while the tracks are on the lower level. All freight was handled by telphers running on tracks supported



Arrangement of Telphers in Original Layout

above the upper floor and was dropped through hatchways to platforms opposite the desired cars.

After over two years' trial, several fundamental objections to the system became evident. One of the most serious was the unreliability of the telphers in operation, the average daily delay because of breakdowns ranging from three to four hours and resulting not only in a corresponding direct loss, but also in the demoralization of the working force. At times of breakdowns or current trouble, the system afforded no alternative method of handling the business, while it was also found to lack elasticity, as the telpher tracks more properly covered a line than an area. The system offered no possibility of speeding up under the pressure which comes in nearly all freight houses during certain parts of the day.

The buggies were heavy and clumsy, blocking the platforms. As they were 4 ft. by 6 ft. in size and weighed empty about 1,000 lb., they were too large and heavy to be run directly into the cars, making necessary a rehandling of the freight at each end. It was also impossible to counterweight in any way to balance the dead load and the average live load, in consequence of which an excessive use of electric current was required. This system of overhead transmission was found to be comparatively unsafe, causing numerous personal injuries and relatively heavy damage to freight, the latter item being estimated to average $1,000 per month. In addition, the repairs to equipment, platforms and scales were

relatively heavy, while the telphers were noisy and interfered materially with calling and checking freight, leading to frequent errors. There was also some damage caused by grease and oil dropping from the carriers.

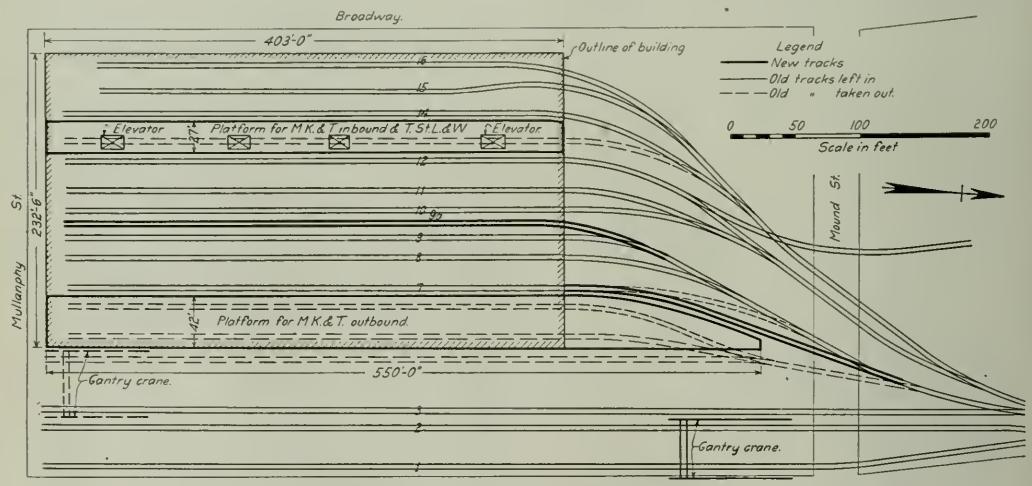
Because of these various conditions, the cost of handling freight was not reduced to the figure expected when the house was built, but on the contrary, it rose materially until in October and November of last year it averaged $0.595 per ton, exclusive of damage to freight, repairs to telphers, loss on account of improper weighing, etc., all of which were estimated to amount to a total cost approaching $1 per ton of freight handled. Also, although there was a track standing capacity of 117 cars and an average of only 70 cars were actually handled per day, the house had practically reached the limit of its capacity under the existing system of operation and a change became imperative. Accordingly, careful studies of the situation were made, as a result of which it was found that the two-level house was well adapted for this particular location and that the construction of the building proper could not readily be improved upon. No change in the building proper was therefore suggested.

The rearrangement effected is shown in the accompanying drawing and consists essentially of the following features. On the lower, or track floor, the space between the outside edge of the east row of columns and the inside edge of the row next west was housed in and extended north almost to Mound street, making a freight house 42 ft. wide by 550 ft. long, side, the truckers leaving or picking up their trucks at the elevator and not moving from floor to floor.

In this way while the track standing capacity of the entire house has been reduced from 117 to 102 cars, the real capacity of the house has been increased to this latter figure from 75. At the same time the cost of handling this freight has already been reduced from approximately $1 per ton to $0.39, with a possibility of further reduction. This plan has the further advantage that when additional capacity is needed it will be possible to return to the two-level house for the M. K. & T. outbound business, giving a total estimated capacity of 174 cars. While it is true that the investment in the telpher system has been wiped out by these changes, the advantages of the two-level house as installed here over the one-level house commonly built in St. Louis and elsewhere throughout the country, have been sufficient to more than offset the loss in this regard, and it is now being operated at a cost low enough to yield a good return upon the entire investment.

DESIGN OF JOLIET INTERLOCKING

The Joliet interlocking, described in the *Railway Age Gazette* of August 28, page 381, protects the crossing of the Atchison, Topeka & Santa Fe and the Chicago & Alton with the Chicago, Rock Island & Pacific and the Michigan Central. T. S. Stevens, signal engineer of the Santa Fe, G. W. Hulsizer, signal engineer of the Alton, and A. G. Shaver, then signal engineer of the



Re-Arrangement of Lower Floor of M. K. & T. Freight House Showing New Platforms and Track Changes

The two tracks Nos. 5 and 6 were removed, and the island platforms extended to provide a floor for this house, which was assigned to M. K. & T. outbound business in connection with the five tracks Nos. 7 to 11, inclusive. The intermediate island platforms were retained with the exception of the one between tracks 9 and 10, which was replaced with another track. The rails were removed from the No. 4 team track immediately east of the house, and this area was saved to serve as a driveway for the use of trucks delivering freight to this outbound house.

Track No. 13 was also taken up and a platform built in its place with four elevators. In connection with the upper or street level floor this is used as an inbound house for both M. K. & T. and T. St. L. & W. freight, as well as an outbound house for the T. St. L. & W. Electric elevators were installed and the drop truck system of operation was adopted on this

Rock Island, co-operated in making the design. The cost of construction, operation and maintenance is apportioned as follows:

Atchison, Topeka & Santa Fe	38 per cent
Chicago & Alton	32 per cent
Chicago, Rock Island & Pacific, and the Michigan Central	30 per cent

The construction work was done by the Rock Island, but entire credit for the design should not have been given in our article to that company.

New Use for English Dining Cars.—In addition to its work of carrying the troops, the Great Eastern Railway of England is converting its restaurant and kitchen cars into ambulances. The interior fittings are removed, and the interior arranged with ambulance materials, everything being done on the most approved principles.

Report of the Joint Committee on Mail Pay

Bourne Committee Recommends Payment by Space; 21 Cents a Mile. Post-Office Department Criticized

The Joint Congressional Committee which has been studying the railway mail pay question since January, 1913, issued its report on Monday last, and a bill embodying the committee's recommendation was introduced in Congress by Senator Bankhead. The report is a pamphlet of 124 pages, and presents a well digested summary of all that the government has done in this matter since 1878. It recommends that the calculations for paying the railway for their services by weight be done away with; that the railways be relieved of carrying mails between stations and post offices and that rates be fixed by law, and not in any degree left within the discretion of the postmaster general, except in connection with certain details named in the proposed bill. The basis of the rates per car per mile is a proportion of the calculated receipts of the railways per passenger train mile, the committee assuming that existing passenger rates are fair and reasonable. Unlimited free transportation of railway postal clerks to and from their homes is continued.

The committee consists of Jonathan Bourne, jr., chairman, Harry A. Richardson, John H. Bankhead, James B. Lloyd, Wm. E. Tuttle, jr., and John W. Weeks. Senators Bourne and Richardson are no longer members of Congress, their terms having expired in March, 1913; but they have continued to act on the joint committee, serving without pay and paying their own expenses.

The report, by order of the committee, was prepared by the chairman; and the assents of the other members are in the form of letters printed in the preface to the report. Mr. Richardson gives hearty approval; but the other members decline to join Mr. Bourne in his severe criticisms of the post office department, and also object to his unfavorable declaration on the general subject of government ownership of public utilities. The principal features of the committee's conclusions are embodied in a proposed bill which is printed below, nearly in full; and the thirteen chapters of the report contain the facts and arguments supporting the views embodied in the bill.

Chapter 1 explains the reasons for different features of the bill; chapter 2 is a historical review, including a resumé of the testimony taken by the committee and of the statistical studies made by Mr. Lorenz, statistician of the Interstate Commerce Commission, temporarily employed by the joint committee; chapter 3 discusses the weight basis of compensation, disclosing its defects; chapter 4 deals with the post office department's claim that the railroads are over paid; chapter 5 is a study of the question of reasonable rates; chapter 6 compares mail with express and other chapters make comparisons with passenger traffic and Pullman service. Chapter 10 declares against government ownership of railway post office cars and chapters 11 and 12 criticize severely the conduct of the post office department in many matters.

At the beginning of their studies the committee soon decided in favor of paying by space instead of by weight, and also to establish a terminal charge separate from the charge for transportation over the line. The adoption of a standard length of car, 60 ft., and standard apartments 30 ft. and 15 ft. long is an important simplification. The adoption of units of seven linear feet and three linear feet for pouches (in baggage cars) settles many difficult questions. The assumption that the present average passenger car mile revenue is ample and reasonable is based on the fact that present rates of fare have been so generally approved by railroad commissions, legislatures and courts. The average passenger revenue for the past five years, as shown by reports of the Interstate Commerce Commission, has been 25.3 cents per car mile. The car mile revenue for passenger service, excluding mail, express and milk, is probably over 26 cents. Other calculations confirm the view that 25 cents a mile is fair to the government for hauling a 60-ft. mail car; but it is recognized that more satisfactory data concerning the cost of transportation might warrant giving the railroads a more liberal sum.

This 25-cent rate includes terminal service. To make a separate charge for this the committee examined the cost of switching; and finally concluded that $1.25 would be fair for each of the six movements usually made with a mail car on a round trip; and to this was added $1 for two cleanings of the car. This makes up the rate of $8.50, named in the bill. Calculating on the average length of the runs of mail cars—which average is admitted to be inexact—the committee adopts a line rate of 21 cents a mile, and the calculations for the different kinds of services are as shown in the following table:

JOINT COMMITTEE RATES ON 60-FT. CAR BASIS

	Rate per unit		Average rate on 60-ft. car basis				
					Term'l and line combined		
Unit	Terminal (round trip)	Line *Cents*	Average distance *Miles*	Terminal (single trip)	Line *Cents*	For average dist. *Cents*	For 100 miles *Cents*	For 1,000 miles *Cents*
60-ft. R. P. O.	$8.50	21.00	301.0	$4.25	21.0	22.41	25.25	21.42
60-ft. storage.	8.50	21.00	556.0	4.25	21.0	21.76	25.25	21.42
30-ft. apartm't.	5.50	11.00	185.0	5.50	22.0	24.97	27.50	22.55
15-ft. apartm't.	4.00	6.00	80.5	8.00	24.0	33.94	32.00	24.80
7-ft. pouch...	1.00	3.00	34.5	4.29	25.7	38.13	29.99	26.13
2-ft. pouch...	.50	1.50		5.00	30.0	44.49	35.00	30.50
All units...	....	.....	.....	....	21.82	24.69	.....	.....

The report says that some members of the committee believe 21 cents to be too low a rate. It will be seen by the table that this makes an estimated total compensation of 22.41 cents per mile per car, for the average distance, as compared with 25.3, the average for five years reported by the Interstate Commerce Commission for all cars in passenger trains.

Because of the belief on the part of some of the committee that 21 cents is too low, and because of the meagerness of the information at the committee's command, a clause in the bill provides for revision of the figures after the new rates shall have been in force two years.

Under the rates recommended the committee estimates that the cost to the government will be about $65,000,000, as compared with an appropriation of about $62,000,000 for the current fiscal year. The proposed rates are fixed, not maximum, and the transportation of the mails by the railroads is made compulsory. The fiction that railroads when dissatisfied may refuse to perform the service should no longer be recognized. If they have such a right public opinion forces them to forego insistence on it.

In chapter 5 the committee gives the data justifying its conclusions as to what is a reasonable rate. There is no reason why the government should not pay the same rate for the use of a car as is paid by passengers. It is claimed that the mail service is a wholesale traffic; but the government does not pay in advance, as do passengers, and, moreover, it imposes penalties for delays. It also requires the mail to be carried on fast trains without extra pay. The committee makes rates universal throughout the country because there is no practicable basis on which a difference can be made in favor of lines where the traffic is light.

A chapter is given to comparisons of mail and express earnings, but the evidence is unsatisfactory and largely inconclusive. The post office department's attempt to show higher

relative railroad earnings from mail is rejected as reckless and misleading.

Comparing with earnings from passengers and from mail traffic the committee finds that practically every expense which improves the passenger traffic in speed, regularity, frequency or safety, is also beneficial in a corresponding degree to the mail service; and the mail service, therefore, should yield to the railroads a revenue per car mile equal to that found to be reasonable for passenger service.

Chapter 9 contains an analysis of the bill presented by the committee. The provision that payment for a car must always be made for a round trip will put an end to unfair requirements of the post office department which have made is necessary to haul cars empty considerable distances without compensation, though it is provided that the Postmaster General may, if he can, contract with a railroad (as, for example, for storage cars) to pay for single trips only. In some cases the railroads may be able to use a storage car for other service in the return direction.

The committee considers at length the question of government ownership of railway post office cars, taking up particularly the statement of Postmaster General Vilas in 1887 that the government would profit greatly by having cars of its own. A comparison is made with rate charged by railroads for hauling special cars, owned by outside parties, and the conclusion is reached that government ownership would be much more expensive than the present system of compensation. Calculating on all the available data, the Interstate Commerce Commission would be forced to allow higher rates per car than the committee now recommends. The committee points out that the government probably would not be able to maintain and repair cars as cheaply as his work is done by the government, and government service is usually extravagant. In the parcel post service the government employs men at an average of $93 a month, whereas the express companies pay an average of less than $50 a month.

In chapters 11 and 12 the committee sets forth in strong language the unbusinesslike way in which data desired by the committee in its investigations was made up and presented by the post office department, and also by the representatives of the railroads. The post office department presented estimates of alleged overpayment by the government to the railroads, but under criticism changed these three times, in each case having to admit that it had been unfair to the railroads. The railroad companies in like manner varied their estimates of under payments from $15,000,000 to $38,000,000, and they were "either reckless or else had no definite data." The inadequacy of the statistics furnished by the post office department "is no more subject to criticism than the seeming lack of frankness with which the department prepared statistics for submission to Congress."

Reference is made to the order issued in 1907 by which the method of averaging the daily weight of mail was changed so as to reduce the pay to the railways $5,000,000 yearly. This, with the recommendation of Postmaster General Hitchcock that the railroads be paid actual cost of operation and taxes with 6 per cent profit, no adequate allowance being made for return on capital employed, is used as an argument against clothing the postmaster general with discretion in making rates.

These and other acts, such as sending magazines by freight trains, are declared by Chairman Bourne to be evidences of "bureaucracy gone mad."

In conclusion the report says:

"We are convinced that space should be substituted for weight as the basis for compensation; that the rates should be such as will yield a car-mile revenue approximating the car-mile revenue derived from passenger service; that legislation on this subject should be drawn as specifically and comprehensively as possible, and that as little as need be shall be left to the discretion of the post office department.

"The record herewith presented fully demonstrates the wisdom of Congress in refusing to enact the legislation proposed by the post office department in its four suggested plans. . . . We believe it better for Congress to bear the unjust criticisms of those who are misled by hasty advisers than to place upon the statute books laws which will be demonstrated by experience to be unworthy the approval of men charged with the sacred trust of legislating intelligently for all the people of the United States.

"It has been our view that it is not our duty to endeavor to make out a case that is favorable or unfavorable to either the government or the railroads, but to ascertain with as great accuracy as possible what is a reasonable compensation to be paid. We believe that the government should deal justly with its citizens, for if it expects them to deal justly with one another and with the government, the government must set the example by dealing justly with them. To what extent the rates we suggest will increase the total amount of compensation is largely problematical for the reason that it cannot be known in advance exactly what space the post office department will authorize for the transportation of mail. We firmly believe, however, on the showing made in the Lorenz table that the enactment and operation of our suggested bill will not result in increased postal expenditures of more than $3,000,000 over the actual appropriations carried in the last post office appropriation bill for railway-mail pay, including inland transportation by railroads, postal pay for freight or expressage, and railway post office car service.

"That there should be an increase in railway-mail pay need not be surprising; in fact, it must be expected. The volume of postal revenue increased at the average rate of about 7 per cent per annum, or an average of about $13,000,000 a year during the 10-year period from 1903 to 1913. This necessarily means a corresponding increase in the volume of mail. No reasonable man can expect that the government can increase its postal revenues at an average rate of $13,000,000 per year without increasing its expenses in practically all departments of the service, though perhaps at a smaller ratio. In this connection it is pertinent to remark that although the postal revenues doubled in that 10-year period railway-mail compensation increased only 20 per cent. . . ."

COMMITTEE BILL

Section 1. From January 1, 1915, or from an earlier date if practicable, the postmaster general is authorized and directed to readjust the compensation to be paid steam railraod companies for the transportation of mail on passenger trains, mixed trains, mail trains, or cabooses of freight trains, and for services connected therewith at the rates hereinafter named: *Provided*, That where two or more railroads have varying distances between the same points, the compensation for the longer distances may be reduced to that of the shortest distance by mutual agreement between the Postmaster General and the railroad companies.

Sec. 2. The Postmaster General may authorize mail service of the following five classes, namely: Full railway postoffice car service, apartment railway postoffice car service, storage-car service, closed-pouch service, and side and transfer service.

Full railway postoffice cars and storage cars shall be of a standard length of 60 ft., inside measurement: *Provided*, That 30 or 15 ft. of space may be authorized for the round trip in baggage cars, at the respective rates hereinafter named for 30 or 15 ft. apartment cars. Apartment cars shall be of two standard lengths, namely 30 ft. and 15 ft. inside measurements. Closed-pouch mail service shall be the transportation of mail in pouches, bags, or hampers in custody of railroad employees on trains on which no full railway postoffice cars or apartment cars are authorized. Closed-pouch service may be authorized in units of three linear feet or seven linear feet, inside measurement: *Provided*, That not more than seven linear feet of space shall be authorized on any one train at the rates here-

inafter specified for closed-pouch service. Side and transfer service shall be the transportation of mail between railroad stations and postoffices supplied therefrom and between railroad stations.

Authorizations of railway postoffice cars, apartment cars, and storage cars herein provided for shall be for the round trip of the car and the maximum space authorized in one direction shall be determinative of the space to be paid for in the opposite direction, unless otherwise agreed upon between the Postmaster General and the railroad company in any particular case: *Provided*, That authorizations may be changed only at points where the switching of cars into or out of trains would not delay the running of such trains: *And provided further*, That not more than one apartment car shall be authorized on any one train. Authorizations for mail service under this act may be made upon any passenger or mixed train scheduled for public use, or upon the caboose of any freight train, and fast-mail trains may be contracted for at rates not exceeding those hereinafter named.

Sec. 3. Service by railway postoffice, apartment, and storage cars shall include the carriage therein of all mail matter equipment, and supplies for the mail service: *Provided*, That the Postmaster General is authorized to return to the mail, when practicable for the utilization of car space paid for and not needed for the mails, postal cards, stamped envelopes, newspaper wrappers, empty mail bags, equipment, and other supplies of the postal service. The rates fixed by this act shall also cover the transportation of persons who are discharging official duties in connection with the railway mail service. Such persons shall include clerks handling mail in cars, clerks traveling from their homes to the beginning of a mail run to which they have been assigned or to their homes from such mail run, and all other persons while discharging official duties as inspectors or supervisors of the railway mail service or in any other manner assigned to duty in the administration of such service.

The rates provided for herein shall further cover expenses of delivering within and receiving mails at car doors and the switching, lighting, heating, furnishing of suitable drinking water, and cleaning of mail cars. Railroad companies carrying the mails shall furnish reasonable facilities for caring for and handling them while in their custody. They shall furnish all cars or parts of cars used in the transportation and distribution of the mails, except as herein otherwise provided, and place them in stations before the departure of trains at and for such reasonable time as the department may require. They shall also provide reasonable station space and rooms for handling the transfer of mails in transit, and for offices and rooms for the employees of the postal service engaged in such transportation, when required by the Postmaster General.

Sec. 4. Standard specifications shall be prepared by the Postmaster General for the construction and fittings of full railway postoffice cars, 30-ft. apartment cars, 15-ft. apartment cars, and storage cars, and the rates herein named shall apply only to cars constructed and fitted in accordance with such standard: *Provided*, That whenever a railroad company is unable to furnish standard cars or apartments of the length requested, the Postmaster General may accept cars of lesser length if sufficient for the needs of the service, and pay only for the actual space furnished, the compensation to be a pro rata of that provided for by this act for the standard lengths requested: *And provided further*, That the Postmaster General may accept cars and apartments of greater length than those of the standard requested, but no compensation shall be allowed for such excess lengths.

Sec. 5. The rates of payment for the services authorized in accordance with this act shall be as follows, namely:

For full railway postoffice car service, a terminal charge of $8.50 for each round trip, or $4.25 for each single trip, of a 60-ft. car, irrespective of the distance run, and in addition thereto a line charge at the rate of 21 cents per mile run.

For 30-ft. railway postoffice apartment-car service, a terminal charge of $5.50 for each round trip, or $2.75 for each single trip, of a 30-ft. apartment car, irrespective of the distance run, and in addition thereto a line charge at the rate of 11 cents per mile run.

For 15-ft. railway postoffice apartment-car service, a terminal charge of $4 for each round trip, or $2 for each single trip, of a 15-ft. apartment car, irrespective of distance run, and in addition thereto a line charge at the rate of 6 cents per mile run.

For closed-pouch service, when a 3-ft. unit is authorized, a terminal charge of 50 cents for a round trip, or 25 cents for a single trip, irrespective of the distance run, and in addition thereto a line charge at the rate of 1½ cents per mile for the authorized number of miles. When a 7-ft. unit is authorized, a terminal charge of $1 for a round trip, or 50 cents for a single trip, irrespective of the distance run, and in addition thereto a line charge at the rate of 3 cents per mile for the authorized number of miles.

For storage car service a terminal charge of $8.50 for each round trip, or $4.25 for each single trip, of a 60-ft. car, irrespective of the distance run, and in addition thereto a line charge at the rate of 21 cents per mile run.

Payment for side and transfer service shall not be covered by the rates named herein. The Postmaster General is authorized to provide, in his discretion, by regulation screen or other wagon, automobile, or mail messenger service under existing law, or to contract with the railroad company or with other persons for the performance of such service at the lowest rates obtainable.

Sec. 6. Railroad companies whose railroads were constructed in whole or in part by a land grant made by Congress on condition that the mail should be transported over their roads at such price as Congress should by law direct shall receive only eighty per centum of the compensation which would otherwise be authorized by this act.

Sec. 7. After the rates specified in this act shall have been in effect for a period of two years, the Interstate Commerce Commission shall, whenever requested by the Postmaster General or by the representatives of railroads with an aggregate mileage of at least twenty-five per centum of the mileage of railroads carrying mail, make an investigation of the justice and reasonableness of rates then in effect, . . . and report to Congress at the earliest practicable date. . . .

Sec. 8. All laws or parts of laws prescribing fines on railroad companies for failing or refusing to perform mail service and furnishing facilities therefor when required by the Postmaster General are continued in force and made applicable to this act.

Railroad companies carrying the mails shall submit under oath, when and in such forms as may be required by the Postmaster General, evidence as to the performance of service.

Sec. 9. It shall be unlawful for any railroad company to refuse to perform mail service at the rates of compensation specified in this act when required by the Postmaster General so to do, and for every such offense it shall be fined not exceeding $5,000. Each day of refusal shall constitute a separate offense.

Sec 10. All laws or parts of laws in conflict with the provisions of this act are hereby repealed. . . .

Experiments with All-Steel Cars in India.—At the present time several Indian railway lines are carrying on experiments with all-steel cars, and it is said that others will also probably undertake experiments. Metal freight cars have already been used in India for some time, but passenger cars are usually built of teakwood resting on steel underframes. Owing to the intense heat and in some cases the great changes in temperature through which the cars run, the wood warps, swells or shrinks, thus affecting the joints. The wood of which the cars are made has been cheap, but lately the price of teak has been rising and that of steel has fallen.

Pennsylvania Improvements in Cleveland

Separating Grades at Eleven Street Crossings, Building New Freight Station and Altering Passenger Station

In the general plan to separate grades at all street crossings on its line entering the city of Cleveland, the Cleveland & Pittsburgh, one of the subsidiary companies of the Pennsylvania Lines West, divided the work into five groups numbered consecutively from the Union station on the lake front to the southeastern limit of the city, a distance of about 7½ miles. Groups IV and V, embracing the section between the city limits and Holton avenue, have been finished, and the work on group II, extending from Central avenue to East Twenty-sixth street, has recently been completed.

EXTENT OF THE WORK

The work on group II involved the elevation of tracks for nearly 2¼ miles through a densely settled industrial and residential section, and the building of permanent subways over 11 streets, and temporary subways over two streets, among which are the most important thoroughfares serving the east side of the city. In connection with this work two main tracks have

A Portion of the City of Cleveland Showing the Pennsylvania's Entrance

been added on this section, making it a four-track line, which will help materially in handling the heavy ore traffic from the unloading dock on the lake front west of the Union station. Also a new freight house and team yard have been built, and some additions and alterations made to the Euclid avenue passenger station which handles fully half of the road's passenger business at Cleveland. New automatic signals were installed, and electro-pneumatic interlocking plants were located at the ends of the four-track section. The additional width required for the third and fourth tracks made necessary some changes between Hamilton avenue and Thirty-third street, where a small brick round house had to be cut through and the leads to this house and the local freight house a short distance east, had to be rearranged. The east end of the local freight yard between Thirty-third and Twenty-sixth streets had to be raised to conform to the new main line grade as the two passenger tracks are carried through the center of this yard.

The freight tracks from Twenty-sixth street to the ore dock are on a continuous 0.8 per cent grade, which is the ruling grade on the division, so that it is improbable that any further elevation of these tracks can be undertaken. If the new Union station is located on higher ground on the steep hill facing the lake, as is now planned, the two Pennsylvania passenger tracks entering this station will probably be elevated so as to eliminate the remaining grade crossings between Twenty-sixth street and the station.

According to the terms of the ordinance under which this work was performed, the Pennsylvania handled all the work incident to elevating the tracks, building retaining walls and bridges over the streets, depressing streets, etc., and the city repaved the streets and made the necessary changes in sewers and water mains. The cost of right of way other than that used for additional railway facilities, of retaining walls, embankment under existing tracks, changes in existing side, switch and industrial tracks, bridges to carry existing tracks over Euclid avenue and streets south of that point, and to carry all tracks over Windsor avenue and streets north, street paving, changes to sewers and water mains, changes in street grades, damages to abutting property and all other incidental expenses were divided between the city and the railway in the proportion of 35 per cent and 65 per cent, respectively. In addition to its share of 65 per cent of the above expense, the railway paid the total cost of bridges, filling and all other work made necessary by the additional facilities which are being provided. The total cost of the work was about $2,800,000, of which the city's share was estimated at $912,000. This amount was authorized to be paid from the grade crossing fund created by the sale of grade crossing bonds. All public service corporations owning tracks, pipes, conduits, poles, etc., located in the streets affected by the work were required to pay the cost of making changes to these lines, with the exception that the relaying of the street railway tracks in the permanent pavement was considered a part of the cost of track elevation work, and divided between the city and the railroad.

METHODS USED IN SEPARATING GRADES

All tracks were elevated on embankments between retaining walls, requiring about 240,000 cu. yd. of slag and refuse in addition to 84,000 cu. yd. of excavation removed from streets and foundations, most of which was used for fill, although this was optional with the contractor. The former material was collected along the division, hauled in in dump cars and placed in the embankment by company forces. The remainder of the work was handled under contract. The work of building retaining walls and street bridges, and of placing the fill was complicated by the necessity of keeping two traffic tracks open at all times, and handling trains without interruption at intervals as short as eight or nine minutes during the ore season. The right of way on which to handle this traffic, and to carry on the construction work, has a maximum width of 60 ft., and in some places is considerably narrower. As all streets had to be kept open it was necessary to drive continuous temporary trestles before the traffic tracks could be elevated.

Although local conditions caused some modification of the general plan, the method adopted was about as follows: West of Windsor avenue two trestles were driven along the south side of the right of way and traffic turned over these temporary tracks. The north retaining wall, the north half of the abutments and the north half of the fill were then built from a construction trestle driven close to the north right of way line. After the fill had been widened sufficiently to carry a second track, traffic was shifted to this track from the outside temporary trestle on the south, and this trestle was used for construction

purposes in building the south retaining wall, the remaining half of the abutments and for placing the remainder of the fill.

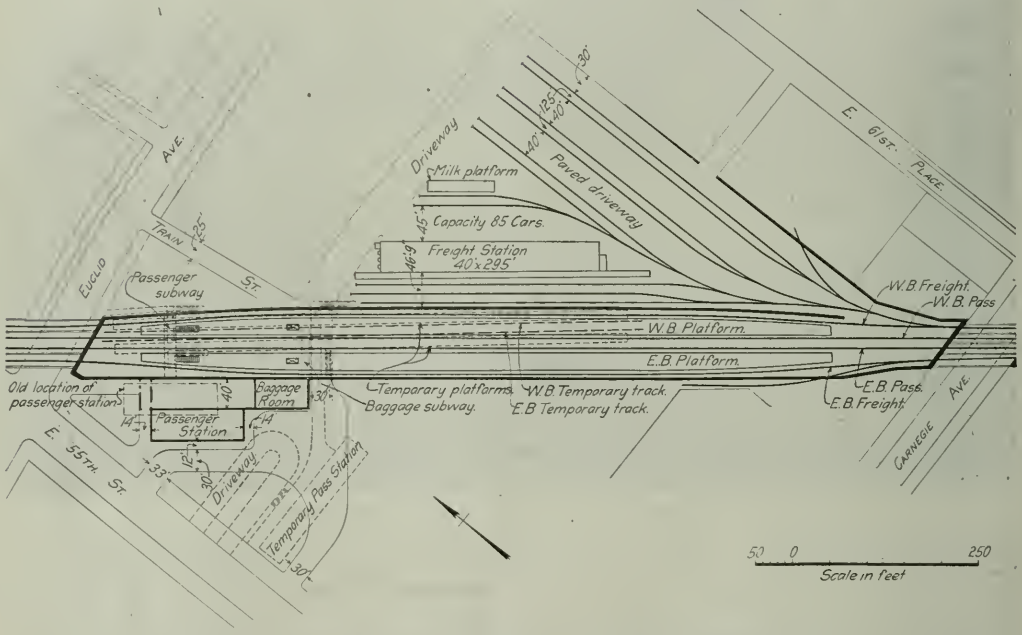
On the other side of Windsor avenue this system could not be used on account of the interference that would have resulted to passenger traffic at the Euclid avenue sation. The old station with two tracks at grade along the south side of the right of way was kept in service while work was under way on the north retaining wall and the north half of the fill. Then traffic was put up on the new grade on a temporary location between two temporary platforms reached by stairways from the street, and from the old freight station which was remodeled to serve as a temporary passenger station. The old passenger station which had been built only eight years before, and was still in excellent condition, was moved back about 40 ft. to allow a covered concourse to be built between the station and the south retaining wall. This concourse has a reinforced concrete roof

Roof of New Concourse at Euclid Avenue Station Under Construction

Euclid Avenue Freight House and Yard

built up of beams and slabs, and is lighted by prismatic skylights. A 20-ft. passenger subway will lead from the concourse under the tracks to two island platforms. A baggage and express building has been added adjoining the station on the south, and a baggage subway extends from this building under the tracks with elevators reaching the two island platforms. The handling of the work at Euclid avenue was also influenced by the desire to complete the new freight station just opposite the passenger station at as early a date as possible. As many as four mixers were used in pushing the concrete work in this locality.

The accompanying profile shows the change in grade that is made by the new improvement with the temporary grade that



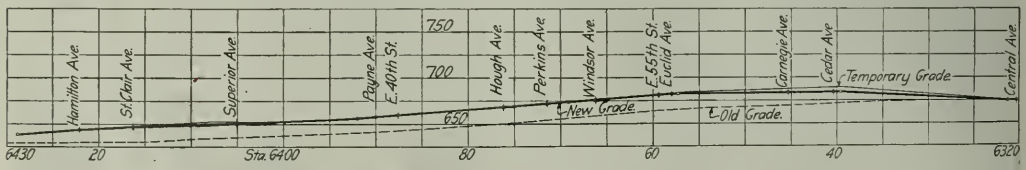
Passenger and Freight Station Layout at Euclid Avenue Showing Temporary Arrangements

was necessary during the course of the work. The maximum temporary approach grade was 0.8 per cent in order to keep within the limits of the ruling grade on the division. As the operated tracks had to be elevated over Cedar avenue before the work of lowering that street could be completed, the temporary trestle was driven at an elevation high enough to clear the street car traffic on the old street level, which raised it considerably above the permanent grade. In lowering this street one street car track was kept in service continuously, a practice which was followed in all cases.

The reconstruction of industrial sidings to connect with the new grade was left to the companies owning the industries, and in some cases these companies had to build two trestles, one at the elevation of the temporary track, and another after the permanent work was completed. No facing point switches were used for these industrial tracks, a double rail track with trailing switch being resorted to wherever this expedient was necessary to eliminate the facing point. The track standards are up to the best Pennsylvania practice, 100-lb. rail being laid on oak ties with rock ballast. The track work was handled by the division forces.

SUBWAY AND RETAINING WALL CONSTRUCTION

The work involved the construction of 11 permanent bridges and two temporary structures, one providing a 10-ft., and the other a 20-ft., driveway. The permanent bridges were all designed to carry four tracks with the exception of Carnegie avenue, just south of the entrance to the new freight yard, which will carry five tracks. The agreement with the city required the construction of bridges which would give the full width of the street under the subway, these street widths varying from 60 ft. to 132 ft. Curb supports were allowed in all cases, and at Superior avenue, where the street is 132 ft. wide, two intermediate supports were allowed between the curbs. The maximum street depression was 8.7 ft. and the maximum approach grade was 4 per cent, although this maximum was only used in three cases, and at important streets the grade was two per cent or less. The clearance was 15 ft., except at three



Profiles of Old, New and Temporary Grades on Group II of the Cleveland Track Elevation

streets where a lower limit was allowed. At seven of the streets provision for street car lines had to be made.

The subways are in general trough floor bridges on concrete abutments and steel columns. The abutments are of mass design with spread footings, no piles being used in the foundations. The columns are carried on concrete piers with grillage tops. The columns support transverse girders, and in general the troughs are run at right angles to the column lines. The longest rim girder span is 67½ ft. at east Fortieth street, and

Temporary Trestle Over St. Clair Avenue, Showing Type of Construction Used and Provision for Street Traffic

the longest trough span is 45 ft. at Payne avenue. The Superior avenue bridge, on account of its extreme length, is provided with a high concrete parapet wall to improve its appearance. The St. Clair avenue bridge is not of the trough floor type, the tracks being supported on transverse girders with buckle plate covers. The transverse girders are supported by web connections and the lower flanges of the rim girders.

In order to save concrete and decrease the dead load on the trough floor bridges, the troughs were not completely filled with concrete. A four-inch layer was placed in the bottom and along each side, the latter supporting a steel arch form at an elevation making its highest point level with the top of the trough. A continuous layer of concrete with a minimum thickness of about seven inches was then laid over the troughs and these arch forms. The water-proofing, consisting of five-ply felt and asphalt compound, was covered by a protecting coat of two inches of cement.

Finished Subway Over Perkins Avenue—One of the Typical Bridges

In placing the retaining walls, a stratum of quicksand was encountered in almost all cases. On account of the lack of right of way, the footings of the walls could not project beyond the wall face, and the walls were designed with a toe support of 13-in. square concrete piles 16 ft. long driven on six-ft.

Typical Floor Construction on Trough Floor Subway, Using Blaw Steel Arch Forms

centers. The quicksand was confined and was so near the surface that it had been drained by the sewers, making the driving of these piles very difficult. A two-inch jet was therefore used with very good results. After turning on the jet a pile would frequently drop of its own weight for half its length. A No. 2 Vulcan steam hammer was used very success-

A Row of Concrete Piles in Place for Toe Supports, Under Retaining Wall

fully for driving the concrete piles, a good day's run being from 25 to 30 piles.

The retaining wall is reinforced with one inch rods spaced 12 in. center to center, and is built in sections of 30 ft. with expansion joints at 60 ft. intervals. A three-inch coping is placed on the walls, and the batter below the coping varies with the height in order to place the toe of the wall on the right of way line. The inside face of the wall is stepped down. Two four-way conduits are carried on each wall with manholes at convenient points. These conduits are designed to carry low tension wires on one side of the right of way, and high tension on the other. One section of retaining wall 1,500 ft. long has been under load for more than a year, and as yet no settlement whatever is noticeable. The wall is in excellent line, showing that the use of the concrete piles has proved very satisfactory in securing a good piece of work. The cost for a design such as the one used is very little higher than would have been necessary to build a wall with a wide toe. Some of the retaining walls were built with horizontal scoring for the ornamental effect, but as this was not very well favored by the city it was stopped.

The piles in the temporary trestles were from 28 to 32 ft. long, and were driven with the jet. The stringers on these trestles were lapped over the entire width of the caps to save framing of stringers and corbels, and this plan was quite satisfactory. The total length of the temporary trestle was 28,000 ft., 90,000 cu. yd. of concrete was required, 2,400 concrete piles were driven. 6,000 tons of bridge steel were used, and 100,000 sq. ft. of waterproofing, 24,000 sq. yd. of street paving and 10,000 sq. yd. of sidewalk were laid.

The contract for pile driving, excavation and concrete work was let to the Brownell Improvement Company, Chicago; the steel was fabricated by the Fort Pitt Bridge Company, Pittsburgh, and was erected by the Strobel Steel Construction Company, Chicago. The work was handled under the direction of R. Trimble, chief engineer maintenance of way North West System, and H. W. Petersen, engineer in charge.

EUROPEAN RAILWAYS IN WAR TIME

American railway officers who have been inclined toward discouragement on account of the poor business conditions and the resulting effect on traffic and earnings which have prevailed in this country for several months, and which still exist, with considerable uncertainty as to the future, should be able to extract a grain of comfort from observation of the far worse plight of the roads in Europe. On the continent of Europe railways in the territory affected by war operations have been required practically to suspend business except for the transportation of troops, and a great deal of their property has been destroyed or damaged, while the lines that are not directly affected by military operations are suffering from the loss of traffic because business is at a standstill. In Great Britain, where the railways are all owned by private companies, the government immediately on the declaration of war with Germany on August 4, issued an order assuming control of the railways. For the time being the railways practically cease to exist as individual commercial undertakings and are merely parts of a great national system.

The announcement of this step made by the British War Office was as follows:

An order in council has been made under section 16 of the Regulation of the Forces act of 1871, declaring that it is expedient that the government should have control over the railways in Great Britain. This control will be exercised through an executive committee composed of general managers of railways, which has been formed for some time, and has prepared plans with a view to facilitating the working of these provisions of the act.

Although the railway facilities, for other than naval and military purposes, may for a time be somewhat restricted, the effect of the use of the powers under this act will be to co-ordinate the demands on the railways of the civil community with those necessary to meet the special requirements of the naval and military authorities.

More normal conditions will in due course be restored, and it is hoped that the public will recognize the necessity for the special conditions, and will, in the general interest, accommodate themselves to the inconvenience involved.

The railway executive committee is composed of the general managers of 10 of the leading railways in Great Britain, with the president of the Board of Trade as official chairman and H. A. Walker, general manager of the London & South Western, as acting chairman. An American, H. W. Thornton, general manager of the Great Eastern and formerly general superintendent of the Long Island, was not numbered among those chosen at first, but the committee had been in charge of affairs only two days when he was asked to become a temporary member, which he did.

This committee, through Mr. Walker, immediately issued a notice to the public explaining the situation, and stating that the control of the railways had been taken over by the government for the purpose of insuring that the locomotives, rolling stock and staff could be used as one complete unit in the best interests of the state for the movement of troops, stores, and food supplies. "The necessity for this action must at once become apparent," the announcement said, "when it is realized that certain ports through which the bulk of our food supplies enters this country may be closed for the purpose of such food supplies and in that event the rolling stock, locomotives, etc., may have to be diverted to other lines for the purpose of serving other ports. The staff on each railway will remain under the same control as heertofore, and will receive their instructions through the same channels as in the past."

The announcement also stated that in order to give due effect to the instructions received from the War Office and the Admiralty for the movement of troops, etc., it might be necessary to discontinue, at short notice, a portion of the advertised service or to close certain of the lines against ordinary traffic, and that, under such circumstances, no responsibility could be accepted for any delay or loss that might arise.

The act under which control of the railways was taken by the government provides that when the Crown by an order in council declares that an emergency has arisen in which it is expedient for the public service that the government shall have control over the railroads or any of them, the secretary of state, by warrants, may empower any person or persons named to take possession of any railroad in the United Kingdom and of its plant or of any part thereof, or may take possession of the plant without taking possession of the railroad itself and use it for government service in such manner as the secretary of state may direct. Any such warrant is to remain in force for one week only, but may be renewed from week to week as long as, in the opinion of the secretary of state, the emergency continues. The act also provides for such full compensation for any loss or injury sustained by the railway companies by the exercise of this power as may be agreed upon between the secretary of state and the railways and provides for arbitration in the case of difference; and that while the railways are in the hands of the government, all contracts for the operation and maintenance of the road shall be enforceable by or against the government.

The arrangements necessary for moving troops, horses and materials by rail for mobilization have been constantly under consideration by the military authorities, and the railways have naturally been regarded as an important factor in any mobilization scheme. There is a war railway council and a railway staff corps attached to the Royal Engineers and there have been various meetings at the Board of Trade to discuss methods for obtaining the maximum efficiency of the railways. Immediately following the taking possession of the railways by the government, the London & South Western gave notice that in consequence of the requirements in connection with the movement of the forces it was not practicable to continue the whole of the passenger train service as advertised, and that it would be necessary to reduce and alter this service from August 5

until further notice. The notice stated that full particulars of the suspension and alteration would be issued, and the company also announced that it would be unable to guarantee the running or punctuality of trains and could not be responsible for any delay, loss or damage which might occur in passenger train service. Similar notices of modified passenger train service were issued by other leading English and Irish railway companies, several of which announced that their ordinary passenger and goods train service would be subject to material alteration and discontinuance without further notice.

The publication of weekly traffic returns of the railways was also discontinued, as during the continuance of the war the railways will be operated almost as a single system, the government compensating the companies for any loss or injury in paying for the movement of troops and stores after the railways are restored to normal conditions. As the sums to be received from the government cannot be dealt with in weekly installments, the publication of these reports would, under the circumstances, be futile. With the business of the country disorganized on account of the obstacles to export and import traffic, the business of the railways would, of course, have been vitally affected even without the necessity for the use of their lines for military purposes.

With the practical cessation of European imports and exports and the general interruption of all kinds of business, the merchandise and general traffic has been heavily reduced and the pleasure and ordinary passenger travel reduced to a minimum. Operating expenses will also naturally be affected by the rise in the prices of materials and in other ways. The declaration of dividends was postponed by several railways, pending the outcome of events.

The Railway News, of London, in its issue of August 8, published an estimate that over 20,000 railway employees had left their employment in obedience to mobilization orders, their places being filled by promoting men of lower grades or by taking on new men for the less skilled occupations. The companies announced that so far as possible they would keep places open for the men who return to civil life when the war ends. At the time of the South African war, the railways not only made arrangements for keeping places open, but also for providing for those dependent upon the men killed or incapacitated during their military service. Similar arrangements are being made now.

The British railways have never yet been put to a complete test as to their ability in the matter of handling such a volume of traffic as would be necessitated in the transportation of an army to resist invasion, but they have often been called upon to handle large numbers of troops, horses and military equipment for maneuvers and royal reviews, frequently at times when their capacity was being subjected to a far greater strain by the handling of holiday passenger traffic.

The British railways are admirably adapted to the handling of troops in large numbers. Among the factors which are considered advantageous are the duplication of lines and the proximity of stations to each other. As the stations are rarely more than three or four miles apart, not all of the trains need go to the same station. Thus if 12 trains are required for the district served by stations A, B and C, the first, fourth, seventh and tenth trains could go to A, the second, fifth, eighth and eleventh to B, and the remainder to C. Should the trains run at 10 minute intervals, there would be half an hour to load or unload the first at A before the next train was due. Moreover, nearly all of the lines are double track and two trains may therefore, in emergency, be run in the same direction at the same time. Other advantages are found in the complete installation of block signals, telephones, speaking instruments and other signals.

As to the continental railways they are largely owned by the governments and a great many lines have been built with reference to their possible use in war time; and naturally the transportation of military forces has been their first consideration. Germany's arrangements for mobilization by railway have been unusually complete. A war time-table, revised as occasion demanded, has always been in the possession of railway officers throughout the country, capable of being put into force at the shortest notice. All railways are administered by the military authorities in time of war, irrespective of whether the railways are state or company owned.

The Russian railways have a different gage from the other European lines and this difference has been maintained for strategic reasons. Short strategic lines built by Germany on the French and Belgian frontiers naturally have been of the greatest importance, and in addition most of the main lines are so located as to have the greatest efficiency for military purposes.

THE TRAIN MASTER'S CHARACTER AND DUTIES*

By W. E. Williams
General Superintendent, Missouri, Kansas & Texas

The question of where a trainmaster should come from is a matter involving considerable difference of opinion. Whether his previous training should have been that of a despatcher, trainman, engineman, station agent or office man is an unsettled question. The fact is, it does not make much difference from what line he comes, as it is the man, after all, that counts. He should be constructive, analytical and judicial. He should be both suspicious and trustful, sufficiently suspicious to hold every man under observation until his worth is determined, and then sufficiently trustful to give to loyalty and worth the confidence that these qualities deserve.

He should by no means have a fixed plan or schedule for covering his division, but on the contrary should be prepared to change from one train to another on a moment's notice so that in no case will his men have a fixed schedule on which to look for him. But little time should be devoted to riding passenger trains, as ordinarily passenger trains take care of themselves; but where it becomes necessary to ride a passenger train that is not doing well and it is necessary to improve the movement, the trainmaster should in all cases ride in the first car of the train so that he will be convenient to the place where the work is being done at stations and will be in position to see and observe the movements of the train and station men, and know to what extent each is putting forth a proper effort to avoid unnecessary station delay. You will frequently see trainmasters on the rear of passenger trains, but, except at night, and for the purpose of observing switch lights, they have no business on the rear of passenger trains. They should, of course, go through every passenger train on which they ride, to observe the condition of the coaches and the general appearances and conduct of the crew.

Check of the more important yards should be made at least once each month and an eternal and never-ending check of foreign cars should be made at all times, particularly cars set out at blind sidings, as by the prompt release and handling of foreign cars alone the trainmaster can easily earn his salary in the saving of per diem, to say nothing of adding to his available car supply.

He should, of course, be at all times familiar with instructions issued by the superintendent of transportation as to the disposition and routing of various line cars in order that he may be in position to see that such cars are properly handled. He should have each day a statement of the overtime made by individual crews the day previous, and a memorandum from the chief despatcher showing tonnage handled on each train run; and where overtime appears to be unnecessary and excessive, the matter should be handled immediately with the crew interested. He should make it his business to spend sufficient time with work trains to see that work is properly organized and that there is no delay or lost motion so far as train service is concerned.

He should never camp at any place, only remaining sufficiently

*Extracts from a paper read at a staff meeting at Galveston, Tex., June 22, 1914.

long in any yard or on any train to see that the work is being properly handled, and then move to some other place. The trainmaster, to be of service, must be in action, up and going at all times. He should be observant of track conditions and methods of track repairs, should work closely with the roadmaster, with the road foreman of engines and the division engineer, and thus relieve the superintendent of detail investigation and supervision.

The right sort of man as trainmaster can be of wonderful assistance to his superintendent in making investigations, and he should so arrange that his report will conclude the matter, so that it will not be necessary for the superintendent to follow after him and conduct an additional investigation.

The trainmaster, in dealing with his men, particularly in matters involving failure to properly perform duty can do best by personal conference with the employee concerned; and this can usually be accomplished by simply waiting your opportunity of riding with the employee where you can have a quiet heart to heart talk with him, point out his error and what will be expected of him in future. In no case, where possible to avoid it, should men be publicly reprimanded or unnecessarily humiliated. A man who is of any account at all, will, regardless of the justice of your action, resent a public reprimand; and where discipline is such as to deprive a man of his self respect it is of a character that, so far as the employee is concerned, absolutely destroys his usefulness.

STREET AND ELECTRIC RAILWAYS IN 1912

The bureau of the census has issued bulletin No. 124, including statistics for street and electric railways for the year 1912, covering all railways other than steam roads in operation during any portion of the year. Comparative statistics are also shown for the censuses of 1907, 1902 and 1890. The statistics for electrically-operated divisions of steam roads are included only in cases where full reports could be made therefor separate from those for steam road operation. In the case of electric railway companies selling electricity for lighting and industrial purposes, when it was impossible to obtain complete, separate reports for the railways and for the electric light and power operations, data for both branches are included in the report for the railway. Comparisons for different censuses are to some extent affected by the inclusion of incomplete or estimated reports. The principal statistics are shown in the following comparative summary:

Comparative Summary, Including Traffic, Income and Capitalization: 1912, 1907 and 1902

	1912	1907	1902	Per cent of increase, 1902-1912
Number of companies	1,260	1,236	987	27.7
Miles of line	30,437.86	25,547.19	16,645.34	82.9
Miles of single track	41,064.82	34,381.51	22,572.52	81.9
Rolling stock:				
Cars, number	94,016	83,641	66,784	40.8
Passenger	76,162	70,016	60,290	26.3
All other	17,854	13,625	6,494	174.9
Electric locomotives	277	117	3	....
Persons employed by operating companies:				
Number	282,461	221,429	140,769	100.7
Salaries and wages	$200,890,939	$150,991,099	$88,210,165	127.7
Salaried employees—				
Number	23,271	11,700	7,128	226.5
Salaries	$26,128,786	$12,909,466	$7,439,716	251.2
Wage earners—				
Average number	259,190	209,729	133,641	93.9
Wages	$174,762,153	$138,081,633	$80,770,449	116.4
Traffic:				
Passengers carried	12,135,341,716	9,533,080,766	5,836,615,296	107.9
Revenue	9,545,554,667	7,441,114,508	4,774,211,904	99.9
Transfer	2,423,918,024	1,995,658,101	1,062,403,392	128.2
Free	165,869,025	96,308,157	....	....
Revenue car mileage	1,921,620,074	1,617,731,300	1,144,430,466	67.9
Passenger	1,885,870,157	1,583,831,199	1,120,101,944	68.4
Express, mail and frt.	35,749,917	33,900,101	24,328,522	46.9
Average number of revenue passengers—				
Per mile of track operated	232,556	216,522	212,217	9.6
Per revenue passenger car mile	5.06	4.70	4.26	....
Condensed income accounts:				
Operating companies—				
Gross income	$585,930,517	$429,744,254	$250,504,627	133.9
Operating revenues	567,511,704	418,187,858	247,553,999	129.2
Transportation revenues	520,184,773	390,276,347	235,997,005	120.4
Non-transportation revenues	47,326,931	27,911,511	11,556,994	309.5
Income from other sources	18,418,813	11,556,396	2,950,628	524.2
Operating expenses	332,896,356	251,309,252	142,312,597	133.9
Net earnings (operating revenues less operating expenses)	234,615,348	166,878,606	105,241,402	122.9
Gross income, less operating expenses	253,034,161	178,435,002	108,192,030	133.9
Deductions from income	191,123,408	138,094,716	77,595,053	146.3
Taxes	35,027,965	19,755,602	13,078,899	167.8
Interest on funded and floating debt and mortgages	98,025,338	63,740,744	38,085,911	157.4
Rent of leased lines and terminals	44,784,521	48,022,596	25,518,225	75.5
Miscellaneous	13,285,584	6,575,774	912,018	....
Net income	61,910,753	40,340,286	30,596,977	102.3
Dividends	51,650,117	26,454,732	15,882,110	225.2
Surplus	10,260,636	13,885,554	14,714,867	—30.3
Lessor companies—				
Gross income	35,605,367	47,913,249	26,138,899	36.2
Rentals from operating companies	35,144,521	47,500,933	26,116,884	34.6
Miscellaneous income	460,846	412,316	22,015	....
Deductions from income	16,090,372	19,465,984	8,779,294	83.3
Interest on funded and other debt	15,234,132	18,030,522	8,376,559	81.9
Miscellaneous deductions	856,240	1,435,462	402,735	112.6
Net income	19,514,995	28,447,265	17,359,605	12.4
Dividends	19,342,101	28,030,542	17,157,961	12.7
Surplus	172,894	416,723	202,544	—14.6
Capitalization:				
Total	4,708,568,141	3,774,772,096	2,308,282,099	104.0
Operating companies	3,956,718,023	2,811,876,374	1,775,468,781	122.9
Lessor companies	751,850,118	962,895,722	532,813,318	41.1
Capital stock	2,384,344,513	2,097,708,856	1,315,572,960	81.2
Funded debt	2,324,223,628	1,677,063,240	992,709,139	134.1
Cost of construction and equipment	4,596,563,292	3,637,668,708	2,167,634,077	112.1

The total capitalization in 1912 is reported as $4,708,568,141, an increase over 1902 of 104 per cent. Of this $2,384,344,513 was capital stock, and $2,324,223,628 was funded debt.

Of the total amount disbursed for salaries and wages in 1912, 13 per cent was for salaries, 47½ per cent for wages of conductors and motormen, and 39½ per cent for all other wage earners. In 1907 wages of conductors and motormen constituted 50.1 per cent of all salaries and wages, and in 1902, 55.1 per cent.

Of the total operating revenues, 91.7 per cent was derived from transportation in 1912, as against 93.3 per cent in 1907, and 95.3 per cent in 1902. The percentage derived from passengers was 88.6 per cent in 1912, as against 91.4 per cent in 1907, and 94.5 per cent in 1902, while the percentage from freight was 1.8 per cent in 1912, as against 1.3 per cent in 1907 and 0.4 per cent in 1902.

A special table is presented showing a comparison of income and expense on a passenger basis, showing that while the gross income per passenger increased from 5.25 cents in 1902, to 6.14 cents in 1912, the passenger revenue per passenger increased from 4.9 cents to 5.27 cents, and the operating expenses from 2.98 cents to 3.49 cents, making an increase in gross income less operating expenses from 2.27 cents to 2.65 cents, and an increase in net income from 0.64 to 0.65 cents.

A Belt Railway for Peking.—The Chinese ministry of communication has arrived at an arrangement with the Peking city authorities whereby they will be able to connect the terminals of the Peking-Kalgan, the Peking-Mukden, the Peking-Tungchow and the Peking-Hankow railways. Later a Peking central railway station will be built. The line will be about seven miles in length and will hug the wall the whole way. To facilitate the handling of traffic in and out of the city two tunnels will be bored through the wall on either side of the existing arch forming the Chien-men.

General News Department

The men in the shops of the Philadelphia & Reading are now working fifty-five hours a week, an increase of fifteen hours over the schedule in force for several weeks past.

No passenger has been killed in any train accident on the New York Central & Hudson River since February 1, 1911; and during that time the number of passengers carried was 136,154,983.

Following a derailment, and while the wreck was being picked up by a derrick, four employees, one of whom was Homer S. Badgett, assistant superintendent, of the New Orleans, Texas & Mexico were killed and three others were probably fatally injured near Savoy, La., August 28, by an explosion of gasoline. The gasoline car was in the freight train which had been derailed. The fire which caused the explosion is supposed to have been started by a spark caused by a chain slipping.

The Baltimore & Ohio has issued general instructions to employees constituting them an organization of fire-fighters, always ready for emergency service. When fires are discovered by enginemen, conductors or other employees in train service, they must lend assistance in extinguishing them, and any delay occasioned by assisting in putting out a fire must be reported at the first telegraph station. At division points the road has provided fire-fighting apparatus and the men are drilled.

The safety department of the Delaware, Lackawanna & Western, in Safety First Bulletin No. 8, gives the number of deaths and injuries to employees during the first half of each year since 1910—1911, 1912, 1913 and 1914—showing a decrease each year. The number of killed was reduced from 34 in 1911 to 7 in 1914, and the number of injuries from 137 to 99. The bulletin gives the causes of the deaths of the seven men in 1914, and contains a large number of suggestions for improving the safety record; also a long list of commendable actions of employees shown on discipline bulletins for four months of this year.

Central Railway Club

The next regular meeting, the annual outing of the Central Railway Club, will be held at Buffalo on September 11. The program for the day is as follows: Members will assemble at the Statler Hotel, the club headquarters, and leave there at 8:45 a. m. to go by the Niagara street cars to the foot of Austin street, from whence a boat leaving promptly at 9:30 will convey them down the west channel of the Niagara river around Grand Island and up the east channel to either the Buffalo Lunch Club or the Motor Club grounds on Grand Island; dinner will be served on arrival and will be followed immediately by the regular club meeting, at which a paper on Locomotive Arch Brick will be read by George Wagstaff of the American Arch Company, New York. For the accommodation of members in New York and vicinity arrangements are being made for a special Pullman sleeping car to be attached to the train leaving the Lackawanna station at Hoboken at 6:55 on September 10.

American Society of Mechanical Engineers

A hearing will be held by the committee on standard boiler specifications in the rooms of the society, 29 West 39th street, on September 15 at 10 a. m. The basic idea of this committee's work is the formulation of a standard of the highest requirements in order to reduce the loss of life and property from boiler explosions. It is the intention also to create a standard which it is hoped will ultimately be adopted by the federal government, and state governments not now having boiler regulations. A considerable number of associations and engineering organizations have been invited to have representatives present and it is also desired insofar as is possible that all who have not already done so, prepare and send a statement in writing previous to the hearing to assist in the deliberations.

MEETINGS AND CONVENTIONS

The following list gives names of secretaries, dates of next or regular meetings, and places of meeting.

Air Brake Association.—F. M. Nellis, 53 State St., Boston, Mass. Next convention, May 4-7, 1915, Hotel Sherman, Chicago.

American Association of Demurrage Officers.—A. G. Thomason, Demurrage Commissioner, Boston, Mass. Annual convention in April.

American Association of Dining Car Superintendents.—H. C. Boardman, D. L. & W., Hoboken, N. J. Next convention, October 22-24, Washington, D. C.

American Association of Freight Agents.—R. O. Wells, Illinois Central, East St. Louis, Ill. Annual meeting, May 21-24, 1915, Richmond, Va.

American Association of General Passenger and Ticket Agents.—W. C. Hope, C. R. R. of N. J., 143 Liberty St., New York. Annual meeting, September 15-16, Boston, Mass.

American Association of Railroad Superintendents.—E. H. Harman, Room 101, Union Station, St. Louis, Mo.

American Electric Railway Association.—E. B. Burritt, 29 W. 39th St., New York. Annual convention, October 12-16, Atlantic City, N. J.

American Electric Railway Manufactureas' Association.—H. G. McConnaughy, 165 Broadway, New York. Meetings with American Electric Railway Association.

American Railway Association.—W. F. Allen, 75 Church St., New York. Semi-annual meeting, November 18, Chicago.

American Railway Bridge and Building Association.—C. A. Lichty, C. & N. W., Chicago. Next convention, October 20-22, 1914, Los Angeles, Cal.

American Railway Engineering Association.—E. H. Fritch, 900 S. Michigan Ave., Chicago. Next convention, March 16-18, 1915, Chicago.

American Railway Master Mechanics' Association.—J. W. Taylor, 1112 Karpen Bldg., Chicago. Annual meeting, June, 1915.

American Railway Safety Association.—L. F. Shedd, C. R. I. & P., Chicago. Next meeting, November, Chicago.

American Railway Tool Foremen's Association.—A. R. Davis, Central of Georgia, Macon, Ga. Annual meeting, July, 1915.

American Society for Testing Materials.—Prof. E. Marburg, University of Pennsylvania, Philadelphia, Pa.

American Society of Civil Engineers.—Chas. W. Hunt, 220 W. 57th St., New York. Regular meetings, 1st and 3d Wednesday in month, except, June, July and August, 220 W. 57th St., New York.

American Society of Engineering Contractors.—J. R. Wemlinger, 11 Broadway, New York. Regular meetings, 2d Thursday in month, at 2 P. M., 11 Broadway, New York.

American Society of Mechanical Engineers.—Calvin W. Rice, 29 W. 39th St., New York. Annual meeting, December 1-4, 1914, New York.

American Wood Preservers' Association.—F. J. Angier, B. & O., Mt. Royal Sta., Baltimore, Md. Next convention, January 19-21, 1915, Chicago.

Association of American Railway Accounting Officers.—E. R. Woodson, 1300 Pennsylvania Ave., N. W., Washington, D. C. Annual convention, April 28, 1915, Atlanta, Ga.

Association of Manufacturers of Chilled Car Wheels.—George W. Lyndon, 1214 McCormick Bldg., Chicago. Annual meeting, second Tuesday in October, New York.

Association of Railway Claim Agents.—C. W. Egan, B. & O., Baltimore, Md. Annual meeting, 3rd week in May, 1915, Galveston, Tex.

Association of Railway Electrical Engineers.—Jos. A. Andreucetti, C. & N. W., Room 411, C. & N. W. Sta., Chicago. Annual convention, October 26-30, 1914, Chicago.

Association of Railway Telegraph Superintendents.—P. W. Drew, Soo Line, 112 West Adams St., Chicago. Annual meeting, June 22-25, Rochester, N. Y.

Association of Transportation and Car Accounting Officers.—G. P. Conard, 75 Church St., New York. Next meeting, December 8-9, 1914, Richmond, Va.

Bridge and Building Supply Men's Association.—L. D. Mitchell, Detroit Graphite Co., Chicago, Ill. Meetings with American Railway Bridge and Building Association.

Canadian Railway Club.—James Powell, Grand Trunk, P. O. Box 7, St. Lambert (near Montreal), Que. Regular meetings, 2d Tuesday in month, except June, July and August, Windsor Hotel, Montreal, Que.

Canadian Society of Civil Engineers.—Clement H. McLeod,176 Mansfield St., Montreal, Que. Regular meetings, 1st Thursday in October, November, December, February, March and April. Annual meeting, January, Montreal.

Car Foremen's Association of Chicago.—Aaron Kline, 841 Lawler Ave., Chicago. Regular meetings, 2d Monday in month, except July and August, Lytton Bldg., Chicago.

Central Railway Club.—H. D. Vought, 95 Liberty St., New York. Regular meetings, 2d Friday in January, May, September and November. Annual meeting, 2d Thursday in March, Hotel Statler, Buffalo, N. Y.

Civil Engineers' Society of St. Paul.—Edw. J. Dugan, P. O. Box 654, August and September, Old State Capitol Bldg., St. Paul.

Engineers' Society of Pennsylvania.—Edw. R. Dasher, Box 75, Harrisburg, Pa. Regular meetings, 1st Friday after 10th of each month, except July and August, 31 So. Front St., Harrisburg, Pa.

Engineers' Society of Western Pennsylvania.—Elmer K. Hiles, 2511 Oliver Bldg., Pittsburgh, Pa. Regular meetings, 1st and 3d Tuesday, Pittsburgh.

Freight Claim Association.—Warren P. Taylor, R. F. & P., Richmond, Va. Annual meeting, June 16, 1915, Chicago.

General Superintendents' Association of Chicago.—A. M. Hunter, 321 Grand Central Station, Chicago. Regular meetings, Wednesday preceding 3d Thursday in month, Room 1856, Transportation Bldg., Chicago.

International Railway Congress.—Executive Committee, 11, Rue de Louvain, Brussels, Belgium. Next convention, June 23 to July 6, 1915, Berlin.

International Railway Fuel Association.—C. G. Hall, C. & E. I., 922 McCormick Bldg., Chicago. Annual meeting, May 17-20, 1915, Chicago.

International Railway General Foremen's Association.—Wm. Hall, 829 W. Broadway, Winona, Minn. Next convention, July 14-17, 1915, Sherman House, Chicago.

International Railroad Master Blacksmiths' Association.—A. L. Woodworth, C. H. & D., Lima, Ohio.

Maintenance of Way and Master Painters' Association of the United States and Canada.—T. I. Goodwin, C. R. I. & P., Eldon, Mo. Next convention, November 17-19, 1914, Detroit, Mich.

Master Boiler Makers' Association.—Harry D. Vought, 95 Liberty St., New York. Annual convention, May, 1915.

Master Car and Locomotive Painters' Association of the United States and Canada.—A. P. Dane, B. & M., Reading, Mass. Next convention, September 8-11, Nashville, Tenn.

Master Car Builders' Association.—J. W. Taylor, 1112 Karpen Bldg., Chicago. Annual meeting, June, 1915.

National Railway Appliances Association.—Bruce V. Crandall, 537 So. Dearborn St. Chicago. Next convention, March 15-19, 1915, Chicago.

New England Railroad Club.—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass. Regular meetings, 2d Tuesday in month, except June, July, August and September, Boston.

New York Railroad Club.—Harry D. Vought, 95 Liberty St., New York. Regular meetings, 3d Friday in month, except June, July and August, 29 W. 39th St., New York.

Niagara Frontier Car Men's Association.—E. Frankenberger, 623 Brisbane Bldg., Buffalo, N. Y. Meetings monthly.

Peoria Association of Railroad Officers.—M. W. Rotchford, Union Station, Peoria, Ill. Regular meetings, 2d Thursday in month, Jefferson Hotel, Peoria.

Railroad Club of Kansas City.—C. Manlove, 1008 Walnut St., Kansas City, Mo. Regular meetings, 3d Friday in month, Kansas City.

Railroad Master Tinners, Coppersmiths and Pipefitters' Association.—U. G. Thompson, C. & E. I., Danville, Ill. Annual meeting, May, 1915.

Railway Business Association.—Frank W. Noxon, 30 Church St., New York. Annual meeting, December 10, 1914, Waldorf-Astoria Hotel, New York.

Railway Club of Pittsburgh.—J. B. Anderson, Room 207, P. R. R. Sta., Pittsburgh, Pa. Regular meetings, 4th Friday in month, except June, July and August, Monongahela House, Pittsburgh.

Railway Electrical Supply Manufacturers' Association.—J. Scribner, 1021 Monadnock Block, Chicago. Meetings with Association of Railway Electrical Engineers.

Railway Fire Protection Association.—C. B. Edwards, Fire Ins. Agt., Mobile & Ohio, Mobile, Ala. Annual meeting, October 6, 1914, Washington, D. C.

Railway Signal Association.—C. C. Rosenberg, Times Bldg., Bethlehem, Pa. Annual meeting, September 22-24, 1914, Bluff Point, N. Y.

Railway Storekeepers' Association.—J. P. Murphy, L. S. & M. S., Box C, Collinwood, Ohio. Annual meeting, May, 1915.

Railway Supply Manufacturers' Association.—J. D. Conway, 2136 Oliver Bldg., Pittsburgh, Pa. Meetings with M. C. B. and M. M. Associations.

Railway Telegraph and Telephone Appliance Association.—G. A. Nelson, 50 Church St., New York. Meetings with Association of Railway Telegraph Superintendents.

Richmond Railroad Club.—F. O. Robinson, C. & O., Richmond, Va. Regular meetings, 2d Monday in month, except June, July and August.

Roadmasters' and Maintenance of Way Association.—L. C. Ryan, C. & N. W., Sterling, Ill. Next convention, September 8-10, 1914, Chicago.

St. Louis Railway Club.—B. W. Frauenthal, Union Station, St. Louis, Mo. Regular meetings, 2d Friday in month, except June, July and August, St. Louis.

Salt Lake City Transportation Club.—R. E. Rowland, Hotel Utah Bldg., Salt Lake City, Utah. Regular meetings, 1st Saturday of each month, Salt Lake City.

Signal Appliance Association.—F. W. Edmunds, 3868 Park Ave., New York. Meeting with annual convention Railway Signal Association.

Society of Railway Financial Officers.—Carl Nyquist, C. R. I. & P., La Salle St., Chicago. Annual meeting, September 15-17, Hotel Aspinwall, Lenox, Mass.

Southern Association of Car Service Officers.—E. W. Sandwich, A. & W. P. Ry., Atlanta, Ga.

Southern and Southwestern Railway Club.—A. J. Merrill, Grant Bldg., Atlanta, Ga. Regular meetings, 3d Thursday, January, March, May, July, September, November, 10 A. M., Candler Bldg., Atlanta.

Toledo Transportation Club.—J. S. Marks, Agent, Interstate Despatch, Toledo, Ohio. Regular meetings, 1st Saturday in month, Boody House, Toledo.

Track Supply Association.—W. C. Kidd, Ramapo Iron Works, Hillsburn, N. Y. Meetings with Roadmasters' and Maintenance of Way Association.

Traffic Club of Chicago.—W. H. Wharton, La Salle Hotel, Chicago.

Traffic Club of New York.—C. A. Swope, 291 Broadway, New York. Regular meetings, last Tuesday in month, except June, July and August, Waldorf-Astoria, New York.

Traffic Club of Pittsburgh.—D. L. Wells, Erie R. R., Pittsburgh, Pa. Meetings bimonthly, Pittsburgh. Annual meeting, 2d Monday in June.

Traffic Club of St. Louis.—A. F. Versen, Mercantile Library Bldg., St. Louis, Mo. Annual meeting in November. Noonday meetings October to May.

Train Despatchers' Association of America.—J. F. Mackie, 7122 Stewart Ave., Chicago. Annual meeting June 15, 1915, Minneapolis, Minn.

Transportation Club of Detroit.—W. R. Hurley, Superintendent's office, L. S. & M. S., Detroit, Mich. Meetings monthly, Normandie Hotel, Detroit.

Traveling Engineers' Association.—W. O. Thompson, N. Y. C. & H. R., East Buffalo, N. Y. Next meeting, September 15-18, Hotel Sherman, Chicago.

Utah Society of Engineers.—Frank W. Moore, Newhouse Bldg., Salt Lake City, Utah. Regular meetings, 3d Friday in month, except July and August, Consolidated Music Hall, Salt Lake City.

Western Canada Railway Club.—W. H. Rosevear, P. O. Box 1707, Winnipeg, Man. Regular meetings, 2d Monday, except June, July and August, Winnipeg.

Western Railway Club.—J. W. Taylor, 1112 Karpen Bldg., Chicago. Regular meetings, 3d Tuesday in month, except June, July and August, Karpen Bldg., Chicago.

Western Society of Engineers.—J. H. Warder, 1735 Monadnock Block, Chicago. Regular meetings, 1st Monday in month, except January, July and August, Chicago. Extra meetings, except in July and August, generally on other Monday evenings.

Traffic News

The receivers of the Pere Marquette have asked Judge Tuttle, in charge of the receivership, for permission to advance freight and passenger rates.

On August 9 the running time of the Chicago & North Western's Duluth-Superior Limited train, from Chicago to Duluth, was shortened by 30 minutes.

The Panama Railroad last week notified connecting carriers that at the end of ninety days the road will withdraw from all agreements relating to through freight traffic. In other words the Panama Canal has superseded the railroad.

The Department of Agriculture has issued an order that spoiled food transported in interstate commerce must be denatured, so that it cannot be eaten. For example, spoiled eggs, to be used in tanning, must be treated with salt, petroleum or coloring matter, so that no one will attempt to use them as food.

Officers of a number of Texas railways recently appeared before a committee of the state legislature to protest against the clause in the cotton warehouse bill now before the special session of the legislature, requiring the roads to build sheds at all points where cotton is received and to protect it from the weather while in transit.

The railways entering Chicago have announced their intention of assessing a charge for trap-car service in the Chicago district after October 1 of 4½ cents per 100 lb., with a minimum of 8,000 lb. The charge will apply from all industries and universal freight stations. The cost of trap-car service is now absorbed, the eastern lines requiring a minimum of 10,000 lb., and the western lines, 6,000 lb.

The United States District Attorney at New York City has begun a suit in the Federal Court against the Lehigh Valley for an injunction forbidding payments as commission or salary to George W. Sheldon & Company, forwarding agents. Sheldon & Company have been indicted for accepting rebates, the charge being that they represent the shippers and are not properly to be regarded as forwarding agents.

The Louisville & Nashville and other roads in Southern territory have filed tariffs to be effective October 1, making advances in certain rates on lumber from points in Mississippi and Louisiana to Ohio River points, as well as numerous advances from Memphis to points in Iowa, North and South Dakota, Minnesota and Western trunk line territory. The increase varies from 1 cent to 4 cents per 100 lb. on oak, gum and cottonwood.

The Chicago, St. Louis & Gulf Transportation Company, which began service between Chicago and LaSalle, Ill., on August 10, via the Illinois & Michigan canal and the Chicago river, making tri-weekly trips with 150-ton capacity barges, is basing its rates on a 20 per cent differential under the rail rates. The company announces that the tonnage is increasing with every trip and that it is planned to make the service daily within the next month. The company is agitating for a deepening of the canal, with the idea of running boats from Chicago to New Orleans via the Mississippi river.

The freight traffic department of the Chicago & Eastern Illinois has issued "Lumber Specialization Circular No. 1," signed by E. S. Stephens, assistant general freight agent, describing the service that the road gives on lumber shipments, which are handled as "Green Ball" freight at an average movement of 100 miles a day, and giving a brief outline of the various rate bases applying on lumber. The circular states the belief that there will soon be great activity in the lumber trade and that officers of the road have been giving closest attention to all details of the lumber traffic. Other circulars are to follow.

The embargoes on shipments of grain to Galveston for export, which had been in effect for about three weeks, were raised on August 27, and all lines entering Galveston have notified their connections that they are ready to accept shipments. The

embargoes were imposed on August 4, on account of the delay to export shipping caused by the outbreak of the European war, and approximately 3,000 cars of wheat had been tied up at Galveston during their continuance. The Illinois Central announced the lifting of its embargo at New Orleans on September 1. The Texas & Pacific last week modified its embargo to clear the congestion of wheat at Westwego, near New Orleans.

The embargo on freight for export to Europe, which was placed by the trunk lines soon after the opening of the war, was lifted August 29 to the extent of announcing that freight would be accepted if prepaid to the Atlantic seaboard, and if, before shipping it, arrangements had been made with the steamship agents. No through export bills of lading can be issued until contract for ocean transportation has been made through foreign freight agents, and all through export bills of lading must have attached the ocean condition war clause, as required by transatlantic lines. The export movement of flour during the past two weeks has been unusually heavy. There is no scarcity of vessels for grain.

Representatives of the Pennsylvania, the Pittsburgh & Lake Erie, the Baltimore & Ohio, and the Bessemer & Lake Erie appeared before the Pennsylvania Public Service Commission September 1 concerning the general 5 per cent increase in freight rates which has been decided on, following the recent order of the Interstate Commerce Commission. They requested the commission to grant blanket permission to all roads publishing Pennsylvania intrastate rates to cancel the tariffs now under voluntary suspension, effective on or before September 12, and also asked authority to re-publish the 5 per cent rates, as modified on the basis laid down by the Interstate Commerce Commission, on less than statutory notice of 3, 5 or 10 days. The Commission agreed as to the withdrawal of the present rates, but reserved its decision regarding the proposition to make effective the 5 per cent increase on less than the statutory time. The Commission also made it plain that no matter what its attitude on the latter question may be, it would not affect the question as to the reasonableness of the increased rates. The matter only involves those lines in the western part of Pennsylvania which come within Central Traffic Association territory.

Rate clerks of the Trunk Line Association and the Central Passenger Association comprising the railways east of the Mississippi river, are working day and night on the compilation of tariffs advancing interstate passenger fares, as mentioned in last week's issue. A meeting of the rate clerks of the Trunk Line and Central Passenger associations was held on August 26 at Niagara Falls, which was attended also by a large number of passenger officers of the roads, at which some little progress was made. The task of revising the tariffs is so large and so complicated that it may be several months before it is completed. Roads in trunk line territory have announced some of their advanced rates to go into effect by October 1, as above noted, but on ordinary ticket fares the advances in that territory will be of less importance than those in Central Passenger Association territory and on the western lines, because a large number of their rates are now on the basis of 2½ to 3 cents, whereas in the Central Passenger Association territory the intrastate rates are on the two-cent basis and have pulled down the interstate fares to some extent. It will therefore be some time before the rates can be advanced in Central Passenger Association territory, or for through fares. The general basis proposed is 2½ cents a mile.

Increases in Passenger Fares

The Pennsylvania Railroad on September 1 filed with the Interstate Commerce Commission tariffs, to take effect October 1, increasing the price of interchangeable mileage tickets from two cents a mile to 2¼ cents. The company announces that other changes are in contemplation. This action is taken in pursuance of the suggestion made by the Interstate Commerce Commission, in its recent decision on freight rates, to the effect that passenger rates are too low, as compared with freight rates.

On Wednesday it was announced that the Boston & Albany, the Boston & Maine and the New York, New Haven & Hartford had issued similar notices; and at Harrisburg, Pa., similar notices were filed with the state commission by the Philadelphia & Reading, the Pittsburgh & Lake Erie, the Lake Shore & Michigan Southern, the Lehigh Valley, the Delaware, Lackawanna & Western and the Delaware & Hudson. The Reading proposes to revise all of its fares, except for season tickets, on the basis of 2¼ cents a mile. Round trip fares will be no lower than single trip.

Resumption of Traffic to Mexico

Announcement has been made by officers of the Texas & Pacific and International & Great Northern that affairs in Mexico have reached a state where traffic with the United States is being resumed. The International & Great Northern, in connection with the Texas & Pacific and St. Louis, Iron Mountain & Southern, previous to the trouble in Mexico ran through trains via Laredo, Tex., to the City of Mexico in connection with the National Railways of Mexico. The war caused the suspension of this traffic. Recently arrangements have been made with the Constitutionalists for an interchange of traffic between the Gould lines and the Mexican railways at Laredo. All freight in both directions is transferred in the International & Great Northern yards at Laredo. No through rates are in effect and through bills of lading cannot be issued.

Through train service over the railroad between Laredo and the City of Mexico was resumed on August 26, the track which was destroyed in connection with the operations of the war having been made passable. Numerous branch roads are being repaired rapidly.

Controversy Over Western Passenger Traffic

The Union Pacific has received many protests from connecting lines on account of a notice issued by the traffic department on August 13, closing the Ogden gateway both eastbound and westbound, to passengers desiring to travel on through tickets via the Denver & Rio Grande and connecting lines east of Colorado common points, the notice to be effective on October 1. The notice says that on passenger traffic originating at Colorado common points, Denver, Colorado Springs, Pueblo and Trinidad, or points east, south or north thereof, destined to points on the Oregon Short Line, or from points on that line, interchange at Ogden or Salt Lake City will be discontinued and that such business must be routed via the Union Pacific between Denver, Colo., or authorized points of interchange east thereof on the one hand, and Granger, Wyo., or Ogden, Utah, on the other. Interchange on traffic to or from points beyond Huntington is to continue as at present, and interchange on traffic originating on points west of, but not including Colorado common points, destined to points on the Oregon Short Line or the reverse, is to continue as at present. Connecting lines are requested to arrange to eliminate from tariffs all routing in conflict with this notice and for the withdrawal of tickets accordingly.

The Denver & Rio Grande issued a notice to the public stating that should the Ogden gateway be closed the Burlington, the Rock Island, the Santa Fe, the Missouri Pacific, the Colorado & Southern and Colorado Midland and their connections would be unable to ticket passengers to Oregon Short Line points through Colorado and Utah, and the result would be to divert from Denver, Colorado Springs, Manitou, Pueblo, Canyon, Canyon City, Leadville, Glenwood Springs, Grand Junction, Green River, Price, Provo, Salt Lake City and Ogden, all travel originating in the east and the south destined to Oregon Short Line points; also the very large Yellowstone Park and other round trip tours in commercial travel that has been moving through Colorado and Utah. The notice says that the major portion of the diverted travel which has heretofore passed through Colorado and Utah would be ticketed through St. Paul, Billings and other northwestern routes, to the disadvantage of Colorado and Utah cities and towns if the Ogden gateway were closed to the Denver & Rio Grande and its connections.

On Tuesday of this week it was reported that the Union Pacific would defer action, because of the vigorous protests from interested lines. The object of closing the gateway was control of tourist business; but in recalling its notice the Union Pacific says that it will take measures to accomplish its purpose in another way.

Commission and Court News

INTERSTATE COMMERCE COMMISSION

New England Lumber Rates

Opinion by Commissioner Clements:

The commission finds that the carriers have justified proposed increased rates on lumber and other forest products from points on the Maine Central to points on the Boston & Maine. In justification of the proposed increases reference was made to the general financial condition of the two roads. It was stated that in order to maintain their present standard of service and to insure a reasonable return to investors it was necessary that means be taken to increase revenues. In this connection it was shown that, although the total revenue of the Maine Central for the eight months ended February 28, 1914, increased $192,554 over the total revenue for corresponding months in the previous year, operating expenses increased $436,944, and that there was a decrease in net operating revenue of $227,018, with an increase in taxes of $38,703. It was further shown that the percentage of operating expenses to operating revenues during the eight-months period referred to increased from 70.43 to 74.16 per cent over the corresponding period in the previous year. It was also asserted that the proposed rates are lower than rates generally for equal distances in the same general territory and that they are lower than lumber rates applicable on connecting lines in Maine, such as the Bangor & Aroostook and the Canadian Pacific. (31 I. C. C., 553.)

Fourth Section Violations in Rates on Sugar

Opinion by the commission:

The carriers have asked permission to continue rates on sugar lower than to intermediate points (a) via certain routes from San Francisco and from beet-sugar producing points in California, Utah and Arizona to destinations on and east of the Missouri river; (b) from Colorado beet-sugar producing points to El Paso, Tex.; (c) from New Orleans, La., and points taking the same rates to El Paso, Tex.; (d) from New Orleans to various points in Arkansas, Illinois, Iowa, Kansas and other states and (e) to establish a rate of 46 cents on sugar in carloads, minimum weight 60,000 lb., from San Francisco and other sugar-producing points in California, Nevada, Arizona and Utah to Chicago and rates from the same points of origin to all points between the Missouri river and Chicago, 23 cents higher than the present rates to the same points from New Orleans, while continuing higher rates to intermediate points.

Rates from California points to Chicago: The traffic is carried via four routes and as a rule the rates increase to 55 and 60 cents for carload minima of 60,000 and 36,000 lb., respectively, to points in eastern Nevada, which rates are blanketed to points west of the Missouri, the rates to points between the Missouri and Chicago being 5 cents higher. The rates applying for the route over the Southern Pacific and Union Pacific through Ogden, Cheyenne and Omaha already accord with the fourth section. The commission does not find any necessity for violations of that rule in the rates via the route over the Western Pacific, Denver & Rio Grande and the Missouri Pacific or that afforded by the Santa Fe via Bakersfield, Cal., Albuquerque, N. Mex., and Trinidad, Cal. The route via the Southern Pacific to El Paso, the El Paso & Southwestern to Tucumari, N. Mex., and the Rock Island beyond is circuitous as compared with the other routes. It is held that the rates to the Missouri river should not be exceeded at intermediate points via this line west of and including Tucumari and that east of Tucumari they should not exceed the rates to the Missouri by more than 10 cents per 100 lb.

Rates to El Paso: No justification is found for the maintenance of lower rates via the direct lines from Colorado beet-sugar producing points or from New Orleans and points taking the same rates to El Paso than to intermediate points. The line of the Santa Fe from New Orleans is 23 per cent longer than the short line, so that line will be allowed to carry rates to stations west of Vaughan, N. Mex., not more than 10 cents higher than the rates to El Paso.

Rates from New Orleans to points in Arkansas, Oklahoma, etc.: The commission finds no necessity for violations of the fourth section in the rates to these points via the direct lines. The rates from producing points on Morgan's Louisiana & Texas Railroad, the New Orleans, Texas & Mexico, the New Iberia & Northern and the Texas & Pacific intermediate to New Orleans on routes from New Orleans to stations west of the west bank of the Mississippi have or will have the same rates as from New Orleans. To St. Louis, Cairo, Chicago and certain points east of the Mississippi the rates are from 2 to 5 cents higher than from New Orleans. This violation of the fourth section will be allowed. The rate on sugar from New Orleans to Cairo is 17 cents, to St. Louis 17 cents and to Chicago 23 cents and the short lines are east of the Mississippi river. The rates via these lines were considered in 31 I. C. C. 495 and it was held that carriers east of the river could maintain lower rates to Cairo and St. Louis than to intermediate points. The rates to the Mississippi river crossings have been influenced by water competition. Rates grade westerly from the river towards the western boundary of these states and traffic moving in a northwesterly direction usually moves under rates conforming with the fourth section. The opposite holds true of traffic moving in a northeasterly direction.

The commission grants relief from the fourth section in several cases. The Kansas City Southern is allowed to continue a rate to Fort Smith, Ark., lower than to points north of Texarkana. Lower rates are also allowed to the Mississippi river points, Helena, Memphis, Cairo, St. Louis and points north thereof than to points in Louisiana, Arkansas, Missouri, Iowa and Minnesota. Lower rates are also permitted to Chicago, Milwaukee and other points in eastern Illinois and Wisconsin than to intermediate points.

The commission does not allow lower rates to Oklahoma than to intermediate points in Texas on the direct lines.

The rate to Omaha is 32 cents. The Rock Island is allowed to meet this rate and to continue higher rates to intermediate points provided the latter do not exceed 40 cents at the highest rated points. The same carrier is also allowed relief as to the rates via Keokuk and Burlington to Davenport and Clinton.

The Missouri Pacific may meet rates of 12 cents to Arkansas City, Helena, Memphis and 17 cents to Cairo and St. Louis, provided the rates to intermediate points south of Arkansas City do not exceed 22 cents, south of Memphis 24 cents and south of St. Louis 28 cents. No relief is granted with reference to the rate of 28 cents to Fort Smith.

The Santa Fe because of its circuitous route is allowed to continue lower rates to Kansas City, Mo., etc., and to Illinois than to intermediate points in Missouri, Kansas and Oklahoma.

The Chicago Great Western may continue lower rates to the twin cities than to intermediate points and lower rates to Chicago and Illinois points than to intermediate Iowa and Missouri points.

The rate of 46 cents from San Francisco to Chicago: A rate of 46 cents from San Francisco and beet-sugar producing points to Chicago will compare with a rate of 55 cents to the Missouri river and points west thereof. The commission finds that the carriers may establish rates from San Francisco to Chicago and points taking Chicago rates from New Orleans 25 cents higher than the rates to the corresponding points from New Orleans, and to other stations between Chicago rate territory and Missouri river points 23 cents higher than the rates to the same points from New Orleans, provided the rates to other intermediate points west of the Missouri river are corrected as outlined in the preceding portions of this report.

It was shown in the record that the total consumption of sugar in the United States in 1913, including sugar for manufacturing purposes, was 3,600,000 tons, an average per capita of 82 lb. During that year the seven western states, California, Nevada, Utah, Idaho Montana, Colorado and Arizona, produced 573,000 tons of beet-sugar and during the same year approximately 280,000 tons of cane sugar, mostly from the Hawaiian Islands, was brought to San Francisco, refined at and distributed from that point. This total of 853,000 tons is enough to supply a population of 20,000,000 people, while the total population in the 11 western states—including the

above seven and Washington, Oregon, Wyoming and New Mexico—was but 6,825,821 persons, according to the census reports of 1910. It is obvious that a large part of the sugar produced or refined in these 11 states must find a market in the territory east thereof.

The rates made to the Missouri have enabled the cane-sugar refiners at San Francisco and the beet-sugar producers in the western states to market some of this sugar in the territory bordering on the Missouri. It was represented, however, that the rate of 23 cents made to Chicago from New Orleans and by the lake-and-rail lines from the Atlantic seaboard was so low as practically to prohibit the movement of western sugar to Chicago on the rates now in effect.

It was also shown that about 270,000 tons of sugar move from the Hawaiian Islands via the Isthmus of Tehuantepec to New York, where it is refined and then distributed. The refiners at San Francisco and the carriers serving that point desired to secure a larger proportion of this Hawaiian sugar than they are now doing and in order to do so had to have rates to consuming territory that would enable them to compete with the sugar refined at New York or New Orleans, or the Louisiana sugar, coming mainly from New Orleans. (31 I. C. C., 511.)

STATE COMMISSIONS

The Minnesota Railroad and Warehouse Commission has allowed an extension of time from August 10 to September 10 for putting into effect its recent order reducing freight rates in the State.

The Illinois Public Utilities Commission on August 26, ordered the suspension of freight tariffs by the Chicago & North Western canceling the absorption of tunnel and lighterage charges in Chicago.

The Texas Railroad Commission has announced that a hearing will be held on September 8 to consider a proposition of canceling the special rates on all kinds of fruits, melons, vegetables in carloads and less than carload lots.

Indiana railroads have announced that they will file new freight tariffs of class rates with the Indiana Public Service Commission on September 12, embodying advances made on the same basis as that allowed by the Interstate Commerce Commission for interstate traffic in the 5 per cent case.

The Missouri Pacific has filed notice with the Nebraska Railroad Commission that it intends to appeal from the commission's order of August 5, making a reduction of about 19 per cent in the class freight rates in Nebraska. The appeal will be taken to the state supreme court. The rates will go into effect, however, pending the appeal.

The Oklahoma Corporation Commission has announced that a hearing will be held on September 22, in connection with the application filed by the attorney-general of the state for refunds amounting to approximately $6,000,000 on passenger fares collected by the railways of the state while the two-cent fare law was under injunction. Claims for refunds of approximately $700,000 in express charges are also involved.

The Texas Railroad Commission has set November 23 as the date for the public hearing of the application of the Texas railroads for authority to increase freight rates throughout the state. The commission announces that the investigation will embrace the following questions: "First, do the present rates of transportation yield to common carriers by railroad operating in the state of Texas adequate revenue? Second, if not, what general course will be pursued to meet the situation?"

The Iowa Railroad Commission will hold a hearing on October 9, on a controversy between the Wabash and the Iowa State Board of Control regarding demurrage charges on coal shipped to the state school for the deaf at Council Bluffs. At that point the Wabash turns cars over to the Street Railway Company, which in turn places them on a side track at the state institution. Occasionally it takes three or four days to switch the cars to the school. The state board claims that delivery is not effected until the cars are received at its side track. The Wabash claims that the street railway is an agent for the school and that demurrage begins 48 hours after that road receives the cars. Both the board of control and the street railway have refused to pay the demurrage charges, which, since August, 1912, have aggregated nearly $1,000.

Railway Officers

Executive, Financial, Legal and Accounting

Hale Holden, vice-president of the Chicago, Burlington & Quincy, has been elected president, with headquarters at Chicago, to succeed Darius Miller, deceased. A portrait and sketch of Mr. Holden appear elsewhere in this issue.

The office of car accountant of the Rock Island Lines, held by W. H. Wallace, has been placed under the jurisdiction of the accounting department. He will report to the controller instead of to the superintendent of car service as heretofore, and the headquarters will remain at Hamilton Park, Chicago.

C. V. Lewis, freight claim agent of the Baltimore & Ohio, at Baltimore, Md., at his own request has been relieved of the duties of that position, and has been appointed special representative of the freight claim department. B. M. Waldron, freight claim agent of the Cincinnati, Hamilton & Dayton, at Cincinnati, Ohio, since February, 1909, succeeds Mr. Lewis.

William J. Cunningham, assistant to the president of the New York, New Haven & Hartford, has been appointed president's assistant of the Boston & Maine, with headquarters at Boston, Mass. Mr. Cunningham will continue as assistant professor of transportation in the Harvard School of Business Administration. A photograph and sketch of Professor Cunningham were published in the *Railway Age Gazette* of October 17, 1913, page 722.

Operating

Fred N. Beal, general freight and passenger agent of the Sandy River & Rangeley Lakes at Phillips, Me., has been appointed general manager, with office at Phillips, and the offices of general freight and passenger agent, and superintendent, are abolished.

Traffic

R. W. Rigdon has resigned as commercial agent of the Kansas City, Mexico & Orient at Ft. Worth, Tex.

P. J. Leimbach, local freight agent of the Missouri Pacific at Hutchinson, Kan., has been appointed commercial freight agent at that place.

H. S. Baggs has been appointed traveling passenger agent of the Atlanta, Birmingham & Atlantic, with office at Atlanta, Ga., succeeding R. E. Camp, resigned.

J. R. Long has been appointed traveling freight and passenger agent of the Wabash, with headquarters at Philadelphia, Pa., succeeding C. H. Latta, resigned.

H. G. Locke, traveling passenger and freight agent of the Chicago Great Western at Boston, Mass., has been appointed district passenger agent with headquarters at Boston.

E. K. Garrison, district freight and passenger agent of the Chicago, Milwaukee & St. Paul at Portland, Ore., has been appointed general agent of the freight department at Seattle, Wash., succeeding Robert M. Boyd, deceased.

H. C. Davis has been appointed traveling passenger agent of the Nashville, Chattanooga & St. Louis, with office at Chattanooga, Tenn., succeeding J. H. Latimer, who was retired at his own request on September 1, after a service of 57 years with that road and its predecessors.

J. H. Fitch, general agent of the traffic department of the Louisville & Nashville at Detroit, Mich., has been appointed division freight agent of that road and the Lexington & Eastern, with headquarters at Lexington, Ky. L. G. Parsons, commercial agent of the Louisville & Nashville at Indianapolis, Ind., succeeds Mr. Fitch and C. H. Ryan, Jr., traveling freight agent at Chicago, succeeds Mr. Parsons. W. C. Dillard, traveling freight agent at Houston, Tex., has been appointed division freight agent, with headquarters at Pensacola, Fla., succeeding J. W. Lurton, deceased. W. L. Dulaney, soliciting agent at New Orleans, La., succeeds Mr. Dillard and J. J. Coburn succeeds Mr. Dulaney. Fred Mulberry, soliciting agent at Cincinnati, Ohio, has been appointed travel-

ing freight agent at Chicago, succeeding Mr. Ryan, and W. D. Clary succeeds Mr. Mulberry. F. L. Salisbury, contracting agent at Knoxville, Tenn., has been appointed traveling freight agent of the Louisville & Nashville and the Lexington & Eastern, with headquarters at Lexington, Ky. D. M. Goodwyn has been appointed general freight agent of the Lexington & Eastern and R. D. Pusey has been appointed general passenger agent of the Lexington & Eastern, both with headquarters at Louisville, succeeding C. Scott, deceased.

Engineering and Rolling Stock

C. M. Buck has been appointed division engineer of the Atchison, Topeka & Santa Fe, with office at Emporia, Kan., vice F. L. Guy, resigned.

R. A. Billingham has been appointed master mechanic of the Tennessee Central, with office at Nashville, Tenn., succeeding J. J. Clark, resigned.

E. E. Chrysler, master mechanic of the Chicago & Alton at Slater, Mo., has been appointed superintendent of shops of the Oregon Short Line, with headquarters at Pocatello, Idaho, succeeding D. J. Malone, deceased.

W. J. Miller, master mechanic of the St. Louis Southwestern of Texas at Tyler, Texas, has been appointed superintendent of motive power of the St. Louis Southwestern, with office at Pine Bluff, Ark., vice T. E. Adams, deceased, and J. M. Kilfoyle succeeds Mr. Miller.

W. D. Warren, division engineer of the Midland division of the New York, New Haven & Hartford, at Hartford, Conn., has been appointed division engineer of the Providence division, with office at Providence, R. I., succeeding W. T. Spencer, promoted. H. E. Astley, division engineer of the Central New England at Hartford, succeeds Mr. Warren. C. F. Yardley, track supervisor on the Providence division of the New York, New Haven & Hartford at Providence, R. I., succeeds Mr. Astley, and R. L. Pearson succeeds Mr. Yardley.

Purchasing

C. B. Williams, whose appointment as purchasing agent of the Central of New Jersey, with headquarters at New York City, has been announced in these columns, was born on March 22, 1873, at Beech Creek, Pa., and after leaving the common schools was a student at the Pennsylvania State College for a short time. In 1890, he was graduated from Eastman Business College and in July of the following year began railway work with the Beech Creek Railroad, now a part of the Pennsylvania division of the New York Central & Hudson River. He entered the service of the Central of New Jersey on November 27, 1893, as stenographer and chief clerk to the general superintendent. From February, 1900, until September, 1908, he was chief clerk to the superintendent of motive power and then was appointed general storekeeper, which position he held at the time of his recent appointment as purchasing agent of the same road, as above noted.

C. B. Williams

OBITUARY

Francis B. Sears, formerly vice-president and director of the Chattahoochee Valley, died on August 26, at his summer home in Weston, Mass., at the age of 65.

Daniel E. Sullivan, formerly master mechanic of the Union Pacific at Cheyenne, Wyo., died at Ogden, Utah, on August 20, aged 60 years. He was employed by the Union Pacific for 34 years, retiring July 1 last on account of illness.

Equipment and Supplies

LOCOMOTIVE BUILDING

The Georgia Railroad is in the market for 4 Mikado type locomotives.

The Erie has ordered one Santa Fe type locomotive from the Baldwin Locomotive Works.

The Southern Railway has ordered one ten-wheel type locomotive from the Baldwin Locomotive Works.

The Charleston & Western Carolina has ordered one six-wheel switching locomotive from the Baldwin Locomotive Works.

The Northwestern Pacific has ordered four ten-wheel passenger locomotives, two ten-wheel freight locomotives and three six-wheel switching locomotives from the American Locomotive Company. The four ten-wheel passenger locomotives will have 20 by 28 in. cylinders, 63 in. driving wheels, and a total weight in working order of 180,000 lb. The two ten-wheel freight locomotives will have 21 by 28 in. cylinders, 57 in. driving wheels, and a total weight in working order of 198,000 lb. The three six-wheel switching locomotives will have 19 by 24 in. cylinders, 50 in. driving wheels, and a total weight in working order of 124,000 lb.

CAR BUILDING

The Rutland is in the market for 75 50-ton steel hopper cars.

The Cincinnati, Hamilton & Dayton has ordered 1,000 box cars from the Standard Steel Car Company and 1,000 gondola cars from the Cambria Steel Company.

IRON AND STEEL

The International & Great Northern has ordered 116 tons of material for a Strauss bascule bridge across Buffalo Bayou, Houston, Tex., from the Wisconsin Bridge & Iron Company, Chicago.

SIGNALING

The Nashville, Chattanooga & St. Louis on September 8 will change the colors of its signal lights on the Paducah & Memphis Division, adopting green for the proceed indication and yellow for caution. At the same time long-time burners will be put into the lamps. Hand signals used to indicate caution will be made yellow—lanterns, flags and fusees.

The Stentor Electric Manufacturing Company, New York, has recently completed an installation of "Stentor" loud speaking telephone despatching apparatus on the Dillsburg division of the Cumberland Valley, extending from Harrisburg, Pa., to Dillsburg, 16 miles. Loud speaking receivers have been installed in all operating stations, thus making the use of selectors unnecessary. The Stentor loud speaking telephone was described in the *Railway Age Gazette* of July 31.

Chilean Railway Contract.—It is reported that probably one of the largest contracts ever secured by Chilean manufacturers was recorded on July 6, when the government placed a home order for railway equipment to the value of $8,240,000.

Railway Construction in India.—At the present time there are in India 2,331 miles of railway in course of construction or planned for construction during the year 1914-15. Of this total 1,575 miles are already under way and 856 miles are merely proposed. Of the former 220 miles are being constructed by the state and 1,355 miles by private companies. Of the latter, 173 miles will be constructed by the state and 583 miles by private companies. The total cost of the 2,331 miles of line is estimated at $80,000,000.

Supply Trade News

Charles B. Yardley, Jr., formerly of Jenkins Bros., has been appointed manager of the railway department of the United States Metal Products Company, New York, effective September 1.

Henry D. Shute, whose election to the position of treasurer of the Westinghouse Electric & Manufacturing Company, has been announced in these columns, was born at Somerville, Mass., and attended high school in Boston. He graduated from the Massachusetts Institute of Technology in 1892, and following his graduation spent a year in Germany at the School of Mines, Clausthal, and in Dresden. In 1893 he entered the works of the Westinghouse Electric Company at Pittsburgh as an apprentice, and spent his first two years in the testing department, following which he was engaged for a considerable time in erection and laboratory work, part of the time as assistant foreman. In 1897 he entered the engineering department. One year later he was transferred to the commercial department, and in 1901 was appointed head of the latter's alternating current division. Two years later he was made assistant to vice-president L. A. Osborne, and in that position was particularly active in the development of heavy electric traction and single-phase railway work. In 1910 Mr. Shute succeeded Walter McFarland as acting vice-president, which position he held until his election as treasurer. Mr. Shute is a member of the American Institute of Electrical Engineers, the National Electric Light Association, and the Engineers' Club of New York. He is also a director of the Pittsburgh Chamber of Commerce, and is closely identified with a number of other technical and social organizations.

H. D. Shute

The C & C Electric & Manufacturing Company, Garwood, N. J., has removed its Detroit office in charge of R. K. Slaymaker, from 144 Seyburn avenue to 1111 Chamber of Commerce building.

W. J. McKone, sales manager of the Edgar Steel Seal & Manufacturing Company, Chicago, has resigned to engage in other business, and Graham Dodge, assistant general manager, has arranged to perform his duties temporarily.

A. T. Gardiner, for many years connected with the Landis Tool Company, Waynesboro, Pa., has accepted a position with the Modern Tool Company, Erie, Pa. He will cover the same territory as when with the Landis Tool Company.

James H. Van Dorn, president of the Van Dorn Iron Works Company, Cleveland, Ohio, and the Van Dorn & Dutton Company, died at his home in Cleveland on Saturday, August 29, 1914. Funeral services were held at the family residence on Tuesday, September 1. Mr. Van Dorn was 73 years old.

W. J. Johnson, formerly of the Western Electric Company, has recently been appointed a member of the engineering department of the Stentor Electric Manufacturing Company, Inc., New York. Mr. Johnson, who has had an extended experience with the Bell Telephone Company of Pennsylvania, and the Chesapeake & Potomac Telephone Company of Baltimore will look after the installation work which the company has on hand at the present time.

The Ogle Construction Company, Chicago, Ill., has been awarded contracts for the erection of a 150-ton balanced bucket type coaling station for the Chicago & Alton at Venice, Ill., and a 200-ton station of the same type for the Chicago, Indianapolis & Louisville at New Albany, Ind. This company has also received orders from the Louisville & Nashville for machinery and equipment for a large concrete station at Paris, Ky., and for one at Lebanon Junction, Ky.

H. O. Fettinger has been appointed eastern railroad representative of the Ashton Valve Company, Boston, Mass., with headquarters at 128 Liberty street, New York, to succeed W. H. Foster, resigned to become associated with another company. Mr. Fettinger formerly served for a number of years in the motive power department of the Pennsylvania Railroad, and resigned from the position of chief air brake and steam heat inspector to engage in the supply business.

Fred. B. Corey, for eleven years in the engineering department of the General Electric Company, and for the past three years engineer of inspection and tests of the Union Switch & Signal Company, reporting to the general manager, has resigned that position and opened an office at 404 Arrott Building, Pittsburgh, Pa. He will conduct a consulting engineering business, making a specialty of inspection methods and organizations for manufacturing companies. He will also give attention to electric railway signaling and allied subjects.

William M. Kinch, of the Gordon Primary Battery Company, New York, died at his home in that city on August 29, and was buried at Altoona, Pa., on Monday, August 30. Mr. Kinch had been connected with the Gordon Primary Battery interests for over 12 years, and prior thereto was signal engineer of the New York Central & Hudson River, and before that was in the signal department of the Pennsylvania Railroad. He was one of the early members of the Railway Signal Association, and was a familiar figure at all the conventions and meetings.

T. P. Gaylord, who has recently been elected acting vice-president of the Westinghouse Electric & Manufacturing Company, succeeding Mr. Shute, as announced in the *Railway Age Gazette*, of last week, was born at Shelby, Mich., and attended preparatory school at Allen Academy, Chicago. He subsequently attended the University of Michigan, and in 1895 received the degree of electrical engineer from the Armour Institute of Technology. Mr. Gaylord was engineer of underground construction during the World's Fair at Chicago, 1892-3. At the close of the fair he became assistant professor of electrical engineering in the Armour Institute, and retained that position until 1898, when he became associated with the Commonwealth Edison Company of Chicago as electrical engineer. In July, 1899, he entered the employ of the Westinghouse Electric & Manufacturing Company as a salesman, and followed this line of work until 1903, when he was appointed district manager at Chicago, which position he has held up to the present. Mr. Gaylord is a member of the American Institute of Electrical Engineers, the National Electric Light Association, and is closely identified with a number of other engineering societies.

T. P. Gaylord

In New York on August 26 C. Philip Coleman and Grayson M., P. Murphy were appointed receivers of the International Steam Pump Company, New York, in an equity suit brought by bond and stockholders and a creditor, the corporation itself joining in the application. The receivers have been authorized to continue the business. It is stated that the receivership was necessary because, although the company has been doing a fairly

prosperous business, and has been earning considerably more than its interest charges, it will not be able to make the interest payment of about $235,000 and the sinking fund payment of $250,000 due September 1 on its first lien twenty-year 5 per cent bonds. It also lacks adequate working capital. The receivership is not expected to involve the associated companies, among which are the Henry R. Worthington Company, the Blake & Knowles Steam Pump Works and the Power & Mining Machinery Company.

George A. Blackmore, whose election as vice-president and a director of the Bryant Zinc Company, New York, has been announced in these columns, was born at Wilkinsburg, a suburb of Pittsburgh, Pa., on January 7, 1884. When he was but 12 years old he entered the service of the Union Switch & Signal Company as an office boy, later becoming a clerk and stenographer in the office of the general manager. In 1901 he was appointed chief clerk in the engineering and estimating departments at Swissvale. In July, 1904, however, he was transferred to New York and was associated with Sidney Johnson in the work on the Interborough subway and other signaling construction work in the east. In March, 1909, he was appointed assistant eastern manager of the company, with office at New York, and in April, 1911, was promoted to the position of eastern manager in direct charge of the company's New York, Montreal and Atlanta offices and of sales and construction. Mr. Blackmore at the time he resigned to enter the service of the Bryant Zinc Company had completed 18 continuous years of service with the Union Switch & Signal Company.

G. A. Blackmore

E. S. Jackman & Co., agents of the Firth-Sterling Steel Company, of McKeesport, Pa., have issued a circular calling attention to the fact that the European war may seriously interrupt the foreign supply of those American buyers who have been satisfactorily served by the tool steel makers of other countries, and announcing that "if, during this period when business connections of long standing have been forced apart, we can help such shops to continue their work and usefulness, we shall be glad to respond with our best efforts and in the true American spirit that the misfortunes of others will be of short duration."

TRADE PUBLICATIONS

Sprayers and Whitewashers.—The Dayton Manufacturing Company, Dayton, Ohio, has recently issued hand implement catalogue No. 176, descriptive of Dayton sprayers and whitewashers.

Conduit Boxes and Fittings.—The Sprague Electric Works of the General Electric Company, New York, has recently issued pamphlet No. 442 descriptive of the company's line of conduit boxes and fittings.

Roofing Material.—The Barrett Manufacturing Company, New York, has recently issued a folder showing "Another Mile of Barrett Specification Roofs" on the buildings of the Standard Steel Car Company at Butler, Pa.

Valves.—The National Tube Company has recently issued bulletin No. 7D describing in detail the advantages of N. T. C. regrinding valves. Three illustrations in the bulletin show a valve which was opened and closed 327,094 times when the photographs were taken, and which after being reground several times has since been opened and closed over 3,046,280 times, and is still in use.

Railway Construction

Canadian Northern.—A new branch called the Brazeau subdivision has been opened for business on the Western division from Warden, Alta., west to Nordegg 174 miles.

Canadian Pacific.—The new Alberta Central subdivision has been opened for business from Forth, Alta., west to Rocky Mountain House 63.2 miles.

The new Gleichen subdivision has been opened for business from Gleichen, Alta., west to Shepard 41 miles.

The Esquimalt & Nanaimo has been extended from Parksville Junction, B. C., formerly McBride Junction, north to Courteney 44.5 miles. (December 19, p. 1207.)

Carolina, Clinchfield & Ohio.—Announcement is made that the first train was run over the extension from Dante, Va., north to Elkhorn City, Ky., 35 miles, on September 1.

Cincinnati, Indiana & Louisville.—According to press reports surveys are now being made for this line from Cochrane, which is a suburb of Aurora, Ind., via French, Rising Sun, North, Patriot, Florence, Markland and Vevay to Lamb, in Switzerland county. The company was organized recently in Indiana to build from Madison, Ind., east, then north via Aurora to Lawrenceburg, and eventually east to Cincinnati, Ohio. L. S. Cook, president, Cincinnati. (April 10, p. 855.)

Detroit, Bay City & Western.—This road has been extended from Snover, Mich., to Sandusky eight miles. (November 20, p. 1004.)

Esquimalt & Nanaimo.—See Canadian Pacific.

Illinois Roads (Electric).—Financial arrangements have been made and the right of way has been secured, it is said, for an interurban line to be built from Mattoon, Ill., southwest to St. Louis, Mo. H. R. Budd, Bunker Hill, Ill., may be addressed.

Indiana Roads (Electric).—Residents of Liberty, Ind., are back of a project to build an electric line from Hamilton, Ohio, northwest via Liberty, Ind., to Richmond, about 40 miles. The plans also include a 10-mile branch from Liberty west to a connection with the Indianapolis & Cincinnati Traction Company's line at Connersville. The Liberty Commercial Club may be addressed.

Kansas Roads (Electric).—According to press reports R. A. Long of Kansas City, Mo., and associates have under consideration the question of building an interurban line from Kansas City southeast via Lees Summit to Pleasant Hill, thence southwest to Harrisonville, about 45 miles.

Louisiana Railway, Light & Power Company.—Financial arrangements are being made, it is said, to build an electric railway from Lockport, La., northwest via Thibodaux, to Donaldsonville, about 55 miles. W. Ohlmeyer, Plattenville; L. P. Caillouet, A. Picot and H. S. Smith, Thibodaux, are said to be interested.

Mascot & Western.—An officer writes that contracts are to be let at once to build a railway from the Mascot Copper Companies' mines near Dos Cabezos, Ariz., west to Wilcox 17 miles. The grading work will call for handling an average of 15,000 cu. yd. to the mile. About 25 per cent of the work will be rock work. The maximum grades will be 3.5 per cent, and the maximum curvature 10 deg. The line is to be built to carry copper ore. J. N. McCauley, president. C. R. Weston, general manager and engineer.

Oregon Short Line.—The Oregon Eastern branch of the Idaho division has been extended from Juntura, Ore., to Riverside 19 miles.

Southern Minnesota Traction.—Incorporated in Minnesota with $250,000 capital to buy and operate steam and electric railways. The incorporators include W. D. Mitchell, W. Rumble and G. Hoke, St. Paul, Minn.

Texas Roads.—A line will probably be built from Glen Rose, Tex., south to Walnut Springs, about 14 miles. S. Lewis, Waco;

J. H. Farr, Walnut Springs, and J. P. Lightfoot, Austin, are said to be back of the project.

Surveys are being made, and construction work is to be started soon, it is said, on a line from Luling, Tex., northwest to San Marcos, about 20 miles. The proposed route is through San Marcos river valley via Prairie Lee, Fentress and Martindale. A syndicate of eastern capitalists are back of the project.

RAILWAY STRUCTURES

Hartford, Conn.—An officer of the New York, New Haven & Hartford writes that a contract has been given to the P. J. Carlin Contracting Company, New York, at about $220,000 for rebuilding the station at Hartford. (August 14, p. 311.)

Matewan, W. Va.—An officer of the Norfolk & Western writes that a contract has been given to the Virginia Bridge & Iron Company, Roanoke, Va., for the steel work of a bridge over Tug river. W. W. Boxley & Co., Roanoke, has the contract for the masonry work.

Mobile, Ala.—An officer of the Southern Railway writes that a contract has been given to Hancock, Harbin & Hancock, Mobile, to build a new freight house and office building at Mobile. (June 26, p. 1607.)

New York.—Plans have been filed by the New York Central & Hudson River for the erection of a four-story office building as an addition to the New York terminal. The building is to be built on the block bounded by Forty-fifth and Forty-sixth streets and fronting on Lexington avenue. The new building is to be used by the express companies and for railway mail service, and in the upper stories will have offices.

Pittsburgh, Pa.—We are told that a contract has been given to the Raymond Concrete Pile Company, New York, for concrete piles and concrete foundations for steel towers on the Ohio Connecting Railway bridge, Brunots Island, Pittsburgh. The Seaboard Construction Company, Philadelphia, Pa., has the general contract.

Savannah, Ga.—A contract has been given to the Phoenix Construction Company, New York, for driving about 8,500 timber piles and building the reinforced concrete substructure for the Ocean Steamship Company's terminal improvements at Savannah.

Woodlawn, N. Y.—The bridge of the New York, New Haven & Hartford, at Woodlawn, is to be replaced by two arches with steel girders covered with concrete.

Freight Rate Increase Denied in Ireland.—On July 24 the British Railway and Canal Commission rejected the application of the Great Southern & Western for a general 4 per cent increase in merchandise and package rates. This decision affects directly one-third of the railway mileage of Ireland and may also affect most of the remainder. In the spring of 1913 the Irish railways simultaneously announced a 4 per cent increase in rates. Under the traffic act of 1894 the roads were subject to be called upon to justify the increase if challenged by the trading public, but as it happened no protest was forthcoming. The Great Southern & Western, which, with controlled lines, operates 1,122 miles of line, or more than any other two railways in Ireland, was in an exceptional position, however, owing to provisions of an act of 1900 whereby it had been permitted to absorb certain rival lines. By this act the burden of proof for justifying proposed increases was cast upon the company. As the railway has now failed to justify the increases it seems probable that the other railways which have been enforcing the 4 per cent increase will promptly be challenged on behalf of the commercial public. The decision was based largely upon a study of the facts as to both costs and efficiency of operation. The commissioners found that the system had been so wisely conducted that the rising expenses in connection with labor and upkeep have been neutralized. "Notwithstanding that wages have undoubtedly increased and hours have been reduced and local government rates (of taxation) have grown larger, this company has been so prudently and skillfully managed by its board of officers by the introduction of improved methods of working and by effecting the economies which the amalgamation was designed to effect, that the extra outlay has been recouped and the net result has been advantageous to the company."

Railway Financial News

Chicago, Rock Island & Pacific.—The suit by preferred stockholders of the Keokuk & Des Moines against the Chicago, Rock Island & Pacific has been transferred from the Iowa supreme court to the United States district court.

New England Investment & Security Company.—This company is understood to own the street railways of Worcester and Springfield and its preferred stock is guaranteed 4 per cent dividends by the New York, New Haven & Hartford. A protective committee, consisting of Henry B. Cabot, Moses Williams, Jr., and E. V. R. Thayer, has been formed to buy in the interests of the preferred stockholders the common stock. The committee has sent out a circular which says in part:

The organization of this company is peculiar. The owners of 1,000 common shares select four of its seven trustees, and the owners of the 40,000 preferred shares select only three. For several years all these properties, operating about 420 miles of street railway, have been controlled, now by one set of owners of common stock and now by another set—the whole common stock representing a par value of only $100,000. The preferred stock, largely held by investors in Springfield, Worcester and Boston and of a par value of $4,000,000, has been legally in the position of a minority.

The preferred stockholders, nearly all of whom reside in Massachusetts, have become uneasy and restless at this anomalous situation. The frequent criticisms in the press and by public officials, voicing the dissatisfaction of the patrons of the street railways over such an unusual method of control and complaining of unsatisfactory service and difficulty of obtaining relief, have now led influential preferred shareholders to form a protective committee. The committee announces, as its purpose, the purchase of all the common stock in the permanent interest of such preferred shareholders as wish to co-operate. If the plan is successful it will result in vesting the control of the important Worcester and Springfield street railways in the preferred shareholders, who have a substantial financial interest in seeing that those properties are maintained and operated in such a way as to give a service satisfactory to the public and under a management easily accessible and responsive to that public.

Pennsylvania Railroad.—The Wall Street Journal has been making an investigation of the extent to which stock of the various American railroad companies is held in Europe. In regard to the Pennsylvania The Wall Street Journal finds that of a total of 90,114 stockholders registered on books of the Pennsylvania Railroad as of June 30, 1914, 11,822 were European, holdings amounting to $74,490,442 (par value) of a total outstanding stock of $499,265,700. On June 30, 1913, there were 84,244 stockholders, of which 11,215 were European, holdings totaling $73,003,614 par value. The number of women stockholders on June 30, 1914, was 43,454 as compared with 40,325 on June 30, 1913. The total number of stockholders in 1906 was 40,153, and in 1901, 27,540.

St. Louis, Iron Mountain & Southern.—This company has asked the Missouri Public Service Commission for permission to issue $893,000 5 per cent equipment trust bonds.

Exportation of Manchurian Lumber.—At the present time, one of the most important factors in the business of exporting lumber from Manchuria is the possibility of changing the place of shipment from Vladivostok to Nikolaiefsk. If such a change is made it will be because of the heavy charges on the Chinese Eastern whereby the cost of transporting the timber to Vladivostok is 7.7 cents, whereas the cost of river transportation to Nikolaiefsk is only 4.6 cents. A Russian concessionaire owning 1,318 square miles of timber land and three sawmills located near the Sungari river has planned to build his own narrow gage railway to the river and then to ship via his own line and the latter to Nikolaiefsk, at which port the timber will be shipped to the southern ports of China and to Europe.

[ADVERTISEMENT.]

ANNUAL REPORT

TWENTY-NINTH ANNUAL REPORT OF THE BUFFALO, ROCHESTER & PITTSBURGH RAILWAY COMPANY,

FOR YEAR ENDING, JUNE 30th, 1914.

REPORT.

The Directors of the Buffalo, Rochester and Pittsburgh Railway Company submit to the Stockholders the following report for the year ending June 30, 1914:

ROAD OPERATED.

	1914. Miles.	1913. Miles.	Increase. Miles.
Owned	367.06	360.30	6.76
Leased	89.90	87.29	2.61
Trackage rights	129.52	128.87	.65
Total length of road operated	586.48	576.46	10.02
Second track	207.32	194.89	12.43
Sidings	360.48	333.59	26.89
Total miles of all tracks, all steel rail	1,154.28	1,104.94	49.34

The increase of road operated is due to the construction of 6.76 miles of mine lines, 2.61 miles of additional line leased from the Allegheny & Western Railway Company, and an adjustment of .65 mile in trackage rights, from remeasurement.

The second track was increased by the construction of 12.09 miles between Rochester, N. Y., and Scottsville, N. Y., .09 mile at Riverside, N. Y., and an adjustment of .25 mile of trackage rights, from remeasurement.

Sidings were increased 26.89 miles.

INCOME.

Rail Operations:	1914.	1913.	Increase.	Decrease.
Operating revenues	$10,709,534.81	$10,947,246.06		$237,711.25
Operating expenses	7,938,062.89	7,665,891.28	$272,171.61	
Net operating revenue	$2,771,471.92	$3,281,354.78		$509,882.86
Outside Operations:				
Revenues	$25,213.99	$25,581.60		$367.61
Expenses	28,111.02	32,946.34		4,835.32
Deficit	$2,897.03	$7,364.74		$4,467.71
Total net revenue	$2,768,574.89	$3,273,990.04		$505,415.15
Taxes Accrued	234,000.00	216,000.00	$18,000.00	
Operating Income	$2,534,574.89	$3,057,990.04		$523,415.15
Other Income	821,223.05	1,018,717.73		197,494.68
Gross corporate income	$3,355,797.94	$4,076,707.77		$720,909.83
Deductions for Interest and Rentals	2,001,013.78	1,949,713.70	$51,300.08	
Net corporate income	$1,354,784.16	$2,126,994.07		$772,209.91
Appropriations:				
Pension and Fire Insurance Funds	$16,432.49	$1,497.51	$14,934.98	
Equipment Agreement Sinking Funds	348,351.67	448,795.68		$100,444.01
Total Appropriations	$364,784.16	$450,293.19		$85,509.03
Surplus available for dividends	$990,000.00	$1,676,700.88		$686,700.88

Taxes amounted to $234,000, an increase of 8.33%, due to additional property purchased, higher assessments on Capital Stock, and the new Federal Income Tax Law.

A special appropriation of $348,351.67 was made from the Net Corporate Income. Of this amount $125,000 was paid into the Sinking Funds under Equipment Agreements Series A, B and C, out of which $2,000 Series B and $50,000 Series C bonds were retired, leaving $73,000 to be applied to the purchase of new rolling stock; $207,000 represents one-half of the principal of Equipment bonds Series D, E and F paid off during the year, the other half being refunded by 4½% Consolidated Mortgage bonds held in the Treasury of the Company; the remainder, $16,351.67 is a part of the appropriation to the Sinking Fund under Equipment Series G, together with the interest accrued on the various Sinking Fund balances in the hands of the Trustee.

Profit and Loss Account was charged with $138,433.05, the balance required for the Sinking Fund under Equipment Agreement Series G.

DIVIDENDS.

Dividends in cash were paid on:		1914.	1913.
Preferred stock	$6,000,000	6% $360,000	6% $360,000
Common stock	10,500,000	6% 630,000	6% 630,000
Total	$16,500,000	$990,000	$990,000

Since the close of the fiscal year, your Board of Directors has declared semi-annual dividends of three per cent. on the preferred stock and two per cent. on the common stock, payable August 15, 1914.

CAPITAL STOCK.

There has been no change during the year in this account. The total outstanding Capital Stock of the Company amounts to $16,500,000, and consists of $6,000,000 preferred stock and of $10,500,000 common stock.

FUNDED DEBT.

In accordance with the provisions of the Consolidated Mortgage of 1907, $1,051,000 4½% bonds were issued and sold, and the proceeds applied to payment of Additions and Betterments. The Trustee also delivered to the Company $206,000 Consolidated Mortgage 4½% bonds, representing 50% of Equipment Bonds Series D, E and F retired during the year. These bonds, added to those in the Treasury of the Company, made a total of $1,524,000, of which $349,000 were sold during the year for corporate purposes, leaving a balance of $1,175,000 held in reserve.

Under the terms of the Sinking Fund for the redemption of Equipment Bonds, $619,000 bonds were retired, as follows: $2,000 Series B; $50,000 Series C; $117,000 Series D; $117,000 Series E; $179,000 Series F; and $154,000 Series G. The balance of Equipment Bonds Series G authorized in 1910, was issued to the amount of $887,000.

To provide for additional rolling stock, an issue of $2,000,000 five per cent. Gold Bonds was authorized, to be secured by new equipment costing $2,200,000. These bonds were issued under an Agreement, known as "Equipment Agreement, Series H" dated July 1, 1913, and were all sold during the year. The agreement provided that both principal and interest are payable without deduction for any tax. The bonds mature in annual installments of $125,000, commencing January 1, 1915, and ending January 1, 1930.

The net result is an increase of $3,668,000 in the bonded debt of the Company, outstanding on June 30, 1914.

CONSTRUCTION.

Capital account has been charged during the year with $1,892,696.28 for additions and betterments, as follows:

Land	$51,323.48
New station, Lackawanna, N. Y.	5,807.53
Station improvements	12,357.47
Genesee dock improvements	16,438.74
Second track, Rochester, N. Y., to Scottsville, N. Y.	190,393.37
" Riverside Junction, N. Y.	5,127.01
Improving bridges and culverts	173,440.63
Increased weight of rail, frogs and fastenings	54,927.22
Stone ballast	29,371.16
Tearing Run mine line	351,785.90
Guthrie mine line	43,898.12
Sidings and yard extensions	138,494.65
Interlocking apparatus, C. & M. Junction, Pa.	11,589.29
Automatic block signals	150,973.78
Telephone train despatching lines	16,528.95
Roadway machinery	4,849.53
New roundhouse, Du Bois, Pa.	139,180.67
Additions to shops, Du Bois, Pa.	84,769.79
Shop machinery	53,451.79
Water and fuel stations	8,829.53
Storage warehouse, Rochester, N. Y.	46,638.30
New terminal, Lincoln Park, N. Y.	256,937.64
Subway, Saxton St., Rochester, N. Y.	15,789.02
Other items	29,792.71
Total	$1,892,696.28

The following work, referred to in last year's report, is completed:

Telephone train despatching line between East Salamanca, N. Y., and Punxsutawney, Pa., a distance of 119 miles.

Automatic block signals for 76 miles, from Gainesville, N. Y., to East Salamanca, N. Y., and Falls Creek, Pa., to Punxsutawney, Pa.

Second track, Rochester, N. Y., to Scottsville, N. Y., a distance of 12.09 miles, turned over to the Operating Department on December 31, 1913.

The Tearing Run and Guthrie mine lines.

New yard near Rochester, N. Y.

New roundhouse and extension of boiler and tank shops at Du Bois, Pa.

A new station was constructed at Lackawanna, N. Y.

Among the important work now in progress, may be mentioned:

Storage warehouse at Rochester, N. Y.

Subway, Saxton St., Rochester, N. Y.

Extension of power house, etc., at Du Bois, Pa.

Automatic block signals for 45 miles, from Buffalo Creek, N. Y., to Ashford, N. Y.

Replacing various timber bridges, trestles and culverts in permanent form.

In keeping with the policy of your Company to promote efficiency and economy in operation, other improvements were made, including the construction of 26.89 miles of additional sidings and yard tracks.

EQUIPMENT.

Expenditures were made for new rolling stock as follows:

Three passenger locomotives	$69,550.12
Twelve freight locomotives	277,799.32
Twenty-seven steel passenger train cars	377,885.41
One thousand steel coal cars	789,609.40
Six caboose cars built at Company's shop	5,843.84
Three locomotive crane hoists	21,930.07
One scale test car	4,163.36
Two derrick cars	3,866.72
Steel underframes applied on four hundred and eleven freight train cars	26,321.36
Steel side stakes applied on two hundred and thirty-six freight train cars	3,954.34
Sundry other betterments, including re-classification or transfer of rireteen freight train cars and twenty-five work equipment cars	47,963.33
	$1,628,887.27

In addition to the above, fifteen freight locomotives, two passenger locomotives, and one thousand steel underframe freight cars for commercial traffic were purchased, but owing to late delivery will be accounted for in next year's report.

There was credited for equipment sold, transferred or destroyed, the following values, charged in part to Operating Expenses, and the balance, representing the depreciation since June 30, 1907, charged to Reserve for Accrued Depreciation.

One locomotive	$3,459.45	
Seven passenger train cars	13,056.08	
Six hundred and sixty-one freight train cars	290,776.20	
Twenty-eight work equipment cars	11,222.27	
		318,514.00
Making a net increase of		$1,310,373.27

The total tractive power of engines aggregates 10,643,255 pounds, an increase of 710,362 pounds over last year. The average tractive power of each engine increased 765 pounds, being 34,782 pounds as against 34,017 pounds last year.

The total carrying capacity of cars in freight service now amounts to 737,498 tons, an increase of 28,685 tons over last year. The average carrying capacity or efficiency of each freight car increased 1.03 tons, being 42.29 tons as against 41.26 tons last year.

The reserve for accrued depreciation of equipment on June 30, 1914, is as follows:

On equipment owned	$1,912,961.95	
On leased equipment	190,949.67	
Total		$2,103,911.62

PASSENGER REVENUES.

The gross passenger revenue, the largest in the history of the Company, amounted to $1,184,416.99, a gain of 5.04 per cent., or $56,804.87.

The average rate received per passenger per mile increased .063 cent, being 27.01 miles, against 26.98 miles last year.

The average distance each passenger was carried increased .03 mile, being 27.01 miles, against 26.98 miles last year.

Passengers carried in 1914	2,059,683	
Passengers carried in 1913	2,023,020	
An increase of 1.81 per cent., or		36,663
Passengers carried one mile in 1914	55,632,097	
Passengers carried one mile in 1913	54,573,203	
An increase of 1.94 per cent., or		1,058,894

FREIGHT REVENUES.

The average rate received per ton per mile increased .01 mill, being 4.62 mills as compared with 4.61 mills last year.

The average distance each ton was hauled decreased 2.31 miles, being 161.04 miles, against 163.35 miles a year ago.

Pending an adjustment of the miners' wage scale most of the collieries shipping over your line were idle for about six weeks from April 1st. In spite of this loss, the revenue coal tonnage moved was the largest in the history of the Company. All of the other general commodities show decreases, due to the depression of business, especially in the iron and steel trade.

The revenue tonnage moved was as follows:

	1914.	1913.	Increase.	Decrease.
Bituminous coal	8,176,430	7,980,204	196,226	
Coke	393,358	593,447		200,089
Iron ore	699,702	781,201		81,499
Pig and bloom iron	265,521	310,374		44,853
Other freight	2,760,038	2,825,382		65,344
Total	12,295,049	12,490,608		

A decrease of 1.57 per cent., or		195,559
Tons moved one mile in 1914	1,980,012,951	
Tons moved one mile in 1913	2,040,358,520	
A decrease of 2.96 per cent., or		60,345,569

The result for the year is a loss of 2.74 per cent., or $257,936.90 in gross freight revenue.

EXPENSES.

Operating Expenses increased $272,171.61 or 3.55 per cent., due principally to advances made in wages, the employment of extra trainmen in New York under the requirements of the so-called "full crew bill" and the extraordinary expenses attending the large program of new work in progress during the year.

The operating ratio increased 4.09 per cent., being 74.12 per cent., against 70.03 per cent. last year.

The percentage of each group of operating expenses to gross earnings for the past five years, is as follows:

	1914.	1913.	1912.	1911.	1910.
Maintenance of way	13.52	14.23	12.52	12.57	13.65
Maintenance of equipment	20.69	19.74	18.94	19.35	20.78
Traffic	1.41	1.30	1.26	1.44	1.35
Transportation	36.23	32.71	32.88	32.11	28.55
General	2.27	2.05	2.14	1.81	1.74
Total	74.12	70.03	67.74	67.28	66.07

The average cost per ton per mile is 3.23 mills, being .23 mill more than last year.

The average number of revenue tons carried one mile per revenue freight train mile, excluding the mileage of helping engines, decreased 16.44 tons, being 693.60 tons, against 710.04 tons a year ago.

The average number of revenue tons carried one mile per revenue freight engine mile, including the mileage of helping engines, decreased 8 tons, being 454, against 462 a year ago.

The averages for the past ten years are as follows:

Year.	Train Load.	Engine Load.
1905	507	374
1906	525	418
1907	543	435
1908	530	371
1909	597	400
1910	638	420
1911	635	430
1912	647	439
1913	710	462
1914	694	454

The average number of revenue passengers carried one mile per revenue passenger train mile is 40, being 1 more than last year.

The non-revenue traffic, not included in any of the other figures of this report, is as follows:

	1914.	1913.
Number of passengers	323,720	331,305
Number of passengers carried one mile	13,098,629	12,820,161
Number of tons	1,106,032	1,117,413
Number of tons carried one mile	108,941,868	99,797,191

LEASED LINES.

Advances were made to leased lines for additions and betterments expenditures, as follows:

ALLEGHENY & WESTERN RAILWAY.

Land	$3,957.49
Track fastenings and other material	6,480.44
Sidings and spur tracks	15,887.13
Branch, Craigsville, Pa.	93,195.74
Block and other signal apparatus	5,018.26
Telephone and telegraph lines	9,339.55
New station, West Mosgrove, Pa	1,696.04
Terminal, New Castle, Pa	2,925.92
Other items	115.97
Total	$138,616.54

CLEARFIELD & MAHONING RAILWAY.

Land	$2,356.48
Track fastenings and other material	2,213.37
Sidings and spur tracks	44,443.50
Other items	1,020.45
Total	$50,033.80

All of the above work is completed, including the branch at Craigsville, Pa., 2.61 miles in length, which was turned over to the Operating Department on November 19, 1913.

FIRE INSURANCE FUND.

The assets of this fund were increased $22,963.32 during the year, and now amount to $282,507.47 in interest-bearing securities and cash.

PENSION FUND.

The assets of this fund, created July 1, 1903, were increased $6,623.14 during the year, and now amount to $197,575.92 in interest-bearing securities and cash.

There were fifty-seven pensioners upon the roll on June 30, 1914, a net decrease of one during the year.

GENERAL REMARKS.

The Ontario Car Ferry Company, Limited, paid a dividend of 5% for the year ending December 31, 1913. The sum of $12,485 received on the $249,700 of this Company's stock was credited to Other Income account.

To accommodate the increasing traffic, the Ferry Company has contracted for another boat, with the Polson Iron Works, Limited, of Toronto, Canada, to be delivered the ensuing year.

The acknowledgments of the Board are renewed to the officers and employes for their faithful and efficient services.

Statements and statistics of the operation of your road for the year are submitted herewith.

By order of the Board,

WILLIAM T. NOONAN,
President.

ROCHESTER, N. Y., July 31st, 1914.

PROFIT AND LOSS ACCOUNT.

June 30th, 1914.

CREDIT.

By Balance Surplus, June 30, 1913		$4,199,713.41
By Miscellaneous Credits—		
Unclaimed wages, etc.	$2,846.11	
Discounts on debt retired	12,659.75	
Sundry items	.83	
		15,506.69
Total		$4,215,220.10

DEBIT.

To appropriation to Sinking Fund of Equipment Agreement Series G for retiring bonds of said Series, the balance being appropriated from Net Income		$138,433.05
Premiums on funded debt retired.	$2,775.00	
Discounts on funded debt issued	100,892.63	
		103,667.63
Loss on abandoned tracks		4,787.59
To Miscellaneous Debits—		
Losses resulting from adjustments required to bring to par, Securities sold from Fire Insurance and Pension Funds	$4,312.53	
Sundry items	11.01	
		4,323.54
Total		251,211.81
By Balance Surplus, June 30, 1914 (page 17)		$3,964,008.29

COMPARATIVE INCOME ACCOUNT.

OPERATING REVENUES.

	1914.	1913.	Increase.	Decrease.
Rail Operations—				
Freight—				
Coal	$5,904,105.54	$5,849,292.16	$54,813.38	
Coke	338,339.13	529,047.49	.....	$190,708.36
Merchandise	2,911,497.08	3,033,539.00	.....	122,041.92
Total	$9,153,941.75	$9,411,878.65	.....	$257,936.90
Passenger	1,184,416.99	1,127,612.12	$56,804.87	
Other Transportation—				
Excess baggage	9,344.93	10,851.22	.....	1,506.29
Mails	52,834.38	50,368.92	2,465.46	
Express	101,076.18	92,013.93	9,062.25	
Milk	16,732.63	15,439.63	1,293.00	
Switching	93,138.59	120,260.15	.....	27,121.56
Sundry sources	6,241.13	4,757.27	1,483.86	
Total	$279,367.84	$293,691.12	.....	$14,323.28
Other Operations—				
Station and train privileges	4,058.93	3,857.04	$201.89	
Car service	21,866.00	21,688.00	178.00	
Ganson St. Docks	61,878.50	78,466.50	.....	16,588.00
Sundry sources	4,004.80	10,052.63	.....	6,047.83
Total	$91,808.23	$114,064.17	.....	$22,255.94
Total Operating Revenues	$10,709,534.81	$10,947,246.06	.....	$237,711.25

OPERATING EXPENSES.

Maintenance of way and structures	$1,447,952.93	$1,557,963.28	.....	$110,010.35
Maintenance of equipment	2,216,194.01	2,161,210.43	$54,983.58	
Traffic expenses	150,553.46	141,659.31	8,894.15	
Transportation expenses	3,880,160.28	3,580,617.38	299,542.90	
General expenses	243,202.21	224,440.88	18,761.33	
Total Operating Expenses	$7,938,062.89	$7,665,891.28	$272,171.61	
Net Operating Revenue	$2,771,471.92	$3,281,354.78	.....	$509,882.86
Outside Operations—				
Revenues	25,213.99	25,581.60	.....	367.61
Expenses	28,111.02	32,946.34	.....	4,835.32
Deficit	$2,897.03	$7,364.74	.....	$4,467.71
Total Net Revenue	$2,768,574.89	$3,273,990.04	.....	$505,415.15
Taxes Accrued	234,000.00	216,000.00	$18,000.00	
Operating Income, *Carried forward*	$2,534,574.89	$3,057,990.04	.....	$523,415.15

	1914.	1913.	Increase.	Decrease.
Operating Income, *Brought forward*	$2,534,574.89	$3,057,990.04	.....	$523,415.15
Other Income—				
Rents—Hire of Equipment	561,079.12	763,046.87	.....	201,967.75
Rents—Joint Facilities	165,011.18	158,198.06	$6,813.12	
Dividends on stocks owned	12,485.00	12,485.00		
Interest on securities, loans and accounts	66,381.78	68,933.63	.....	2,551.85
Release of premium on funded debt	3,402.71	2,384.58	1,018.13	
Miscellaneous	12,863.26	13,669.59	.....	806.33
Total Other Income	$821,223.05	$1,018,717.73	.....	$197,494.68
Gross Corporate Income	$3,355,797.94	$4,076,707.77	.....	$720,909.83

DEDUCTIONS FROM GROSS CORPORATE INCOME.

Rents Accrued for Lease of Other Roads—				
Allegheny & Western Railway	$272,000.00	$272,000.00		
Clearfield & Mahoning Railway	86,500.00	86,500.00		
Mahoning Valley Railroad	15,000.00	15,000.00		
Total	$373,500.00	$373,500.00		
Rents—Joint Facilities	298,005.03	302,989.55	.....	$4,984.52
" —Miscellaneous	16,883.87	17,314.38	.....	430.51
Total	$314,888.90	$320,303.93	.....	$5,415.03
Interest Accrued on Funded Debt—				
First Mort. Bonds—Roch. & Pitts. Rd.	$78,000.00	$78,000.00		
Con. Mort. Bonds—Roch. & Pitts. Rd.	235,200.00	235,200.00		
Gen. Mort. Bonds—B., R. & P. Ry.	221,350.00	221,350.00		
Con. Mort. Bonds—B., R. & P. Ry.	343,915.00	312,275.75	$31,639.25	
First Mort. Bonds—L., P. & C. Rd.	17,500.00	17,500.00		
Equipment Agreements	415,422.38	391,584.02	23,838.36	
Total	$1,311,387.38	$1,255,909.77	$55,477.61	
Interest on Loans	1,237.50	.....	1,237.50	
Total Deductions	$2,001,013.78	$1,949,713.70	$51,300.08	
Net Corporate Income. *Carried forward*	$1,354,784.16	$2,126,994.07	.....	$772,209.91

	1914.	1913.	Increase.	Decrease.
Net Corporate Income. *Brought forward*	$1,354,784.16	$2,126,994.07	.....	$772,209.91

DISPOSITION OF NET CORPORATE INCOME.

Appropriations—				
Pension and Insurance Funds	$16,432.49	$1,497.51	$14,934.98	
New Equipment	74,104.38	125,795.68	.....	$51,691.30
Retirement of Equipment bonds.	274,247.29	323,000.00	.....	48,752.71
Dividends Declared—				
Preferred Stock—				
(No. 40) 3% on $6,000,000, payable Aug. 15, 1913	180,000.00	180,000.00		
(No. 41) 3% on $6,000,000, payable Feb. 15, 1914.	180,000.00	180,000.00		
Common Stock—				
(No. 27) 3% on $10,500,000, payable Aug. 15, 1913	315,000.00	315,000.00		
(No. 28) 3% on $10,500,000, payable Feb. 15, 1914	315,000.00	315,000.00		
Total Charges	$1,354,784.16	$1,440,293.19	.....	$85,509.03
Balance transferred to Profit and Loss Account (page 15)	.....	$686,700.88	.....	$686,700.88

Railway Age Gazette

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WE GUARANTEE, that of this issue 8,900 copies were printed; that of these 8,900 copies 7,434 were mailed to regular paid subscribers to the weekly edition, 250 were provided for counter and news companies' sales, 1,112 were mailed to advertisers, exchanges and correspondents, and 104 were provided for samples and office use; that the total copies printed this year to date were 346,850, an average of 9,361 copies a week.

VOLUME 57 SEPTEMBER 11, 1914 NUMBER 11

Contents

*Illustrated.

Why should the appeal of the railroads to President Wilson deserve a different consideration than that of the cotton industry or any other great industry desperately hard hit by the war? The magnitude of the property involved, the extreme urgency of the emergency both entitle the railroads' case to the President's consideration, but not necessarily on these accounts alone to a different kind of consideration than that given to other hard hit businesses. The President having shown himself a strong man, undisputed leader of his party and a director of the course of the country, is in the present crisis beset with many and moving appeals for help. But no government can shoulder the burdens and misfortunes of private business. Why then should the railroads ask special consideration? Precisely because the railroads are not a private business. This fact railroad presidents of twenty years ago were loath to unreservedly acknowledge. Since then the fact has been pounded home by legislators, by agitators, by courts and by overwhelming public opinion. There can be no investor so blind to conditions as to have any doubts that when he buys railroad securities the property he invests in is subject to public regulation. This distinction between the railroads' case and that of other businesses that have appealed to the government for some measure of relief is vital and fundamental. The public have heretofore been mainly impressed with only one side of this fact. Now every consideration of justice and integrity require the consideration of the other side of the same fact. The railroads' appeal is a modest one, the facts are momentous. The loss in 1914 in net operating income was $120,000,000. No government guarantee of railroad securities is asked. The President is simply requested to urge on the people that no further immediate burdens be placed on the railroads, and on the "appropriate governmental agencies" that they seek a way by which additional revenue may be promptly raised. The granting of these two requests would mean the recognition of the government's obligations, as well as its prerogatives in the regulation of private capital engaged in public service. Its effect on the credit of the railroads would be incalculably great.

President Wilson and the Railroad Situation

Railroads, speaking generally, have a reputation for punctuality. This reputation dates from the time, 60 to 80 years ago, when railroad trains were compared with stage coaches. A correspondent, in another column, avers that today, in this respect, many prominent roads deserve execration rather than praise. How many there are to which our correspondent's criticisms and admonition may apply we do not know; but every one must agree that his position is sound. A passenger's loss of three minutes may not produce a grievance that ever will be felt by the general manager; but the superintendent who prevents those three-minute delays will have greatly improved the general discipline of his forces; for only good men can perform the satisfactory service which the best punctuality implies. Any engineman (or conductor, or station master) who is not alive to the arts involved in being punctual can learn them any day, by a visit to the New York subway, where time-intervals of 96 seconds are quite regularly adhered to; and the schedules are maintained too. Why not send some of your men on such a visit? Premiums to enginemen for punctuality could be made very useful and profitable, at least temporarily. Again, on many runs, a satisfactory degree of punctuality, once accomplished, would suggest a saving by the use of lighter engines. How many thousands of tons do we haul over the road daily, in the shape of monster locomotives, far too heavy for their loads, simply to be able to make up lost time? Punctuality is a fascinating study in many directions.

Unpunctuality as Affecting Reputation

In connection with the efforts of the railways to carry out the suggestions recently made by the Interstate Commerce Commission in the direction of increasing passenger fares and charging for incidental services now rendered free in freight traffic, a suggestion has been made that the railways impose a charge for handling baggage. European roads generally charge for handling baggage in excess of a very small amount, and while the adoption of such a plan in this country would undoubtedly raise a storm of protest, there are many reasons why a difference should be made in the charges paid by those for whom the railroad checks baggage and those for whom it does not. Certainly the idea is consistent with the gradual tendency of the com-

Charging for Free Service

mission toward the cost of service basis of rate-making. The equipment and labor necessary to handle baggage both at terminals and in transit cost money, and passengers for whom the roads provide transportation and care for 150 pounds of personal property receive an appreciably greater service than those for whom it does not handle baggage. The usual charge for checking a parcel at stations for 24 hours is 10 cents. This service is far less valuable to the patron and costs less to render than the handling and transportation of baggage, yet the man who cares for his own hand baggage en route, but checks it at a parcel room at either end of his journey, pays more than the man who asks the railway to handle his 150-pound trunk. Whether the charge should be a fraction of a cent per mile for each 100 or 150 pounds, or a certain percentage of the ticket rate, is a matter of detail. Excess baggage rates are based on the latter plan, and under the prevailing mileage system of passenger fares both come to about the same. Even a flat charge of 10 cents, regardless of distance, would yield a considerable income in the course of a year. This suggestion should, but probably will not, appeal to the very numerous class of people who are fond of pointing out examples of railroad discrimination in favor of the other fellow.

Opportunity for American Supply Concerns

It looks as if the great European war were going to open up an unusual opportunity for the railway supply manufacturers of the United States. The railways of a country tend to purchase equipment and supplies in the same countries in which they are financed. This is by no means an invariable rule, but is what usually is done. For example, most of the capital invested in the railways of Argentina has come from England, the roads have been built chiefly by Englishmen, and most of their equipment and supplies have been bought in England. The railways of Australia, while most of them are owned by the governments, have been built by men of English birth or descent with capital raised in England, and they likewise have bought in England most of the equipment and supplies which have not been made in Australia itself. Largely because of the fact that relatively few of the railways of foreign countries have been financed by American capital the railway supply concerns of the United States have had great difficulty in winning foreign markets. The war, however, has largely stopped the exportation of railway supplies and equipment from most of the countries on the continent of Europe, and has most seriously interfered with their manufacture and shipment from Great Britain. This should broaden the market of the railway supply concerns of America in all parts of the world outside of Europe. As long as the war continues there will be more destruction of railways in Europe than building or equipping of them, but when the war is over Europe's demands for railway supplies to be used in reconstructing and re-equipping the lines that are now being allowed to deteriorate or which are actually being destroyed will be something enormous. Of course, the one large market to which the railways of Europe can turn will be that of America. While, therefore, the war may have temporarily injured the railway supply business of this country, it would seem that it will not be long until it will begin to help it, and that in the long run it will help it a great deal.

Government Stamp of Approval on Railroad Securities

Professor William Z. Ripley, of Harvard University, has a very interesting article in the current number of The American Economic Review discussing public regulation of railroad securities, in which he comes to the conclusion that the power to compel publicity alone, as recommended by the Hadley Securities Commission, is not enough authority to give the Interstate Commerce Commission over the issuance of railroad securities to prevent interference by state authorities. It must be remembered that the decisions in the Minnesota and Shreveport cases had not been rendered by the Supreme Court when the report of the Hadley commission was made, and it is quite possible that a majority of the Hadley commission would now agree with Professor Ripley. The report of the commission made it plain that the majority did not believe that conflicting state regulation was desirable, and that it did believe that its elimination by the assumption of authority by a federal body was desirable. On the other hand, Professor Ripley apparently believes that a great deal of good has resulted from state regulation, and cites the work of the New York and Texas commissions as examples of the successful prevention of overcapitalization. He fails to mention, however, that one of the earliest decisions rendered by the New York commission was one in which it gave permission to the Delaware & Eastern to issue $2,050,000 stock and $4,570,000 5 per cent bonds at not less than 80. That was early in 1909. In the latter part of February, 1910, the company was put into the hands of a receiver, and on March 2 The Wall Street Journal had the following to say in regard to the affairs of the company:

> Receivers for the Delaware & Eastern are at work on the company's books in an effort to straighten them out sufficiently to enable the bondholders to see just what sort of situation they confront. As matters stand the exact amount of the railway company's liabilities is unknown, and its assets appear to consist of little more than a lease of the Delaware & Eastern Railroad Company, an agreement with a foreign underwriting syndicate, and a heap of overdue and unpaid bills.

This is a rather glaring instance of the failure of public regulation of the issuance of securities to protect the investor, and it is worth while recalling just at present when the federal bill for the regulation of securities is under discussion.

DIVISION OF MAINTENANCE OF WAY EXPENSES BETWEEN PASSENGER AND FREIGHT TRAFFIC

DURING the past two years there has developed a very marked tendency on the part of regulating bodies to demand the division of railway expenses between freight and passenger service. The methods adopted by the Pennsylvania Railroad and by the Oklahoma Commission, and those tentatively outlined by the Interstate Commerce Commission, were reviewed in our issue of July 24, page 153. Among the most difficult classes of expenses to distribute accurately between passenger and freight traffic are those incurred in the maintenance of way and structures. While the division of these charges is an accounting problem, the accountants must depend upon the maintenance of way department for their basic data and, therefore, the problem becomes primarily one for the maintenance of way department.

It is necessary to assume some unit as a basis for the distribution of charges, and it is here that the great difficulty arises. Various units have been proposed which differ according to the degree of refinement desired. The most common one is the revenue train mile, which is the unit adopted by the Pennsylvania and very generally by other roads in the distribution of charges for the maintenance of joint tracks. The advantage of this unit is its simplicity. But, it is inaccurate in that it assumes that all trains cause equal damage to the track and structures and ignores all the effects of tonnage and speed. A light two-coach passenger train is assumed to cause as much damage to track as a 4,000-ton freight train or a high speed passenger train with 10 or 12 heavy cars. To eliminate these causes of error the "train speed ton mile" was proposed in Oklahoma, although it was not adopted finally. This unit equates for the greater wear on the track and structures resulting from the operation and high speed passenger trains and heavy freight trains. But it also is subject to criticism because, while it is known that a locomotive is more destructive to the track than an equivalent weight of cars, the scheme of division in question does not allow for this. The relative allowance which should be made for a locomotive is a point on which there is a wide diversity of opinion. Some authorities have estimated that a locomotive is five times as destructive as cars having the same

weight. The committee on Economics of Railway Location of the American Railway Engineering Association concluded a year ago that a locomotive does twice as much damage per ton of weight as the rest of the train, while a passenger train is twice as destructive as a freight train of the same weight. While this conclusion was not formally adopted by the association, it is supported by results taken recently from the records of some roads. While the use of this unit, called "the equivalent ton mile" requires the collection of considerable data and statistics, it is probably nearer correct than any of the others favored.

Unfortunately, very little accurate information throwing light on this general question has been collected. There is, however, a rapidly increasing need for it. When it has been secured many points that are now doubtful will be cleared up, and the expenses which must be divided arbitrarily between freight and passenger traffic will be reduced to a small proportion of the total. Now that the railroads are beginning to face this problem squarely its solution will be found.

RESULTS OF MUNICIPAL OWNERSHIP

SOME interesting figures bearing on the question of government ownership of public utilities are given in a bulletin on central electric light and power stations for 1912, just issued by the Bureau of the Census. The figures include comparisons of the operations of municipal and commercial plants. The bulletin shows that during the 10-year period, 1902-1912, the total number of stations increased from 3,620 to 5,221, or 44.2 per cent, and that while the number of commercial stations increased from 2,805 to 3,639 or 30.4 per cent, the number of municipal stations increased from 815 to 1,562 or 91.7 per cent.

Municipal ownership of these utilities seems to have become rather popular. If this popularity has been justified by an increase in efficiency or by improved service it would be expected that this would be shown in the figures for income, output and expenses. But during this 10-year period the total income of commercial stations increased 254.2 per cent, and of municipal stations 233.4 per cent; the output of commercial stations in kilowatt-hours increased 375.8 per cent, and of municipal stations 174.4 per cent; and the total expenses of commercial plants increased 246.1 per cent, while the increase in municipal plants was 222.5 per cent. In other words, with three times the percentage of increase in numbers the municipal plants increased both their income and their output in less proportion than the commercial plants and had an increase of 222 per cent in expenses to produce an increase of 174 per cent in output, while the commercial stations, with only a slightly greater increase in expenses, obtained over twice the increase in output.

This is not the kind of efficiency that is promised by advocates of government ownership. Reduced to units of output the expense of producing electricity in municipal plants in 1912 was 3.15 cents per kilowatt-hour, while that in commercial plants was only 1.96 cents. On the other hand, the total income of municipal stations grew faster than either their expenses or their output, while the commercial plants had a gain of 254 per cent in income to pay for a 375 per cent increase in output, which enhanced their expenses by 246 per cent. This would indicate that the commercial stations had their rates reduced, but that the municipal stations not only were more successful in maintaining their rates than the commercial stations, but were more successful in making rates high than in increasing production or controlling expenditures.

The bulletin does not give statistics showing the rates charged for service, but by dividing the total income by the number of kilowatt hours of output we obtain an average rate of 2.5 cents for the commercial stations and 4.3 cents for the municipal stations. The rate of the commercial companies had been reduced from 3.4 cents in 1902, while that of the municipal plants had been increased from 3.5 cents.

Figures are not given separately in the bulletin for the wages and salaries paid, but it is significant that the number of persons employed in municipal plants is shown as 10 per cent of the total for both classes of stations, while the kilowatt capacity of their dynamos was 7.2 per cent, and their actual output was 4.7 per cent of the total. The total number of persons employed in municipal plants increased 132.4 per cent in 10 years, to produce an increase of 174.4 per cent in output. In the commercial plants an increase of 165.3 per cent in the number of persons employed produced an increase of 375 per cent in output. The commercial stations also were more successful in obtaining the greatest efficiency from their plants, the kilowatt capacity of their dynamos increasing 333.7 per cent for an increase of output of 375 per cent, while in the municipal plants the kilowatt capacity of dynamos increased 225.2 per cent for an increase of output of 174.4.

Of course, central electric stations are not railroads and municipalities are not the same as the federal government, but it is noteworthy that the more the results of government activities are studied, whether in relation to their own finances or to the operation by them of the postoffice, railways, telegraph, telephone, or other utilities, the more glaring becomes the showing made of the inefficiency of political management as applied to business.

NEW BOOKS

Proceedings of the Sixth Annual Convention of the International Railway Fuel Association. 342 pages, 41 illustrations, 6 in. by 9 in. Bound in morocco. Published by the Association, 922 McCormick building, Chicago. Price $1; paper binding, 50 cents.

This book contains a complete record of the proceedings of the convention of the International Railway Fuel Association which was held at Chicago, May 18 to 21, 1914. Committee reports and papers were presented and discussed relative to many phases of the railway fuel problem. To those who are interested in the efficient storage and handling of coal and the various conditions affecting combustion, this book will be of value; it contains much that is authoritative on these subjects.

Traffic Glossary. By R. D. Riley, instructor in Interstate Commerce, La Salle Extension University, Chicago. 136 pages, 6 in. by 9 in. Bound in paper. Published by the La Salle Extension University, 2550 Michigan avenue, Chicago. Price $1 postpaid.

This book has been prepared especially for the use of students of the course in Interstate Commerce and Railway Traffic of the La Salle Extension University, and is devoted to definitions of traffic territory and technical traffic terms. It is divided into four sections. Section A comprising the larger part of the book, defines territorial traffic terms. These are subject to changes from time to time to meet the various changes in traffic requirements and section A will gradually become obsolete. For the benefit of the readers who desire to keep in touch with these changes a list of territorial directories and freight association publications is given. Section B defines technical traffic terms, section C contains a list of abbreviations frequently used in traffic publications and section D is devoted to the application of classifications both to intrastate and interterritorial traffic.

Brass Furnace Practice in the United States. By H. W. Gillett. 287 pages, illustrated, 5¾ in. by 9 in. Bound in paper. Published as bulletin No. 73 of the Department of the Interior, Bureau of Mines, Washington, D. C.

This bulletin is issued as a contribution to the increase of safety and efficiency in the preparation and utilization of the mineral resources of the United States. The object of the investigation of brass furnace practice was to find out the melting and fuel losses in brass melting as practiced at present and to indicate as far as possible the methods by which the losses may be reduced. The investigation deals with the general types of furnaces in use and gives the result of the investigation in detail. General factors affecting the operation of brass furnaces are carefully considered and considerable space is devoted to remarks on furnace types and parts. Possible improvements in furnaces and accessories are discussed as well as some furnace problems which are awaiting solution. The latter part of the book is devoted to causes of disease and danger and essentials for health and safety.

Letters to the Editor

THE LATE STARTING OF PASSENGER TRAINS

New York, August 20, 1914.

To the Editor of the Railway Age Gazette:

In casting about for ways and means to please the public some railway officers could well afford to devote more attention to the matter of getting trains away from terminals on time. There are roads on which it is a chronic condition for trains to leave terminal stations from two to five minutes late, almost entirely because of waiting for late passengers and late baggage. Of course there is the argument that no one need worry as long as the train arrives on time, no matter how late it is in leaving; but in a great many cases the few minutes late in leaving are never made up. And then, again, what about the passengers who get off at a local station before there is any opportunity to make up time? They are as much entitled to schedule time service as those who go the full length of a division.

Passengers are largely to blame for this condition; they adopt an "Oh, the trains are always late anyway" attitude, and get into a habit of arriving at the station at the last minute, or later. But, after all, the railways are responsible for this attitude on the part of the traveling public. If they had made a reputation for getting trains away on time instead of late, a much greater percentage of the passengers would be on hand at leaving time. There will, of course, always be some stragglers who will complain about being left, but if the trains leave on time the majority will be on hand to leave with them, and will adopt a different attitude toward the road and its service.

Some years ago a western road achieved such an unenviable reputation for late trains that the vice-president issued a circular to all concerned in train operation, calling upon them to co-operate in every possible way to bring about an improvement. A great deal may be accomplished by the prompt closing of doors and giving of signals by trainmen, and by enginemen being ready to receive a signal and act on it immediately. Particularly in suburban service, where schedules are often so exacting that a two-minute or a three-minute delay in starting is never regained, there should be close co-operation among the members of the crew. On a certain road which does a large suburban business, a considerable proportion of the trains are almost always two or three minutes late in starting, and in most cases this time is never made up, the trains falling back on the time of following trains and causing additional delays. Holding the gates open in terminal stations until the leaving time of a train, of course makes it impossible for the train to get away on time. In some of the large stations with their magnificent distances that must be traveled after the gates are passed, the situation is more complicated, but it should surely be possible to arrive at a solution even here. There is no reason why a road should not have a reputation for starting trains on time. If trains start on time they are more likely to arrive on time, and the officers of a road that has such a reputation will not need to worry much if some of their competitors have a little nicer cars.

L. C. N.

BASIS OF REASONABLENESS OF COMPETITIVE RATES

Ann Arbor, Mich., July 10, 1914.

To the Editor of the Railway Age Gazette:

The discussion of "Economic Theory and Railway Rate Regulation," by Mr. Hand in the *Railway Age Gazette* of February 27 has suggested to me one interesting problem—namely, the basis of the reasonableness of a competitive rate. Mr. Hand has shown that there are today many cases of competition—competition of localities, facilities and markets.

The organization of our commercial and industrial enterprises is influenced to a considerable extent by the construction of our competitive rates. The relative rates on wheat and flour, for instance, from the Kansas wheat fields to California, has a direct influence upon the location of flour mills. Since flour made from California wheat must be mixed with the durum wheat of Kansas, the margin between the rates on wheat and flour from Kansas will determine where the mill had best be located. When the carriers increased the rate on flour from $.65 to $.75, and kept the rate on wheat at $.58, the Kansas millers complained to the Interstate Commerce Commission (29 I. C. C. R., 459). This is one of the many examples of the competitive rate problems. The decision in this case was that no proof had been made that the increase was justifiable. There was no reason why the California miller be put upon a parity with the Kansas miller to the detriment of the latter. The course was open to the railroads to reduce the rate on wheat rather than to increase the rate on flour in order to equalize the difference.

As Mr. Hand suggests, such a readjustment of rates would not mean extra traffic for the railroads involved, and so, from the point of view of profit for the carrier such an increase is not justifiable. Let us consider, on the other hand, a case where a railroad has reduced its rates upon competitive traffic to that point, which, in the estimation of the traffic manager, affords the greatest net return, allowing a free movement of the commodity—but, after a period of years, the competitive situation which necessitated the low rate has become less acute, or perhaps has entirely ceased to exist.

My desire, therefore, is to discuss what factors a commission should consider in determining the reasonableness of a competitive rate which has been increased by a railroad for the purpose of securing a greater return from the traffic involved. This question is complicated with the problem of a railroad absorbing part of the prosperity of an industry; its analysis also will throw light upon such issues as the present advance in rates case, the reasonableness of the schedule as a whole, and "specific cost for the specific service."

The increase in the rate on fir, hemlock and spruce from the Pacific coast to St. Paul and common points directly presents the issue. (14 I. C. C. R., 1.) In order to utilize an empty car movement eastward, the western roads in 1893 established low rates on lumber moving to the central west. By 1907 the empty car movement, due, in part at least, to the lumber industry, which had grown to enormous proportions, became westward. At this time the carriers raised the rate from $.40 to $.50. There were many rates on lumber involved, but for illustrative purposes one will suffice. The problem for the railroads was to justify this increase of a rate which, when first established, was admittedly low.

The question is pertinent: what was the effect of this increase? Did it mean that southern and northern lumber producing areas would encroach upon the market of the Pacific coast? Did it mean that those lumber concerns which operated upon the margin, under the least favorable circumstances, suffered, although, as a whole, the lumber industry continued to be prosperous? An analysis of these questions will throw light upon the theory of competitive rate structure.

On economic grounds, this increase was due to the great prosperity of the business; the carriers realized that they were not receiving all that the traffic could bear. The original low rate was justifiable because some return was made over and above actual haulage cost, thereby reducing the burden of the constant charges upon the non-competitive rates. As long as that competition exists, and the rates are adjusted with reference to that competition, should a railroad be allowed to construct its rate so as to secure the maximum return from the commodity? If the competition of the southern lumber regions in this central territory should suddenly cease, the cause of the original low rate on Pacific coast lumber would no longer exist. If that competition continues, but not to so great an extent, the prob-

lem for the western railroads is to organize their rates with the view of obtaining the largest possible return.

It is a problem of broad public policy to what extent a railroad must equalize economic factors. If an increase in rates, in addition to decreasing profits for some concerns, forces others into insolvency, that rate increase is bound to be opposed. If, however, we argue upon the hypothesis that the sole justification of the rate when first made was to allow an industry to enter a competitive market, that industry cannot with justice demand a maintenance of this low rate whenever that competition ceases. If, on the other hand, there enters a new and more acute competition, the shippers will request their railroad to reduce rates so that they may continue in that market. The traffic manager must then determine at what point in the readjustment of the rate, the railroad will secure the maximum return. The railroad will not be compelled to establish a rate so low that the concern which existed "on the margin" under the former may continue to earn a profit with the lower rate which the exigencies of competition necessitated. In this case, however, the competition did not continue to remain acute, and the railroad felt it could secure a greater return from the traffic by an increase in the rate. Such an increase, therefore, ipso facto, is justifiable, although all the concerns served by that rate may not continue to enjoy prosperity.

The construction of rate schedules upon this basis of the prosperity of the industry concerned is open to the criticism that the gains of good management in that industry, as well as the advantages accruing to an industry because of its excellent location, would thus be shared with the railroad. In answer to that it is well to remember that no rate can be increased above the point at which the principles of classification are operative. We realize that lumber should not be rated as high as sixth class, but the principles underlying the basis of classification applied to lumber would determine the upper level of the lumber rate.

The success of an industry depends in part at least upon its market. If now a market which is not naturally tributary to that producing area is opened to that producing area by reason of a low rate, is it justifiable that such a low rate continue when the competitive forces which caused its inception have ceased? It is fair that a railroad share in the prosperity which it has occasioned, not only through the increased tonnage, but also by an increased rate, and what is more important, it is right that whenever a railroad requests an increase in its non-competitive rates, that railroad can claim, that from its competitive rate structure, it is securing a maximum return.

The advance in rates case involves to some extent such a situation. I do not claim that this theory is particularly applicable when the rate schedules of many carriers in a large district are at issue. To some extent such a readjustment would mean that certain carriers would secure a larger tonnage of competitive traffic. I do offer the suggestion, however, that not only with industrial tracks are the large industries securing revenue due to the railroads, but also that these companies are not paying as high a rate upon the competitive business as the railroads may, with justice, exact.

It is also a question of considerable importance whether such competition would result in severe rate wars. From the point of view of the public, a repetition of the rate wars of the eighties is highly undesirable. If such competition is indirect in its influence, we have little to fear from fluctuating rates, and cut-throat tactics. But such a situation must be recognized in the adjustment of the organization of our commercial and industrial resources.

The theory of the reasonableness of the competitive rates, furthermore, has considerable importance in the question of the reasonableness of the schedule as a whole. There has been, of late, discussion as to the results of a physical valuation upon the structure of our rates; it is claimed that all the railroads are not operating under the same conditions so that what would be a living rate for some carriers would mean insolvency for others. In order to earn a fair return, a road with severe grades must have higher rates than a water-level line, and competition will force the road with severe grades to meet the rates of the more favorably located company. Is there not, however, a tendency to exaggerate this factor? As a matter of fact, railroads do not compete at each and every point along the line. Some rates are necessarily non-competitive so that, on a line of heavy grades the class rate structure, on which the burden of the constant charges naturally falls, will be relatively high.

Similarly, a road which enjoys a regular heavy tonnage, as is the case with the Pittsburgh & Lake Erie, will establish a lower class rate than a road which serves a large passenger traffic must maintain, because the passenger business is not only in competition with interurban electric lines, but also because of the sociological necessity of a wide distribution of workers from a large city.

It is, in addition, important for a traffic manager to know what is the lowest point at which he can place a rate upon a commodity when requested by a shipper, that that article may enter a competitive market. The traffic manager knows that every increase in the volume of the business does not, within reasonable limits, incur a proportionate increase in the cost of haulage. We see, therefore, that some cost figures must be ascertained in order to determine this lowest possible level for a competitive rate.

The Interstate Commerce Commission in 22 I. C. C. R., 623, considered the reasonableness of an advance in rates on coal from the West Virginia fields to the lakes.

> Is a rate unreasonable because it does not pay its full share of taxes, fixed charges and dividends? At the end this is the question to which we come in this case. The carriers themselves having fixed these rates under the mandate of the law that they shall fix just and reasonable rates, have they justified higher rates by showing that the existing rates which they had fixed fall somewhat short of meeting all the related expenses which the carrier must bear, not only for transportation, but to secure an adequate return upon its property? Let us see where this doctrine would lead. If a carrier may raise all rates to a basis where each rate will bear its share of the cost, including all costs, and no lower rate is reasonable, then it must follow that all rates are unreasonable which yield to the carrier a greater return than such cost. Under such theory what would be the rate on tea or silks, or high-priced horses, or delicate machines? . . . In all classifications consideration must be given to what may be termed public policy, the advantage to the community of having some kinds of freight carried at a less rate than other kinds. And this is the true meaning of the phrase "what the traffic will bear." It expresses the consideration that must be shown by the traffic manager to the need of the people for certain commodities. . . . We may not say that a rate shall be fixed so as to meet the requirements or needs of any body of shippers in their efforts to reach a given market, nor may we establish rates upon any articles so low that they will not return out-of-pocket costs. . . . There is, however, a zone within which we may properly exercise "the flexible limit of judgment which belongs to the power to fix rates." . . . A just and reasonable rate must be one which respects alike the carriers' deserts and the character of the traffic. It cannot be a rate which takes from the carrier a profit and thus favors a shipper at the carrier's expense, nor is it one which compels the shipper to yield for the transportation given a sum disproportionate either to the service given by the carrier or the service rendered to the shipper. The words "just and reasonable" imply the application of good judgment and fairness, of common sense and a sense of justice to a given condition of facts.

We realize that the economic basis of the existence of this zone in which to exercise the flexible limit of judgment is the law of increasing returns. We would like to know, on the other hand, what principles should guide judgment in ascertaining whether the rate in a competitive situation is disproportionate either to the service given by the carrier or the service rendered to the shipper. It is our function to measure the value of a transportation service given to one commodity that it may reach a certain market. We must analyze the factors of that service, and it is our firm conviction that the margin of profit for the shipper and the nature and intensity of the competition, so that the railroad may receive the greatest possible return upon the traffic involved, are factors of considerable importance.

Bradshaw Langmaid,
University of Michigan.

CONFERENCE BETWEEN THE PRESIDENT AND RAILROAD EXECUTIVES

On Wednesday of this week a committee of railroad executives held a conference with President Wilson. The committee was made up of Frank Trumbull, chairman, chairman, Chesapeake & Ohio and Missouri, Kansas & Texas; Samuel Rea, president, Pennsylvania Railroad; Daniel Willard, president, Baltimore & Ohio; Fairfax Harrison, president, Southern Railway; E. P. Ripley, president, Atchison, Topeka & Santa Fe; Hale Holden, president, Chicago, Burlington & Quincy.

The following statement was presented by the committee to the President:

The purpose of this conference is to lay before the President in brief terms the present situation of the railroads of the United States—250,000 miles of great national highways. That the case of the railroads deserves sympathetic treatment arises from the fact that, although privately owned, their property is devoted to public service. The industrial health of the country depends upon an adequate railroad service; such service cannot be rendered and proper response to public needs cannot be made, unless the financial soundness of the railroads is maintained.

The credit of the railroads, seriously impaired as we believe, before the war started, is now confronted by an emergency of a magnitude without parallel in history. To understand the full import of the existing crisis, it is necessary to consider briefly the antecedent conditions.

The purpose here is not to complain but to point out the one paramount fact that by reason of legislation and regulation by the federal government and the 48 states, acting independently of each other, as well as through the action of a strong public opinion, railroad expenses in recent years have vastly increased. No criticism is here made of the general theory of governmental regulation, but, on the other hand, no ingenuity can relieve the carriers of the burden of expense created thereby. However desirable may have been the expenditures which have been forced upon the railroads, no adequate provision has been made to pay the bill.

This great increase in expenses now coincides with seriously depleted revenues, with no corresponding ability of the railroads to reduce their costs in proportion. Governments can proceed with expenditures of all kinds by taxation, but railroads cannot. While the effect of the European war upon railroad earnings may vary in different sections, it is painfully evident that there will be serious decreases in the total because of the unprecedented difficulties in the marketing of cotton, the great decrease in imports, and the general dislocation of trade and industry.

Even prior to the existing emergency and to meet the antecedent situation, railroad expenditures generally had been reduced to absolute necessities. The difficulty of further contraction is enhanced by existing wage agreements, and, in so far as the western railroads are concerned, by the possibilities involved in the arbitration proceedings to which they have recently agreed.

The net operating income of the railroads of the United States for the year ending June 30, 1914, was $120,000,000 less than for the previous year, or about 15 per cent. The gross earnings for the year were $44,000,000 less than for 1913—expenses and taxes were $76,000,000 more.

The maintenance of the credit of the railroads (and the credit of the railroads establishes the standard for all industrial enterprises) depends upon their ability to increase their net earnings. The railroads may have the most perfectly appointed plants in the world, but if the net earnings are not adequate, new capital cannot be attracted.

In the important eastern rate case, the Interstate Commerce Commission unanimously found that the railroads in the richest section of the country needed more revenue. That finding was based upon the situation prior to the first of July, this year; indeed upon conditions of a year previous.

No emphasis need at this time be put upon the new railroad capital which has heretofore been required to provide for normal development, but this has been from $400,000,000 to $500,000,000 per annum, and railroads should not only be able to keep abreast of the times, but should even in this emergency be in a position to anticipate the demands of an expanding commerce.

Simultaneously with the great impairment of earnings, general credit conditions have broken down, and the absolute and immediate necessities of both public and private borrowers of money here and abroad have already increased interest rates to a level unthought of a few months ago—rates much higher than present net earnings return upon the railroad property of the United States.

This emergency was not contemplated when the Interstate Commerce Commission rendered its decision in the eastern rate case, yet the problems now confronting the railroads greatly transcend the seriousness of those which existed then. The menace is now not only to railroad credit but to the transportation service itself, and efficient transportation is inseparably connected with the welfare of our people.

Securities of United States railroads held abroad are computed at from three to five billion dollars. It is a certainty that bond and note obligations of the railroads maturing before the end of next year aggregate over $520,000,000. In the highest public interest, it is imperative that these obligations shall be met. Yet it is evident that for a long time Europe will not be a lender of money to America. On the contrary, the war will create such enormous debts and involve such a general dislocation of industry and commerce, that Europe must realize largely on its holdings of American securities regardless of the price obtainable.

The New York Stock Exchange has now been closed for a longer period than at any other time in its history. There is no present market for railroad securities, either old or new. The United States is in a condition of financial isolation. If the Stock Exchange were to open (and it must open some time), the pressure of selling would inevitably be greatest against railroad securities. If they go down, industrial issues will fall still more seriously. The public necessity to stem this tide of selling and to reduce to the utmost its destructive effect, is one that calls for the exercise of every resource of statesmanship.

Our respectful requests are:

1. That the President will call the attention of the country to the pressing necessity for support of railroad credit by the co-operative and sympathetic effort of the public and of all governmental authorities, and that the railroads be relieved as far as possible of further immediate burdens involving additional expense; and.

2. That the President will urge a practical recognition of the fact that an emergency is upon the railroads which requires, in the public interest, that they have additional revenue and that the appropriate governmental agencies seek a way by which such additional revenue may be properly and promptly provided.

Railway Construction in the Chinese Province of Shantung.—At present there are two railways in operation in the Chinese province of Shantung; the Shantung railway from Tsingtau to Tsinanfu, 256 miles, and the Tientsin-Pukow line, 690 miles long, traversing the western portion of the province. Both of these lines are of standard gage. The former is German owned and operated. The latter, likewise a standard gage road, is divided into two sections. The northern runs from Huschowfu on the southern border of Shantung to Tientsin. It is 457 miles long and was built by the Germans. The southern section is 235 miles long and extends from Huschowfu south to Pukow on the Yangtse river. It was built by the British, but in common with the northern section is operated by Chinese. There are, however a few German overseers on the German section and a few British overseers on the other. The Chinese government administers both sections as an undivided government railway under a European engineer in chief who of course has a voice in the ordering of supplies.

The Erection Equipment for the Quebec Bridge

A General Description of the Method Adopted and the Traveler Built for This 1,800-Foot Span

By H. P. Borden
Assistant to Chief Engineer, Board of Engineers, Quebec Bridge.

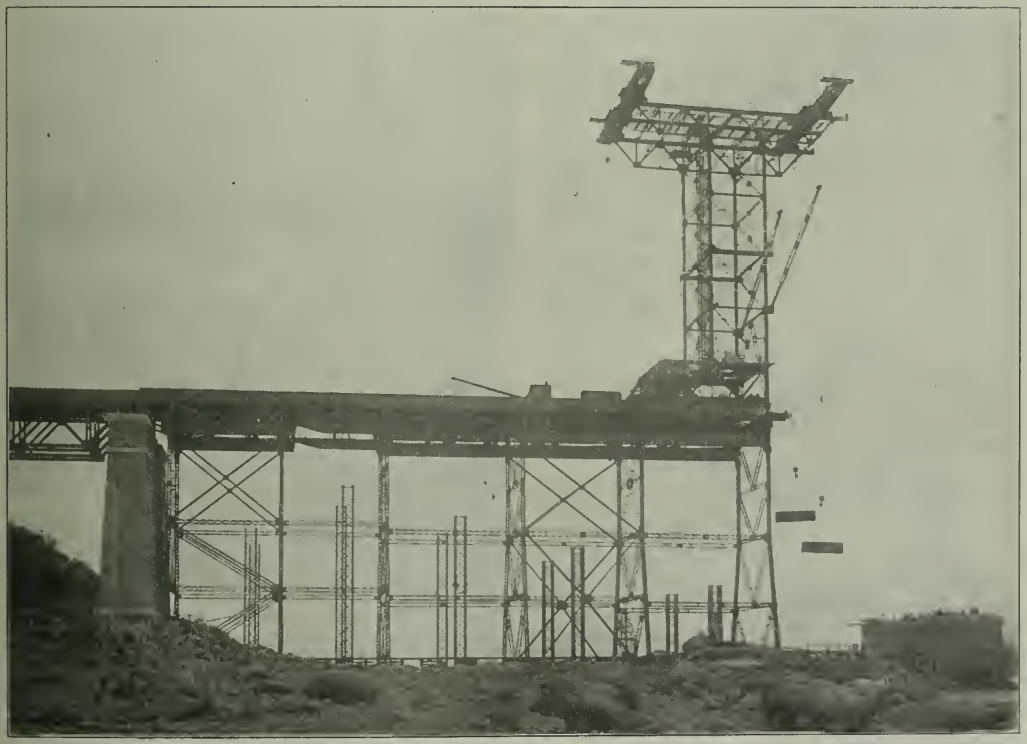
During the present season considerable progress will be made towards the erection of the new Quebec bridge. The unprecedented weight and size of many of the members have created problems unusual in ordinary bridge erection. This phase of the work has been very carefully studied, the result being that every step has been thoroughly worked out and equipment has been designed to meet every emergency.

The center span is of the same length as that of the old bridge, namely, 1,800 ft. center to center of main piers, being divided into two cantilever spans 580 ft. long, and one suspended span 640 ft. long. The two anchor arms are each 515 ft. long center to center of piers. The main posts over the piers are 310 ft. high center to center, the cantilever and anchor arms tapering back to 70 ft. at each end.

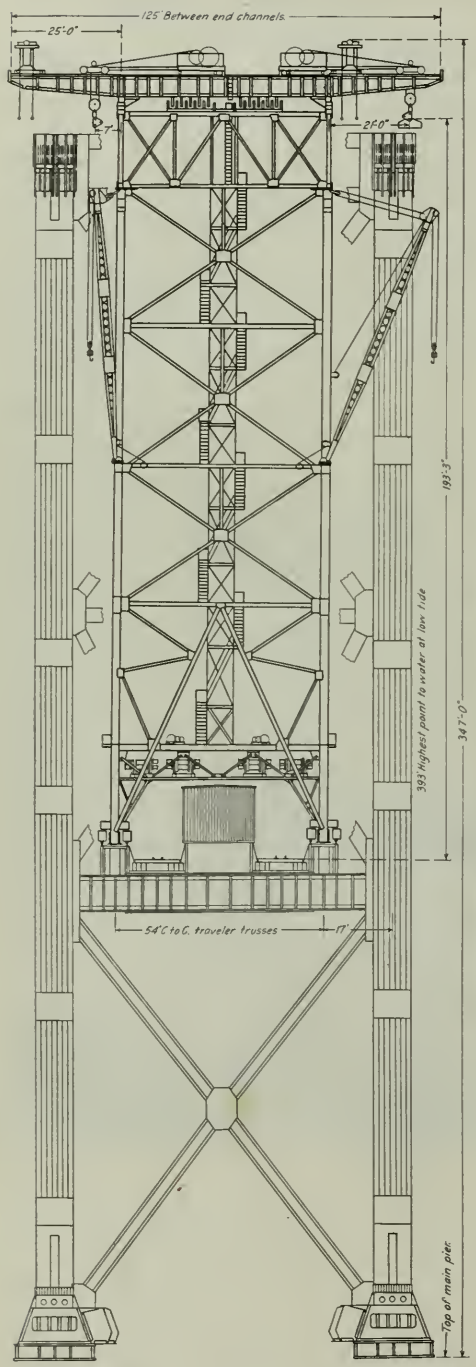
The suspended span, being designed to be floated into position, is of a bow-string Pratt design 110 ft. high at the center. The trusses of the bridge are vertical, and are 88 ft. center to center. There are two approach spans on the north side between the anchor pier and the abutment 110 ft. and 157 ft. long, and one span 140 ft. long on the south side. The over-all length of the bridge is 3,239 ft. face to face of abutments.

Owing to the requirements of navigation, the center of the bridge for a distance of about 700 ft. is 150 ft. above extreme high water. In order to provide sufficient clearance for ships it was necessary to design the bridge with a one per cent grade entering from the abutments to the ends of the cantilever arms, the suspended span, however, being on a level grade. The extreme height of the bridge above the water did not entail any extra expense for approaches, due to the fact that the high banks on each side of the river conformed approximately to the required grade level.

In designing the plant required for the erection, the St. Lawrence Bridge Company, the contractors for the superstructure, spared no expense to develop an equipment that would combine the greatest efficiency with absolute safety. The bridge itself is situated about seven miles from Quebec in a more or less isolated district, and the difficulty of obtaining labor within a close radius was apparent. In order to provide accommodation for a large staff, and to locate them within a reasonable distance from the work, the company went to a large expense in fitting up a model camp at the bridge site. Bunk houses were provided for 250 men with an up-to-date kitchen and dining-



General View of the Traveler, Placing the Grillage for the Last Bent of Falsework



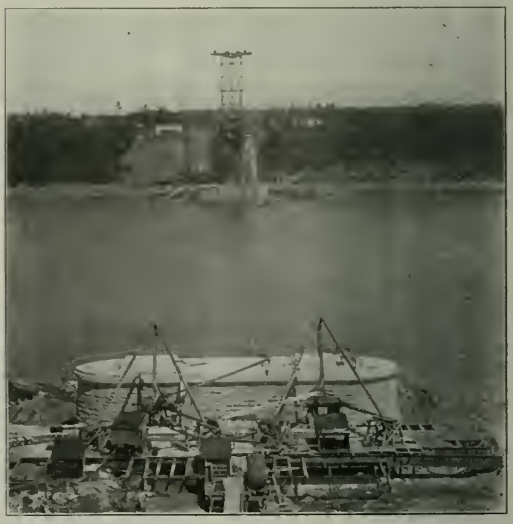
The Quebec Bridge Traveler Between the Main Trusses

room, bakery, wash rooms, recreation rooms, laundry, as well as general offices, hospital and police quarters. An efficient water supply service was inaugurated with fire protection and electric light. For the use of the officers of the company, several bungalows were also constructed in the vicinity.

As all the mechanical equipment is operated by electricity, power was obtained from the City of Quebec and transformed at the site to suit the various requirements of lighting, heating and operating machinery. A compressed air plant, operated by electricity, was also constructed on each side of the river. In the north and south handling yards, crane runways were established and equipped with traveling cranes having a capacity of 90 tons each.

ERECTION OF CANTILEVER SPANS

The main traveler, which will be used for the erection of the cantilever span proper, is of heavy steel construction, weighing when fully equipped approximately 1,000 tons. This traveler is about 200 ft. high from base of rail, and is supported on four buggies of six wheels each, running on four lines of tracks at the floor level. The upper arms of the traveler extend 50 ft. fore and aft of the main tower. On the top of the traveler two electric cranes are located, running on tracks parallel to the center line of the bridge. On each of these cranes are two trolley hoists running at right angles to the center line of the



General View of the Crossing Showing the Traveler on the North Shore

bridge, thus commanding every point within their radius. These cranes have a capacity of 110 tons with a 35-ft. overhang, and have an out-to-out reach of 47 ft. 6 in. on each side of the center line. All the movements of these cranes, as well as the operation of the hoists, are controlled by one man at two switch boards located on the bridge of the traveler at the lower platform. By this means the superintendent can stand by the side of the operator, and in an ordinary conversational tone give instructions as indicated by the foremen at the different points where the work is going on. The operator can also see all operations at close range, and consequently can use better judgment in operating the hoists.

In order to avoid any possibility of accident, automatic electric brakes are attached to every machine, which will prevent the machine running away should anything happen to the electric current. In lowering a heavy member, the machines, operating through electrical resistance, have to work just as hard as in

the operation of lifting. Should a fuse burn out, it is impossible for the load to move until the proper connection is again made. By this means the mechanism is made as nearly foolproof as it is possible to make it.

Four small gantry cranes with two six-ton hoists each are also situated at the extreme ends of the crane girders on the top of the traveler, and are used to handle pins and other small material in line with the trusses. These gantry hoists are also

View Looking Back from the Traveler Showing the Four Lines of Rails Carrying the Traveler

operated from the bridge at the lower level. At each of the four corners of the main tower, steel booms have been installed having a reach of 90 ft. and a capacity of 20 tons each. These booms are operated by four electric hoists on the lower deck, and are used to handle smaller members between the trusses, such as the floor system and lateral and sway bracing.

In order to facilitate reaching all parts of this traveler for inspection or other purposes, an electric elevator travels from the main deck to the floor under the crane girders at the top. There is also a stairway around this elevator for emergency purposes. In order that the progress of the work may not be held back, a second traveler, a duplicate of the one already erected on the north side, is now being constructed for use on the south side and will be in operation next spring. These two travelers, fully equipped, will cost in the neighborhood of $500,000.

ERECTION OF APPROACH AND ANCHOR SPANS

The north approaches, consisting of two Warren-type truss spans 110 and 157 ft. in length, respectively, were erected complete last fall. As the railway tracks are 32 ft. center to center, each span is composed of two distinct bridges, each carrying one track. The railway floor is trough-shaped, being in fact a series of through plate girder spans with sub-floor beams and track stringers. These track stringers are heavily reinforced with gusset plates and inverted channel top flanges in order to provide an extra factor of safety to the bridge as a whole in case of derailment. In the case of the approach spans these track girders

Placing One of the Four 40-Ton Castings That Form the Base of Each of the Main Shoes

are carried directly on the top of the vertical posts of the trusses which posts extend through the top chords.

The approach spans were erected with two traveling derricks before the main traveler was constructed. The shorter span, from the abutment to the intermediate pier, was supported on wooden falsework at the first and third panel points, the two outside panels being cantilevered out to the intermediate pier. The span was lowered to its proper position on the pier members by means of sandjacks on the falsework. The longer of the approach spans was erected in the same manner, with the exception that

View Showing One Half of Diagonal Tension Member 108 ft. Long on Cars for Shipment

steel falsework was used throughout. This falsework was so designed that it could be taken down and reused for the falsework of the anchor arm.

The falsework for the anchor arm consists of two distinct sets, known as the inside and outside falsework. The inside falsework carries the floor and the traveler up to the time the anchor arm is swung. The outside falsework is of varying length from the main pier to the anchor pier and supports first the bottom chords

and finally the entire weight of the anchor arm with the exception of the floor system.

The main traveler is used to erect this anchor arm falsework. Two of the lines of rails upon which this traveler runs are placed on the top flange of each of the outside track girders, the other two lines of rails being placed on special erection girders located about 4 ft. outside of these track girders and connected to the falsework bridge floor by special inclined struts and bracing. As each panel of the inside bracing is erected, the permanent floor of the bridge is placed in position. This does not apply to the main floorbeams which attach to the trusses of the anchor arm. These are put in a temporary position to accommodate present erection purposes and will not be put in their permanent position until the web members of the anchor arm trusses are erected in place.

There are seven bents of falsework for the inside staging and six bents for the outside. This staging and flooring is now practically all in place between the anchor arm and the main north pier, and the work of setting the shoes is going ahead. These shoes are approximately 26 ft. by 21 ft. at the base, are 19 ft. high and are shipped in seven sections, the heaviest of which weighs 70 tons. The shoe as a whole weighs over 400 tons.

If no unexpected delay occurs, it is expected that most of the anchor arm, or in the neighborhood of 10,000 tons, will be erected during the present season. During the coming winter the traveler for the south side will be erected and next season work will be started on the south shore, both sides working simultaneously towards the center. The cantilever arms will, naturally, be erected without staging. In order to save practically a year in erection, the big suspended span will be erected on the shore, in the vicinity of the bridge, and floated into position, being lifted from the pontoons by means of enormous hydraulic jacks.

The work is under the direction of the Board of Engineers, Quebec Bridge, a commission appointed by the Dominion government, and is composed of C. N. Monsarrat, chairman and chief engineer, Ralph Modjeski, and C. C. Schneider.

UNNECESSARY TELEGRAPHING*

By W. H. Hall
Superintendent of Telegraph, Missouri, Kansas & Texas

. . . I find that we still have a few officers and employees who believe that the telegraph rules, the telegraph code, etc., were made for the other fellow, and do not apply them. Recently I was told that the traffic department people were using the code to some extent and using symbol letters and numbers on a large majority of their telegrams; but that the operating department people do not seem to be doing so well. This was to me an astonishing statement, but I found that, generally speaking, it was correct. [Mr. Hall here quoted a telegram *of the traffic department* of 33 words which ought to have been put into 17. Other examples of lack of care were a message from a roadmaster ordering grass to be cut around bridges and directing responses, by wire, from 40 section foremen; and one from the passenger department, and one from the legal department omitting symbols, and thus necessitating unnecessary words in the reply. Six relaying offices found in one day 400 messages lacking symbol letters or numbers.]

In August, 1913, the telegraph department issued a telegraph code of about 75 code words, covering sentences used many times each day by all departments. Some of the departments are using this code, with a marked decrease in the length of telegrams. Others are not making any use of it. I quote a few words that can be used to advantage by all departments.

Anxiety:	All concerned are instructed to rush.
Arrow:	Urgent that we have quick action.
Converse:	Referring to our conversation.
Decision:	What action has been taken.
Exact:	Advise if now O. K.
Hearken:	Have matter up and will advise soon as possible.
Hindrance:	Advise by wire what is delaying.
Home:	Referring to my letter of.....
Stimulate:	Very urgent, immediate attention and reply requested.
Searching:	Will investigate and advise you.

There are others just as good. I heard an employee the other day dictating a telegram, and by the use of four or five code words a message that would have contained probably fifty words was cut down to about twelve. It was a revelation, even to me, of the economy that can be effected by an intelligent use of this code.

As our railway increases in mileage and cities increase in size and industries multiply, there will be a legitimate growth in the number of telegrams, and I have found the management willing to meet this demand for additional facilities; but unwilling to have the telegraph service used for unimportant and unnecessarily long communications.

I believe that fully 25 per cent of the messages now being handled by wire could be handled by letter and serve every purpose. Recently on a certain middle west railroad the management came to the conclusion that there was too much telegraphing being done, and in one relay office, where there had been 24 men employed, they cut the force to 5. Clerks were put on and it was left to the discretion of the manager as to what messages should be sent by wire and what messages should be sent by mail; and, while their service has suffered to some extent, still it has been shown that a large proportion of the messages heretofore handled were unnecessary.

*Abstracted from a paper read at a staff meeting at Galveston, June 22, 1914.

THINK OF THE ENGINEMAN

Many automobile drivers are daily "flirting with death" by failing to observe the highway regulation, "stop, look and listen," when approaching railway crossings; and, commenting on this, the press agent of the Southern Railway, calls attention to the experience of M. C. Glenn, an engineman of that road, on September 3. "Yesterday," said Mr. Glenn, "I was engineer on train No. 108 and at Williams Crossing, about four miles west of Raleigh, I only missed striking an automobile by about two seconds, and in this automobile were grown people and children. If I had struck the automobile some one would have said that the engineer failed to sound the whistle; when in fact, I had just whistled for Thompson, answered a signal from the conductor, and had blown a road-crossing signal. The bell was ringing also, but the driver of the auto evidently did not hear any of the signals; for when I came in sight of him, which was only for a short distance, on account of a curve in the track, he averted a collision by suddenly cutting his car to the right, and I passed within 10 or 12 ft. of him." And the "some one" who in cases like this says that the engineman was at fault, usually proves to be a witness for the plaintiff in a lawsuit against the railroad; and jurymen who do not believe his statement are rare. Mr. Glenn's experience should go on record, for it is an instance where the runner's testimony was not contradicted.

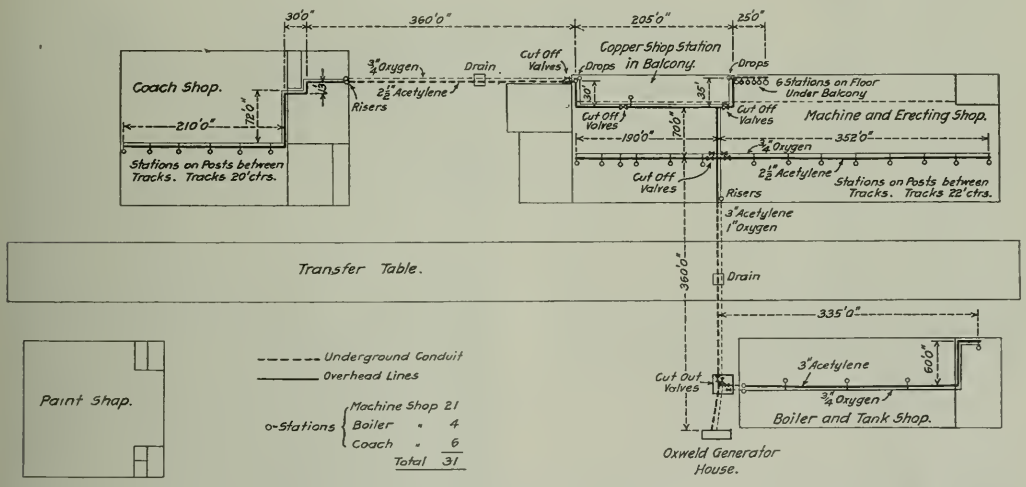
Canals in Norway.—An old scheme for a waterway between Lake Mjösen, Norway, and the sea is again being given attention, and as a first step the part canalization of the Glommen is being advocated. The building of several dams on the section Vamma-Mörkfas will facilitate the solution of this important question by the Glommen being made navigable from Oieren to Sarpsborg and on to Frederiksstad. Lock will have to be built by the side of the dams already built, or about to be built, but this is not expected to present any difficulties. The water level above the Sarpsfos Falls will have to be raised to a mean of 77 ft. above the level of the sea, in order to make the canalization of Glengshölen efficient. The passage round the Sarpsfos Falls, will be solved by means of a combination of locks and tunnel, and the whole scheme is looked upon as feasible also from a financial point of view.

Oxy-Acetylene Welding and Cutting on the Frisco

Large Savings Made by Use of Central Generating Plant and Piping System to Different Shop Departments

After about two years experimental work with apparatus that did not prove satisfactory, the St. Louis & San Francisco decided to install a complete modern plant for oxy-acetylene welding and cutting on a large scale at the Springfield (Mo.) shops. With the object of extending its use to the several departments of the locomotive and car repair shops, it was decided to install a central generating plant and to pipe the gases to the various departments, providing outlets at the several points where this process would be required, either for welding or cutting. This was done in the belief that in the end it would prove more economical to install and maintain such a plant than to follow the practices either of bringing the work to a central point or trucking the oxy-acetylene apparatus to the different places. A study of the extent to which oxy-acetylene welding and cutting is now being used throughout the shops and the resulting savings, seems to amply justify this decision.

So successful has the plan worked out that similar installations have been made at the old north shops at Springfield and at the reclamation plant at Springfield, which is located in the old Kansas City, Fort Scott & Memphis shops, which were practically abandoned when the new Frisco shops were built several years ago. Other small plants have also been installed at Birmingham (Ala.), Chaffee (Mo.), Enid (Okla.), Kansas City (Kan.), Memphis (Tenn.), and Sapulpa (Okla.). The railroad company was not put to any capital expense in building and equipping these plants. They were furnished by a service company which also provided in its contract for supervision and instruction as to methods, free of charge, and conditioned only on the purchase through the service company of oxygen, carbide and other necessary supplies at the usual and current market prices.



Plan of the Oxy-Acetylene Layout at the Springfield New Shops of the St. Louis & San Francisco

THE APPARATUS

The installation at what is known as the new shops at Springfield is by far the largest of the nine plants thus far placed in operation on the Frisco. Twenty operators are regularly employed; of these four are in the machine and erecting shop, eleven in the boiler shop, three in the blacksmith shop, one in the coppersmith department and one in the coach shop. The welding operators have been selected from the various departments of the shop and are assigned as nearly as possible with reference to their trades and qualifications. The scope and variety of the work is continually increasing, as the welders become more and more proficient in handling the apparatus and as the shop management becomes more familiar with its possibilities.

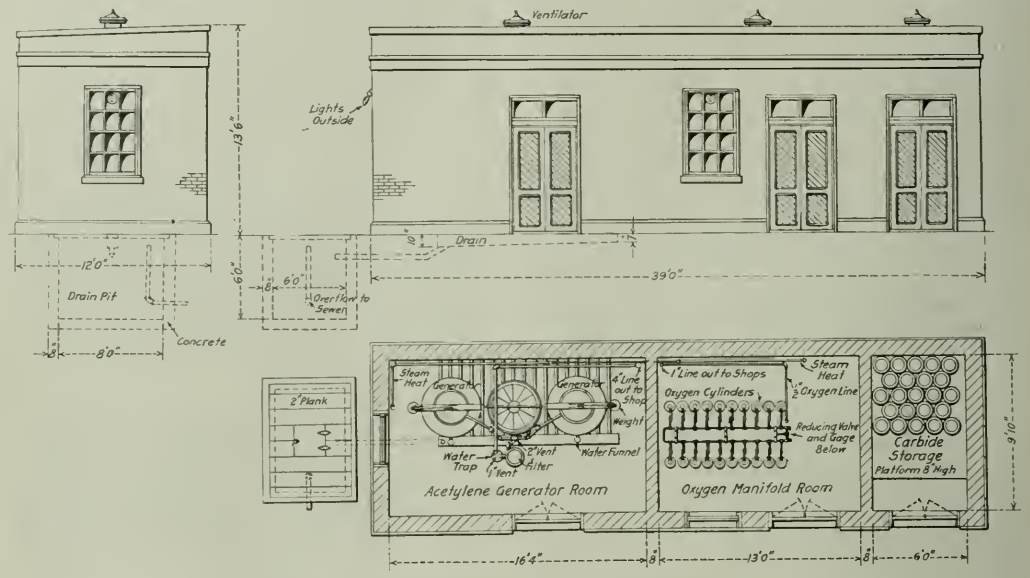
Some idea of the extensive area which is served at the new Springfield shops may be gained from the fact that there are 6,204 ft. of piping, divided as follows: For acetylene, 60 ft. of 4 in. pipe, 745 ft. of 3 in., 1,677 ft. of 2½ in. and 620 ft. of 1 in. For oxygen, 390 ft. of one 1 in. pipe, 2,092 ft. of ¾ in. and 620 ft. of ½ in. There are 21 outlets or stations in the machine and erecting shop, four in the boiler shop, and six in the coach shop. As shown on the diagram, the piping between the buildings is placed underground, while that inside is carried overhead. In the erecting shop and in the coach shop, the outlets are placed on the columns between the pits or tracks.

At the north shops in Springfield there are 4,500 ft. each of acetylene and oxygen piping, with 25 drops or outlets. Three of these outlets are in the erecting shop, three in the machine shop, 10 in the freight car repair yard, two in the motor shop, two in the coach shop, three in the boiler shop and two in the tin shop. At the reclamation plant there are 1,060 ft. of piping and 16 outlets. This article will consider only the work which is being done in the new shops and the north shops, that at the reclamation plant being reserved for a later article descriptive of that plant.

The arrangement of the apparatus in the generator house at the new shops is clearly shown in the illustrations. The greater part of the building is used as an acetylene generator room. Here is placed the Oxweld low-pressure duplex generator which consists of two acetylene generators and one gasometer. The generators may be operated independently of each other, the advantage of the duplex arrangement being that one generator may be in operation, while the other is being recharged. The generators operate automatically and require only a comparatively small amount of attention.

The oxygen containers are grouped in two rows in another

room and are connected to a manifold by flexible copper pipes, as shown in one of the photographs. Only one or two of the cylinders are opened into the manifold at one time. As soon as a tank exhausts its supply, which is indicated by the pressure gage, it is cut off and a fresh tank is cut in; as soon as convenient the empty tank is then removed and replaced by a filled one. The reducing valve regulates the pressure to the piping for making similar repairs. At the new shops, for instance, a report is made on each operation on a special form which is shown in one of the illustrations. This is made up by the shop checker or foreman, and is referred to the chief clerk of the shop superintendent, who personally checks the data to insure its accuracy. The accompanying statement is taken at random from one of a large number of records on file in the shop, super-



Oxweld Generator House at the Springfield New Shops

system. The cans containing the carbide are stored in still another part of the house, as shown on the plan.

The building at the new shops at Springfield is a substantial brick structure, agreeing with the style and architecture of the other buildings in the plant. At other places, and particularly the smaller points, much less pretentious buildings are used, such, for instance, as the one at Birmingham (Ala.), which is shown in one of the photographs.

Statement Showing Work Performed with Oxweld Welding Plant at New Shops, Springfield, and Cost During January,* 1914

Articles Cut or Welded		Date	Time welding or cutting	Rate per hr., cents	Amount of labor	Cost per blow pipe hr.	Total cost	Material	Labor	Total	Saving
Welding frame 2 x 4	Eog. 294	1-2-14	3 hr. 15 min.	41	$1.33	$3.70	$5.03	$3.40	$44.10	$47.50	$42.47
Welding crank arm 2½ x 3	Eng. 747	1-2-14	2 hr. 30 min.	41	1.02	2.85	3.87	....	6.35	6.35	2.48
Cutting eight frame bolts 1¼ in. diameter	Eng. 3707	1-2-14	1 hr.	41	.41	1.14	1.55	....	3.96	3.96	2.41
Welding worn place in frame ⅝ x 4 x 5	Eng. 3707	1-2-14	2 hr.	41	.82	2.28	3.10	....	7.60	7.60	4.50
Welding two brake hanger pins worn	Eng. 3707	1-2-14	2 hr.	41	.82	2.28	3.10	....	7.60	7.60	4.50
Cutting tail piece ½ x 3 ft.	Eng. 3707	1-2-14	30 min.	41	.20	.57	.77	....	2.64	2.64	1.87
Cutting off 445 staybolts 1 in. in diameter	Eng. 773	1-2-14	10 hr.	41	4.10	11.40	15.50	....	23.10	23.10	7.60
Cutting one hole in smoke arch ¼ x 7 and 10 holes ¼ x ½	Eng. 728	1-2-14	45 min.	41	.30	.85	1.15	....	3.30	3.30	2.15
Cutting two holes in running board ¼ x 1¼	Eng. 707	1-2-14	15 min.	41	.10	.28	.38	....	1.98	1.98	1.60
Cutting top of cab ¾ 10 ft. 8 in. and six holes ¼ x ½	Eng. 765	1-2-14	1 hr.	41	.41	1.14	1.55	....	4.62	4.62	3.07
Cutting one hole in cab ¾ x 4 in. and one hole ¼ x 1¼ and four ¼ x ½	Eng. 877	1-2-14	30 min.	41	.20	.57	.77	....	2.64	2.64	1.87
Cutting two deck braces 1½ x 4 in.	Eng.	1-2-14	30 min.	41	.20	.57	.77	....	2.64	2.64	1.87
Cutting ash pan ¼ x 2 ft. 10 in. and two holes ¼ x 2 in.	Eng. 490	1-2-14	30 min.	41	.20	.57	.77	....	2.64	2.64	1.87
Welding two cracks in door collar ⅜ x 1½ and two ⅜ x 4	Eng. 816	1-2-14	2 hr.	41	.82	2.28	3.10	1.96	9.24	11.20	8.10
Heating two flue sheets corners	Eng. 816	1-2-14	30 min.	41	.20	.57	.77	....	1.98	1.98	1.21
Cutting two patches on door sheet ⅜ x 7	Eng. 816	1-2-14	30 min.	41	.20	.57	.77	....	1.98	1.98	1.21
Cutting ash pan 3/16 x 12 in.	Eng. 728	1-2-14	30 min.	41	.20	.57	.77	....	1.98	1.98	1.21
Cutting tail piece ½ x 8	Eng. 773	1-2-14	1 hr.	41	.41	1.14	1.55	....	4.62	4.62	3.07
Heating crown sheet	Eng. 765	1-2-14	30 min.	41	.20	.57	.77	....	1.98	1.98	1.21

*This shows only a few of the items for January 2.

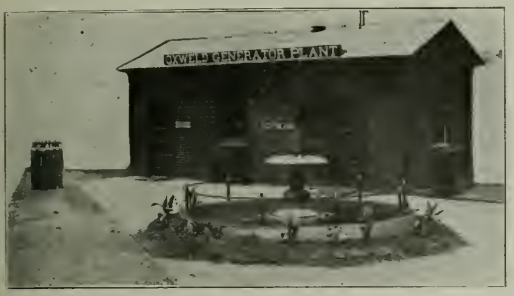
COMPARATIVE COST OF DOING WORK

Accurate and thorough records have been kept of the comparative cost of doing the work with the use of the oxy-acetylene apparatus and by the methods which were formerly employed intendent's office and will give some idea of the care and thoroughness with which the railroad has checked the comparative costs.

As noted, each item is separately considered, the cost by the Oxweld process being determined by totaling the labor cost, the gas cost and the expense of supervision, operation and maintenance of plant.

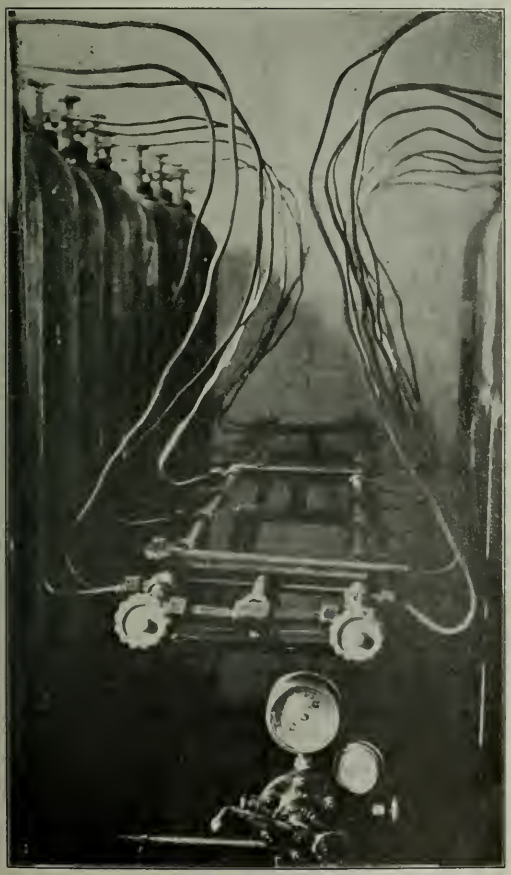
The average cost per burning hour of the gas consumed is determined by dividing the total expenditure for gas and gas making material by the number of hours worked by burner operators. The cost of gas per burner hour is influenced by a number of factors and the lowest cost does not necessarily denote the greatest efficiency of operation. A lower gas cost per

burner hour may be due to the large per cent of time lost by the operator during which the flame is not actually burning. A higher cost, on the other hand, may be due to a wasteful use of gas, accounted for by an improper mixture or by allowing the



Oxweld Generator House for the Frisco at Birmingham, Ala.

flame to burn while not actually welding. Obviously, the cost per burner hour is not an acceptable measure of welding efficiency. The most equitable comparison may be made between the performance at different plants, or different periods at the same plant, by using the economy effected by burner hours, or per dollar expended for gas.



Oxygen Manifold in the Generator House

The cost of making repairs by former methods is arrived at as follows:

In all cases where, in the absence of the Oxweld plant, the parts would have been scrapped, the cost is computed by deducting the scrap value of the old parts from the cost of new material.

In all cases where it would have been necessary to remove the parts to complete repairs by other methods, the cost of removing and replacing has been added to the cost of effecting repairs.

In cases where, by either the Oxweld or other methods, the parts would have been removed, the cost of repairs in the blacksmith, machine or other shops is considered as against the cost by the oxy-acetylene process.

The following table shows in detail the welding operations which were performed at the new Springfield shops for the twelve months ended June 30, 1914, giving also the direct labor and material cost of the repairs made by the oxy-acetylene process, the estimated cost by former methods, and the estimated saving effected by the use of the oxy-acetylene method. No attempt has been made to take into consideration the overhead or indirect expenses as they practically offset each other in both cases. This saving does not include a large number of minor operations of insufficient importance to justify the labor of recording them separately. Nor does it take into consideration the indirect saving due to time saved. For instance, if a locomotive is assumed to be worth $25 a day and a freight car 45

Savings by Individual Items—Springfield New Shops, July 1, 1913, to June 30, 1914

Parts	Pieces	Other method	Oxy-Acetylene	Saving
Ash pans	637	$456.44	$904.34	$1,384.10
Brackets	391	858.22	332.04	466.13
Braces	661	2,562.42	1,066.34	1,496.08
Bolsters	13	231.57	24.87	206.70
Crossheads and pistons	254	3,873.68	572.37	3,301.31
Center castings	26	172.44	63.18	109.26
Center plates	2	98.50	6.44	92.06
Cylinders	23	6,105.88	89.21	1,516.67
Driving boxes	240	1,644.21	355.74	1,288.47
Drawbars	12	127.08	11.93	115.15
Driving wheels	3	133.58	36.13	97.45
Door collars and sheets	400	6,974.09	1,955.39	5,018.70
Deck castings	1	71.30	3.02	68.28
Equalizers	236	735.23	416.65	318.58
Engine frames	567	9,172.80	2,316.86	6,855.94
Front end ring	45	404.65	140.88	263.77
Miscellaneous firebox work	3,017	20,733.12	10,210.40	10,522.72
Lubricators	3	105.00	3.54	101.46
Flue sheets	261	3,866.53	1,137.97	2,728.56
Shop machines	692	2,891.58	990.39	1,901.19
Main rod brasses	8	141.89	10.46	131.43
Miscellaneous repairs	473	1,455.36	560.21	895.15
Main rods	146	1,184.90	404.99	779.91
Miscellaneous parts	4,914	19,640.32	8,865.29	10,775.03
Oil boxes	531	1,790.64	678.95	1,011.69
Pedestals	626	2,080.05	742.78	1,337.27
Reverse lever strips	368	989.01	471.70	517.31
Rocker arms	100	788.53	181.24	607.29
Running boards	374	770.61	383.02	407.59
Steam chests	5	45.99	22.37	23.52
Steam pumps	10	190.00	19.95	170.05
Side sheets	495	31,512.10	3,918.31	27,593.69
Steam pipes	62	249.11	102.96	146.15
Truck boxes	113	437.71	201.51	236.20
Truck frames	14	531.58	65.80	465.78
Triple valves	2	23.00	2.48	20.52
Water columns	4	151.00	30.71	120.29
Total	...	$120,532.12	$37,340.42	$83,191.60

Economy Effected by Use of Oxy-Acetylene Process—April 1, 1913, to August 31, 1914

Month 1913	New shop	North shop	Reclamation plant	Memphis	Kansas City	Sa-	pulpa	Birmingham	Enid	Chaffee	Total
April	$215	$200	...	...	...	...	...	...	...	...	$415
May	1,121	240	..	...	...	...	...	...	...	...	1,361
June	1,367	276	...	...	...	...	...	...	...	...	1,643
July	2,034	266	...	...	...	...	...	...	...	...	2,400
August	3,247	782	...	...	...	...	...	...	...	...	4,029
September	5,652	604	...	...	...	...	...	...	...	...	6,256
October	9,861	555	$163	...	...	...	...	...	...	...	10,579
November	5,248	1,140	1,116	...	...	...	...	...	...	...	7,504
December	5,683	1,518	1,501	...	...	...	...	...	...	...	8,702
January, 1914	6,773	2,579	639	...	...	...	...	...	...	...	9,991
February	6,783	2,077	1,403	...	...	...	...	...	...	...	10,263
March	11,875	2,364	1,942	$50	$48	...	...	...	...	...	16,279
April	9,390	2,492	1,895	109	1,095	$17	$148	...	...	...	15,146
May	8,015	3,430	2,354	542	2,312	288	690	...	...	...	17,598
June	8,662	3,353	2,698	1,409	2,480	129	1,970	...	...	...	20,701
July	11,691	4,022	2,833	1,215	2,116	869	1,047	$115	$69	...	23,977
August	9,174	2,951	2,720	1,969	2,198	1,805	1,676	1,445	582	...	24,520
Total	106,793	28,940	19,264	5,294	10,249	3,108	5,531	1,560	651	...	181,364

cents a day, the amount saved by returning them to service several days sooner than would otherwise be the case would be very considerable.

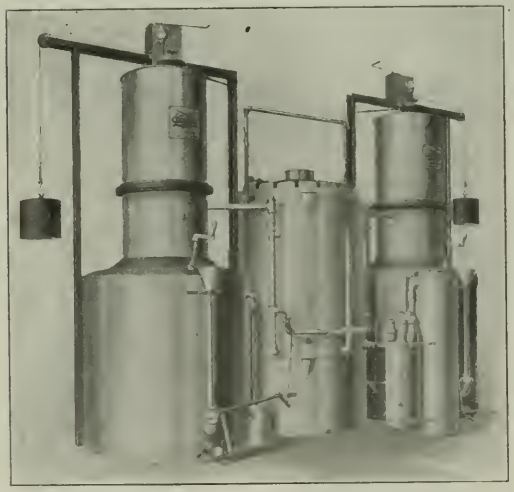
The chart showing the relative savings due to the use of oxy-acetylene for various groups or classes of repairs is of more than ordinary interest and indicates that its greatest use thus far has been in connection with boiler repairs.

The table showing the saving effected by the oxy-acetylene

Oxweld Generator House at the Springfield New Shops

process from April 1, 1913, to June 30, 1914, is also of special interest because of indicating the extent to which this process is used at the various shops. The variety of work performed at the north shops and at the reclamation plant is so great that its listing would occupy more space than is available.

Sometimes figures of economies claimed are questioned as to their accuracy and authenticity. In order that the officers of the company might not congratulate themselves with unwarranted optimism or enthusiasm a thorough check of these accounting figures was recently made by Haskins and Sells, certified public accountants. The result determined the substantial accuracy of the figures quoted.



Oxweld Low-Pressure Duplex Generator

BOILER AND FIREBOX REPAIRS

All firebox sheets and patches are welded in instead of using rivets and patch bolts. The actual saving thus accomplished is very large, but even this is insignificant as compared to the saving made by lessening the running repair work at the engine houses and curtailing terminal delays. The Frisco now has in operation more than four hundred locomotives in which firebox sheets and patches have been welded. Seventeen of these have been reported as leaking. Careful inspection, however, developed the fact that four had pin hole defects in the welds while the remaining 13 had developed defects in other sheets than those welded.

When new staybolts are applied to fireboxes, the usual practice is either to cut off the protruding ends with a staybolt nipper, an air hammer and chisel, or a chisel bar and sledge. When the nippers are used the end of the staybolt is crushed and the threads are held less securely in the sheets than they otherwise would be. When the staybolt ends are cut off, either by the use of an air hammer or the sledge and chisel bar, the hole in the sheet is to a slight extent elongated, resulting oftentimes in a loose staybolt. Where staybolts are carefully driven up after being cut off, such defects may not immediately cause trouble, but often within a short time leaks develop and after the bolt

STATEMENT OF WORK PERFORMED
OXY-ACETYLENE PROCESS

DESCRIPTION OF MATERIAL	COST						
	OXY-ACETYLENE			OTHER METHODS			
	Labor	Gas and Material	Total	Labor	Mat'l	Total	Saving or Loss

Form Used for Recording Comparative Costs of Performing Work by Oxy-Acetylene and Other Methods

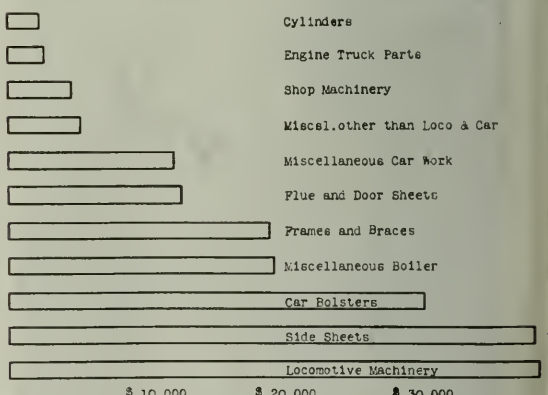


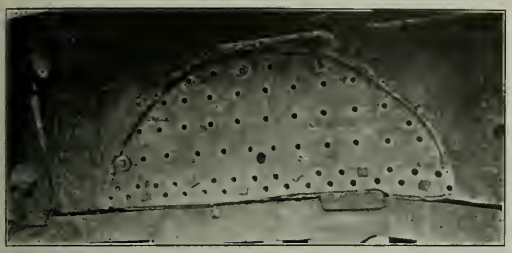
Diagram Showing Relative Saving on Various Classes of Work Repaired With the Oxy-Acetylene Apparatus for 17 Months, Ending August 31, 1914

has been calked a few times, and the metal of the head has worked away, the only way of stopping the leak is to remove the bolt from the sheet and apply a new one.

With the use of oxy-acetylene cutting burner the protruding ends may be cut off in less time and at no greater expense than by the other methods; when done in this way neither the bolt nor the sheet is injured and the end of the bolt is also annealed so that it may easily and properly be driven up.

Two or three typical cases of repairs to fireboxes made by

the oxy-acetylene method are illustrated. One of these shows a welded door hole patch on engine 740. This patch saved the renewal of a door sheet, and except for the discoloration of the metal due to heat from the burner it is practically impossible to detect the weld. It cost $21.10; it is estimated that if done by former methods it would have cost $81.68. One of the other views shows a firebox sheet, which had been badly worn by a driving wheel, with a patch in place ready for welding. The companion view shows the patch welded in by oxy-acetylene process.



Patch in Place, Ready for Welding, on Firebox Sheet Worn by Driving Wheel

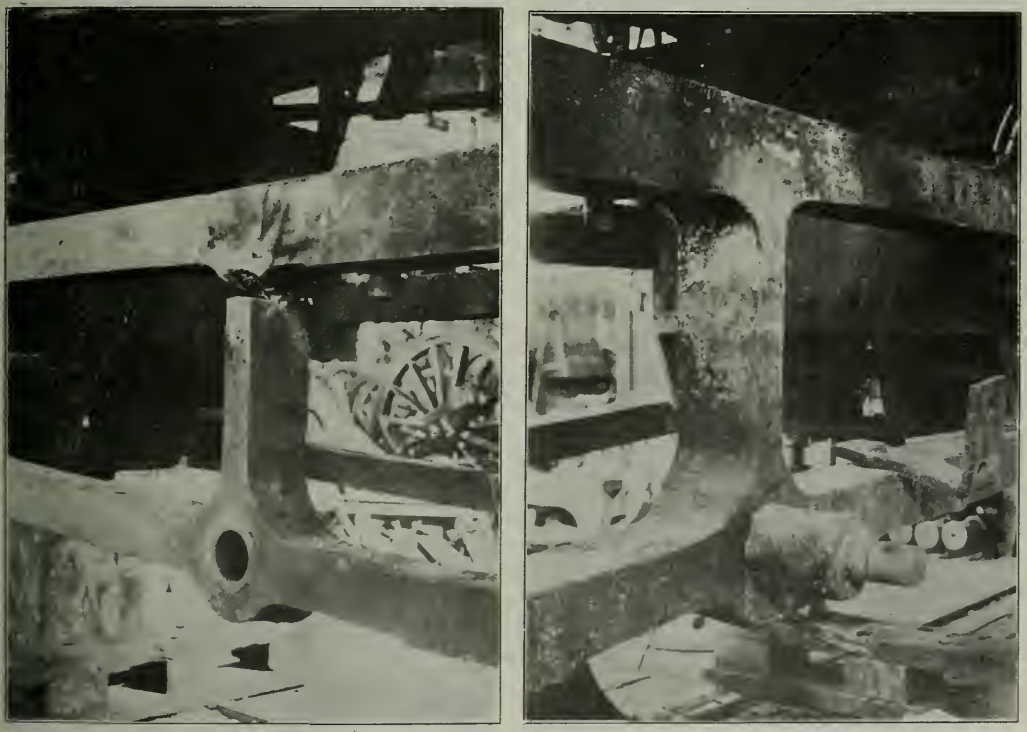
Firebox Patch Welded in Place by Oxy-Acetylene

Following is a brief extract from a report made by one of the master mechanics:

We have engine 975 with a collar patch on the firebox door, and it is surprising to see the job that was done. There is no sign of a leak whatever. I also took guide yoke off of engine 1404, which was badly cracked and patched, and sent it to the north shops at Springfield. It is a hard matter to detect where the weld was made; it is now as strong as ever, and saved applying a new one.

TUBE WELDING

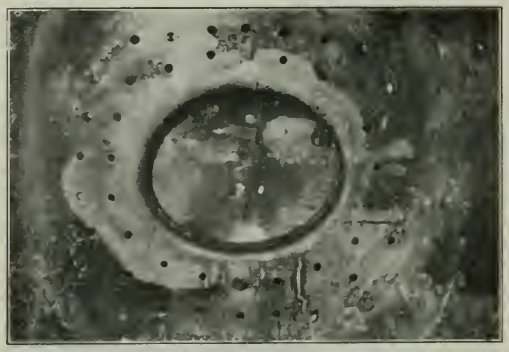
The welding of tubes into the tube sheet has proved most successful. One engine had an entire set of tubes welded in 11 months ago and has been in continuous service since that time; it was recently inspected and the tubes were found to be in splendid condition. During this period no repairs have been necessary to keep the tubes tight in the sheet and to prevent leaking. As a result of this experiment, the welding in of tubes has been adopted as a standard practice and all of the locomotives will be treated in this way as rapidly as the oxy-acetylene plants can handle the work.



A Difficult Frame Weld Accomplished by the Oxy-Acetylene Process

While the original or first cost of welding in the tubes is higher than the ordinary practice of rolling and beading, this

additional expense is much more than compensated for by the advantages of the welded tubes. If the original welds are properly made the maintenance cost is reduced to practically nothing. This is especially appreciated by those in charge of the engine houses. In addition to the reduction in engine house work the life of both the tubes and the tube sheets will be increased, possibly as much as 50 per cent. With the continual rolling and working ordinarily done to stop leaks, the life is gradually worked out of the tube ends and the tube sheets are distorted, necessitating renewals at more frequent intervals than



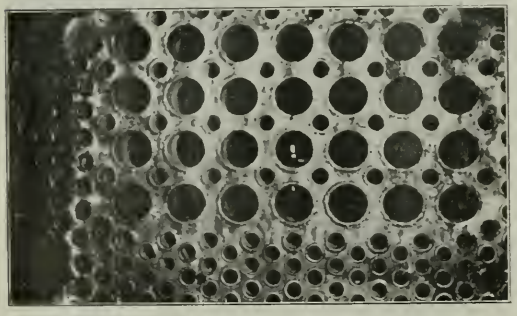
Fire Door Patch Welded in by the Oxy-Acetylene Process

is the case with welded flues where no work is necessary. One of the illustrations shows an installation of superheater tubes which have been welded into the tube sheets.

MISCELLANEOUS REPAIRS

As indicated on the chart which shows graphically the relative savings made by oxy-acetylene welding in the handling of different classes of repairs, the welding of locomotive frames plays a most important part at the new Springfield shops. Several of the photographs show repairs which have been made, either by welding broken frames or filling up worn places. This method has given uniformly good results.

Thus far the work accomplished at the new Springfield shops



Superheater Tubes Welded into Tube Sheets

has been very largely in the line of boiler and frame repairs, although splendid use has been made of the apparatus in repairing broken machine castings and in welding various locomotive and passenger car parts. The volume of boiler work has prevented, or interfered with, this miscellaneous class of work. However, it is steadily increasing in volume. A few of the articles which have been thus repaired are shown lying on the bench and floor in the photograph of the pre-heating forge which is used by the oxy-acetylene welders in the machine and erecting shop.

A considerable amount of work has been done in filling up and re-enforcing worn side rods, some of which were originally of poor design. It is estimated that the saving effected in forming and welding on new ends amounts on the rods of a ten-wheel engine to approximately $65.

The flange joints at the end of the water columns and spouts are subject to frequent breakage. Ordinarily this means the scrapping of the column and its replacement with a new one.

With the oxy-acetylene process broken flanges may be welded at a slight cost. As an instance of this sort, the water column at Monett, a most important point, was damaged in this way.

Preheating Forge and Bench for Making Welding Repairs

It was sent to the north shops on a night train and the iron flange which was broken in several places was repaired and the column was returned to Monett the following night.

NORTH SPRINGFIELD SHOPS

The north Springfield shops are largely used for the finishing or manufacturing of material and for freight car repairs. How-

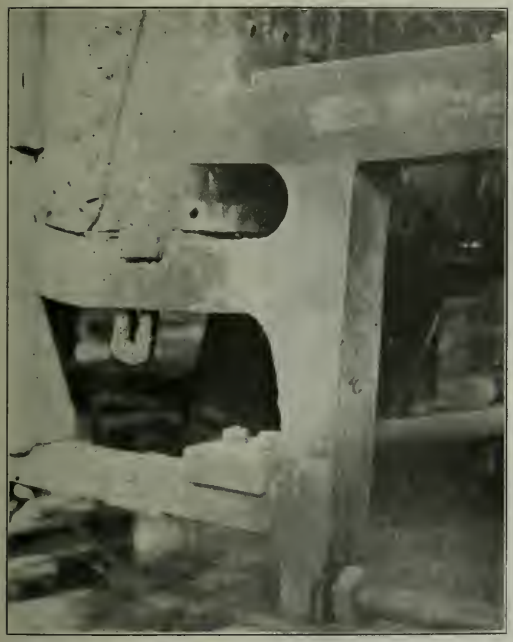
This Frame Worn to a Depth of 5-8 in. by a Spring Hanger Was Built up to Size by the Oxy-Acetylene Process

ever, several engines are repaired in the erecting shop each month and there is also a special department for overhauling work equipment and motor cars. Naturally, under these conditions, many possibilities are offered for the advantageous use of the oxy-acetylene apparatus. The greatest volume of this

work is in connection with the repair of freight car castings. The value in making repairs to broken or worn parts of the work equipment and motor cars can hardly be estimated, but is very great. Many of the parts for this class of equipment are not regularly kept in stock, and if the oxy-acetylene plant were not available extended and expensive delays for securing material would be unavoidable.

Wonderful results have also been obtained at the north shops in making repairs to machine tools and machinery. Following are a few instances of this sort:

Engine 1000 came into the shop for repairs to a cylinder. The planer upon which this work was to be done broke down. Under ordinary conditions it would have required from ten days to two weeks to secure a new part for the planer and the locomotive would have been held out of service for that length of time, although no repairs were necessary other than those to the cylinder casting. With the use of the oxy-acetylene ap-



Pedestal Jaw Broken Between the Top and Bottom Rail Which Was Welded by Oxy-Acetylene Process

paratus the planer was repaired and placed in service within 45 minutes.

The internal gear was broken on a power forcing press, two of the teeth being torn off. It would have required at least ten days to procure a new gear. With the oxy-acetylene apparatus the teeth were built up and the press was again in operation on the following day.

The housing for a large roll was broken. The factory was immediately telegraphed for a new part which reached the north shops six weeks later. Meanwhile the oxy-acetylene operator got busy and welded and replaced the housing within a day and a half. The new housing is still held in reserve.

A long hole of large diameter was being drilled through a locomotive trailer truck casting. There was only one drill of the proper size in the shop and it broke through the middle. In one and one-half hours it had been repaired with the use of the oxy-acetylene apparatus and was back in operation. This was several months ago and the drill is still working.

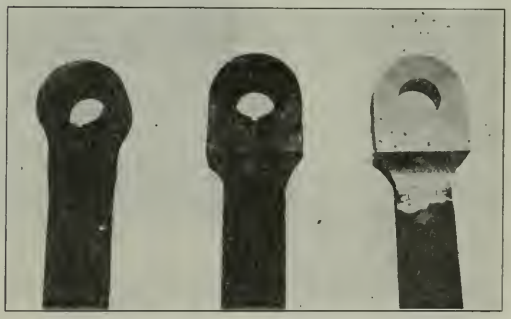
Repairs are made to brass, bronze, special alloy castings, and steel castings, as well as to those of cast iron. Important savings are made in repairing the cases for air motors and other of the smaller parts of these tools. Other interesting jobs which have been performed at the north shops are as follows: In a number of cases deck castings have been welded. A locomotive bell of a special composition which had become cracked was successfully welded without in any way affecting the sound qualities. Splendid results have been obtained in repairing steel

A Water Column and Spout Which Were Repaired by the Oxy-Acetylene Process

passenger coaches by cutting out worn parts of the roof, thus allowing new parts to be riveted in place. A cast steel frame on a six-wheel coach truck was broken on both sides. There were no extra castings of this sort in stock and the pieces were successfully welded together, resulting in a very large saving, as the steel castings would otherwise have had to be scrapped. Instead of drilling the cylinder saddle holes in a new smokebox they are burned through with the cutting burner. Large savings have been made in repairing injector castings which have been cut by the wind sheet.

Particularly important results have been gained at the north shops in welding cast steel bolsters. The average cost of these bolsters when new, allowing for their scrap value, is $19.36; the average cost of making repairs to a large number proved to be $2.46, a net saving per bolster of $16.90.

Examples of savings such as mentioned above, might be multi-



The Ends of Side Rods are Reinforced by the Oxy-Acetylene Process

plied indefinitely, but those cited will give some idea of the adaptability of the oxy-acetylene apparatus for emergency repairs of all kinds, as well as for the routine work in a locomotive and car repair shop.

The installation of the Oxweld plants on the Frisco and the progress of the work in these plants has been carefully supervised by H. W. Jacobs, of the Oxweld Railroad Service Company, who was probably the first engineer to suggest the piping of oxygen and acetylene gases for this purpose in railroad shops in this country.

HARRY R. KURRIE

Harry R. Kurrie, general attorney of the Chicago, Indianapolis & Louisville, at Chicago, on September 4 was elected president of the company at a meeting of the board of directors in New York, to succeed Frederic A. Delano, who recently resigned to become a member of the Federal Reserve Board. Mr. Kurrie is 39 years old and is, therefore, one of the youngest railroad presidents in the country. He was selected by the executive committee which has had the matter under consideration since Mr. Delano's resignation.

Mr. Kurrie is a lawyer, and for the past 13 years has been connected with the legal department of the Monon; for the last four years as general attorney. Having previously been engaged in the private practice of the law he has never been directly connected with any other corporation than the Monon, and in his work in the legal department he has commanded the respect of his superiors for his character and ability and his unremitting industry.

Harry R. Kurrie

In announcing Mr. Kurrie's election E. C. Field, vice-president and general solicitor of the road, gave out a statement in which he spoke of Mr. Kurrie as follows: "He is a man of character and deliberate judgment and his proficiency as a lawyer became well established throughout Indiana. He has always been a hard worker, has unusual capacity for the details of transportation problems and is now the most thoroughly equipped man for chief executive on the Monon road. He will have no outside matters to embarrass him and his sole ambition will be to make successful the property that has acquired the most enviable reputation under the splendid management of Fairfax Harrison, and later of Frederic A. Delano. Mr. Kurrie knows practically every man on the system and there will be no disturbance either in the policy of the road or its organization. The Monon is essentially an Indiana road, most of its mileage being in that state. Mr. Kurrie is the first Indianian to have executive charge of the property, and I predict his appointment will be more gratifying to our patrons than any other that has ever been made. He is a young man yet and he is a very sensible man. He will make as good a president as any railroad man in the world."

Mr. Kurrie was born in Orange county, Indiana, on April 26, 1875, of German stock, and although of recent years he has maintained a residence in Chicago, he has also spent much of his time on his farm at Paoli, Ind., his home town, and has always lived almost within sight of the Monon tracks. The Monon road was built through Paoli soon after he was born, and he has thus been constantly associated with it throughout his life and has felt a real attachment to the company. Since being connected with the road he has had various opportunities to accept other places at greater salaries, but has always felt a strong inclination to remain with the road. His early life was spent on a farm near Paoli; later he became a student in the State University at Bloomington, Ind., and he was graduated from both the literary and law departments. In June, 1895, he began the practice of law at Rensselaer, Ind., and on February 10, 1902, he was appointed assistant general solicitor of the Chicago, Indianapolis & Louisville, in Chicago. In January, 1910, he was promoted to the office of general attorney.

ENDING THE MILEAGE-BOOK DISCRIMINATION

[New York World].

The Pennsylvania and New England railroads which have announced increases in passenger rates are confining the advances to their mileage-books. If any change upward is to be made, and the commission has virtually sanctioned an upward change, this is the best way to go about it. A general advance in passenger rates would undoubtedly reduce passenger traffic. An advance in mileage-book rates alone should have slight effect in reducing traffic. There has never been any sound reason for this discrimination against single-ticket travelers. The wholesale and retail principle does not apply. While mileage is sold wholesale in the book form, its transportation is actually used retail by the buyer as he pleases, in time or place or distance, just as with the single-ticket buyer. He is as incalculable a traveling quantity to the railroad in the one case as in the other. The money of the hand-to-mouth buyer of transportation ought to be as good as that of the man who buys his transportation ahead of its use.

[Philadelphia Public Ledger]

The Interstate Commerce Commission is responsible for the proposed increase in mileage-book passenger rates. The commission is committed to the proposition that every branch of the railroad business should show a profit. . . . A 5 per cent increase in freight rates would have distributed the burden so widely that no one would have felt it. . . . But the extra cost of every mile one travels on mileage books will be considerably greater than the extra freight which the railroad wished to charge on the pair of shoes that he wears. The traveler will feel the increased cost of each mile, but the increased cost of the shoes would not have been discernible. It is a beautiful theory that every branch of the railroad business should show a direct profit; but every practical man knows that the indirect profits of an apparently unprofitable branch of his business are sometimes so great that he would have to go into bankruptcy if it were not for them. It is the men traveling in the passenger trains who make the business that fills the freight cars. Theorists in Washington do not seem to be able to comprehend these simple business principles.

Port Development in Costa Rica.—The president of Costa Rica, subject to the approval of Congress, has signed a contract providing for the development of Port Tortuguero.

Controlled Manual Block for Opposing Movements

A Short Two-Track Freight Railroad in New Jersey Fulfilling the Functions of a Three-Track Line

By C. C. Anthony

The Pennsylvania Railroad has recently installed on two miles of double track a controlled manual block system designed to permit movements to be made by signal indications in either direction on either track and to protect against opposing trains every possible movement from a yard or over a crossover near the middle of the section. The installation is on a part of the freight line connecting the four-track main line with the terminal yard on the Hackensack Meadows, near Jersey City. On account of the large number of both slow and fast freight trains passing over these tracks it was thought desirable to provide block signal protection and, at the same time, to provide for movements against the current of traffic by signal so that one train could be run around another in the section in question, without the use of train orders. It had been found necessary to make such movements frequently (on one occasion sixteen trains were run against the current of traffic in one day) for the purpose of getting trains of perishable freight into Jersey City for the New York market when slow freights ahead of them were blocking the normal track; getting fast freight, from Jersey City around slow trains that had pulled out of the Meadows Yard, and getting trains into the yard within the sixteen-hour limit.

For movements with the current of traffic the two-mile block section is divided into three blocks by automatic signals. The signals governing entrance to the two-mile section in the normal direction are, however, necessarily absolute signals to hold trains when opposing trains are in the section. To enable trains to follow one another the same as they do under automatic block signals, each of these signals is provided with a second—"calling-on"—arm. Both arms must be horizontal when a train moving against the current of traffic is at any point in the two-mile section. When trains are moving in the normal direction, the top arm may be set at caution if the block extending to the first automatic signal is clear and that signal is at stop, or at proceed if the block is clear and the first automatic signal is at caution or proceed. If, however, the block is occupied (by a train that has entered in the normal direction), the top arm is held in horizontal position by track-circuit control and the calling-on arm can be set at caution to allow a second train to enter the occupied block.

For movements against the current of traffic it was not thought necessary to provide intermediate automatic signals and, on each track, the block extends the entire length of the two-mile section. Entrance to this block in the direction against the current is governed by a three-position signal which is, of course, locked in (absolute) stop position when trains are moving in the normal direction, but can be set at proceed for a movement in the reverse direction, if the block is clear; or at caution for a second train to enter the block occupied by a preceding train. That is, trains move normally under the automatic block signal system varied by the use of a calling-on arm for movements past an absolute stop signal at the entrance of the first block; while, in the reverse direction, they move under the permissive manual block system. The layout of tracks and signals is shown by the right-line plan, Fig. 1. West of CG the tracks run through a yard and are not block-signaled; hence the absence of westward signals at that point.

In working out the system it was assumed that the rear protection to be provided should be the same as that afforded by the simple manual block system; that it would not be justifiable to complicate and increase the cost of the system for the purpose of making it necessary to secure a separate unlock for each of several successive trains in the same direction. The circuits and controlling devices are designed primarily to prevent the admission of opposing trains to a section under any circumstances. If, however, power-operated or electrically slotted signals are installed, it is a simple matter to provide a degree of rear protection that is not possible with the simple manual block system; that is, the movement of a signal from the caution to the proceed position may be controlled by all the track circuits in the section, so that a clear signal cannot be given unless the whole section is clear. And, as a matter of course, such a signal would be made semi-automatic so that it would be set at stop by every train passing it, and manipulation of the signal lever for each train would be necessary. The signals of the installation in question are motor signals controlled in this way.

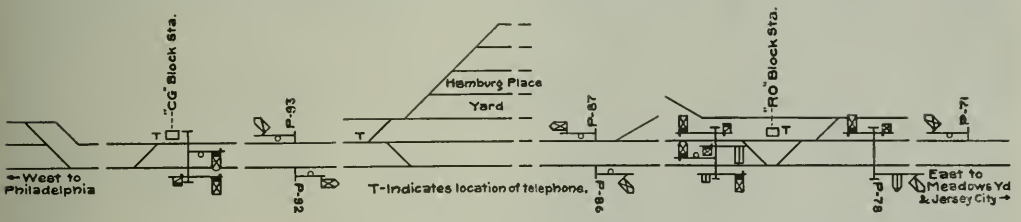


Fig. 1—Tracks and Signals on Freight Line

It is true that, if the system were designed for absolute blocking only, it might not be a difficult matter to arrange it so that a separate unlock would have to be secured for each train. But it is important to note that, to secure the full protection of the system, every train movement into a section should be made by signal indication, or by its equivalent, such as the unlocking of an outlying switch. If absolute blocking is provided for and if then, in practice, it happens rather frequently that freight trains are allowed, by caution card or train order, to pass stop signals for the purpose of following other freights in the sections, the checks applied by the system are ineffective in these cases; a card or order may be issued in error to admit a train against an opposing train. Therefore, if permissive movements are to be made even occasionally, the system should be designed so that proper signal indications can be given for such movements. To accomplish this in a simple way it is practically necessary that the apparatus be so arranged that an unlock, once obtained, can be held until the section is clear. The only occasion for admitting trains under stop signals should be when there is some derangement that prevents the clearing of a signal; or when a train must be admitted in the opposing direction to reach a disabled train; or when a train has to be run over the working

limits of a work train that entered the section in the opposite direction. In all such cases on the Pennsylvania the despatcher takes charge and issues the necessary orders, first assuring himself that any apparent derangement is not due to the presence of an opposing train in the section.

The novel feature of the system is the provision for control of movements into the section at outlying switches. The apparatus and the essential circuits are shown diagrammatically in Fig. 2. Readers who are not interested in these details will find the possible train movements and the protection afforded, illustrated by the diagrams in Fig. 3, which are explained farther on.

Fig. 2 shows a block section with two outlying switches, one controlled from each block station. For the control of an outlying switch the block instrument is made up of two manually operated electric locks, C and D, interlocked by mitered mechanical locking clearly shown in the figure. When the operating handles, c and d, of these electric locks are moved to the right or left, the lock segments, of course, rotate in the opposite direction; in the three conventional symbols for the circuit-controller contacts in each lock (shown below the lock) the lower ends of the contact arms are supposed to move in the same direction as the handle. The signalman at station A, to give an unlock to B, moves the handle c, of his block instrument, to the left. The circuit is then from battery (+) through contact of indicator E, which is controlled by the track circuits extending to a point just beyond outlying switch a; wire 1, contact of electric lock F, which is closed when the signal at A is locked in stop position; wire 2, armature contact of block instrument C, which is closed when the instrument is locked against a movement that would release the signal; wire 3, contact closed when c is moved to the left, wire 4 through contacts of track relays I, J, i, covering the middle portion of the block, between the outlying switches; normally closed contact of the block instrument at B, wire 5, electro-magnet C to common return. The signalman at B then moves his handle c to the right, thereby mechanically releasing the other part of his instrument, D, and closing the circuit from wire 6 to 7. The circuit from 4 to 5 remains closed so that after an unlock is received, the indicator of C will show at any time whether the portion of the block between A and b is occupied.

B is now ready to clear his signal. To do this he must move handle d to the right and this can be done only when indicator E is clear, the circuit being from battery at B through contact of E, wires 1, 2, 6, 7 and 8 to electro-magnet of D. Movement of d to the right breaks connection between wires 7 and 8 so that the armature of D will fall, lock d against return to normal position and close a circuit from battery through wires 9 and 10 to the lever lock F, which then releases the signal.

When the signal has been cleared and thereafter returned to normal position, d may be moved to position MR to break circuit 9, 10, and lock the signal lever; but it cannot be moved farther until the train for which the signal was cleared has passed beyond switch b; then indicator E will clear and close circuit 1, 2, 6, 7, 8, thereby unlocking D. Handle d can then be moved to normal position, when it releases c, which is mechanically locked in position to the right when d is moved either to the right or left.

If B should now move c to the left he would close a circuit to unlock A, exactly the same as the one first described. This circuit, however, would not be complete so long as the train was on any track circuit controlling a relay h, i, J or I; (relay h controls indicator E which prevents the giving of an unlock, by B by opening the connection between battery and wire 1; while relay H, although similarly preventing the giving of an unlock by A, does not prevent the receipt of an unlock at that station because wire 4 goes directly to instrument C). Assuming that

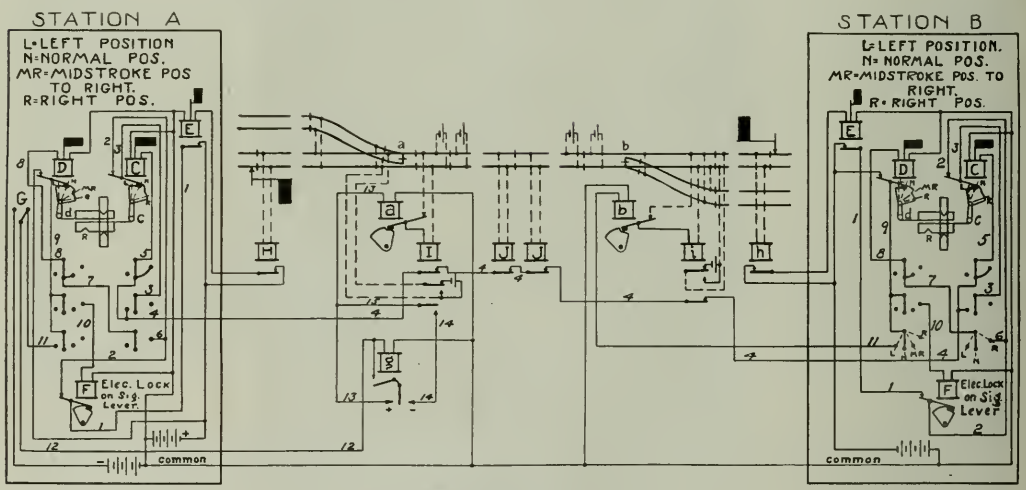


Fig. 2 Typical Diagram of Circuits

there is a train on the siding waiting to pull out at a, the crew will report by telephone when the train moving from B to A passes. B may then give A an unlock. A will move handle c to the right but cannot move d to the right, so as to release his signal, because the circuit for unlocking D (1, 2, 6, 7, 8) is open at indicator E while the approaching train is between a and A. He is, however, free to move d to the left because it is mechanically released by c (moved to the right) and the electric lock of D is not effective against movement of d to the left but locks only against movement to the right or return from position MR to normal. Movement of d to the left breaks connection between wires 7 and 8 so that, when there is no train between A and a and circuit 1, 2, 6, 7, 8 is closed at E, the armature of D will fall. The same movement, the armature contact of D being closed, completes a circuit from battery through wires 9 and 11, circuit controller G and wire 12 to polarized relay g which closes a branch of the same circuit through wire 13 to the electric switch lock, a.

As the armature of lock a controls relay I and relay I controls the circuit of H, indicator E is open while the switch is unlocked and while a train pulling out is on the track circuit of relay I. It is therefore impossible, during that time, to move

handle d to the right to release the signal; and the train would be protected at A if it should make the move illustrated by case 4 or case 6, Fig. 3. Assuming that it moves toward B, an unlock cannot be received at B while it is between a and b; consequently an opposing train cannot be admitted to the block either by signal at B or by unlocking of the switch at b. After it has passed b an unlock may be received and used to let a train out of the siding at b but, as explained in the case of A, cannot be used to release the signal. A, however, still retaining the unlock obtained to let the train out at a, may, after this train has cleared the track circuit of relay I, move handle d to the right and give a caution signal to admit a following train.

If a train moving from B to A has to enter the siding at a,

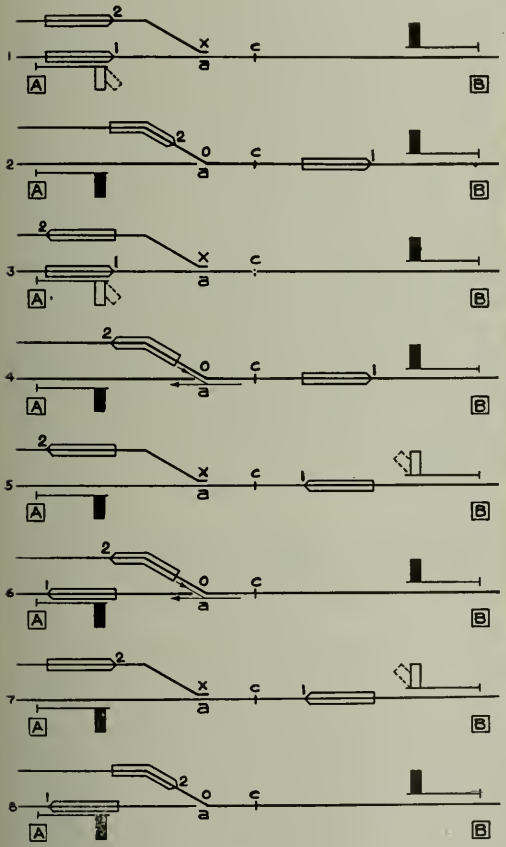


Fig. 3—Diagrams Illustrating Protection and Possible Train Movements

circuit controller G is moved to the left to close a circuit from the negative pole of a separate battery to relay g. This relay then continues the circuit through wire 14, back contact of relay I, wires 15 and 13 to the switch lock which may thus be unlocked when the train is shunting relay 1. Obviously the switch could be unlocked in this way while a train was passing on the main track or while the track relay was open because of some defect. But it is equally obvious that, if electric switch locks are used, some provision must be made for unlocking switches at which trains have to enter sidings; the arrangement illustrated is reasonably simple and has been found satisfactory in practice. If a switch is normally used only for trains leaving the siding, the circuits are arranged as at station B.

There are various additions to these circuits where semi-automatic signals, electric distant signals, approach locking, etc., are installed; but the block circuits remain the same and, as the diagram shows, require but two line wires through each block and one additional wire for each outlying switch, extending from the switch to the block station from which it is controlled. Indicator E, however, requires a line wire if there is a semi-automatic distant signal between the block station and the farther end of the track circuit for relay 1.

Turning now to Fig. 3, the results obtained in the way of protection and facility of movement may be explained with the aid of the diagrams; these show a block between block stations A and B, the signals governing entrance to that block and an outlying switch, a, controlled from block station A, with trains passing and meeting under various conditions. X indicates that the switch is electrically locked; O, that it is unlocked. Semaphore arms in solid black indicate that the signals are, for the time being, locked in stop position; arms in outline are free to

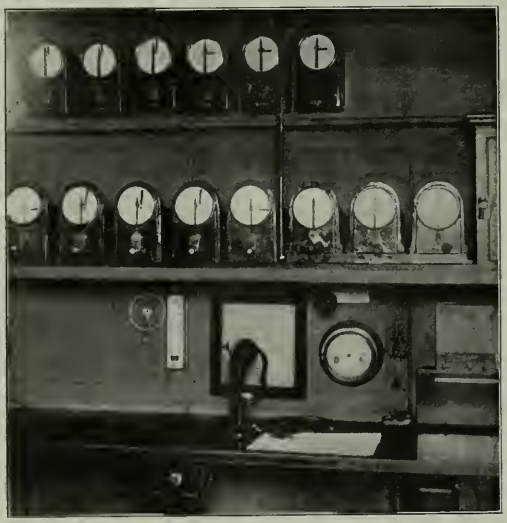


Fig. 4 Interior of R O Cabin

be set in caution position as indicated by dotted lines. The point c is the end of an intermediate track circuit beginning at the switch and extending 500 feet or more.

In case 1, train 1 has entered the block at A and switch a cannot be unlocked. When train 1 has passed c, as in case 2, the switch can be unlocked for train 2 to follow. Whether train 2 shall be allowed to follow permissively or shall be held on the siding till the block is clear, is a matter of manual block operation; but if it is allowed to follow train 1, it will be protected against opposing trains, by the signal at B, until it clears the block. In case 3 and 4 it is assumed that train 2 has taken the siding to meet train 1, but, for some reason, will have to back out at a instead of pulling through the siding and going out at the other end. Again the switch is locked until train 1 has passed c and may then be unlocked for train 2 to back out and proceed toward A. In this case the signal at A remains locked until train 2 clears. In cases 5 and 7 the switch is locked while train 1 is approaching from B, but may be unlocked as soon as train 1 has passed it, so that train 2 may back out and follow train 1, as in case 6, or pull out and proceed to B, as in case 8.

It is hardly necessary to say that, if two or more trains are in the block, the last train in must pass c, in cases 1 and 3, or a, in cases 5 and 7, before the switch can be unlocked. In case 2, as

soon as train 2 has passed c, the switch having been set and locked for the main track, the signal at A is free to be set at caution for a third train to enter the block at that point. Similarly in case 4, if, after train 2 has cleared at A, a third train should arrive at A before train 1 has cleared at B, the signal at A can be set at caution for this third train to follow train 1; and in case 8, after train 1 has cleared and train 2 has passed c, a third train may be admitted at A on a caution signal. In cases 4 and 6, however, the signal at B remains locked until train 2 clears the block; it is hardly practicable, without undue complication, to arrange the circuits so that the signal at B, in these cases, can be unlocked as soon as train 2 has started from a toward A (assuming that, in case 4, train 1 has cleared in the meantime). Nor is such facility of much importance in practical operation.

In actual operation there is, of course, an understanding as to the move to be made in each case; but it is obvious that, *so far as the signal system is concerned*, the unlocking of an outlying switch leaves a train free to enter the block and move in either direction, and must, therefore, be preceded by the locking of signals against other trains from both directions. It is found to be quite practicable, however, to release the signal at the block station from which the switch is controlled, as soon as the rear of a train that moves away from that block station has cleared a track circuit at a point about 500 feet from the switch, as in case 2, Fig. 3. It is assumed that, if the train stops on the main track for the switch to be set normal and then moves in the reverse direction, as in case 4, it will not clear the track circuit in question and will hold the opposing signal locked until it clears the block.

An indicator or electric signal might be used, instead of an electric switch lock, to govern trains leaving a siding, with practically the same circuits and operation. The electric switch lock requires means for unlocking the switch to allow a train to enter the siding, as explained in connection with the circuits.

Although the circuits and operation have been explained for the typical case of one or two outlying switches in the block—one controlled from each block station—the number of switches that can be controlled is not limited. In one block on another part of the Pennsylvania, there are four switches, all of which it was thought desirable to place under complete control because trains might occasionally clear the main track at any one of them. An additional section of the block instrument, with the necessary switch-lock and controlling circuits, is provided for each additional switch controlled from a given block station, and the same protection and facility are secured for movements into the block at any one of the switches as are obtained in the case of one switch controlled from each block station. In practice complete control is provided only at those switches at which trains are expected to clear the main track in normal operation. The switch of a short industry track, for example, is not electrically locked and the instructions prohibit the regular use of that track for passing of trains. If, in some emergency, an engine should get clear on such a track and allow other trains to pass, its return to the main track would be governed by train order.

An example of a switch not controlled is the one at the spur track near signal P87, Fig. 1; as there will practically never be any occasion for even an engine to get clear on this track, the cost of providing an electric lock fully controlled, as a part of the block system, would not have been justified. The crossover between main tracks, near Hamburg Place yard, is treated, with reference to each main track, as a connection between that track and a siding. Thus, if a train is on the westward main track waiting to cross to the eastward track, the crossover must be unlocked by circuits connected with the eastward track—the track that the train is about to enter; and, as already explained in the case of a siding switch on single track, these circuits permit the unlocking of the crossover only when conditions are such that a train may safely enter and move in either direction on the eastward track. The presence of the train on the westward track prevents the unlocking of the crossover by means of circuits connected with that track. Conversely the crossover must be unlocked by circuits connected with the westward track when a train is to cross to that track. The connection between the yard and the westward track falls under the typical case of a siding connecting with a single-track line; the circuits are necessarily arranged, as explained in connection with Fig. 2, to permit the unlocking of the switches for a train to enter the yard.

The benefits derived from the system in this application to double track are the saving of the despatchers' time that would have to be given to this section if movements against the current of traffic were frequently made by train order, and the facility for making such movements safely at a moment's notice whenever conditions permit, without the delays incident to the issue of train orders—a facility that means, assuming a certain use of the tracks against the current of traffic, the maximum capacity possible with such use of the tracks.

The same system is used on several sections of single track, among them two that lie between sections of double track. In one case, the first installation, the single track is about 8½ miles long, divided into two blocks of 3½ and 5 miles. There are passing sidings extending into the blocks from both ends of double track and a passing siding with crossovers at the middle block station. Each block station is an interlocking and a certain amount of benefit results, of course, from the saving of stops of trains that have to enter the sidings. Double track was thought to be urgently needed before the system was installed, seven years ago; from that time to the present there has been no serious difficulty in handling the trains on the single track, and second track, which would be quite costly, seems to be still some distance in the future. The latest installation has been made in connection with a section of new line about five miles long built to secure a better grade on a single-track division. Both the old and new lines are equipped with controlled manual block and the old line has one passing siding and one station spur track in the block. In this case passenger trains and local freights in both directions have to run over the old line on account of intermediate stations. The installation permits the use of both lines to the best advantage for the meeting and passing of trains, and at the same time gives some relief to the despatchers on a very busy single-track line.

The system described is the subject of a patent issued to the writer.

A QUARTER CENTURY OF DEFICITS IN PASSENGER SERVICE

The Bureau of Railway News and Statistics has issued the following:

Twenty-one years ago more than one-third of the railway mileage of the United States was carrying its passenger business at a loss. Taken in conjunction with the recent decisions of the Interstate Commerce Commission in both eastern and southwestern rates cases, finding present state-enforced passenger fares unprofitable and ruling that the railways need not apply to interstate traffic the excessively low rates forced by state legislation, figures taken by the Bureau of Railway News and Statistics from early reports of the commission show that at least for a quarter century the passenger traffic of the United States has either resulted in actual loss to the carriers performing the service or has failed to contribute its proper share to railway revenues.

The commission's recent decision, therefore, is seen as the result not of a recent development in passenger traffic, but of the fact that American passenger fares never have been adequate to the expensive quality of service demanded by Americans.

For six years after its creation the commission compiled figures showing not only the average revenue received by the railways for carrying one passenger one mile, but also the average cost of performing the service. For these six years the revenue, cost and difference in cents per passenger mile are as follows:

Year	Revenue	Cost	Difference
1888	2.349	2.042	.307
1889	2.165	1.993	.172
1890	2.167	1.917	.250
1891	2.142	1.910	.232
1892	2.126	1.939	.187
1893	2.108	1.955	.153

Taking these costs of a quarter century ago it may be seen how slight could be the profit today, when the average revenue has declined to 2.01 cents per passenger mile, forced upon the railways by state legislation, while all elements of cost, particularly labor, fuel, equipment and terminal facilities, have risen enormously.

By 1893, in fact, when the commission abandoned the computations, the railways in 4 of the 10 territorial groups were shown to be carrying passengers at a loss. The deficits for these groups for the several years follow in fractions of cents per passenger mile:

Group	1890	1891	1892	1893
V	*.388	*.217	*.089	.146
VII	*.063	.093	.283	.151
VIII	.026	.176	.212	.250
IX	.153	.057	.133	.050

*Net profit.

Thus in 1893 there was an average loss for every passenger carried by the railways of Georgia, Florida, Alabama, Mississippi, Tennessee, Kentucky, Louisiana, Arkansas, southern Missouri, Oklahoma, Indian Territory, Kansas, Nebraska, western North and South Dakota, Montana, Wyoming, Colorado, eastern New Mexico and Texas. These railways, paying more to furnish the passenger service than they earned from the service, operated 58,843 miles of the 169,780 for the entire country, or almost 35 per cent.

Today American railways furnish the highest class passenger service in the world at a price as low or lower than that charged by any of the railway systems of Europe in their first class tariffs, even disregarding the much greater value of the American cent in these foreign countries. The comparative cheapness of American travel is shown more truly in the length of journeys purchasable by an average day's labor, the wage taken being that of railway employees:

	Av. wage per day	Av. rects. 1st class per passenger mile	First class for day's labor
Switzerland	$0.99	*3.26 cents	30.4 miles
Great Britain	0.93	*3.00 cents	31.0 miles
Italy	1.15	*3.52 cents	32.7 miles
France	0.87	2.12 cents	41.0 miles
Belgium	0.85	2.01 cents	42.1 miles
Germany	1.35	2.93 cents	46.1 miles
United States	2.49	2.01 cents	123.9 miles

*Tariff rate.

One day's labor in the United States purchases thus almost three times as much travel as would the same labor traveling first class in the nearest European competitors above.

TARE WEIGHTS AND REFUSE*

By Arthur Hale

General Agent, American Railway Association

It was abundantly proved by the recent investigation into railroad weighing by the Interstate Commerce Commission that on an average the tare weights marked on cars were higher than the actual weights of the cars. This is because cars on an average decrease in weight by wear, rust and general decay, and gradually fall below the weight with which they were originally marked.

It seemed to surprise the commission and many of the shippers to find that this situation is an advantage to the shipper. But there is no doubt that whenever the tare weight of a car is used in arriving at the net weight, and this tare weight is too large by, say, 1,000 lb., the railway is moving 1,000 lb. of freight free for the shipper.

Of course, there are cases when the tare weight is too low. Sometimes cars are repaired so thoroughly that they weigh more than they did, and sometimes the addition of new wheels or other new parts to cars increases their weight; but the railways are growing more and more careful to reweigh cars after repairs are made and there is not near the difficulty with this that there used to be. There is still difficulty when refuse is left in a car and when the car with refuse in it weighs more than the stenciled tare weight upon it. This is something we will return to.

The important point is that cars grow lighter, and as they are growing lighter the light weighing of cars should be renewed from time to time to prevent losses by the railways in carrying freight.

It was testified in this investigation by the superintendent of the largest weighing association that in light weighing over 30,000 cars under the old rule, it was found that the tare marked on 73 per cent of the total exceeded the actual tare by an average of 1,008 lb. per car. Let us see what this means in freight money. The last statistics of the Interstate Commerce Commission show that lumber pays the railways a little over 7 mills per ton per mile. This means that if one of these cars, whose marked tare weight was 1,000 lb. too much, was loaded with lumber for a thousand mile trip, the railway makes a gift to the shipper of $3.51, which is enough to clean, weigh and mark the car several times.

The average rate on bituminous coal is 4.7 mills per ton per mile. Coal does not move as far as lumber, but many cars of coal move 500 miles, and on every such trip we are presenting the shipper with $1.17 whenever we use one of these cars.

The situation has undoubtedly improved since the investigation. The rule has been improved; the railways are weighing their cars more frequently and it may be fair to presume that the old status has been so far improved that we should use on an average 500 lb. instead of 1,000 to indicate the difference in light weight of cars which should be weighed. Taking the average rate of freight, 7½ mills per ton per mile, and the average trip of a ton of freight, 254 miles, we are on the average presenting each shipper 47 cents for each load if we neglect the light weighing of cars. The average freight car makes so many trips per month that it is an immediate economy to see that it is light weighed in accordance with the new rules. It may be safely stated that millions of dollars are being saved to the railways by this more frequent weighing and marking of their cars. But this is not a question to handle by averages. The average car is probably all right, but here and there a car will be found which has not been weighed for several years and is dried out, so that it is 1,000, or even 2,000 lb. light. Whenever a shipper loads a car like this, the railroad man responsible therefor may be absolutely certain that he is going to charge the shipper less freight than he should, and with a very old car and high class freight this may run up to $10 or $20 for the trip, according to the freight rate per hundred.

This weighing of a car rests primarily with its owner, but cars are away from home so much now that liberal provisions have been made to encourage railways to weigh foreign cars. The rules provide for the light weighing of wooden cars every two years and steel cars every three years, and any railway finding a foreign car on its line which has not been light weighed as per the rule can weigh the car and make a charge against the owner of $1 for the work, which charge is increased to $1.25 in the case of stock cars.

We understand that at points where a large number of empty foreign cars are handled, railways can make very good money by systematically examining and reweighing foreign cars; and this is as it should be, because in practice the railway which bills out the lading of one of these light cars not only loses a portion of its own revenue, but compels the other railways which move the car to lose a portion of their revenue as well.

I know from experience how difficult it is to get cars regularly light weighed and marked. In times of car surplus the demand for economy is such that it is sometimes difficult to get proper force assigned to this work; but when it is fully understood, not only by the traffic department, but also by the transportation and mechanical departments that every time the marked tare weight is reduced to the true figure there is an important increase in the freight earnings, the difficulty of getting the work done is very much lessened; and this paper is written chiefly with the idea of getting this important question

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before the transportation people who arrange to have the cars light weighed, and the mechanical people who have to look after the marking of the car after it is light weighed.

The moment that it is generally understood that the reweighing of the old car is likely to bring an immediate and lasting reward in freight revenues, the difficulties in securing this light weighing will be diminished, even in hard times.

There is great difficulty too in getting cars light weighed when they are in demand. It seems hard to make a shipper wait while cars are being light weighed and remarked, but on the other hand it is very unfair to the railway to expect it to continue to use cars which are so marked as not to give full freight revenue.

This is one of the many things where railroad clubs, including as they do members of all departments, can help to improve railway practice. Normally the transportation and mechanical railroad men know little about freight rates, and when the traffic men are brought into contact with them the traffic men can tell them readily what rates are in effect on the principal commodities weighed on track scales; and they can work out together the actual economy in securing true weights on the freight which they are actually handling. If, for instance, there is a 10-cent rate on some iron pipe which is being shipped and the only car available is one whose light weight has not been renewed within two years, the agent can be pretty nearly sure that $2, or even $3 freight money can be saved to the company if that car is light weighed before shipment. This is also a matter of great importance to shippers who sell their goods on railroad track scale weights. If too high a tare is used they are going to be paid for less freight than they ship.

There is another way to look at this question, and here the yardmasters and agents can be especially useful to the railways. The marked tare is an important thing when cars are weighed on track scales, but not when cars are not weighed on track scales. It makes no difference to the railways what the marked tare is on cars loaded with warehouse freight, or on cars loaded by shippers with freight which moves under weight agreements. When it is impossible to get all cars light weighed to date, agents and yardmasters can do a great deal by using the cars with the old light weights in business where the tare weight is not a matter of importance.

There is a matter related to this on which the shippers can help the railways a great deal and where the railways can also help themselves, and that is the question of refuse in cars.

Under the law, consignees should unload *all* their freight, and this means they should not leave refuse in the cars, more especially when that refuse is incidental to that particular load of freight. Our present difficulty, however, in trying to get the consignees to clean out cars is that this rule has never been generally enforced, especially with open cars. Further, the railways, themselves, are not guiltless in this matter, and they do not always clean out the cars which they unload themselves.

It is true, as above, that a consignee ought to clean out his car, but on the other hand the railway ought to furnish a shipper with a clean car. The case is complicated where a consignee reloads a car and fails to clean it out before it is reloaded, and frequently a consignee objects to clearing out the car after he has unloaded it because he believes it contains refuse from a prior carload.

This state of things was fully exploited in the Weighing Investigation, and it was represented chiefly as a hardship on the shipper who might be called upon to pay freight on refuse left in the car by some one else. But the investigation did not fully develop another point, which is that the railways are now hauling about in their cars an amount of refuse so great in the aggregate that it must make some increase in their cost of operation. It is by no means infrequent, when cars of coal are unloaded by hand, to leave in the bottom of a car, and especially in the hoppers, slack coal and slate weighing 1,000 lb. or more. If 40 such cars get into one train of empties, it would cost the railway just as much to haul those 40 cars as it would to haul 41 really clean cars.

I see no way in which we can get definite figures on this subject, but the expense is undoubtedly there, and I believe that this would justify railways in spending more money than they do in cleaning out cars. If the railways will get their cars cleaned, I think it will be practicable to take the next step which will be to insist on consignees cleaning out cars, or charging them with the expense of such cleaning.

Can we not then conclude that there is more than one reason why the railways should see that their freight cars are clean and that the tare weight marked upon them is kept up to date? Not only will it pay the railways to do this, but it is the only honest thing to do.

EXPRESS COMPANY PROFITS NEAR VANISHING POINT

The Bureau of Railway News and Statistics has issued the following:

"With above 4,000 more miles of railway covered by their services 11 express companies operating in the United States during 10 months of the last fiscal year experienced a loss of 85 per cent in operating income. Official figures just published by the Interstate Commerce Commission show that for the 10 months to April, 1914, operating income for these 11 companies was $628,487, only 15 per cent of the operating income for the corresponding period in the year before, or $4,231,465.

"So drastic an exhibit as this raises the question before the American people whether they desire to see the express business wholly taken from private management and given entirely to the government through the parcel post. The showing is the direct result of the immense deflection of tonnage formerly carried by express to the parcel post, which in its competition for the business has enjoyed the overwhelming advantage of being able to increase its tonnage steadily through raising of the weight limit on parcels admitted to the mails while refusing with impunity to bear the increased expenses entailed, as would be necessary for a commercial enterprise, by withholding from the railways increased remuneration to cover the heavier work of carrying the enlarged mail tonnage. At the same time rates on the traffic left to the express companies have been cut 16 per cent.

"In gross receipts from operation for the 10 months, due largely to these influences, there was a loss of more than $8,000,000. Payments to the railways for their service in the express business consequently fell more than $3,000,000, while the tonnage which would have saved this revenue for the carriers as express was carried by the same railways without pay in mail cars. Operating revenues of the express companies thus fell $5,000,000, while a reduction of only $1,500,000 in expenses left a loss in net of $3,500,000, which was aggravated by an increase in taxes.

"For April alone, due to the same conditions, operating income fell from $437,826 in 1913 to $48,747 in 1914.

"The figures for the ten months and for April are as follows:

Ten months—	1914	Loss
Mileage	303,986	*4,213
Gross receipts	$132,646,163	$8,382,778
Express privileges—Dr.	66,413,551	3,266,223
Total revenue	66,232,612	5,116,555
Expenses	64,376,816	1,581,227
Net revenue	1,855,796	3,535,328
Taxes	1,227,309	*67,650
Operating income	628,487	3,602,978
April—		
Gross receipts	$12,839,513	$970,175
Express privileges—Dr.	6,475,442	373,537
Total revenue	6,364,071	596,638
Expenses	6,185,416	226,738
Net revenue	178,655	369,900
Taxes	129,908	*19,180
Operating income	48,747	389,080

*Increase.

"Of the 11 companies covered by the official figures, five reported operating deficits for the 10 months. One of the largest express companies alone during that period took in $466,258 less than it paid out to operate, and after paying taxes reported a deficit of $635,657 for the ten months' operations.

KANSAS CITY RAILROAD COLLECTION BUREAU

The railways entering Kansas City have organized the Railroad Collection Bureau of Kansas City, which began business on September 1, for the purpose of making joint collections of freight bills for all roads. The bureau is operated by the credit officers of the Kansas City lines under the supervision of an executive committee of the Credit Officers' Association. The expenses will be apportioned monthly to the lines according to the number of bills and the amount of money collected.

All freight bills, except the following three classes, are to be sent to the bureau for collection: 1. Bills collected in advance of delivery or forwarding of freight, known as counter-collections. 2. Bills covering freight interchanged with other lines. 3. Bills covering livestock collected by the Kansas City Stockyards Company. Fourteen collectors are employed and the cities of Kansas City, Mo., and Kansas City, Kan., are divided into districts with one collector assigned to each district. Each local freight office lists in numerical order bills for delivery to the bureau on a form made in duplicate, the original to be receipted by the bureau and returned to the local office, and the duplicate to be retained by the bureau. As fast as the bills reach the bureau they are to be charged to the collectors and distributed in cases provided for the collectors in the order of the names of the payees. Each collector gives a receipt for all bills received by him. The bills for collection turned over to the bureau are to consist of the original freight bill, cashier's memorandum, and, when receipt from consignees for freight is desired, a form of receipt, and all parts of each bill are to be attached together. Each collector is to make a list of the bills collected by him and balance them with the checks and cash collected, turning all in together with the cashier's memoranda of bills collected.

The bureau is to make a list daily of all bills collected for each line, separating them into the following classes: Inbound, outbound, switching, demurrage and storage, using a form which each line may use as a loose leaf sub-cash book. In case exception is taken to any bill the collector is required to obtain a written statement of the exception, and such statement and all parts of the bill are to be returned to the local office and a receipt taken for them. When correction has been made it is treated as a new bill and will take the regular course.

The manager of the bureau is required to deposit daily the full amount of cash collected for all lines and to draw a check daily in favor of each line for the full amount of the collections made for it, and will make such disposition of the same as the proper officer may direct. Each line is to designate the name of some officer or a bank to whom checks shall be made payable and the bank acting as depository for the bureau is instructed not to pay any checks drawn in favor of any one else. The manager of the bureau is authorized, and it is his duty to check the local offices to prevent bills being sent direct to patrons for collection. All bills are to be receipted in the name of the bureau manager.

Prepaid bills are considered as due and payable upon presentation after loading or forwarding of freight. A reasonable time, according to conditions surrounding the business, with a maximum of one week, is allowed for checking, auditing and payment of bills.

In case a patron refuses or neglects to pay bills according to these conditions the manager is authorized to call upon him and in a diplomatic way, without embarrassing any line, to endeavor to arrange to have bills paid satisfactorily. If such arrangements cannot be made the manager is to notify each agent that the patron expects the railroad to discriminate in his favor, and payment of bills in advance of the delivery of freight will be required till the manager of the bureau can reach an understanding with him and get him to pay his bills promptly. No credit is to be granted by any line until the manager shall have made a report favorable to the applicant, and new applications for credit are to be referred to the manager, who, after investigating the financial standing of the applicants, their proposed plan of making payment, etc., is to report to each agent.

The force of the bureau includes about 25 people, a manager, cashier, chief accountant, stenographer, 5 adding machine operators, 14 collectors, and a messenger. The plan of the bureau was recommended by a committee of the Kansas City Local Freight Agents' Association, which compiled figures showing that the total number of bills collected for all lines monthly would amount to 357,595, and that the total amount of money collected by all lines monthly amounted to $2,792,000. It was estimated that a considerable saving would be made in the cost of collections, as well as in the efficiency of collection, and that the plan would promote the convenience of both the railways and the shippers, as the latter would have to make out but one check a day for all lines, instead of making separate payments to the different lines. R. P. Isitt has been appointed manager of the bureau.

PROGRESS ON VALUATION WORK

The following statement has been issued by Thomas W. Hulme, general secretary of the Presidents' Conference Committee on Valuation on the Developments in Connection with Federal Valuation during July and August:

"A. W. Newton, general inspector permanent way and structures of the Chicago, Burlington & Quincy, was elected a member of the engineering committee, and J. F. Cleveland, land commissioner of the Chicago & North Western, was elected a member of the land committee, western group, to fill the vacancy caused by the resignation of E. C. Carter; D. W. Gross, valuation engineer of the Atlantic Coast Line, was elected a member of the engineering and land committees, southern group, to fill the vacancy caused by the resignation of Robert Scott.

"The engineering land and accounting committees met during the first week in August. The engineering and land committees will hold their next meeting during the third week in September; the accounting committee will meet in September, at a time not now determined. Special consideration was given at these meetings to the subjects of depreciation, abandoned property, and transportation charges for men and material in estimating the cost of reproduction and for addition and betterment work as provided from July 1, 1914, in the new accounting classification of the Interstate Commerce Commission. These subjects are to be further considered at the meetings in September, at which the equipment officers, selected to aid the engineering committee are expected to be present. The Land Committee is giving consideration to the proper scheduling of land acquisitions (see circular issued by the general secretary on August 10, 1914).

"On June 25 there was issued from the office of the general secretary a circular communication in explanation of the mechanical process for reproducing maps on tracing cloth as contemplated in the government map order.

"Referring to the circular communication of May 9, 1914, with reference to transportation of government employees, the sundry civil appropriation bill, as amended in the Senate, and finally passed, contained the following provision with reference to transportation, which materially differed from the form in which the legislation was introduced in the House:

> It shall be the duty of every common carrier by railroad whose property is being valued under the act of March first, 1913, to transport the engineers, field parties and other employees of the United States who are actually engaged in making surveys and other examination of the physical property of said carrier necessary to execute said act from point to point on said railroad as may be reasonably required by them in the actual discharge of their duties, and also to move from point to point, and store at such points as may be reasonably required the cars of the United States which are being used to house and maintain said employees; and also to carry the supplies necessary to maintain said employees and the other property of the United States actually used on said railroad in said work of valuation. The service above required shall be regarded as a special service, and shall be rendered under such forms and regulations and for such reasonable compensation as may be prescribed by the Interstate Commerce Commission, and as will insure an accurate record and account of

the service rendered by the railroad, and such evidence of transportation, bills of lading, and so forth, shall be furnished to the commission as may from time to time be required by the commission.

"It is my understanding that government employees will purchase tickets and pay tariff charges for transportation of their outfits and supplies in regular trains, but that where a special service is provided by the carrier under survey, said carrier should, pending the determination by the commission of the 'reasonable compensation' for said special service, render the same at the request of the government district engineer.

"The general secretary expects to issue in September a circular communication for the assistance of carriers in determining what shall be classified as abandoned property and advising of the importance to the carriers in preparing the information contemplated by the order. It is believed that an extension of time beyond February 1, 1915, can be secured to prepare the detail information required by the order, but the list and general statement of the carrier's claim should be filed by February 1, 1915.

"The commission adopted on June 25, 1914, effective July 1, 1914, 'Regulations to Govern the Recording and Reporting of all Extensions and Improvements or other Changes in Physical Property of every Common Carrier,' but has not promulgated up to this time the forms upon which to make the reports. It is, however, to be noted that, by the terms of the order, carriers which are not inventoried as of June 30, 1914, are only required to keep and not report the detail of what is commonly designated as addition and betterment records. It is possible that there may be further conferences with reference to the form of these reports between the accounting committee and the division of valuation. As this order is drawn particularly to enable the commission to keep up to date, as required by the valuation act, inventory of the property of each carrier, it is of importance to the carriers that they should see that the record is kept of all quantities and elements of cost of each improvement, so that there may be no failure to include in the additions to the inventory all proper charges.

"The Interstate Commerce Commission on June 25, 1914, adopted an order providing for the inventorying of materials and supplies as of June 30 of each and every year beginning June 30, 1914. It is the understanding of the general secretary that this order is intended to apply to the verification of the balance sheet account 'materials and supplies' and that it is not intended to apply to other items of a movable nature which are not embraced in said account.

"The division of valuation of the Interstate Commerce Commission has created a cost data bureau under the supervision of M. A. Zook, resident engineer. Our engineering committee has expressed its willingness to co-operate with the government in the gathering, preparation, and consideration of such data and has tendered its services through the group engineers.

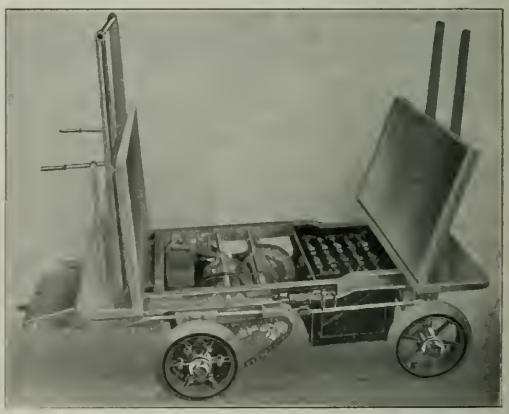
"The general secretary desires to issue as of October 1 a statement showing the progress of valuation work on all railroads, and therefore has made a request that each railroad should send him by September 21 advice as to the progress of the government work on its lines, and, also, information as to the work that has been done by each company in preparation for the government work."

STORAGE BATTERY TRUCK FOR RAILROAD STATIONS

A storage battery electric truck for use in and about railroad stations, industrial plants, etc., has been developed by the Electromobile Company, St. Louis, Mo. Three types are built, each having a carrying capacity of 2,000 lb. and a tractor capacity ranging from 5,000 lb. to 8,000 lb. Type A is capable of speeds up to 10 miles per hour, type C up to seven miles per hour and type E up to five miles per hour.

The truck is operated by a storage battery which is mounted under the platform in a cradle hung between the side frame channels. The motor is hung upon a shaft extending across the frame and drives the countershaft through a differential by means of a Morse silent chain. The countershaft is supported in three hangers swung from a second shaft extending across the frame. These hangers are in two parts to facilitate the removal of the countershaft, and are equipped with S. K. F. self-alining ball bearings. Large sprockets bolted to bosses cast on the spokes of the two rear wheels are driven by chains from smaller sprockets on the ends of the countershaft. Independent adjustment of the side chains is effected by means of radius rods between the axle and countershaft hangers, the bearings maintaining proper alinement without strain on the countershaft.

Malleable iron pedestals of strong construction are riveted to the side frames of the truck over each axle. Spiral steel springs are placed in these pedestals and supported on the axles, the pedestals being closed at the bottom by means of plate binders which hold the body of the truck firmly upon the axles. The front axle is of I-beam section with steering knuckles on each end. A steering rod connected to one of the steering arms extends to the opposite end of the truck where it is operated by means of a lever having a vertical movement, through a bell crank and a vertical rod extending through the floor of the truck. This lever and the controller handle are pivoted on a shaft which is supported by malleable iron uprights riveted to the frame. A foot pedal conveniently



Storage Battery Truck, Showing Motor and Transmission Suspension

located on the operator's platform controls the band brake upon the drum of the differential. Standing on the pedal pushes open a spring which normally sets the brake, and closes the battery switch in the controller. Raising the foot from the pedal cuts off the current and sets the brake. The pedal is locked in this position until the controller handle has been brought back to its neutral position. When the truck is running the speed may also be regulated by raising or depressing the pedal slightly. This effect is produced by means of electrical contacts controlled by the pedal.

Ample battery capacity is provided for a full day's work on one charge without changing the battery. The wiring arrangement is such that a maximum capacity fuse located directly in the battery circuit is removed when recharging, thus making it impossible to start the truck while the batteries are charging. If 24-hour operation is desired the battery may be readily lifted out of its cradle and a fresh one inserted.

The trucks are regularly equipped with wheels 20 in. in diameter over the tires, which are of solid rubber. The platform stands 22½ in. high and has a width of 40 in. The length of loading space varies from 6 ft. to 7 ft., type A having the longest platform and type E the shortest. The trucks are designed to be operated by ordinary laborers and will handle loads on 30 per cent grades.

General News Department

The annual convention of the Veterans' Association of the New York, Chicago & St. Louis was held on September 5 at Cleveland, Ohio.

The four arbitrators who have been selected in the western enginemen's and firemen's wage controversy have not as yet agreed on the fifth and sixth members.

The Pennsylvania, in pursuance of its retrenchment policy, announces that 68 trains are to be discontinued on the lines east of Pittsburgh and Erie, September 15.

The Lake Shore & Michigan Southern has asked the approval of the Ohio Public Utility Commission for a demurrage rule to provide for an increase from $1 to $2 per day on refrigerator cars.

The North Dakota board of equalization has declined to adopt recommendations of the state tax commission to greatly increase the assessed valuation of railroads in the state. The board expressed the opinion that the present assessments are on a basis of equality with assessments of other kinds of property, and only allowed increases on some branch lines on which improvements have been made. The total assessment of railroads for the state is $45,422,000.

A passenger train of the Grand Trunk was boarded by two masked robbers near Detroit, Mich., on the night of September 5, and a number of passengers in the parlor car were made to give up their valuables. A passenger who refused to obey the orders of the robbers was shot, probably fatally, and they also wounded another passenger. After the shooting they escaped from the train, which was running at low speed. The whole affair lasted only two or three minutes.

Most of the divisions of the National Railways of Mexico have now been reopened, but there is such a shortage of cars and engines that shippers are meeting with difficulty in having their transportation orders filled. Through traffic between the United States and Mexico is also inconvenienced because there is no through billing. It seems likely that it will be many months, even with internal affairs in Mexico undisturbed, before the enormous amount of equipment that was destroyed during the war can be replaced and traffic put on a normal basis.

The Mexican Northwestern has let the contract for restoring the Cumbre tunnel, which was destroyed by Mexican bandits some months ago. At present the tunnel forms a complete blockade, and there can be no through travel on that road between Juarez and Madera. All of the timbers in the tunnel were burned, and in many places the sides caved in. It is estimated that it will take five months to clear and re-timber the tunnel. As soon as the line is reopened the large lumber mills at Pearson and Madera, which are owned by the same British interests that own the railroad, will be put in operation.

The governor of Massachusetts, acting under a special act of the legislature, has appointed the "Western Massachusetts Transportation Commission" to study the general subject of transportation throughout the wetsern part of the state. The chairman is Louis C. Hyde of Springfield. The studies of the committee will have to do especially with the question of electric lines to small towns, in the hills, which now have no railroad connection. The New York, New Haven & Hartford, under President Mellen, secured control of most or all of the existing electric lines in western Massachusetts, and had planned a number of new lines. It is the failure of these plans which has led to the present action of the legislature. The special commission has an appropriation of $10,000 for its expenses.

The Salt Lake division on the northern district, the Stockton division on the southern district and the Sacramento general shops have won the 1914 safety banners awarded annually by the Southern Pacific for sending in the largest number of practicable suggestions for safety and the elimination of carelessness and hazardous conditions and practices. Almost without exception there was a fine increase in the total number of suggestions made for the year ended June 30. For the Pacific system over 50 per cent more suggestions were received this year compared with 1913 and over 81 per cent more of them were found practical. There was an improvement of over 108 per cent in the number of practical suggestions per 100 employees in the service. The Shasta division ranked second on the northern district and the San Joaquin second on the Southern district. The cost of improvements made as a result of these suggestions this year amounted to nearly $130,000, with pending expenditures for adopted suggestions approximating $160,000.

Sweetness Long Drawn Out

The Mobile & Ohio lately moved a trainload of 17 tank cars loaded with Cuban black strap molasses destined for East St. Louis. Another tank steamer with a load of this freight was due September 5. This is the traffic over which a strenuous fight was made by New Orleans lines when the Mobile & Ohio made a low rate to Chicago.

Railway Mail Pay

The railroads' Committee on Railway Mail Pay has discussed the report submitted to Congress by the Joint Congressional Committee, and Mr. Peters, chairman of the railroads' committee (representing 218 principal railroads) expresses gratification that the congressional committee so fully and unanimously sustains the main contention that the railroads are now materially underpaid for carrying the mails; and also that it agrees that the railroads ought to be paid for the terminal messenger service they now perform. Continuing, he says: "While the congressional committee does not see eye-to-eye with the railroads as to the total compensation due the companies for their mail service, the railroad committee has expressed its willingness to accept the views of the Bourne committee upon this main question of fact. The specific plan proposed by the Bourne committee for hereafter meeting the underpayment due the companies is open to question. The feeling of the railroad managers is that the present system of payment, based on the weight of the mails and the distances over which it is carried, is scientific, and, that, if fairly administered, it should be satisfactory. It actually measures and provides payment for the actual service performed. The proposed plan does not.

"That, however, is a technical matter. The Bourne committee has established the doctrine that the railroads should be compensated on a commercial basis for the services they render. The railroad committee is now prepared to co-operate with Congress in establishing detailed standards of payment which should place this purely commercial relation of the government and the railways upon a sound business basis."

Western Society of Engineers

The first autumn meeting of the Western Society of Engineers will be held on Monday night, September 14, in the society's rooms in the Monadnock block, Chicago. Two papers will be presented: one on "The Permeability of Gravel Concrete," by M. O. Withey, assistant professor of mechanics at the University of Wisconsin, and the other on "Reactions in a Three-Legged Stiff Frame with Hinged Column Bases," by N. M. Stineman.

American Electric Railway Association

The American Electric Railway Association will hold its annual convention at Young's Million Dollar Pier, Atlantic City, N. J., October 12-16, five days. Special trains will be run from Chicago and St. Louis to Atlantic City. It is expected that the advance copies of the papers to be read will be in the hands of members by the middle of next week.

MEETINGS AND CONVENTIONS

The following list gives names of secretaries, dates of next or regular meetings, and places of meeting.

Air Brake Association.—F. M. Nellis, 53 State St., Boston, Mass. Next convention, May 4-7, 1915, Hotel Sherman, Chicago.

American Association of Demurrage Officers.—A. G. Thomason, Demurrage Commissioner, Boston, Mass. Annual convention in April.

American Association of Dining Car Superintendents.—H. C. Boardman, D. L. & W., Hoboken, N. J. Next convention, October 22-24, Washington, D. C.

American Association of Freight Agents.—R. O. Wells, Illinois Central, East St. Louis, Ill. Annual meeting, May 21-24, 1915, Richmond, Va.

American Association of General Passenger and Ticket Agents.—W. C. Hope, C. R. R. of N. J., 143 Liberty St., New York. Annual meeting, September 15-16, Boston, Mass.

American Association of Railroad Superintendents.—E. H. Harman, Room 101, Union Station, St. Louis, Mo.

American Electric Railway Association.—E. B. Burritt, 29 W. 39th St., New York. Annual convention, October 12-16, Atlantic City, N. J.

American Electric Railway Manufacturers' Association.—H. G. McConnaughy, 165 Broadway, New York. Meetings with American Electric Railway Association.

American Railway Association.—W. F. Allen, 75 Church St., New York. Semi-annual meeting, November 18, Chicago.

American Railway Bridge and Building Association.—C. A. Lichty, C. & N. W., Chicago. Next convention, October 20-22, 1914, Los Angeles, Cal.

American Railway Engineering Association.—E. H. Fritch, 900 S. Michigan Ave., Chicago. Next convention, March 16-18, 1915, Chicago.

American Railway Master Mechanics' Association.—J. W. Taylor, 1112 Karpen Bldg., Chicago. Annual meeting, June, 1915.

American Railway Safety Association.—L. F. Shedd, C. R. I. & P., Chicago. Next meeting, November, Chicago.

American Railway Tool Foremen's Association.—A. R. Davis, Central of Georgia, Macon, Ga. Annual meeting, July, 1915.

American Society for Testing Materials.—Prof. E. Marburg, University of Pennsylvania, Philadelphia, Pa.

American Society of Civil Engineers.—Chas. W. Hunt, 220 W. 57th St., New York. Regular meetings, 1st and 3d Wednesday in month, except June, July and August, 220 W. 57th St., New York.

American Society of Engineering Contractors.—I. R. Wemlinger, 11 Broadway, New York. Regular meetings, 2d Thursday in month, at 2 P. M., 11 Broadway, New York.

American Society of Mechanical Engineers.—Calvin W. Rice, 29 W. 39th St., New York. Annual meeting, December 1-4, 1914, New York.

American Wood Preservers' Association.—F. J. Angier, B. & O., Mt. Royal Sta., Baltimore, Md. Next convention, January 19-21, 1915, Chicago.

Association of American Railway Accounting Officers.—E. R. Woodson, 1300 Pennsylvania Ave., N. W., Washington, D. C. Annual convention, April 28, 1915, Atlanta, Ga.

Association of Manufacturers of Chilled Car Wheels.—George W. Lyndon, 1214 McCormick Bldg., Chicago. Annual meeting, second Tuesday in October, New York.

Association of Railway Claim Agents.—C. W. Egan, B. & O., Baltimore, Md. Annual meeting, 3d week in May, 1915, Galveston, Tex.

Association of Railway Electrical Engineers.—Jos. A. Andreucetti, C. & N. W., Room 411, C. & N. W. Sta., Chicago. Annual convention, October 26-30, 1914, Chicago.

Association of Railway Telegraph Superintendents.—P. W. Drew, Soo Line, 112 West Adams St., Chicago. Annual meeting, June 22-25, Rochester, N. Y.

Association of Transportation and Car Accounting Officers.—G. P. Conard, 75 Church St., New York. Next meeting, December 8-9, 1914, Richmond, Va.

Bridge and Building Supply Men's Association.—L. D. Mitchell, Detroit Graphite Co., Chicago, Ill. Meetings with American Railway Bridge and Building Association.

Canadian Railway Club.—James Powell, Grand Trunk, P. O. Box 7, St. Lambert (near Montreal), Que. Regular meetings, 2d Tuesday in month, except June, July and August, Windsor Hotel, Montreal, Que.

Canadian Society of Civil Engineers.—Clement H. McLeod, 176 Mansfield St., Montreal, Que. Regular meetings, 1st Thursday in October, November, December, February, March and April. Annual meeting, January, Montreal.

Car Foremen's Association of Chicago.—Aaron Kline, 841 Lawler Ave., Chicago. Regular meetings, 2d Monday in month, except July and August, Lytton Bldg., Chicago.

Central Railway Club.—H. D. Vought, 95 Liberty St., New York. Regular meetings, 2d Friday in January, May, September and November. Annual meeting, 2d Thursday in March, Hotel Statler, Buffalo, N. Y.

Civil Engineers' Society of St. Paul.—Edw. J. Dugan, P. O. Box 654, August and September, Old State Capitol Bldg., St. Paul.

Engineers' Society of Pennsylvania.—Edw. R. Dasher, Box 75, Harrisburg, Pa. Regular meetings, 1st Friday after 10th of each month, except July and August, 31 So. Front St., Harrisburg, Pa.

Engineers' Society of Western Pennsylvania.—Elmer K. Hiles, 2511 Oliver Bldg., Pittsburgh, Pa. Regular meetings, 1st and 3d Tuesday, Pittsburgh.

Freight Claim Association.—Warren P. Taylor, R. F. & P., Richmond, Va. Annual meeting, June 16, 1915, Chicago.

General Superintendents' Association of Chicago.—A. M. Hunter, 321 Grand Central Station, Chicago. Regular meetings, Wednesday preceding 3d Thursday in month, Room 1856, Transportation Bldg., Chicago.

International Railway Congress.—Executive Committee, 11, Rue de Louvain, Brussels, Belgium. Next convention, June 23 to July 6, 1915, Berlin.

International Railway Fuel Association.—C. G. Hall, C. & E. I., 922 McCormick Bldg., Chicago. Annual meeting, May 17-20, 1915, Chicago.

International Railway General Foremen's Association.—Wm. Hall, 829 W. Broadway, Winona, Minn. Next convention, July 14-17, 1915, Sherman House, Chicago.

International Railroad Master Blacksmiths' Association.—A. L. Woodworth, C. H. & D., Lima, Ohio.

Maintenance of Way and Master Painters' Association of the United States and Canada.—T. J. Goodwin, C. R. I. & P., Eldon, Mo. Next convention, November 17-19, 1914, Detroit, Mich.

Master Boiler Makers' Association.—Harry D. Vought, 95 Liberty St., New York. Annual convention, May, 1915.

Master Car and Locomotive Painters' Association of the United States and Canada.—A. P. Dane, B. & M., Reading, Mass.

Master Car Builders' Association.—J. W. Taylor, 1112 Karpen Bldg., Chicago. Annual meeting, June, 1915.

National Railway Appliances Association.—Bruce V. Crandall, 537 So. Dearborn St., Chicago. Next convention, March 15-19, 1915, Chicago.

New England Railroad Club.—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass. Regular meetings, 2d Tuesday in month, except June, July, August and September, Boston.

New York Railroad Club.—Harry D. Vought, 95 Liberty St., New York. Regular meetings, 3d Friday in month, except June, July and August, 29 W. 39th St., New York.

Niagara Frontier Car Men's Association.—E. Frankenberger, 623 Brisbane Bldg., Buffalo, N. Y. Meetings monthly.

Peoria Association of Railroad Officers.—M. W. Rotchford, Union Station, Peoria, Ill. Regular meetings, 2d Thursday in month, Jefferson Hotel, Peoria.

Railroad Club of Kansas City.—C. Manlove, 1008 Walnut St., Kansas City, Mo. Regular meetings, 3d Friday in month, Kansas City.

Railroad Master Tinners, Coppersmiths and Pipefitters' Association.—U. G. Thompson, C. & E. I., Danville, Ill. Annual meeting, May, 1915.

Railway Business Association.—Frank W. Noxon, 30 Church St., New York. Annual meeting, December 10, 1914, Waldorf-Astoria Hotel, New York.

Railway Club of Pittsburgh.—J. B. Anderson, Room 207, P. R. R. Sta., Pittsburgh, Pa. Regular meetings, 4th Friday in month, except June, July and August, Monongahela House, Pittsburgh.

Railway Electrical Supply Manufacturers' Association.—J. Scribner, 1021 Monadnock Block, Chicago. Meetings with Association of Railway Electrical Engineers.

Railway Fire Protection Association. C. B. Edwards, Fire Ins. Agt., Mobile & Ohio, Mobile, Ala. Annual meeting, October 6, 1914, Washington, D. C.

Railway Signal Association.—C. C. Rosenberg, Times Bldg., Bethlehem, Pa. Annual meeting, September 22-24, 1914, Bluff Point, N. Y.

Railway Storekeepers' Association.—J. P. Murphy, L. S. & M. S., Box C, Collinwood, Ohio. Annual meeting, May, 1915.

Railway Supply Manufacturers' Association.—J. D. Conway, 2136 Oliver Bldg., Pittsburgh, Pa. Meetings with M. C. B. and M. M. Associations.

Railway Telegraph and Telephone Appliance Association.—G. A. Nelson, 50 Church St., New York. Meetings with Association of Railway Telegraph Superintendents.

Richmond Railroad Club. F. O. Robinson, C. & O., Richmond, Va. Regular meetings, 2d Monday in month, except June, July and August.

Roadmasters' and Maintenance of Way Association.—L. C. Ryan, C. & W. W., Sterling, Ill.

St. Louis Railway Club.—B. W. Frauenthal, Union Station, St. Louis, Mo. Regular meetings, 2d Friday in month, except June, July and August, St. Louis.

Salt Lake City Transportation Club.—R. E. Rowland, Hotel Utah Bldg., Salt Lake City, Utah. Regular meetings, 1st Saturday of each month, Salt Lake City.

Signal Appliance Association.—F. W. Edmunds, 3868 Park Ave., New York. Meetings with annual convention Railway Signal Association.

Society of Railway Financial Officers.—Carl Nyquist, C. R. I. & P., La Salle St. Sta., Chicago. Annual meeting, September 15-17, Hotel Aspinwall, Lenox, Mass.

Southern Association of Car Service Officers.—E. W. Sandwich, A. & W. P. Ry., Atlanta, Ga.

Southern and Southwestern Railway Club.—A. J. Merrill, Grant Bldg., Atlanta, Ga. Regular meetings, 3d Thursday, January, March, May, July, September, November, 10 A. M., Candler Bldg., Atlanta.

Toledo Transportation Club.—J. S. Marks, Agent, Interstate Despatch, Toledo, Ohio. Regular meetings, 1st Saturday in month, Boody House, Toledo.

Track Supply Association.—W. C. Kidd, Ramapo Iron Works, Hillburn, N. Y. Meetings with Roadmasters' and Maintenance of Way Association.

Traffic Club of Chicago.—W. H. Wharton, La Salle Hotel, Chicago.

Traffic Club of New York.—C. A. Swope, 291 Broadway, New York. Regular meetings, last Tuesday in month, except June, July and August, Waldorf-Astoria, New York.

Traffic Club of Pittsburgh.—D. L. Wells, Erie R. R., Pittsburgh, Pa. Meetings bimonthly, Pittsburgh. Annual meeting, 2d Monday in June.

Traffic Club of St. Louis.—A. F. Versen, Mercantile Library Bldg., St. Louis, Mo. Annual meeting in November, Noonday meetings October to May.

Train Despatchers' Association of America.—J. F. Mackie, 7122 Stewart Ave., Chicago. Annual meeting June 15, 1915, Minneapolis, Minn.

Transportation Club of Detroit.—W. R. Hurley, Superintendent's office, L. S. & M. S., Detroit, Mich. Meetings monthly, Normandie Hotel, Detroit.

Traveling Engineers' Association.—W. O. Thompson, N. Y. C. & H. R., East Buffalo, N. Y. Next meeting, September 15-18, Hotel Sherman, Chicago.

Utah Society of Engineers.—Frank W. Moore, Newhouse Bldg., Salt Lake City, Utah. Regular meetings, 3d Friday in month, except July and August, Consolidated Music Hall, Salt Lake City.

Western Canada Railway Club.—W. H. Rosevear, P. O. Box 1707, Winnipeg, Man. Regular meetings, 2d Monday, except June, July and August, Winnipeg.

Western Railway Club.—J. W. Taylor, 1112 Karpen Bldg., Chicago. Regular meetings, 3d Tuesday in month, except June, July and August, Karpen Bldg., Chicago.

Western Society of Engineers.—J. H. Warder, 1735 Monadnock Block, Chicago. Regular meetings, 1st Monday in month, except January, July and August, Chicago. Extra meetings, except in July and August, generally on other Monday evenings.

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF JULY, 1914

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses						Net operating revenue (or deficit).	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
					Maintenance									
		Freight.	Passenger.	Total. inc. misc.	Way and structures.	Of equipment.	Traffic.	Trans-portation.	Miscel-laneous.	General.	Total.			
Alabama & Vicksburg	143	$77,736	$41,827	$131,781	$21,831	$34,812	$3,619	$47,509	$3,023	$5,758	$116,552	$15,229	$7,240	$7,989	—$9,226
Alabama Great Southern	309	263,623	115,256	413,617	50,363	100,423	12,884	136,202	3,443	9,394	312,709	100,908	15,493	85,415	4,592
Atchison, Topeka & Santa Fe	8,340	5,024,161	2,243,523	7,885,546	1,192,198	1,354,740	172,109	2,225,496	.....	141,570	5,086,070	2,799,476	400,855	2,397,866	219,200
Atlanta & West Point	93	45,947	43,159	99,571	16,326	24,050	5,098	30,923	594	4,422	81,413	18,158	7,125	11,027	2,942
Atlantic & St. Lawrence	167	71,540	34,100	114,386	22,548	16,585	4,089	56,846	.....	3,266	103,334	11,052	10,800	252	12,964
Atlantic Coast Line	4,664	1,618,666	709,896	2,538,139	469,938	494,506	50,914	989,170	6,672	77,676	2,083,748	454,391	138,000	313,850	—21,478
Baltimore & Ohio Chicago Terminal	80	.....	854	138,661	14,448	17,628	1,033	56,776	3,741	4,996	98,622	40,039	19,021	21,018	—4,823
Belt Ry. Co. of Chicago	24	.....	.....	268,515	20,282	21,934	1,293	86,287	.....	5,788	135,583	132,933	12,113	120,819	34,782
Bessemer & Lake Erie	204	1,061,712	41,854	1,118,462	96,191	194,318	9,126	206,061	2,210	12,028	519,935	598,528	18,000	580,526	22,655
Bingham & Garfield	27	158,029	5,081	163,951	18,381	21,884	919	27,283	85	2,490	71,041	92,909	2,991	89,918	11,555
Birmingham Southern	44	50,018	1,240	90,657	16,482	16,915	480	30,689	.....	3,308	67,874	22,783	1,719	21,064	—24,205
Buffalo & Susquehanna Railroad Corp'n.	253	105,034	7,679	115,585	25,231	37,642	1,085	36,540	.....	5,410	105,908	9,678	2,600	7,078	.....
Buffalo & Susquehanna Railway	91	15,581	8,502	26,473	6,982	9,765	489	12,134	84	2,285	31,739	—5,266	1,600	—6,866	—408
Buffalo, Rochester & Pittsburgh	586	728,026	114,651	881,454	143,664	198,162	12,155	257,872	1,467	18,655	631,975	249,479	20,000	229,475	—78,657
Central of Georgia	1,924	716,324	349,056	1,166,371	161,158	217,229	39,047	402,810	1,453	34,350	856,048	310,324	52,360	257,926	139,397
Central New England	304	217,859	44,501	276,993	79,908	37,075	1,183	96,789	.....	3,663	218,618	58,375	11,000	47,375	—62,578
Charleston & Western Carolina	341	101,040	34,521	143,062	33,094	26,794	5,281	56,978	.....	4,306	126,453	16,608	5,000	11,608	—8,154
Chesapeake & Ohio Lines	2,367	2,475,819	587,346	3,264,098	424,715	712,717	58,016	1,039,773	23,542	70,316	2,329,078	935,019	109,922	825,097	58,936
Chicago & Erie	270	340,266	60,534	439,757	83,746	125,969	20,868	238,980	2,144	12,089	483,796	—44,039	12,895	—56,977	—36,300
Chicago & North Western	8,108	4,344,456	2,198,704	7,310,086	1,236,312	1,073,854	119,540	2,441,269	58,817	142,273	5,072,066	2,238,020	375,000	1,862,790	185,554
Chicago, Detroit & Can. Gd. Trunk Jctn.	60	43,825	21,392	82,199	9,022	11,026	1,679	33,205	509	1,369	56,810	25,389	2,870	22,519	14,918
Chicago, Indiana & Southern	359	289,255	29,741	331,754	52,117	98,059	6,809	109,387	1,811	17,645	285,829	45,925	18,600	27,230	—6,704
Chicago Junction	12	.....	.....	155,117	20,396	17,047	953	81,436	.....	4,939	124,771	30,346	2,324	36	27,986
Chicago, Milwaukee & St. Paul	9,987	5,169,571	1,843,240	7,824,986	1,068,249	1,051,291	149,308	2,823,798	73,105	140,652	5,045,915	2,779,071	395,174	2,381,851	151,582
Chicago, Peoria & St. Louis	255	117,108	29,504	154,371	22,294	35,947	5,823	62,138	.....	4,800	131,001	23,370	4,800	18,570	11,971
Chicago, Rock Island & Gulf	477	161,488	55,815	234,247	40,676	29,251	9,635	97,325	2,132	6,425	185,444	48,803	8,815	39,988	4,408
Chicago, St. Paul, Minneapolis & Omaha	1,753	906,444	534,150	1,557,280	216,036	217,634	31,157	524,445	17,375	36,606	1,043,253	514,027	86,569	427,229	125,162
Cincinnati, Hamilton & Dayton	1,015	682,159	155,656	938,738	127,347	153,510	18,634	396,992	.....	17,767	714,250	224,488	35,411	188,228	74,340
Cincinnati, New Orleans & Texas Pacific	337	645,304	140,661	831,499	83,543	218,605	25,139	258,789	4,359	20,043	610,477	221,022	31,000	190,022	—27,600
Cincinnati Northern	246	99,778	24,200	130,220	19,333	25,501	2,622	42,342	.....	3,143	92,942	37,278	6,000	31,165	45,963
Cleveland, Cincinnati, Chic. & St. Louis	2,361	2,026,348	840,915	3,147,147	296,803	644,406	78,580	1,182,835	26,634	67,831	2,291,600	855,547	124,500	730,453	627,533
Colorado Midland	338	81,960	35,228	135,024	38,087	40,533	8,671	61,271	2,072	6,104	156,737	—21,713	10,000	—31,713	—1,306
Colorado & Southern	1,127	389,919	168,915	606,142	112,825	167,266	12,388	196,737	5,767	19,397	514,380	91,762	35,625	56,020	—112,715
Cumberland Valley	164	167,434	59,888	240,254	52,715	29,149	4,919	75,919	811	7,276	170,789	69,465	5,910	63,555	—28,599
Delaware, Lackawanna & Western	960	2,526,521	853,981	3,752,005	581,041	551,598	73,042	1,142,821	37,459	69,481	2,439,783	1,312,222	185,000	1,126,979	—1,003
Detroit & Mackinac	411	59,633	35,031	103,658	13,062	16,709	2,228	35,208	340	2,629	70,177	33,481	9,189	24,292	—4,464
Detroit & Toledo Shore Line	79	91,696	.....	91,974	8,523	10,074	1,471	32,545	.....	2,710	55,323	36,651	5,900	30,751	—21,834
Detroit, Grand Haven & Milwaukee	191	130,000	65,000	221,906	46,575	30,976	6,930	107,725	1,294	4,382	197,882	24,024	3,360	20,664	—28,136
Detroit, Toledo & Ironton	441	121,152	17,254	149,844	20,743	22,949	3,018	77,533	.....	6,352	130,595	19,249	6,000	13,249	59,361
Duluth & Iron Range	292	761,183	21,718	812,254	108,000	80,813	1,996	140,427	4,172	8,327	343,734	468,519	43,331	425,188	—268,079
Duluth, Missabe & Northern	364	804,322	31,958	856,170	100,863	84,950	2,043	128,180	3,807	9,158	329,009	527,161	42,961	484,199	—288,022
Duluth, Winnipeg & Pacific	181	107,907	19,758	130,065	36,424	23,978	2,578	44,523	94	5,548	113,145	16,920	6,503	10,417	—30,220
El Paso & Southwestern Co	1,029	583,828	116,788	740,159	95,659	100,984	18,498	203,277	5,720	22,302	446,440	293,719	38,210	255,304	59,033
Elgin, Joliet & Eastern	777	752,334	.....	800,348	106,767	148,252	4,963	215,745	.....	17,095	492,821	307,526	32,833	274,693	—105,277
Erie	1,988	3,554,650	997,644	4,979,824	544,688	1,057,640	90,962	1,657,450	36,310	99,161	3,526,209	1,453,615	138,547	1,314,909	—150,209
Florence & Cripple Creek	87	69,744	21,119	92,537	12,417	9,728	2,250	35,134	.....	4,145	63,674	28,863	5,677	23,186	25,819
Florida East Coast	696	137,705	113,793	291,866	71,465	52,111	6,050	120,098	2,937	15,752	265,748	26,117	20,000	6,095	35,200
Fort Worth & Denver City	454	266,200	143,162	433,760	44,682	79,456	11,676	168,133	3,229	13,907	321,084	112,676	12,920	99,756	24,531
Grand Rapids & Indiana	575	237,635	210,839	489,579	55,334	64,918	10,438	200,067	2,897	13,193	346,848	142,731	24,221	118,510	41,542
Grand Trunk Western	347	382,000	198,000	610,438	103,456	119,259	19,500	249,948	13,069	15,790	521,023	89,415	35,920	53,495	—65,755
Great Northern	7,994	4,716,860	1,452,169	6,840,447	911,393	703,649	120,973	1,643,850	81,485	100,681	3,560,308	3,280,139	383,881	2,896,028	—228,612
Gulf & Ship Island	308	106,148	33,981	149,680	19,507	28,554	2,837	41,405	362	7,362	100,027	49,654	7,276	42,333	—30,003
Gulf, Colorado & Santa Fe	1,937	1,023,882	313,853	1,409,164	182,810	228,425	26,323	486,398	.....	31,478	955,435	453,729	51,055	402,481	224,928
Illinois Central	4,769	3,781,139	1,214,498	5,396,122	906,982	1,310,261	98,676	1,946,128	30,479	122,122	4,414,649	981,473	275,000	706,341	—62,139
Indiana Harbor Belt	105	.....	.....	284,712	47,399	42,529	2,686	113,928	.....	8,221	214,763	69,949	7,785	62,076	7,409
International & Great Northern	1,159	497,398	188,330	738,937	129,929	140,508	27,436	451,361	2,779	40,392	792,405	—53,468	25,000	—78,607	—180,009
Kanawha & Michigan	177	241,407	31,467	279,393	33,481	60,661	2,483	75,257	.....	6,328	178,211	101,182	11,773	89,409	—5,509
Lake Erie & Western	906	405,117	76,873	507,956	73,924	62,087	15,047	193,031	.....	12,084	356,172	151,784	24,000	126,851	70,245
Lake Shore & Michigan Southern	1,852	2,656,716	1,304,618	4,592,240	542,113	964,856	70,908	1,487,932	56,039	88,917	3,310,766	1,381,474	196,500	1,183,749	—288,449
Lehigh & New England	296	221,522	1,219	233,342	31,639	32,843	1,699	54,887	.....	6,052	127,120	106,222	5,670	100,553	50,725
Lehigh Valley	1,444	2,921,757	457,342	3,582,081	422,089	722,427	79,912	1,216,646	14,592	71,008	2,526,674	1,055,407	137,000	918,097	—91,093

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF JULY, 1914—CONTINUED

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses							Net operating revenue (or deficit).	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
					Maintenance										
		Freight.	Passenger.	Total. inc. misc.	Way and structures.	Of equipment.	Traffic.	Transportation.	Miscellaneous.	General.	Total.				
Long Island	398	299,806	1,030,540	1,519,806	118,025	125,422	22,103	493,853	6,016	29,317	794,736	725,071	65,362	659,638	32,692
Louisiana & Arkansas	279	123,295	24,428	152,151	30,716	26,171	2,594	37,788	.....	3,988	101,257	50,894	6,050	44,844	—2,419
Louisiana Ry. & Navigation	351	132,690	25,216	167,891	33,241	16,056	5,873	62,435	.....	4,882	122,487	45,404	8,500	36,904	19,379
Louisville & Nashville	4,991	3,401,055	1,095,550	4,803,643	720,796	985,532	114,222	1,602,022	15,850	110,168	3,548,590	1,255,053	184,275	1,070,337	126,371
Maine Central	1,209	542,648	389,827	1,014,868	162,018	138,613	11,134	370,663	10,717	26,138	719,284	295,584	52,129	243,455	42,210
Michigan Central	1,800	1,568,567	944,039	2,838,342	336,599	452,322	63,864	1,078,933	47,277	53,892	2,032,887	805,455	134,000	671,455	124,261
Midland Valley	380	67,673	42,235	116,266	26,992	26,558	1,946	41,912	.....	5,541	102,949	13,317	6,582	6,571	—17,878
Minneapolis, St. Paul & Sault Ste. Marie	4,102	1,639,555	645,919	2,485,501	362,578	365,459	50,541	753,077	18,029	46,917	1,592,343	893,158	111,580	781,579	—22,269
Missouri & North Arkansas	365	65,220	40,188	112,040	30,444	22,075	5,024	43,105	.....	5,615	106,263	5,777	6,000	—361	—11,853
Missouri, Oklahoma & Gulf	332	73,748	23,227	100,956	18,685	17,027	4,325	44,893	71	5,665	90,666	10,291	6,462	3,782	—3,797
Missouri, Oklahoma & Gulf Ry. of Texas	19	9,432	460	10,200	1,687	2,725	198	4,712	.....	676	9,998	203	197	6	78
Monongahela	67	91,788	2,558	95,717	17,274	5,810	1,014	22,098	.....	1,981	48,177	47,540	2,100	45,440	—31,936
Nashville, Chattanooga & St. Louis	1,231	732,242	258,434	1,071,780	145,906	204,209	42,821	405,916	9,382	29,661	837,895	233,886	27,213	206,673	74,688
Nevada Northern	165	124,539	12,806	141,289	24,960	17,669	485	30,153	22	4,699	77,987	63,302	5,600	57,702	—7,275
New Orleans & North Eastern	204	244,953	53,736	327,213	29,987	69,675	9,224	111,851	5,272	11,691	237,700	89,513	14,500	75,013	857
New Orleans Great Northern	283	108,246	32,857	155,069	19,208	20,018	2,254	44,253	228	6,330	92,291	62,778	3,167	59,611	—10,578
New Orleans, Texas & Mexico	286	119,819	21,993	149,407	32,984	16,976	5,518	53,377	.....	7,971	116,826	32,581	1,621	30,960	—2,741
New York Central & Hudson River	3,692	4,825,497	3,266,777	9,543,460	1,251,942	1,728,415	152,397	3,288,473	190,180	259,307	6,870,714	2,672,746	492,211	2,180,379	208,378
New York, Chicago & St. Louis	567	706,958	166,890	920,658	126,900	87,497	36,035	405,308	6,562	17,772	680,074	240,584	42,000	198,465	108,177
New York, New Haven & Hartford	2,003	2,596,430	2,584,644	5,755,634	822,566	770,010	46,421	2,077,898	43,418	123,685	3,883,352	1,872,281	310,000	1,561,626	—18,802
New York, Ontario & Western	568	552,579	304,519	992,561	129,411	146,556	8,761	311,899	.....	14,484	611,112	381,450	19,583	361,860	4,296
New York, Philadelphia & Norfolk	112	363,978	47,443	442,619	34,983	64,365	3,679	163,268	4,780	9,622	280,696	161,923	8,700	153,223	43,692
New York, Susquehanna & Western	140	162,655	51,869	237,085	30,225	29,035	1,949	106,126	.....	6,691	174,025	63,061	12,583	50,477	7,554
Norfolk & Western	2,037	3,168,639	442,252	3,743,588	552,527	773,752	61,324	1,079,759	9,512	67,822	2,515,422	1,228,166	140,000	1,088,166	—72,396
Norfolk Southern	860	201,207	94,636	322,141	54,134	58,237	8,047	116,952	.....	18,729	256,098	66,043	11,500	54,543	—29,899
Northern Pacific	6,409	3,640,634	1,580,686	5,792,063	906,563	971,718	102,432	1,668,051	96,539	91,132	3,735,226	2,056,837	410,960	1,645,747	—136,410
Panhandle & Santa Fe	668	214,304	56,824	285,947	47,017	60,841	3,401	94,569	.....	9,612	215,441	70,506	9,234	61,057	37,877
Pennsylvania *Company*	1,750	3,720,365	926,091	5,198,495	736,845	832,281	77,801	1,747,440	37,680	112,109	3,543,556	1,654,939	278,047	1,376,892	—283,643
Pennsylvania *Railroad*	4,519	11,136,608	3,591,145	16,068,587	2,110,352	3,020,428	198,658	5,900,394	235,809	388,918	11,854,559	4,214,028	653,145	3,560,883	—344,376
Philadelphia, Baltimore & Washington	717	1,029,068	656,480	1,852,017	293,174	351,742	27,620	772,241	17	39,214	1,484,008	368,009	56,230	311,779	125,535
Pittsburgh & Lake Erie	224	1,275,788	165,186	1,503,661	167,603	330,187	13,917	340,541	4,013	27,729	883,991	619,671	51,550	568,121	—173,775
Pittsburgh, Cincinnati, Chic. & St. Louis	1,472	2,357,436	732,701	3,476,209	461,490	622,068	65,560	1,182,389	24,088	78,116	2,433,711	1,042,498	164,288	878,210	200,272
Pittsburgh, Shawmut & Northern	294	122,466	12,408	136,732	36,613	49,623	1,435	47,905	.....	4,230	139,806	—3,074	1,639	—4,713	—24,716
Richmond, Fredericksburg & Potomac	88	159,488	70,174	257,913	20,886	30,097	3,512	91,136	462	6,954	153,046	104,867	7,637	97,230	15,298
Rutland	468	175,405	90,887	306,908	40,316	54,495	9,185	130,654	1,219	5,602	241,472	65,437	17,095	48,341	—27,310
St. Louis Merchants' Bridge Terminal	9	.....	227	146,599	20,211	5,856	725	72,733	.....	5,886	105,411	41,188	5,830	35,358	25,949
St. Louis, San Francisco & Texas	244	105,659	32,098	144,714	19,792	21,150	2,649	51,849	.....	4,948	100,389	44,326	1,327	42,999	—11,229
St. Louis Southwestern of Texas	811	195,704	100,725	322,528	83,508	79,421	12,558	142,073	1,270	16,002	334,720	—12,193	13,500	—25,767	—10,862
San Antonio & Aransas Pass	724	208,389	128,491	357,418	55,116	51,058	6,753	167,203	.....	12,189	292,319	65,099	12,000	53,099	6,666
San Pedro, Los Angeles & Salt Lake	1,132	546,201	255,326	878,791	102,470	138,745	32,269	279,565	15,253	19,084	587,385	291,406	40,712	250,356	28,395
Seaboard	3,098	1,198,662	426,939	1,833,171	222,968	268,249	69,905	688,026	6,601	54,441	1,307,932	525,239	91,000	433,949	7,253
Southern	7,036	3,539,575	1,689,086	5,705,119	759,085	1,025,475	191,016	2,115,896	38,708	180,148	4,310,328	1,394,791	224,792	1,169,472	—55,817
Southern Pacific	6,492	5,366,116	2,576,839	8,741,556	958,990	1,292,872	161,365	2,765,969	146,905	223,635	5,540,884	3,200,672	425,541	2,772,961	—359,837
Spokane International	163	60,521	19,277	83,177	11,856	5,128	2,191	22,754	.....	3,621	45,550	37,628	3,192	34,435	—2,697
Tennessee Central	294	103,832	41,989	154,153	28,441	18,223	5,387	51,030	.....	6,634	109,715	44,438	4,445	39,979	—4,342
Terminal R. R. Ass'n of St. Louis	34	.....	199	213,916	20,364	12,072	878	73,558	.....	5,243	112,114	101,802	26,183	75,618	24,416
Toledo & Ohio Central	446	231,951	58,503	316,407	66,186	82,964	7,618	132,780	1,758	10,055	301,360	15,047	21,365	—6,318	—123,121
Toledo, Peoria & Western	248	66,767	41,622	114,572	18,329	27,093	2,310	45,470	.....	3,780	96,982	17,589	6,100	11,489	8,508
Toledo, St. Louis & Western	451	338,766	37,184	402,559	43,079	62,511	15,954	144,750	.....	7,833	276,127	126,432	20,500	105,932	—18,753
Trinity & Brazos Valley	463	88,681	39,311	135,817	22,545	9,159	6,915	58,806	.....	9,633	107,058	28,759	4,900	23,857	59,044
Union R. R. of Baltimore	9	115,857	21,132	138,627	13,297	.....	.....	4,803	.....	2,333	20,433	118,194	6,180	112,014	—12,922
Union R. R. of Pennsylvania	31	.....	.....	393,818	70,156	98,709	100	144,545	.....	2,966	316,476	77,342	6,000	71,342	—109,234
Vandalia	910	629,998	220,401	956,462	152,518	182,853	22,177	350,926	12,100	21,741	742,315	214,147	32,219	181,856	—20,352
Vicksburg, Shreveport & Pacific	171	74,105	46,716	133,099	21,807	31,646	3,122	47,232	2,417	5,038	111,262	21,837	7,200	14,637	—8,093
Virginian	503	382,182	40,329	450,818	64,283	88,903	5,521	110,491	8,368	9,714	283,548	167,270	22,500	144,760	—31,468
Wabash	2,518	1,776,702	655,312	2,649,453	345,829	434,473	95,225	949,777	18,391	65,955	1,909,650	739,804	83,382	656,226	34,432
Washington Southern	36	47,086	34,320	109,693	13,327	16,779	1,334	43,588	26	2,946	78,000	31,693	3,320	28,373	2,026
West Jersey & Seashore	356	164,010	619,811	831,305	97,182	95,621	12,345	272,386	3,301	12,370	493,205	338,100	26,959	311,141	32,245
Western Maryland	661	579,491	104,080	712,429	105,019	111,751	21,140	266,132	706	17,996	521,503	190,926	24,500	166,426	14,967
Western Ry. of Alabama	133	51,609	43,520	105,029	23,173	26,710	5,457	33,579	587	4,849	94,355	10,674	5,008	5,629	—2,294
Wheeling & Lake Erie	459	423,914	63,360	531,094	73,913	107,306	8,775	181,791	1,570	16,436	387,792	143,302	32,435	110,867	—32,661
Yazoo & Mississippi Valley	1,372	587,158	215,250	853,191	177,228	156,885	16,655	347,155	813	23,509	722,245	131,946	50,000	80,886	42,225

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF JUNE, 1914

Name of road.	Average mileage operated during period.	Operating revenues			Maintenance		Operating expenses			Net operating revenue (or deficit).	Outside operations, net.	Taxes.	Operating income (or loss).	Increase (or decr.) comp. with last year.
		Freight.	Passenger.	Total. inc. misc.	Way and structures.	Of equipment.	Traffic.	Transportation.	General.	Total.					
Arizona Eastern	367	184,703	34,503	232,020	30,727	30,472	2,839	71,511	10,688	146,237	85,783	219	12,260	73,742	68,561
Atlanta, Birmingham & Atlantic	646	$161,154	$53,612	$239,916	$21,778	$34,825	$13,703	$114,803	$11,488	$196,597	$43,319	.....	$14,337	$28,982	$27,395
Atlantic & St. Lawrence	167	75,835	38,957	130,041	36,124	20,808	5,066	53,243	5,614	120,855	9,546	.....	18,009	—8,463	—11,970
Atlantic City	167	65,759	167,489	243,557	32,574	19,621	2,771	100,590	463	156,019	87,538	—2,890	20,000	64,648	—2,734
Bessemer & Lake Erie	204	1,020,071	30,139	1,060,609	97,619	191,551	8,519	210,346	12,737	520,772	539,837	.....	18,000	521,837	55,402
Birmingham Southern	44	45,526	1,276	84,669	14,021	19,443	434	30,327	3,832	68,057	16,612	.....	2,198	14,414	—19,184
Boston & Maine	2,252	2,428,865	1,350,527	4,123,004	679,536	662,834	48,845	1,764,777	112,571	3,268,563	854,441	$13,051	152,591	714,901	—405,646
Central of Georgia	1,924	555,627	305,074	951,971	193,131	178,890	41,030	395,007	43,806	851,864	100,107	6,948	52,360	54,695	—36,348
Central of New Jersey	678	1,814,670	471,607	2,364,053	339,518	428,941	38,753	726,033	70,692	1,603,937	760,116	—2,362	115,145	642,609	1,934
Central New England	304	247,148	41,031	302,766	70,176	44,371	1,497	186,799	3,780	306,623	—3,857	637	6,304	—9,524	—118,050
Chicago & Alton	1,033	633,063	347,235	1,067,559	164,212	296,090	25,106	372,430	35,249	893,087	174,472	—4,752	50,770	118,950	67,611
Detroit, Grand Haven & Milwaukee	191	137,844	58,003	236,229	44,548	31,424	7,622	104,360	8,398	196,352	39,877	—3	672	39,202	18,221
Grand Trunk Western	347	453,859	146,177	628,773	¶13,050	66,325	27,766	257,229	28,767	493,137	135,636	—3,573	84,532	47,531	—46,053
Louisville & Nashville	4,941	3,198,671	1,032,290	4,515,757	705,522	964,423	125,003	1,612,108	95,610	3,502,666	1,013,091	—2,213	750,930	259,948	—312,322
Louisville, Henderson & St. Louis	200	73,954	43,176	¹123,957	22,053	12,961	6,114	38,808	3,533	83,469	40,488	291	5,863	34,916	20,340
Missouri Pacific	3,920	1,522,663	439,761	2,163,502	307,163	404,902	52,365	802,603	44,625	1,611,658	551,844	—3,666	98,974	449,204	—141,615
New Orleans Great Northern	283	105,822	31,006	150,328	18,319	27,464	2,196	38,399	7,474	93,852	56,476	—29	3,330	53,117	—21,560
New York, New Haven & Hartford	2,003	2,795,845	2,311,398	5,778,516	960,633	1,075,407	68,312	1,803,275	261,581	4,169,208	1,609,308	—2,732	278,219	1,328,357	—476,970
Northern Pacific	6,354	3,547,308	1,381,806	5,657,637	1,148,641	379,453	136,849	1,172,869	91,630	2,929,442	2,728,195	23,386	442,162	2,309,419	366,807
Philadelphia & Reading	1,020	2,913,416	583,789	3,700,179	685,295	681,327	41,438	1,435,468	65,692	2,903,620	791,559	48,577	137,996	702,140	—482,801
Port Reading	21	81,097	.....	87,733	19,552	Cr. —1,456	38	30,716	1,382	50,232	37,501	—1,548	19,000	16,953	—37,947
St. Louis, Iron Mountain & Southern	3,365	1,818,469	495,335	2,523,628	343,366	500,440	52,955	795,688	50,147	1,742,596	781,032	—3,618	123,936	653,478	57,409

Traffic News

The Western Classification Committee has announced hearings at its Chicago office on September 16, September 22, September 29, September 30, October 1, and October 6.

Freight, except perishable, for points in Great Britain, and Ireland and also for Norway, is now accepted by American railroads without requiring the inland American freight charges to be prepaid.

The Southern Pacific announces that during July out of a total of 7,632 local trains arriving at terminals on its Pacific system, 6,821, or nearly 91 per cent, made schedule time or better, and 6,709 arrived on time. Of the others 460 were less than 15 minutes late.

The Nashville, Chattanooga & St. Louis took out of Nashville the other day a solid train of 28 carloads of flour, 8,700 barrels, destined for Europe by way of New Orleans. The train was run through on a passenger schedule by way of the Mobile & Ohio and the New Orleans & North Eastern.

The Chicago, Burlington & Quincy has announced that passenger service will be established over the new Galveston-Puget Sound route about October 15, through the installation of through service from Denver to the north branch. Later through sleeping car service will be inaugurated between Galveston and Seattle.

The Denver Clearing House Association has adopted resolutions urging the Colorado representatives in Congress "at once to advocate and work for the submission of a joint resolution asking for such prompt revision by the Interstate Commerce Commission of its recent decision as shall afford substantial and adequate relief to all railroads in the present emergency."

The Erie, which recently established a lighterage service on the Chicago river for carload freight, has announced that beginning October 1 it will lighter l. c. l. freight to and from industries that have dock facilities on the Chicago river. The notice provides that the Erie shall receive the road haul, and the limit is a minimum of 10,000 lb. outbound in a single shipment, or 10,000 lb. inbound received for one industry in one day. This new service is in addition to the car float service, which was established by the Erie some time ago.

The through night passenger trains of the Seaboard Air Line between Savannah, Ga., and Montgomery, Ala., are not very profitable, and the company recently asked authority from the State Railroad Commission of Georgia to discontinue the trains; and at the same time announcing that day and evening trains would be put on so as to largely take the place of the trains discontinued. But because of a good deal of opposition from a number of towns, the petition before the commission has been withdrawn, and the night trains are to be continued.

On September 2, the Grand Trunk Pacific began the operation of through passenger service on its western division between Edmonton and Prince Rupert. Passenger trains between Winnipeg and Edmonton have been in daily operation for some time. On September 2, a tri-weekly service was established between Edmonton and Prince George, and a bi-weekly service between Prince George and Prince Rupert, the Pacific coast terminal. Through trains for Prince Rupert will leave Winnipeg on Mondays and Saturdays, and will leave Prince Rupert for Winnipeg on Sundays and Tuesdays.

The Northern Pacific has opened a new suburban freight station at Seattle, Wash. The building cost $20,000, and is intended to afford a level haul for shippers and receivers north of Madison street in the wholesale section of the city. The company expended $750,000 in reaching this station, $200,000 of which was paid to the city of Seattle for right of way. The branch to the freight station leaves the main line at Ross station, and follows Lake Union to the new terminal yards. It gives the Northern Pacific valuable water front rights in the vicinity of the new ship-canal which is to connect Lake Washington with salt water shipping at Salmon Bay.

CAR BALANCE AND PERFORMANCE FOR MAY, 1914

	New England.	N. Y., N. J., Del., Md., Eastern Pa.	Ohio, Ind., Mich., Western Pa.	Va., W. Va., No. and So. Carolina.	Ky., Tenn., Miss., Ala., Ga., Fla.	Iowa, Ill., Wis., Minn.	Mont., Wyo., Neb., Dakotas.	Kan., Colo., Okla., Mo., Ark.	Texas, La., New Mex.	Ore., Idaho, Nev., Cal., Ariz.	Canadian Lines.	Grand Total.
Revenue freight cars owned	89,198	702,861	207,198	195,585	176,453	456,221	20,351	144,830	31,884	144,698	181,132	2,350,411
Average number of system cars on line	55,773	457,071	154,333	123,529	117,680	349,535	10,908	95,100	24,710	84,624	113,351	1,586,614
Railway-owned cars: Average foreign on line	39,974	233,470	83,925	60,321	48,662	95,396	9,227	40,882	16,776	34,173	50,364	713,170
Total railway-owned cars on line	95,747	690,541	238,258	183,850	166,342	444,931	20,135	135,982	41,486	118,797	163,715	2,299,784
Excess	6,549	*12,320	31,060	*11,735	*10,111	*11,290	*216	*8,848	9,602	*25,901	*17,417	*50,627
Per cent of cars on line to total owned:												
Home	62	65	74	63	67	77	54	66	77	58	62	68
Foreign	45	33	41	31	27	21	45	28	53	24	28	30
All railways	107	98	115	94	94	98	99	94	130	82	90	98
Private cars on line	3,491	32,186	8,781	5,632	9,785	14,025	1,484	7,800	4,281	11,846	2,941	102,252
Total, all cars on line	99,238	722,727	247,039	189,482	176,127	458,956	21,619	143,782	45,767	130,643	166,656	2,402,036
Per cent of cars in shop	8.31	7.66	12.31	10.04	10.25	6.16	6.60	11.46	9.08	6.98	5.00	8.35
No. of freight engines owned	1,435	10,880	3,090	3,472	2,928	7,395	502	2,924	858	2,942	2,617	39,043
Average cars on line per freight engine owned	69	66	80	55	60	62	43	49	53	44	64	62
Total freight-car mileage	56,472,285	492,503,421	141,857,842	156,435,210	139,854,977	303,925,712	24,888,424	97,326,790	35,325,963	121,152,779	106,657,462	1,676,400,865
Average miles per car per day	18.4	22.0	18.5	26.6	25.6	21.4	37.1	22.8	24.9	29.9	20.6	22.2
Per cent loaded mileage	72.2	64.6	63.7	61.5	65.6	69.6	75.9	67.1	65.3	71.0	73.5	68.0
Ton-miles of freight, including company freight	645,433,556	7,509,475,557	2,125,455,199	2,360,667,474	1,744,260,224	3,097,974,080	308,939,505	1,026,837,922	418,289,652	1,697,665,051	1,539,797,390	22,474,795,610
Average ton-miles, including company freight:												
Per car-mile	11.4	15.2	15.0	15.1	12.5	13.2	12.4	13.2	11.8	14.2	14.4	14.2
Per loaded car-mile	15.8	23.6	23.6	24.6	19.0	18.8	16.4	19.6	18.1	20.1	19.7	21.2
Per car per day	210	335	279	402	320	281	461	289	295	424	298	320
Gross freight earnings	$7,189,037	$44,300,788	$11,800,592	$13,151,042	$11,871,052	$30,130,347	$2,732,852	$10,645,168	$3,512,914	$15,852,757	$10,803,013	$161,989,562
Average daily earnings: Per car owned	$2.60	$2.03	$1.84	$2.17	$2.17	$2.13	$4.33	$2.30	$3.55	$3.53	$1.92	$2.22
Per railroad car on line	2.42	2.07	1.60	2.31	2.30	2.18	4.38	2.53	2.73	4.30	2.13	2.27
All cars on line	2.34	1.98	1.54	2.24	2.17	2.12	4.08	2.39	2.48	3.91	2.09	2.18

*Denotes deficiency.

The Chicago, Milwaukee & St. Paul announces the opening of its new transcontinental train service through Spokane, Wash., for September 14. On that date the main line passenger trains will discontinue the use of the 87 miles of the main line between Plummer and Marengo, Wash., and will be run through Spokane, the abandoned line being served with local trains. The company plans to put on a local train running between Seattle and Spokane, to be known as the "Cascadian." By the new arrangement the distance between Chicago and Seattle has been increased only fourteen miles. The time at both terminals will be the same as before. The service would have been begun several months ago but for the delay in the construction of the bridge at Spokane, which passes over the city bridge.

Increases in Passenger Fares

A general advance in mileage-ticket rates in the Eastern states was noticed last week, page 447. Some additional details are given by the New York State Public Service Commission, Second district, as follows:

On 500-mile books the rate is advanced from 2 cents to 2¼ cents per mile by Boston & Albany, Boston & Maine, New York, New Haven & Hartford, and Rutland. The sale of 500-mile ticket books is discontinued by the New York Central & Hudson River and its leased line, the West Shore. Thousand mile ticket books are advanced from 2 cents to 2¼ cents per mile by Boston & Albany, Boston & Maine, Buffalo, Rochester & Pittsburgh, Buffalo & Susquehanna, Delaware & Hudson, Lehigh Valley, New York, New Haven & Hartford, Rutland, and Pennsylvania. The sale of 1,000-mile ticket books is discontinued by the Central New England and Erie.

The New York Central & Hudson River continues sale of 1,000-mile ticket books at 2 cents per mile, but use is restricted to travel between points in New York state not interchangeable.

By all railroads the use of mileage tickets is practically confined to travel over their own lines of road.

In many instances limits of tickets are changed from "Good until used" to "One year from date of sale," and, except as to the Delaware & Hudson. On the Delaware & Hudson tickets sold prior to October 1, 1914, will only be honored to and including September 30, 1914, but the company will redeem unusued coupons of such tickets at the rate of two cents per coupon.

All companies selling trunk line interchangeable 1,000-mile refund tickets have changed the regulations governing redemption value of cover of ticket from $5 to $2.50, which change has the effect of increasing the cost of travel from 2 cents to 2¼ cents per mile. This form of ticket has not heretofore been good over the New York Central or the Lake Shore, but such tickets sold on and after October 1, 1914, will be good over those lines.

Car Balance and Performance

Arthur Hale, chairman of the committee on relations between railroads, of the American Railway Association, in presenting statistical bulletin No. 176, covering car balance and performance for May, 1914, says:

The miles per car per day were 22.2, compared with 23.0 for April. This figure for May, 1913, was 25.0.

Ton miles per car per day for May were 320, compared with 334 for April. This is a decrease of 17.3 per cent compared with the figure for May, 1913, which was 387.

The proportion of home cars on line was 68 per cent, compared with 64 per cent in April. This is an increase of 12 points over May, 1913.

The per cent of loaded car mileage increased from 60.2 per cent in April to 68.0 per cent in May. This figure for May, 1913, was 68.7 per cent.

The average earnings per car per day for all cars on line decreased 23 cents to $2.18 in May. This figure for May, 1913, was $2.55.

The accompanying table gives car balance and performance in the month covered by the report, and the diagram on the following page shows car earnings and car mileage and different car performance figures monthly from July, 1907.

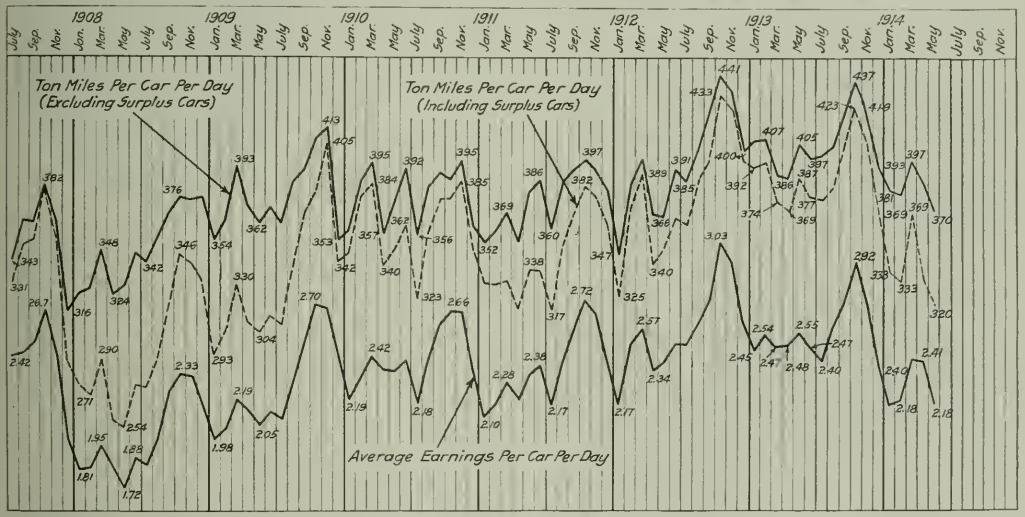
Car Location

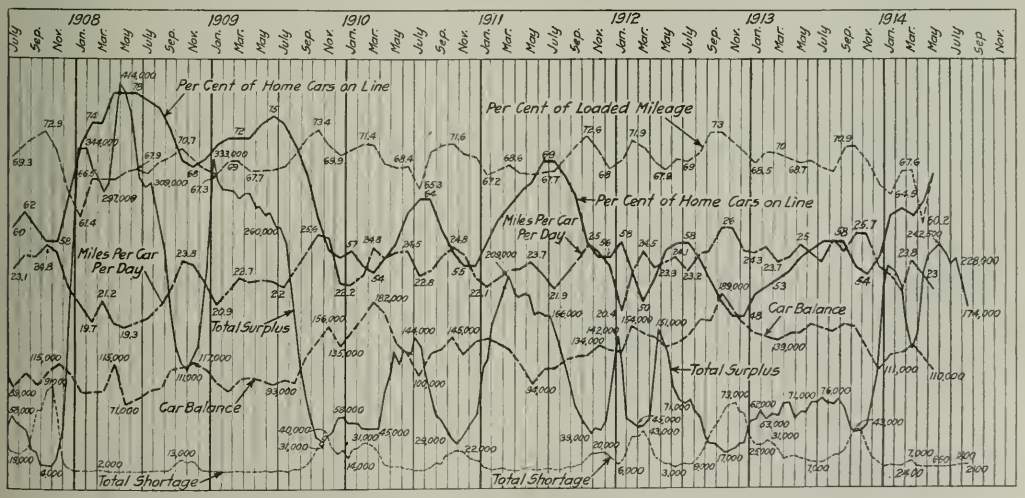
The table on the following page, which was taken from bulletin No. 21 of the American Railway Association, gives a summary of freight car location by groups on August 1, 1914.

CAR LOCATION ON AUGUST 1, 1914

	New England.	N.Y., N.J., Del., Md., Eastern Pa.	Ohio, Ind., Mich., Western Pa.	Va., W. Va., No. & So. Carolina.	Ky., Tenn., Miss., Ala., Ga., Fla.	Iowa, Ill., Wis., Minn.	Mont., Wyo., Neb., Dakotas.	Kans., Colo., Okla., Mo., Ark.	Texas, La., New Mexico.	Oregon, Idaho, Nev., Cal., Ariz.	Canadian Lines.	Grand Total.
Total Cars Owned	87,683	684,841	261,538	208,681	169,776	496,031	24,017	162,477	33,631	138,687	154,502	2,421,864
Home Cars on Home Roads	56,734	479,599	117,125	137,330	107,526	364,870	12,971	109,104	19,945	88,363	112,665	1,606,232
Home Cars on Foreign Roads	30,949	205,242	144,413	71,351	62,250	131,161	11,046	53,373	13,686	50,324	41,837	815,632
Foreign Cars on Home Roads	32,334	203,550	167,007	55,840	50,456	147,901	10,324	59,005	22,995	54,248	24,048	827,708
Total Cars on Line	89,068	683,149	284,132	193,170	157,982	512,771	23,295	168,109	42,940	142,611	136,713	2,433,940
Excess or Deficiency	1,385	*1,692	22,594	*15,511	*11,794	16,740	*722	5,632	9,309	3,924	*17,789	12,076
Surplus	4,043	28,478	49,055	11,886	8,190	31,309	4,566	11,210	1,983	20,295	27,983	198,998
Shortage	14	6	629	50	258	681	50	375	54	216	0	2,333
Shop Cars—												
Home Cars in Home Shops	8,157	61,178	23,718	20,304	17,843	37,819	859	15,850	3,678	6,683	6,747	202,836
Foreign Cars in Home Shops	477	5,103	7,295	951	1,367	4,069	569	1,700	913	3,336	172	25,952
Total Cars in Shops	8,634	66,281	31,013	21,255	19,210	42,963	1,428	17,550	4,591	10,019	6,919	229,863
Per Cent to Total Cars Owned—												
Home Cars on Home Roads	64.70	70.03	44.78	65.81	63.33	73.56	54.01	67.15	59.31	63.71	72.92	66.32
Total Cars on Line	101.58	99.75	108.52	92.58	93.05	103.37	96.99	102.63	127.68	102.83	88.49	100.50
Home Cars in Home Shops	9.30	8.93	9.07	9.73	10.51	7.62	3.58	9.75	10.94	4.82	4.37	8.38
Foreign Cars in Home Shops	.54	.75	2.79	.46	.80	.82	2.37	.99	2.71	2.40	.11	1.07
Total Cars in Shops	9.84	9.68	11.86	10.19	11.31	8.66	5.95	10.74	13.65	7.22	4.48	9.49

*Denotes deficiency.





Freight Car Mileage, Earnings and Performance, 1907 to 1914

Commission and Court News

INTERSTATE COMMERCE COMMISSION

The commission announces that its general investigation into complaints relative to embargoes on freight will be made the subject of a public hearing at Chicago, January 20, next. The investigation is in charge of Commissioner Daniels.

Switching Charges at Harrisburg, Pa.

Hooven, Owens, Rentschler Company v. Cincinnati, Hamilton & Dayton et al. Opinion by the commission:

The commission finds unreasonable a charge of 4 cents per 100 lb. charged by the Pennsylvania Railroad for switching service rendered at Harrisburg, Pa., and reparation is awarded to the extent of the amount collected over a charge of 2 cents per 100 lb. (31 I. C. C., 550.)

Switching Charges at Charlestown, W. Va.

Jefferson Milling Company v. Baltimore & Ohio. Opinion by the commission:

The commission finds that a charge of 4 cents per 100 lb. for switching cars loaded with flour from complainant's spur track on the line of the defendant at Charlestown, W. Va., to points on the Norfolk & Western, reached also by connections of the defendant, is unreasonable and that the switching charge on that competitive traffic should not exceed 2 cents per 100 lb., with a minimum charge of $3 per car. (31 I. C. C., 547.)

Rates on Pulp Wood to Rhinelander, Wis.

Rhinelander Paper Company v. Minneapolis, St. Paul & Sault Ste. Marie. Opinion by the commission:

The commission upon rehearing reaffirms its former decision given in 26 I. C. C., 104, to the effect that the rate of 7.5 cents on pulp wood in carloads from Whitedale, Bovee, Christiansen Spur and Spur No. 447 to Rhinelander, Wis., was unreasonable to the extent that it exceeded 6.5 cents, and that the rate of 6 cents from Trenary, Delta Junction and Manistique to Rhinelander was not unreasonable nor discriminatory. (31 I. C. C., 555.)

Rates on Beer from the Twin Cities to Sioux Falls and Sioux City

In re beer and other malt products between stations in Iowa and South Dakota and points in Minnesota and Wisconsin. Opinion by Commissioner Harlan:

The commission finds that the carriers have justified a proposed increase in the carload rates on beer and other malt products from the special commodity rate of 15 cents per 100 lb. to the fifth-class rate of 20.1 cents from St. Paul, Minneapolis and La Crosse to Sioux Falls, of 20 cents from the same points of origin to Sioux City, of 20 cents from La Crosse to Pipestone, of 26 cents from La Crosse to Granite Falls, Minn., and of 18 cents from La Crosse to Marshall, Minn. (31 I. C. C., 544.)

Transit Privileges on Grain at Atlanta

Atlanta Milling Company v. Louisville & Nashville. Opinion by the commission:

The commission does not find that the failure of defendant to establish prior to May 16, 1909, a transit privilege under which grain could be forwarded from Cincinnati, Ohio, and Lexington, Ky., to Atlanta, Ga., there milled and reshipped to points in Carolina territory, resulted in damage to complainant. Complaint dismissed. (31 I. C. C., 485.)

STATE COMMISSIONS

The Railroad Commission of Mississippi on September 3 entered orders imposing fines on the St. Louis & San Francisco of $500 for each of three failures to comply with orders of the commission requiring the construction of stations, freight houses, etc.; and also one fine of $500 against the Yazoo & Mississippi Valley.

The Railroad Commission of Texas has announced its adoption of the accounting methods and forms of the Interstate Commerce Commission. This will make a considerable saving for the Texas lines by saving them extra bookkeeping which has been required in the past to conform to the systems both of the interstate and state commissions.

Government Freight-Car Standards in Canada

The Board of Railway Commissioners for Canada, modifying its general order of February 17, 1913, respecting safety appliances on trains, has granted an extension of time until July 1, 1916, within which to make the following changes:

To change the location of brakes on all cars; to comply with the standard specifications prescribed in the regulations in respect of all brakes; to change cars having less than 10 in. end ladder clearance within 30 in. of the side of car; to comply with the standard prescribed in the regulations in respect to hand holds, running boards, ladders, sill steps, and brake staffs, except that when a car is shopped for work amounting practicaly to rebuilding body of car, it must then be equipped according to the prescribed standards regulations.

Railway companies are not to be required to make changes to secure additional end ladder clearance on cars that have 10 or more inches end ladder clearance within 30 inches of side of car, or to make the changes in end ladders, side ladders, hand grips and steps which have been made in accordance with the provisions of the general order above referred to, or to comply with the board's regulations aforesaid, until the car is shopped for work amounting to practically rebuilding body of car.

And it is further ordered that railway companies shall not be required to change the location of hand holds (except end hand holds under the end sills), ladders, sill steps, brake wheels, and brake staffs on freight train cars where the appliances are within 3 inches of the required location, except that when cars undergo regular repairs they must then be made to comply with the prescribed standards.

PERSONNEL OF COMMISSIONS

H. E. Kellenberger has been appointed as senior signal engineer of the central district, division of valuation, Interstate Commerce Commission, with headquarters at Chicago. He was formerly superintendent of signals on the Chicago Great Western.

J. A. Lindstrand has been appointed senior architect in the central district, division of valuation, Interstate Commerce Commission, with headquarters at Chicago. Mr. Lindstrand was for 15 years in the architect's office of the Chicago, Burlington & Quincy, and for the past eight years has been architect for the Chicago, Milwaukee & St. Paul.

Fred M. Baumgardner has been appointed as senior inspector of motive power in the central district, division of valuation, Interstate Commerce Commission, with headquarters at Chicago. His experience has been with the mechanical department of the Union Pacific and the Illinois Central, having served as roundhouse foreman, general foreman and master mechanic on the latter road and having recently been made master mechanic at Clinton, Ill.

D. K. van Ingen has been appointed second assistant field engineer in the central district, division of valuation, Interstate Commerce Commission, with headquarters at Chicago. He was educated at Rensselaer Polytechnic Institute, and has been with the Chicago & North Western, Choctaw, Oklahoma & Gulf and New York Central & Hudson River, having been assistant engineer in charge of valuation work on yards and terminals in Iowa on the Chicago & North Western since 1913, and within the last month having been appointed as chief draftsman in the valuation department of the same road. Mr. van Ingen is a member of the Western Society of Engineers.

W. E. Van Hook has been appointed to the position of office engineer for the central district, division of valuation, Interstate Commerce Commission, with headquarters at Chicago. He is a graduate civil engineer of the University of Wisconsin. The first five years after graduation he was on railroad work in lo-

cation, construction, maintenance and valuation work with the Chicago & North Western, the Chicago & Alton, and the Chicago, Milwaukee & Puget Sound. For the past three years he has been with the Illinois Railroad & Warehouse Commission, and later the Public Utilities Commission of the state of Illinois. He is a member of the Railway Signal Association.

W. A. Christian, formerly first assistant chief engineer of the Chicago Great Western, has been appointed by the Interstate Commerce Commission as senior civil engineer in charge of the roadway and track department for the central district, division of valuation, with headquarters at Chicago. Mr. Christian graduated from the University of Cincinnati, and his early work was with the Baltimore & Ohio, Chesapeake & Ohio, and Cleveland, Cincinnati, Chicago & St. Louis. In 1894 he was assistant county engineer of Hamilton county, Ohio, and from 1895 to 1902 was with the United States Army Engineer Corps as assistant engineer in charge of plans and estimates for river and harbor improvements. He was then with the C. C. C. & St. L., for about a year on maintenance work, and from 1903 to 1907 was again with the United States Army Engineer Corps as assistant engineer in charge of plans and estimates for concrete movable dams in the Ohio river. Since 1907 he has been with the Chicago Great Western as assistant chief engineer. He is a member of the American Society of Civil Engineers and of the American Railway Engineering Association, being chairman of the committee of records and accounts.

W. A. Christian

Canadian Pacific Reserve Men.—The Canadian Pacific has received a cable from Sir Thomas Shaughnessy, its president, to the effect that the positions of men who are called to the colors will be reserved for them, and that they will receive full pay for six months or for such shorter period as they may be serving their country.

Proposed Railway Electrification in Santiago, Chile.—The commission appointed to report on the proposed railway from Santiago to Valparaiso via Casa Blanca, has advised the construction of an electric line. The commission further proposes the construction of branch lines to Melipilla and Talagante. It is suggested that the former proposals for the electrification of the present steam railway system should be abandoned for the time, and that the $11,500,000 intended for this undertaking be utilized in the construction of the proposed new line.

Railway Extension in Korea.—During the year 1913 133 miles of railway were opened in Korea. The total length of line now opened to traffic is, therefore, about 970 miles. The Honam Railway was completed in January, 1914, and the Seoul-Gensan line is expected to be finished in October or November next. During 1913 the Korean railways carried 4,143,803 passengers and 1,425,246 tons of freight, an increase, as compared with 1912, of 1,695,075 passengers and 293,474 tons of freight. No light railway was constructed in 1913. Starting from the financial year 1914-15, the third railway program is to be undertaken and will include the reconstruction of the Seoul-Fusan line, which was originally built in a hurry, owing to the exigencies of the time, and which, though since then to some extent improved, requires reduction in grades, etc. A line from Gensan to Yong-heung, 34 miles in length—a continuation of the Seoul-Gensan track—passing through Munchon and Kowon, is also to be laid down later, and the extension is expected to be carried on to Hamheung.

Railway Officers

Executive, Financial, Legal and Accounting

H. R. Kurrie, general attorney of the Chicago, Indianapolis & Louisville, has been elected president, with headquarters at Chicago succeeding F. A. Delano. A portrait and sketch of Mr. Kurrie appear elsewhere in this issue.

Operating

T. D. Stafford has been appointed assistant superintendent of the New Orleans, Texas & Mexico at DeQuincy, La., in place of H. S. Badgett, deceased.

Traffic

M. L. Schultz has been appointed commercial agent of the Detroit, Toledo & Ironton and the Georgia & Florida, with headquarters at Chicago.

C. W. Hay, traveling freight agent of the Louisville & Nashville, at Frankfort, Ky., has resigned, and the office of traveling freight agent at that place has been abolished.

Willis Callaway, Florida agent of the Atlanta, Birmingham & Atlantic, at Jacksonville, Fla., has been appointed commercial agent of the Norfolk & Western, with headquarters at Jacksonville.

Claude P. Wilson, commercial agent of the Missouri, Oklahoma & Gulf at Houston, Tex., has been appointed general agent at Dallas, Tex., succeeding F. S. Sleight, resigned on account of ill health.

Engineering and Rolling Stock

Gustave Gullickson has been appointed roadmaster of the Northern Pacific at Forsyth, Mont.

Charles Manley has been appointed master mechanic of the Missouri & North Arkansas, with office at Harrison, Ark., succeeding J. P. Dolan, resigned.

J. W. Barrie, principal assistant engineer of the Florida East Coast, with office at St. Augustine, Fla., has resigned, and his former position has been abolished.

William Schuman has been appointed general foreman of shops of the Chicago, Indianapolis & Louisville at Lafayette, Ind., in place of George Crumbo, resigned.

E. B. Kelliher, chief engineer of the Grand Trunk Pacific at Winnipeg, Man., has resigned on account of ill health, and H. A. Woods, assistant chief engineer at Montreal, Que., has assumed charge of the engineering department, with headquarters at Winnipeg.

W. S. Moseley, who has been appointed mechanical engineer of the Carolina, Clinchfield & Ohio, with headquarters at Erwin, Tenn., as has been announced in these columns, was born on March 5, 1880, at Bonsack, Va., and was educated in the public schools and at Virginia Polytechnic Institute, Blacksburg, Va. He began railway work as a messenger boy in the auditor's office of the Norfolk & Western, and from June, 1894, to January, 1899, was messenger and clerk in the same office. He was then for three years machinist apprentice in the Norfolk & Western shops and drawing office at Roanoke, Va., and from January, 1902, to January, 1909, was draftsman in the mechanical engineer's office of the same road, with the exception of two years, during which time he was an assistant shop instructor and special student at the Virginia Polytechnic Institute. In January, 1909, he was appointed mechanical draftsman of the Carolina, Clinchfield & Ohio, which position he held at the time of his recent appointment as mechanical engineer of the same road as above noted.

Purchasing

E. O. Griffin, general fuel and supply agent of the International & Great Northern, has been appointed purchasing agent for the receivers, with headquarters at Houston, Tex., and will report to Thornwell Fay, assistant to receivers.

OBITUARY

Paul P. Rainer, superintendent of the joint rate inspection bureau, with headquarters at Chicago, died at Brockville, Ont., on September 8.

Richard F. Stevens, formerly secretary and treasurer of the Camden & Amboy, now a part of the Pennsylvania Railroad, died recently at his home in South Orange, N. J., at the age of 82.

Frank Barr, formerly vice-president and general manager of the Boston & Maine, died recently at Winchester, Mass., at the age of 62. Mr. Barr was born at Nashua, N. H., and began railway work on March 1, 1869, as freight clerk and telegraph operator on the Worcester & Nashua, now a part of the Boston & Maine. From June, 1873, to November, 1892, he was general agent of the same road, and in November, 1892, was appointed superintendent of the Worcester, Nashua & Portland division of the Boston & Maine, at Nashua, N. H. He was promoted to assistant general manager in December, 1896, remaining in that position until July, 1903, when he was elected third vice-president and general manager of the same road, and in July, 1912, Mr. Barr was retired under the pension rules of the company.

Frank Barr

Railway Construction in British Guiana.—In 1913 a project was seriously considered of constructing a hinterland railway into British Guiana which would undoubtedly have been of great advantage to the balata, timber and mining industries. The governor made a two months' tour of the interior of the colony, going to the Brazilian boundary, accompanied by a railway expert. At present there is a very earnest controversy over the advisability of constructing two railways immediately, one to be a considerable extension of the existing lines along the coastal districts and the other to run into the interior with possible connections with Brazilian points. A proposition was made to the secretary of state for the colonies for building these roads, but it was not favorably considered. The scheme has not been abandoned, but it is unlikely that actual construction will be undertaken for several years. At the present time a short extension of the existing railways along the coast is being built.

French Railway Employees.—Statistics recently issued by the French commission which is charged with the duty of supervising the work of railway employees show that in 1912 the total number of these was 171,240. These were divided as follows: Nord, 29,451; Est, 21,775; Orleans, 23,814; Paris, Lyons & Mediterranean, 40,090; Midi, 14,497; State Railways, 40,150; Ceinture, 1,463. Of the total number 11,799 were enginemen and 13,891 were firemen. Conductors and brakemen numbered 14,161, and there were 8,258 stationmasters and assistant stationmasters. Yard brakemen, switch tenders, etc., numbered 41,748 and the cleaners, car inspectors, etc., amounted to 4,139. Maintenance of way men numbered 42,406, crossing gate men 2,270 and signal men, etc., 3,194. There was also a number of miscellaneous employees. The Paris, Lyons & Mediterranean has more locomotives than any other railway in France and, as might have been expected, has therefore employed the largest number of enginemen, 2,302. On the other hand the Nord employed the largest number of firemen, its total being 3,429. The Paris, Lyons & Mediterranean employed the largest number of stationmasters and assistant stationmasters, 2,032, as well as of maintenance of way employees, 13,126.

Equipment and Supplies

CAR BUILDING

The Rutland, reported in the *Railway Age Gazette* of September 4, as being in the market for 75 50-ton steel hopper cars, has ordered that equipment from the Standard Steel Car Company.

The Cincinnati, Hamilton & Dayton, reported in the *Railway Age Gazette* of September 4, as having ordered 1,000 box cars from the Standard Steel Car Company, has ordered that equipment from the Mt. Vernon Car Manufacturing Company, with the provision that the railroad has the right to cancel the order any time before October 1, 1914, provided that the receivers are unable to make satisfactory financial arrangements.

Improving the Uganda Railway of British East Africa.—It has been proposed to relay the Airobi-Kisumu section of the Uganda railway with 80-lb. rails. The cost would be about $13,300 per mile, exclusive of the strengthening of bridges, but it would permit the use of locomotives having three times the tractive effort of those at present in service.

Free Transportation for Soldiers in London.—The London street and underground railways and the London General Omnibus Company have announced that until further notice men in uniform, whether soldiers or sailors, will be permitted to ride free on all their lines whether or not in possession of the necessary government warrants.

German Southwest Africa Railway.—It is reported that in 1913 no new railways were constructed in German Southwest Africa with the exception of a few private lines for mining purposes. The principal railway in the colony is the Otavi Railway, which, during the year ended March 31, 1913, had earnings of $1,209,815. Its total expenditures were $597,165, leaving a surplus to $612,650. The total earnings of all the railways in the colony were $2,107,705, and the total expenditures $1,235,045.

Financial Returns of the Cuba Railroad.—The annual report of the Cuba railroad for the fiscal year ended June 30, 1914, shows that the company had gross earnings of $5,164,671, as compared with but $4,632,040 in 1913. The net earnings after deducting taxes were $2,470,922 and interest charges were paid to the amount of $819,417. There was paid in preferred dividends $600,000, and a like amount in dividends on the common stock, so that the surplus for the year is $316,505, comparing, however, with $414,280 in 1913, when but $1,000,000 in dividends was paid.

The Hauenstein Tunnel of Switzerland.—At 10:40 a. m. on Friday, August 10, the Hauenstein tunnel on the Basle-Olten line in Switzerland, was pierced. The tunnel is 5 miles 94 yards in length, and was commenced on February 1, 1912. When completed it and its approach lines will replace the existing line between Sissach and Olten. On the latter line there is a tunnel 1 mile 968 yards in length, constructed in 1854-8. There is practically no difference between the lengths of the old and the new routes, but the new line will have much easier grades. On the old line there is a grade of 2.63 per cent for about 4 miles, and on this incline the tunnel is situated. The rest of the route has an average grade of about 2 per cent. On the new route the maximum grade will be 1 per cent, and in the tunnel the grade will be .75 per cent for about 4½ miles and .15 for the remaining distance. As a result of the improved grade wear and tear of rolling stock will be saved, economy of coal will be effected, and twenty minutes taken off the time of the journey between Basle and Olten. The contractors for the new tunnel were the Julius Berger Tiefbau Company, of Berlin, and the contract price was $3,963,545. The tunnel has been pierced about eighteen months in advance of contract time.

Supply Trade News

W. H. Pratt, general superintendent of the North Works of the Illinois Steel Company, Chicago, died at his home Saturday afternoon, September 5, 1914. Funeral services were held on Tuesday, September 8.

Jay G. Coutant, formerly engineer of the plant of the Lima Locomotive Corporation, Lima, Ohio, has gone with the Railway Materials Company, Chicago, Ill., to specialize in the design of furnaces for burning powdered fuel and water gas, having done considerable experimenting in this work.

The Transportation Utilities Company, with general offices at 30 Church street, New York City, has opened a branch office at 1201 Virginia Railway & Power building, Richmond, Va. This office is in charge of Frank N. Grigg, and is devoted exclusively to the appliances manufactured by the Transportation Utilities Company.

The New Process Gear Corporation, Syracuse, N. Y., is building an addition to its plant, which was doubled in capacity less than two years ago and was at that time claimed to be the largest in the world devoted exclusively to gear making, and is planning to double the capacity of its casehardening and heat-treating departments.

The Gun-crete Company, Chicago, has acquired the interests of the Cement Gun Construction Company and has absorbed the construction department of the General Cement Gun Company. The combined business will be conducted under the name of the Cement Gun Construction Company, with office at Chicago. Carl Weber is president, John V. Schaefer, secretary and treasurer, and C. L. Dewey, construction manager.

TRADE PUBLICATIONS

SECOND HAND RAILWAY EQUIPMENT.—The Walter A. Zelnicker Supply Company, St. Louis, Mo., has recently issued bulletin No. 159, an 80 page booklet containing an illustrated and alphabetically arranged list of second hand railway equipment which may be bought from the company.

ENAMELED IRON SIGNS.—The Royal Enameling & Manufacturing Company, Chicago, has issued a catalogue of the Royal line of enameled iron signs. The booklet contains illustrations of a large number of typical signs, many of which are intended for use at railway stations, offices, shops, etc.

USEFUL SPANISH WORDS AND PHRASES.—This is the title of a 20 page booklet recently issued by the Joseph Dixon Crucible Company, Jersey City, N. J. The booklet, which is issued at a very opportune time, contains a large number of common English words and phrases with their Spanish equivalents, and has been compiled primarily for the use of tourists in the West Indies or South America.

TELEGRAPH POLES.—The Western Electric Company has recently issued a booklet entitled Western Electric Poles, describing in brief the obtaining of telegraph poles and containing the standard specifications of white cedar products established by the Northern White Cedar Association, several inspection comments, shipping data relating to northern cedar poles and in addition the official specifications of the Western Red Cedar Association.

SHEET METAL.—The American Rolling Mill Company, Middletown, Ohio, has recently issued two booklets descriptive of Armco Iron, entitled, respectively, "Defeating Rust, The Story of Armco Iron," and "Iron Roofs That Resist Rust," The former booklet is divided into chapters having such heads as: Armco Iron Has Historical Antecedents, Where Armco Iron Goes, What Scientists Say, What Engineers Say and What Users Say. Several illustrations are given showing the Armco Iron in various kinds of service. The latter booklet describes and illustrates the various Armco products.

Railway Construction

ALBERTA & GREAT WATERWAYS.—See Edmonton, Dunvegan & British Columbia.

ARKANSAS VALLEY INTERURBAN.—Arrangements have been made, it is said, to build an extension from Halstead, Kan., west via Burrton to Hutchinson, about 30 miles. The Hutchinson & Northern, a separate organization, is also planning to build from Hutchinson east to Burrton, about 15 miles, and may extend the line to Halstead.

ASHLEY, DREW & NORTHERN.—The final survey is now being made, it is said, for building a section of an extension north of Monticello, Ark. The projected route is via Gillett to Helena. (June 27, p. 1631.)

CANADIAN PACIFIC.—The Railway Commission of Canada has authorized this company to open a section of the Weyburn West branch from Shaunavon, Sask., west to Govanlock, 76.5 miles.

CENTRAL OF NEW JERSEY.—We are told that contracts have been let to the estate of Charles McDermott, Philadelphia, Pa., for the grading work and concrete abutments on the Easton & Western, a switching branch to be built from Glendon, a suburb of Easton, Pa., into the manufacturing district of Easton, about four miles. (April 3, p. 811.)

CHARLESTON, PARKERSBURG & NORTHERN.—An officer writes regarding the report that contracts are to be let to build a section of this line, that contracts will probably be let next spring. The plans call for building from Parkersburg, W. Va., south via Guthrie, to Charleston, about 75 miles. The cut and fill work will involve handling about 28,000 cu. yd. to the mile The maximum grades will be 1.75 per cent, and the maximum curvature 9 deg. There will be five tunnels on the line varying in length from 800 ft. to 2,300 ft. The company expects to develop a traffic in coal, farm products and limestone. Henry H. Archer, president. Robert Cutler, chief engineer, Parkersburg. (April 24, p. 966.)

CHICAGO, BURLINGTON & QUINCY.—Track laying was recently finished, it is said, on the extension from Casper, Wyo., to Orin Junction. This completes the extension from Thermopolis, Wyo., via Powder River to Orin Junction. (July 10, p. 80.)

EASTON & WESTERN.—See Central of New Jersey.

EDMONTON, DUNVEGAN & BRITISH COLUMBIA.—Announcement is made that construction work will be continued on this line and the Alberta & Great Waterways railways, now building in northern Alberta. About 1,500 men and 475 teams are now at work. The Edmonton, Dunvegan & British Columbia has completed 70 per cent of the grade between Sawridge and Smoky river, 133 miles, and the line between Edmonton and Sawridge, 160 miles, has been completed. The Alberta & Great Waterways is being built by the provincial government between Edmonton, Alta., and Fort McMurray, 180 miles. Grading work has been finished on 95 miles, and track has been laid on 25 miles. (June 5, p. 1257.)

HUTCHINSON & NORTHERN.—See Arkansas Valley.

INDIANA ROADS (Electric).—Surveys have been made, it is said, for an electric line to be built from Boonville, Ind., north to Lynnville, and it is expected that work on the line will be started soon.

Surveys have been made, it is said, to build an electric line from Evansville, Ind., northwest to New Harmony, about 30 miles. Bonds are now being sold to secure funds for building the line which may eventually be extended north to Mt. Carmel, Ill., 35 miles additional, including a bridge over the Wabash river. Capitalists of Evansville are said to be back of the project.

MIDLAND PENNSYLVANIA.—A syndicate has been formed to take over the rights and property of this company, which was organized in 1910, to build from Millersville, Pa., on the Susquehanna river northeast via Sacramento and Gordon to Ash-

land on the Philadelphia & Reading, 44 miles. About 10 miles of the line have been partly completed. J. H. Williams, Pottstown, Pa., is secretary of the railroad company.

New Orleans, Mobile & Chicago.—An officer writes that owing to financial conditions, it is doubtful whether actual construction work will be started in the near future on the proposed extension from Beaumont, Miss., south to a connection with the Louisville & Nashville at Ansley, about 80 miles. (March 13, p. 556.)

Pennsylvania Lines West.—An officer writes that work is now under way on the Lengeloth branch, building from Burgettstown, Pa., to a coal section southwest of that place. The work includes putting up bridges at Burgettstown.

Rock Falls & Southern Traction.—Plans are being made, it is said, to build an electric line to connect Sterling, Ill., with Rock Falls, Tampico, New Bedford, Princeton and Kewanee, about 70 miles. A. S. Goodell, secretary, Rock Falls.

Rosston, Grand Rapids & Protection.—Organized in Oklahoma with headquarters at Doby Springs, to build from a point on the Wichita Falls & Northwestern at or near Rosston east to Doby Springs, 12 miles. L. A. Walton, president and general manager; J. H. Butler, secretary, and J. D. Scott, treasurer.

Teal Creek.—Incorporated in Oregon with $10,000 capital to build a line from Falls City, Ore., to timberlands in Polk county. W. McCamant is an incorporator, Portland.

Van Horn Valley.—Contracts have been given to E. G Beecher and F. J. Cumming, it is said, to build from Van Horn, Tex., to a point in southeastern New Mexico, about 100 miles. The plans call for eventually extending the line further north, probably to Roswell. The incorporators include J. M. Daugherty, J. Y. Canon and J. Irby, all of Van Horn. (May 15, p. 1119.)

RAILWAY STRUCTURES

Baltimore, Md.—It is understood that the Western Maryland will soon start work on new piers and warehouses to increase its terminal facilities at South Baltimore.

Burgettstown, Pa.—See Pennsylvania Lines West under railway construction.

Butte, Mont.—Work on the proposed new passenger station of the Chicago, Milwaukee & St. Paul, which has thus far consisted only of grading has been discontinued for an indefinite period.

Chicago, Ill.—Following a meeting of the directors of the Union Station Company on September 5, a statement was sent to the mayor asking an extension of time of one year for the acceptance of the ordinances providing for the construction of the new Union station, on account of the impossibility of financing the project at this time. The ordinances were to be accepted by September 23. The mayor has announced that he is in favor of the extension and that he will call a special meeting of the city council to consider it.

Ft. Worth, Tex.—The St. Louis Southwestern is building a new freight depot between Fifth and Sixth streets on Terry street. The structure is 34 ft. by 300 ft., and has a covered platform 140 ft. long. It is constructed of brick and concrete. The west end of the building will be two stories high and devoted to office space. A. W. Black & Sons, architects and contractors, St. Louis, Mo., are doing the work and expect to have it completed in four months.

Noblestown, Pa.—The Pennsylvania Lines West are reconstructing bridge No. 22 at Noblestown, by putting a concrete slab top on the old masonry.

Oil City, La.—The Kansas City Southern will erect a new passenger station. This structure is to be similar to the old station which was destroyed by fire on August 5, 1914. The approximate cost will be $1,500.

Washington, D. C.—Plans are being made for putting up a concrete overhead highway viaduct over the tracks of the Philadelphia, Baltimore & Washington and the Baltimore & Ohio at Benning Road. The cost of the improvements will be about $110,000, of which one-half is to be paid by the government and the other half by the railroads.

Railway Financial News

Belt Railway of Chicago.—This road, which is owned jointly by 11 railways, each of which holds $240,000 of its $2,640,000 capital stock, leases from the Chicago & Western Indiana the latter's Belt division on a 50 year lease from November 1, 1912, and also the equipment which it uses. In 1913 the Belt Railway's operating revenues were $3,088,798, $2,111,250 of which was for transfer and $924,675 for local switching. The total operating expenses, on the other hand, were $1,975,736, so that the net operating revenue was $1,113,062, as compared to $1,090,094 in 1912. Taxes paid amounted to $118,105, operating income to $1,001,363. The gross income was $1,168,999, from which must be deducted rentals of $953,170, leaving a net income of $215,829. As dividends of $86,400 were declared the surplus for the year was $129,429.

The company's property investment is in the form of leasehold estate, rights and franchises, and has a value of $1,200,000. On December 31, 1913, the working assets amounted to $2,444,483, $1,262,871 of which was cash and $879,460 miscellaneous accounts receivable. As noted above the capital stock, which is all common, amounts to $2,880,000. There are no bonds outstanding. The company on December 31 had working liabilities of $545,404, of which $480,848 was audited vouchers and wages unpaid. There was also a liability item of $109,508 of taxes accrued. The surplus on December 31 was $81,940.

Boston & Maine.—The Hampden Railroad has begun suit against the Boston & Maine, in the Superior Court, at Springfield, claiming compensation for failure on the part of the Boston & Maine to carry out its agreement to take a lease of the Hampden road. Damages are claimed to the amount of $4,000,000.

Canadian Northern.—It is announced in Toronto (as coming from Sir William Mackenzie) that the financial blockade in the affairs of the Canadian Northern has been raised by good news from the London underwriters; and Sir William says that the completion of the transcontinental line can now be carried forward at full speed. Nearly ten thousand men are now at work on the undertaking. It was generally understood that the enactment of the British moratorium was sufficient to place the plans of the C. N. R. in anything but a happy condition; and it was expected that the company would have to fall back on the Dominion Government and ask for further special legislation. The London underwriters had completed the purchase of the company's issue of $45,000,000 of Dominion-Government-guaranteed bonds and had sent to Canada the first instalment of cash. Just as the flotation was ready for the British market came the declaration of war. Investors were not in an investing mood and the London house was caught between two fires. Even when Lloyd George blanketed all contracts by his moratorium act, that did not relieve the underwriting concern from the legal loss of its first payment to the Canadian Northern, amounting to several millions. Only by carrying out the agreement could the initial payment be saved. The only explanation that Sir William Mackenzie would make of the ultimate solution achieved at the London end was that the underwriters had resources of their own. These resources, it is said, are probably insurance companies' funds, which would be available independently of the iron-clad policy of the banks.

Chicago, Rock Island & Pacific.—The Central Trust Company, trustee under the 4 per cent collateral trust bonds of the Chicago, Rock Island & Pacific Railroad Company, began foreclosure proceedings in the United States district court at New York on September 3, the company having defaulted on the interest due on May 1 on these bonds amounting to $71,353,500. The collateral on which these bonds are issued is stock, for the same amount, of Chicago, Rock Island & Pacific Railway Company. The amount of interest in default on May 1 was $1,420,060.

New York Central & Hudson River.—The 5 per cent notes of this company maturing on September 15 to the amount of $5,000,000 have been extended for one year at 7 per cent interest.

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WE GUARANTEE, that of this issue (the monthly Engineering & Maintenance Edition) **10,800** copies were printed; that of those **10,800** copies, **7,431** were mailed to regular paid subscribers to the weekly edition, **1,911** to subscribers who get the Engineering & Maintenance Edition only, **250** were provided for counter and news companies' sales, **1,107** were mailed to advertisers, exchanges and correspondents, and **101** were provided for samples and office use; that the total copies printed this year to date were **357,150**, an average of **9,399** copies a week.

VOLUME 57 SEPTEMBER 18, 1914 NUMBER 12

Contents

*Illustrated.

Taxation Under Government Ownership

E. M. Heigho, in a letter published elsewhere, referring to the estimate made by Sir George Paish that a saving of from 60 to 130 million dollars might be made in the cost of railway capital under government ownership in the United States, raises the question whether this saving would not be reduced by the amount of the 135 millions paid in taxes by the railways in 1913. It is true, as Mr. Heigho suggests, that as federal government property the railways would be relieved of taxation. But the federal government would not actually lose, because as the owner of the railways it would be the beneficiary of the saving made in the taxes that otherwise would be paid to itself. And as between the states and municipalities, on the one hand, and the federal government on the other, what the former would lose in taxes, the latter, as owner of the railways, would gain by not having to pay them. Therefore, on the whole, in the matter simply of taxes, the federal government would be the gainer, while the states and municipalities would be just equally heavy losers, and would be compelled to make up their loss by increasing the taxes on other property.

Traffic Officers as Trade Promoters

The officers of the traffic department of the Lehigh Valley propose to spend a week, and two weeks, or more, if necessary, in explaining South American trade opportunities to the manufacturers in the dozen principal cities along the company's lines between New York and Buffalo. They are going to run a special train, and stop in each place as long as may be necessary to see every interested shipper; and, as far as possible, they are going to give out first-hand information. For example, details of shipping methods will be explained by a man experienced in exporting goods to South America. Another man on the train will be the manager of the foreign department of the National City Bank, of New York, which has recently established branch banks in Buenos Aires, Rio Janeiro and Valparaiso. New York consuls of South American republics will go on the train or send representatives. From teaching farmers how to plant corn and spread fertilizer, and their wives how to make and sell butter and jam, the railway traffic manager has grown in a few years to be the most versatile "promoter" in the country. Banks and boards of trade have copied some of the railways' educational schemes, and at times it has looked as though the traffic man might be called on with discouraging frequency to share his laurels; but the action of the Lehigh Valley people indicates that the watchful railway promoter is liable any day to find some new field of effort. Not the least useful feature of this South American propaganda is a fifty-page pamphlet, issued with the "Compliments of the Lehigh Valley," summarizing in lucid form the varied and voluminous information on this subject which otherwise could be had only by extensive studies.

Prevention of Locomotive Smoke

In a paper entitled "A Practical Method of Handling Locomotive Smoke," presented before the ninth annual convention of the International Association for the Prevention of Smoke recently at Grand Rapids, Mich., the writers, a committee of the Railroad Smoke Inspectors' Association of Chicago, state that the most important features in smokeless firing are eternal vigilance on the part of the smoke inspectors and the authorities controlling the engine crews, the careful instruction of the engine crews as regards the manner of firing and operating locomotives and the special smoke-consuming devices, the co-operation of the engineers and firemen, and, if possible, the use of one grade of coal. These points certainly cover the smoke question very thoroughly, and when they are closely and consistently observed, there is no question that much will be done toward the elimination of locomotive smoke. Perhaps the most

important of these items is the careful instruction of the engine crews. Without this the value of any smoke-consuming device placed on the locomotive will be lost. The instruction of the engine crew should not be restricted to the fireman. Oftentimes the engineer is the one who most needs to be told a good deal about smoke prevention. He may have been brought up in the old days when it was thought that an engine which was not smoking was not steaming properly. This notion should be removed from his mind, and he should be made familiar with the proper methods for smokeless firing in order that he may properly control the work of his fireman. There is also need of close co-operation between the engineer and fireman, and unless the engineer is made to see the reasons why a certain method of firing should be used and thoroughly understands it he is likely not to give his firemen the support that it is necessary he should. That smokeless firing may be properly maintained, eternal vigilance on the part of the smoke inspectors is absolutely necessary. Perhaps the most effective and satisfactory plan of smoke inspection is in use at Chicago. That city covers an area of 191 square miles, which is overspread with tracks and yards on which operate engines of every road entering it. It would be impossible for each road satisfactorily to inspect all of its engines operating over the entire district. In order to secure satisfactory inspection the Railroad Smoke Inspectors' Association of Chicago was formed under the direction of the General Managers' Association, as has been previously described in these columns. It is now the duty of each smoke inspector to report locomotives of all roads impartially. Since this system has prevailed the average density of smoke emitted from locomotives has been reduced from 11.99 in 1912 to 6.034 in 1914. The plan has worked with very little friction and is recommended for other large localities where operating conditions are similar.

KEEP A STIFF UPPER LIP

THE present in the United States is the kind of a time when strong men show their strength and weak men show their weakness. Six weeks ago the outlook for business throughout the United States generally, and in the railway and railway supply businesses particularly, was promising. It looked as if, when the fiscal year was ended and the decision of the Interstate Commerce Commission in the rate advance case was rendered, the corner would be turned and prosperity would be renewed. But the decision in the rate case was unexpectedly delayed and before it was handed down Europe was involved in a terrible war. It was unavoidable that the beginning of this war should affect business in the United States unfavorably and to a great degree. It was inevitable that it should force a painful readjustment in many directions. We are now going through this period of readjustment and almost everyone is keenly feeling the effects of it. The consequence is most business men are assuming a pessimistic tone and are disposed drastically to reduce their organizations and cut expenses in every direction.

Is this wise? Does the situation justify the adoption of such a policy? When a storm comes up it is desirable to take in sail, but it is never considered desirable entirely to destroy the sails because it is assumed that after the storm is over there will be further use for them. Now, under present conditions it is undoubtedly desirable for business concerns generally, and those in the railway and railway supply fields particularly, to proceed cautiously. But is there not great danger of carrying retrenchment so far as not merely to protect the solvency of the concerns affected, but as to lose the opportunities which the war is opening up and make it impossible for the concerns which do the severe retrenching to handle their business successfully and profitably after the war is over?

At home all the underlying conditions are sound. Abroad the war is opening up for American manufacturers and exporters markets in South America, Asia and even in Europe itself, which, to a large extent, have been closed to them. Are we not thinking too much about the dark side of this cloud and not enough about its silver lining? Is there not being manifested too general a disposition to take flight before the danger with which American business apparently is menaced, and not enough disposition to meet the situation squarely, to confront the seeming menace courageously, and to put up a good fight for better business?

It is a familiar fact that in almost every shake-up in any kind of business concern the incapable men suffer while the capable ones gain. The weak go down while in the long run the strong keep on climbing almost regardless of what occurs. The same thing applies to business concerns in the same field or in the same country, and it applies to the business men and business concerns of different countries. Are the business men and business concerns of America really weak or really strong as compared with those of other countries? If they are weak they will be injured both relatively and absolutely by the crises which we are going through. If they are strong they will benefit by it both relatively and absolutely.

There is opportunity as well as danger in the present situation, and probably some concerns will be ruined by it and others will take advantage of the opportunity it offers and profit by it. And those which will be ruined will be those which assume the defensive, pull their organizations to pieces, quit seeking business and think of nothing but saving money, while those which will gain by it will be those which hold their organizations together with a firm hand, assume the aggressive and make a real fight, not merely to keep down expenses, but to hold all the business that they have and to get the business that their weaker competitors are letting slip away from them.

THE PROPOSED FREIGHT TAX AND THE PORK BARREL

DESPATCHES from Washington last week indicated that the people of the country might have an opportunity to experience what would be, in effect, to consumers, a general advance in freight rates, despite the laudable efforts of the Interstate Commerce Commission to hold down the cost of living. The House Ways and Means Committee included in its emergency war tax bill a provision for a three per cent tax on railroad, steamship and express freight shipments, to be added to the freight bill and collected by the carriers, the remainder of the war tax to be levied on beer and wine. Based on the freight earnings for the fiscal year 1913, which the Interstate Commerce Commission reports as $2,198,930,565, this would produce a revenue of about $66,000,000 a year on railroad freight, which, as we have often been reminded, would be a charge on the ultimate consumer.

A five per cent advance in freight rates, for which the eastern roads asked, but which they were denied, would amount to about $110,000,000 if applied over the entire country. This is $44,000,000 more than the proposed tax would amount to; but the tax would be plenty large enough to test the extent to which a general advance in freight rates would operate as a hardship on the public. The railroad contention has been that the general public would hardly notice the effect of a five per cent increase in rates as reflected in the prices of commodities. It is interesting to note, therefore, that the selection of freight for taxation is ascribed to the desire of the Democratic leaders to distribute the burden as widely as possible by an "indirect charge on the consumer imposed in such a way as not to annoy the man who was thinking of voting the Democratic ticket"; and it is easy to believe that, as reported, the President favored a tax on freight rather than on passengers.

Under other circumstances the railways would have little reason for objecting to being made tax collectors for the government. The machinery is provided. They could simply add the United States to their interline accounts, and would receive one per cent of the collections. And, of course, there is no real question that the traffic will bear the tax.

But the rank absurdity of the government's position was quickly disclosed. It was seen that it was proposed to make,

in effect, a general advance in freight rates, which the railways need and have been refused, and to use the proceeds, not to maintain the solvency of the railway companies, to improve the efficiency of transportation, and to distribute throughout the country in wages and in the purchases of equipment money whose disbursement in this way is needed to revive general business, but rather to spare the government the painful necessity of practicing the sort of economy it has so long preached to the railroads, and in order to escape levying a tax on whiskey, tobacco, patent medicines, legal instruments and other proper subjects.

The shippers, generally speaking, had not objected to the five per cent advance proposed by the railways. Many of them openly advocated it. And they probably would not seriously object to paying a three per cent tax on their freight shipments, certainly not if they thought it were needed. But they probably would organize a strong opposition to attempts to both make a general advance in rates and impose a tax on freight.

The railways needed an advance in rates before the development of the emergency created by the war, which has so seriously interfered with the movement of their traffic and with the marketing of their securities. While prices in other businesses have advanced, the average freight rate per ton mile has been reduced from 7.63 mills in 1903 to 7.27 in 1913; and meantime railway expenses have greatly increased. Railway taxation has already been increased from $57,849,569 in 1903 to $129,052,922 in 1913. And yet, in the face of all these facts, it was nonchalantly proposed to raise $66,000,000 out of an estimated war tax of $107,000,000, not from the railroads directly, it is true, but by laying a tax on the public in such a way as greatly to increase the difficulties met by the railways in obtaining the advances in rates which they so sorely need!

The railways have been censured for wasting their revenues, but the railway managers have less need for advice on this subject than for assistance in putting some of it into practice. Moreover, the worst forms of extravagance practiced by the railways have been economy itself compared with the least extravagant practices of the United States government. Our government is so ill-managed that its extravagance and inefficiency have become proverbial. Even while the President was asking Congress for a war tax of $100,000,000 Congress was about to appropriate $93,000,000 for the annual river and harbor "pork barrel." Later reports indicate that the receipt of thousands of telegrams of protest from "back home" has induced the senators in charge of the "pork" bill to cut off appropriations for all new projects, thereby reducing the total by about 50 per cent. This would leave about $46,000,000 to be expended largely for the benefit of politician-contractors. What "drastic economy" this represents will be appreciated when it is noted that the average annual appropriation for river and harbor improvements for the last seven years has been $37,500,000, and that the appropriation of $51,118,889 for 1914 was the largest during that time.

In other words, at a time when the railways are struggling desperately to keep up their earnings and to keep down their expenses, at a time when the business of the country is in bad shape largely owing to the situation in which the railways find themselves, the leaders in Congress felt free to take from the shipping public $66,000,000 a year which ought to go to the railways in order that Congress might make "pork barrel" river and harbor appropriations amounting to $6,500,000 more than the average river and harbor appropriations of the past seven years!

Fortunately the protests against this reckless stupidity came very promptly, and from the press of all political complexions; and after a few days of hedging the freight bill tax was dropped. The caucus decided definitely on the evening of the 15th to draft a bill imposing stamp taxes and other taxes which have been shown by experience to be rational from a business standpoint, and sound politically.

HOW TO GET PROMOTED

NAPOLEON BONAPARTE, the greatest organizer of men the world has ever seen, taught each soldier to feel that he carried in his knapsack a marshal's baton; and Vice-President Taylor, of the Mobile & Ohio, in his recent address before the superintendents' association at New York (*Railway Age Gazette*, August 28, page 389) declared that, for railroad officers, this incident carries the most important lesson that is to be learned from the great general's career. The railroad superintendent who would create enthusiasm and solidarity among his forces must impress on the men the fact that promotions will be made from the ranks. And the speaker implied, of course, that this policy of using "home talent" should be the fact. It is out of the question to impress employees with a "fact" which is impaired by so many exceptions that they cannot believe in its existence.

And to fill responsible positions from the ranks implies that men in the ranks are all the time being educated for higher places. Innumerable appointments have been made from the outside world because the appointing officer could not find among his own men the most suitable candidates. Instead of providing systematic education he trusted his men to educate themselves, and they failed to do so. Mr. Taylor's appeal, if we read between the lines, is, therefore, a call on the superintendent (and his right-hand man, the trainmaster) to educate employees to look upon that imaginary baton with an intelligent appreciation of what a baton is for. Dreaming of future power is a pleasant occupation in which many a young man has spent far too many hours. It might be a good thing, in this present humdrum world, to modify Napoléon's dictum by telling the ambitious railway employee to indulge in that dream for about seven minutes each week, and to spend the rest of his available time in studying the conduct of men who actually wield batons today, to see how they turn the trick. For, in truth, we are here using highly figurative language. The real desideratum is not a symbol of power, but actual ability to exercise power; a mental equipment which enables one, first, to know how to do railroad work in the best possible manner, and, second, to successfully guide other men in doing such work. The brakeman who aspires to be a conductor ought to study conductors' work ten times more assiduously than the average brakeman usually does study. Conductors who make sad blunders in their first six months' service simply because they neglected earnest study beforehand are to be found on every hand. The far-sighted fireman who aspires to be a locomotive runner does not content himself with passing his successive examinations; he studies, night and day, so as to attain to a 100 per cent proficiency. The station agent who expects to rise to a superintendency—or even halfway there—not only studies the rule book and the innumerable circulars which he receives from headquarters; he studies the relations of railways to the public, the knotty problems of the labor question and other things far beyond his present duties. He realizes that if his acts as a superintendent are to measure up to a fair standard of efficiency, his thoughts or studies must go far beyond a fair measure; he must aim to know *everything* bearing on the duties of a semi-public officer managing an important public service.

And, speaking of superintendents, this little lesson which was set forth by Mr. Taylor was admirably supplemented, a week later, by another, equally brief, by General Superintendent W. E. Williams of the Missouri, Kansas & Texas (*Railway Age Gazette*, September 4, page 444). Mr. Williams, writing of the work of the trainmaster, tells that officer that he can do important tasks for the superintendent, and adds this significant injunction: "In making investigations, so arrange your report that it will conclude the matter; so that the superintendent will not have to follow after and conduct an additional investigation." That is setting a pretty high

standard; but what lower one can be called satisfactory? One may adopt a compromise theory; aim to make reports which probably (not surely) will suit the superintendent and trust that he, rather than humiliate you by himself making further investigations, will recommit the matter to you. That is easier. But to make a report which shall be entirely satisfactory not only accomplishes the primary purpose of saving the superintendent's time; it educates the man who makes it; and he gets more profit from it than does the superintendent.

To make a report that will surely be acceptable it is necessary to explore a subject to its utmost limits. If it is necessary to go to the biggest library or to visit a half dozen cities, the situation must be faced in a business-like way. If there is another trainmaster on the road whom the superintendent may think could do the job better, the trainmaster must show him that that supposition is unfounded. Can the superintendent have any wavering of opinion as to what is the right conclusion in the matter? The trainmaster should be prepared to compel him by unanswerable logic to come to a decision. Does this task demand research and night work? The trainmaster should be prepared to get someone on his staff to relieve him of a part of his work, so that he can do the night work without impairing his general personal efficiency. These few suggestions will indicate the comprehensive nature of Mr. Williams' simple demand for "conclusive" reports.

To be able to command, one must first learn to obey. To be capable of being a general manager, one must learn to serve a general manager efficiently. George Findlay, former general manager of the London & North Western, in his book on the Working and Management of an English Railway, gives four rules for the conduct of his office, and the second one is this:

> Before any question is submitted to you for decision, insist upon having all the details filled in, and all the facts before you, so that you may not have to apply your mind to it a second time, but may decide it once and for all with a full knowledge of all its bearings.

If *your* boss is so easy and amiable that he has not adopted this rule—why, that is bad for you!

M. C. B. RULES OF INTERCHANGE

THE time is drawing near for the changes in the M. C. B. Rules of Interchange to go into effect, and it is the duty of every railway mechanical officer to see that the men under his jurisdiction affected by these rules thoroughly understand them. The important changes made this year are in Rule 1, the footnote under Rule 42, and Rule 120. The change in Rule 1 requires each railway company to give foreign cars, while on its line, the same care as to repairs that it gives to its own cars, the previous rule mentioning only "running repairs." This change was made to obviate differences of opinion regarding what constituted running repairs, and also to obtain more complete repairs to the railroad equipment. The chief purpose of this rule is to eliminate bad order cars in so far as possible, and if the roads will repair the foreign cars as conscientiously as they do their own, no matter whether they are repairing defects for which the repairing road or the owner is responsible, much good will come from this rule. The number of bad order cars will be reduced, the cars will be maintained in a more serviceable condition, the car shortage will be reduced, a smaller number of cars will be required, and the car situation will be materially improved. The railroads must pull together, for without the co-operation of all the full benefit of this rule will not be realized.

The foot-note under Rule 42 is intended to eliminate the present practice of holding a car for the owner's authority to repair combinations of defects involving decayed parts, or longitudinal sills requiring renewal or splicing due to elongated holes, or to sills split on this account—a joint inspection statement serving as the necessary authority. Considerable good may be expected from this change, for the roads can get the authority for making the necessary repairs much more quickly, and thus eliminate to some extent the accumulation of defective cars.

The new Rule 120 removes the necessity of home routing cars in a general worn-out condition, and gives the car owner the option of having the reported car rebuilt or destroyed. It is believed that this rule will greatly expedite the handling of cars in this condition, and by doing away with the home route card it is surely relieving the roads of hauling some very undesirable cars. In the past it has been found that some roads are very slow about advising as to what shall be done with such cars, the delay running from a year to 18 months. This crowds the repair tracks of the handling line, and in several instances it has been a cause of great annoyance. All roads should make it their business to reply to the report of the joint inspectors just as soon as possible so that the handling line may make a prompt disposition of the car. If the car is to be rebuilt it is to the financial advantage of the owner to reply promptly for per diem ceases on the date of the request for the disposition of the car by the handling line, and if it is to be destroyed the owner should be only too glad to extend the courtesy of a prompt reply to the handling line.

Those making the joint inspection should be persons in whom the owner can place the greatest confidence, and should be men whose experience justifies their acting in that capacity. In other words, the best men available in the locality in which the inspection is to be made should be chosen as joint inspectors. If this policy is followed the owner will feel perfectly sure that his interests have been carefully considered, and will be more likely to give the necessary authority promptly.

NORFOLK & WESTERN

THE growth of coal traffic on the Norfolk & Western in the last five years has been quite remarkable, not only the actual tonnage carried having increased largely each year, but the proportion of coal to other traffic has also increased. Thus in the fiscal year ended June 30, 1910, the tonnage of bituminous coal carried was 13,990,000 tons, which was 55.04 per cent of the total tonnage carried. In 1914 the tonnage of bituminous coal was 23,220,000 tons, or 64.71 per cent of the total tonnage carried. The gain in coal tonnage in 1914 over 1913 was 2,000,000 tons, or nearly 10 per cent.

It was largely due to this increase in coal tonnage that the Norfolk & Western's earnings in 1914 compared favorably with 1913. Total operating revenues amounted to $44,470,000 in 1914, an increase of $730,000, or 1.67 per cent. The total amount available for dividends, however, was $9,350,000 last year as against $10,190,000 the year previous, a decrease of over 8 per cent. It will be seen, therefore, that there was a disproportionately large increase in expenses or deductions from gross income. As a matter of fact, the increase came both in expenses—4.80 per cent—and in deductions—5.76 per cent.

It is particularly interesting to see why expenses should have increased to a greater extent than the increase in volume of traffic when the greater part of the increase in traffic was in the low grade commodity coal, and the tonnage of many other commodities which are generally more expensive to handle, such as manufactures, merchandise and miscellaneous commodities, decreased. The following table shows the per cent of each class of operating expense to total operating revenues in 1914 and 1913:

	1914	1913
Maintenance of way and structures	11.24	12.67
Maintenance of equipment	20.72	19.06
Traffic expenses	1.66	1.58
Transportation expenses	31.64	30.16
General expenses	2.06	1.84
Total	67.32	65.31

The Norfolk & Western operates 2,036 miles of road. This is an increase in the average operated in 1914 over 1913 of 13 miles. In 1914 there was 491 miles of second-track and 1,230

miles of sidings and yard tracks. There was an increase during the year of 40 miles of second-track and 79 miles of sidings and yard tracks.

Besides this coal traffic, manufactures and products of forests furnished the larger proportion of the traffic. In 1914 manufactures furnished 9.98 per cent as against 11.02 per cent in the previous year, and products of forests, 6.20 per cent as against 7.10 per cent.

Even allowing for the fact that the Norfolk & Western has a large proportion of second-track, the freight density is heavy. The revenue tons carried one mile per mile of road was 4,500,000 in 1914 and 4,380,000 in 1913. The passenger density—passengers carried one mile per mile of road—was 113,000 in 1914 and 109,000 in 1913.

It will be noted that the principal increases in operating expenses were in maintenance of equipment and in transportation. Transportation expenses amounted to $14,070,000 in 1914, an increase over the previous year of 6.64 per cent. In its separation of expenses as between freight and passengers, which is probably made on the same basis as that of the Pennsylvania Railroad, namely, largely on a train-mile basis where it is not easily possible to allocate direct, the Norfolk & Western shows an increase in 1914 over 1913 in transportation expenses for freight from $11,310,000 to $12,080,000, and for passengers from $1,880,000 to $1,990,000. The increase in passenger expenses is easy to understand. The increase in passenger mileage was 4.44 per cent; in passenger train mileage, 2.66 per cent, and in passenger locomotive mileage, 3.12 per cent. In addition there were the increased wage costs and an increase in fuel costs, which will be mentioned later. The increase in freight transportation expenses was in the face of a decrease of 1.59 per cent in revenue freight train mileage and 1.05 per cent in freight locomotive mileage, with an increase in average trainload of 38 tons, or 5 per cent. As has already been mentioned, the proportion of slow drag freight was greater in 1914 than in 1913, and beside the better trainload there was better carloading per loaded car—in 1914, 31.60 tons, and in 1913, 30.57 tons. This would be expected with an increase in the coal traffic, as would also an increase in the empty car mileage.

The total freight car mileage in 1914 was 483,820,000, an increase of 3.88 per cent, while the increase in eastbound empty mileage was 9.33 per cent, and in westbound, 11.32 per cent. It is interesting to note that while the mileage of all Norfolk & Western cars increased 11.39 per cent and was 63 per cent of the total car mileage, the mileage of foreign freight cars decreased 7.18 per cent and was 37 per cent of the total freight car mileage. The Norfolk & Western received a large number of freight cars during the year, and the average number in service on all roads in 1914 was 43,787, and in 1913, 41,174. This, coupled with the fact that the increase in traffic was in coal, explains the much smaller proportion of foreign mileage, but does not explain why the hire of equipment credit balance should have been less in 1914 than in 1913.

Detailed figures for operating expenses show that by far the largest single item in the increase in transportation expenses was in the cost of fuel for road locomotives. This was $2,900,000 in 1914, an increase of 13 per cent over 1913. Fuel per engine mile was more expensive in 1914 than in 1913, both because there was an increase in the cost per ton of coal and because less engine miles were made per ton of coal. The average pounds of coal per engine mile in 1914 was 2.15, and in 1913, 2.02. This is an increase of a little less than 6 per cent. The average cost of fuel per 100 engine miles was $11.19 in 1914 and $9.93 in 1913, an increase of a little less than 13 per cent.

The increase in maintenance of equipment expenses was due to considerably larger expenditures on repairs and also to larger charges for depreciation. The increase in depreciation charges for locomotives was 12.20 per cent; for passenger cars, 30.93 per cent, and for freight train cars, 12.35 per cent. Of course there was more equipment in service on which to charge depreciation, but whether or not this would account for all of the increase in depreciation charges it is hard to say. The following table shows the charges for repairs, renewals and depreciation per unit of equipment:

	1914	1913
Locomotives	$3,120	$2,934
Passenger train cars	870	994
Freight train cars	108	103

During the year the tractive power of total locomotives in service increased 3.19 per cent; the seating capacity of passenger train cars, 20.68 per cent, and the tonnage capacity of freight train cars, 16.16 per cent. This is a very large increase in available equipment and the increase in coal cars probably in part accounted for the large increase in coal tonnage, many times, especially in the early part of the year, in West Virginia desiring to ship more coal than there were always coal cars for.

Few railroads in the United States are in a stronger financial position than is the Norfolk & Western. Through skillful financing—in recent years by the issue of convertible debenture bonds—the company has kept its proportion of funded debt to capital stock comparatively low. At the end of 1914 there was $111,645,000 funded debt outstanding and $130,760,000 stock. The sale of convertible debentures cost the company less for its money than would have the sale of stock. As the earnings grew and the amount available for dividends increased, these debentures were converted, and while this increased the dividend requirements, it widened the margin of safety above interest charges. Thus, while the debentures outstanding increased during 1914 by $10,726,000, this increase wiped off $17,139,000 subscriptions for debentures, the common stock having been increased by $7,627,000, due to the conversion of debentures. Even in 1914 the company earned a net available for dividends of 8.68 per cent on its common stock after having paid the 4 per cent on its $23,000,000 preferred.

There was appropriated from surplus $2,094,000 for additions and betterments, and including this amount, there was $7,264,000 spent for additions and betterments. An issue of $10,000,000 equipment trust certificates was sold during the year, and besides paying off $1,300,000 of matured certificates, a large amount of new equipment was bought, which included 10 passenger locomotives and 16 freight locomotives, 4,327 hopper coal cars of 57½ tons capacity, and 748 flat bottom gondola cars of 90 tons capacity.

In commenting on the financial changes, President Johnson has the following to say:

> The urgency of the requirements for additional facilities to be met by that issue of convertible bonds was set forth in the circular dated January 30, 1913, to the stockholders. Early in the year, however, the unfavorable outlook led to the curtailment of expenditures for additions and betterments by postponing the less urgent and reducing the rate of progress upon the more important. This left temporarily in the treasury a considerable balance of funds raised for such expenditures. In order to secure a greater revenue therefrom than was obtainable from ordinary deposits (suitable authority having been given by your board) these funds have been utilized from time to time to purchase well secured short term obligations, maturing in conformity with the company's cash requirements. A substantial addition to the company's dividend and interest income has thus been made.

These short term investments mentioned by President Johnson all mature in 1914 and 1915, and include short term railroad notes, equipment trust certificates and quite a number of municipal issues. They are carried on the books at $12,353,000. In addition the company has $8,010,000 cash, with total working liabilities of but $3,550,000.

The following table shows the principal figures for operation in 1914 as compared with 1913:

	1914	1913
Average mileage operated	2,036	2,023
Freight revenue	$38,038,622	$37,588,024
Passenger revenue	4,908,679	4,715,294
Total operating revenue	44,470,619	43,739,921
Maint. of way and structures	4,998,612	5,542,960
Maint. of equipment	9,214,007	8,336,631
Traffic expenses	737,690	691,558
Transportation expenses	14,068,577	13,192,922
General expenses	916,954	801,742
Total operating expenses	29,935,842	28,565,813
Taxes	1,620,000	1,552,000
Railway operating income	12,894,903	13,714,499
Gross income	14,892,293	15,478,981
Net income	10,268,140	11,166,641
Dividends	7,180,592	6,706,465
Surplus	3,087,548	4,400,176

Letters to the Editor

RAILWAY TAXATION UNDER GOVERNMENT OWNERSHIP

New Meadows, Idaho, September 3, 1914.

To the Editor of the Railway Age Gazette:

In your issue of August 28, 1914, I note an article headed "Savings Under Government Ownership," in which Sir George Paish is quoted as estimating a saving in the annual cost of railway capital, which could be made in the United States under government ownership of from 60 million dollars to 130 million dollars per annum.

Is it not true that the taxes paid by the railways of the United States for the calendar year of 1913 amounted to $135,321,866, and is it not true that under government ownership the railways, as government property, would be relieved of taxation, and therefore does it not follow that at the highest estimated saving from government ownership there would be a loss of over 5 million dollars, and at the lowest of 75 million dollars since all of the taxes are at the present time applied to purposes of government of one sort or another?

Briefly, would not the government, federal, state and municipal, actually lose the difference between the amount of taxes now paid by the railways and the amount which would be saved in other ways by reason of governmental ownership of railways?

E. M. Heigho,
President and General Manager, Pacific & Idaho Northern Railway.

SENATOR BOURNE ON GOVERNMENT OWNERSHIP

New York, September 15, 1914.

To the Editor of the Railway Age Gazette:

You have reported briefly the strong declaration of the Bourne committee against government ownership of mail cars (September 4, page 436). This part of the committee's report will bear further emphasis. A positive and plausible statement from an apparently reliable source, will always be accepted by most people as true, however, erroneous it may be as a matter of fact. This is particularly the case with a statement from a government official appearing in printed form, like that of Postmaster-General Vilas in 1887, cited by the committee. He declared that the government would save a million and a half dollars yearly by purchase and ownership of the railway postoffice cars. The statement appeared plausible and there was no contradiction. For more than 25 years this declaration has been accepted as true by the great majority of people. No proof on the subject was presented.

But in this report Mr. Bourne shows that if the government owned the cars and paid the railroads the usually prevailing rates for transportation of similar cars, and paid the expense of maintenance, repairs, inspection, icing, cleaning and lighting, the government would pay more than it does today.

After presenting statistics showing that under government ownership of railway postoffice cars the expense to the government would be greater than under ownership by the railroads, Mr. Bourne asserted that purchase of the railway postoffice cars would also be unwise because it would be the beginning of a general government ownership policy, eventuating in bureaucratic paternalism, inertia, and, inside of a century, governmental dissolution. He cited the fact that under general government ownership of public utilities there would be over three million governmental employees; that in the last ten presidential elections the President has been elected by a plurality of from 7,000 to a little over 2,500,000, and that, therefore, government employees could absolutely control the government, the tendency being more pay, less service in governmental employment, resistless efforts on the part of outside labor to secure government employment, because less onerous and more remunerative, and dissatisfaction and irritation in all private enterprise. Mr. Bourne's chief objection to government ownership is apparently because of the bureaucratic system which would be built up; and he concludes his discussion of this subject as follows:

"Governmental efficiency and economy of operation can never equal that of private enterprise, and the whole desiderata of government should be equal legal opportunity for all and limitation on individual liberty only in the prohibition of preying on the personal or property rights of others. Our present drift to departmental rule and regulation, instead of a government by law, which is the greatest menace to the future of our country, would, in our opinion, be greatly accentuated by governmental ownership."

E. R. S.

WAGES NOT SALARIES

July 8, 1914.

To the Editor of the Railway Age Gazette:

The letter from "Operating Officer" in your issue of June 19 calls attention to a point which heretofore has been given very little consideration. That such is the case, operating officer made quite clear, but it would not be well to embrace other lines of railroad activity that have grievances of a more pressing nature. I make no complaint about my own salary, but wish to call attention to the men under my jurisdiction, whose periods of service with the company for which I work range from 5 to 35 years in the capacity of concrete foremen and bridge foremen. Each one of these foremen before being appointed such had seen not less than five years service with this or some other railway company in the capacity of laborer, carpenter helper or carpenter, whose average monthly wages for the laborer and carpenter helper rarely exceeded $65 per month, while the carpenter generally obtained $15 more. Foremen, both concrete and bridge, generally draw $100 per month, or thereabouts, for services that call for a knowledge in the reading of plans and execution of work that requires many years to acquire. The men above referred to are not complaining about the wages paid them, but the purpose of this letter is to contrast such wages, which, by the way, "operating officer" should have done for section forces, with the wages of brakemen and conductors and enginemen. The former (brakemen) draw $100 per month and over, probably for the first month's service they render, while the conductors receive $165, and those on work trains exceed the $200 mark. Brakemen and many conductors, spend their spare time "studying" how to avoid work as per schedule, while any common sense man would decide what they should do inside their hundred mile run or ten hour day.

I have been on washout work where bridgemen were face to face with real danger while brakemen and conductors sat nearby looking on if they were interested, but never volunteering to give a helping hand, the engineer being the only man of the work train crew that was at work. Man for man the bridgeman is the equal if not the superior of the trainman. A man who is now vice-president of one of the big systems told me that the bridge crew is unquestionably the most efficient unit in railroad work today.

In the matter of consideration the conductor and his family can get passed on the best trains. Only a few mornings ago, I saw a conductor, his wife and two children on one of the best trains on the continent. I had asked for a pass on the same train, returning from a wedding trip, some time before and was refused.

Does the bridge foreman draw as much as the conductor? How do their duties compare? A readjustment of the wage question is necessary—not to give the trainmen more wages but to take some away and give it out in dividends to stockholders, if the company does not think the section foreman or the concrete laborer or bridgeman entitled to an increase over what they are now getting. Let us "side track" cataclysm referred to by "Operating Officer" and bring about fair treatment of all

Ass't Engineer Bridge & Buildings.

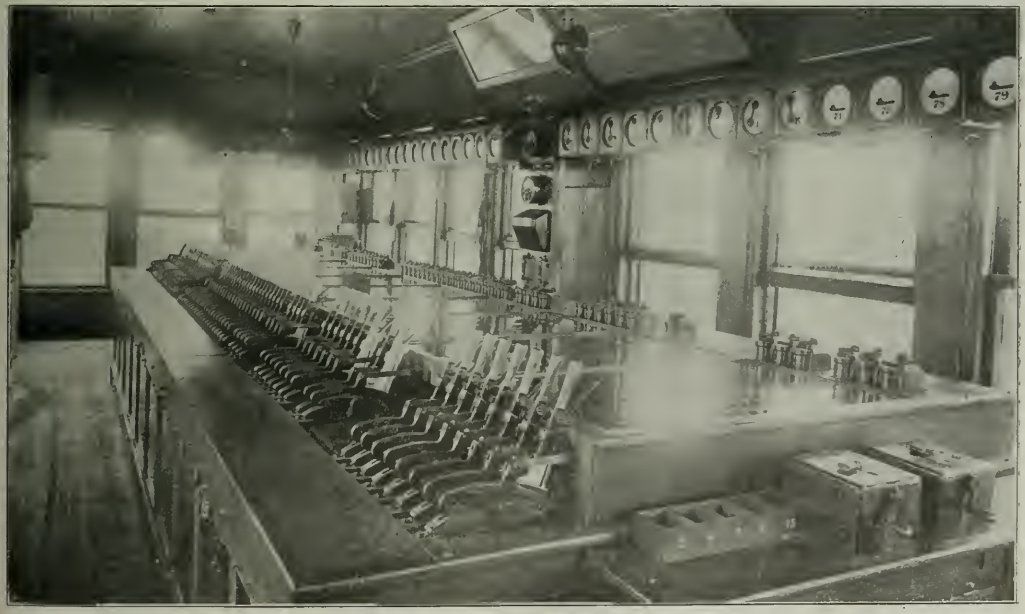
Electric Interlocking at Rome, New York

Speed Conditions Required No. 14 Turnouts. Restricted Track Centers Necessitated Special Signal Supports

At Rome, 109 miles west of Albany, the line of the New York Central & Hudson River expands from four tracks on the east to six tracks on the west. At this point, an 80-lever electric interlocking has been installed to operate the crossovers and turnouts. The improvements are on an entirely new line of road, which was built to eliminate two crossings with the New York State Barge Canal, as located, and which improvements were described last year in the *Railway Age Gazette* of August 15, 1913.

Bracket Post, Looking West; Cantilever Signal Bridge, Looking East

As the layout is to provide for high speed traffic, No. 14 crossovers are used throughout, and turnouts from the ladder leading to the fifth and sixth tracks are also No. 14. The use of these long turnouts makes the interlocking plant a long one. The speed restrictions through this interlocking are: Tracks



Federal All-Electric Interlocking Machine, Rome, N. Y.

1 and 2, maximum speed 40 miles an hour; tracks 3 and 4, maximum speed 20 miles an hour.

SIGNALS AND SIGNAL SUPPORTS

The cantilever signal bridge supporting the eastbound home signals for tracks 1, 4 and 5 is an interesting feature of this plant. The main part of the bridge spans tracks 1, 2, 3, and a siding, with one support outside of track number 1 and one between track No. 4 and the siding. The cantilever section projects over a second siding and also over tracks Nos. 4 and 5. The accompanying illustration shows this bridge and also the bracket post at the east end of the plant adjacent to track No. 3 supporting the westbound home signals for tracks Nos. 2 and 3 (signals 73, 74, 75, 77, 78, 79). These two special types of support were made necessary by the arrangement of track centers, and by the necessity for locating the foundations between tracks in such positions as to allow sufficient clearance.

The signals are three-position, moving in the upper quadrant. The high arms are the Federal Railway Signal Company's top post, 110-volt d. c. motor type and operate as semi-automatic non-stick signals. The dwarf signals are Style 4, Federal Railway Signal Company's design, the mechanism being exactly the same as that used in the top post signals; but when used in

New York Central Signal Station, Rome, N. Y.

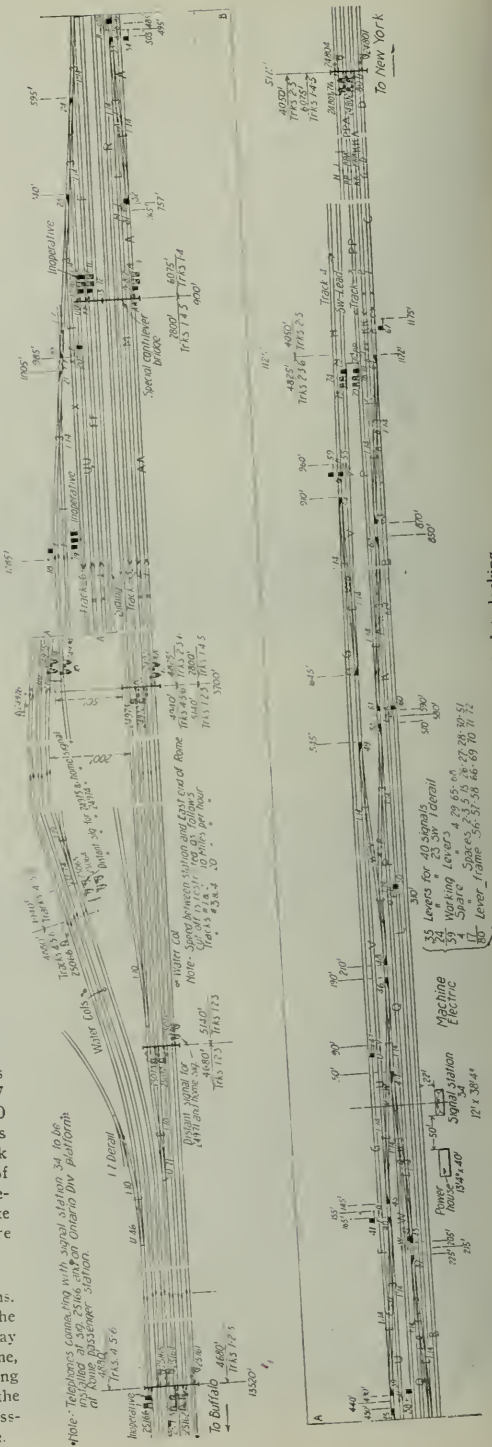
dwarf signals it is mounted on cast iron supports, which are bolted directly to concrete foundations.

All signals are electric lighted, the current used being 100-volt d. c. Each light has two 2-c. p., 100-volt carbon lamps. In case the first lamp fails to light or is burnt out, a cut-in relay completes the circuit to the second lamp. Night indications are green for clear, yellow for caution and red for stop.

The interlocking machine is of the Federal Signal Company's standard type, and has 59 working levers, 4 spare levers and 17 spare spaces, in an 80-lever frame. Thirty-five levers operate 40 signals and 24 levers operate 23 switches and 1 derail. This plant has but one interlocked derail, that on the ladder track leading to track No. 6 at switch 23. The complete outfit of crossovers provides diverging tracks for any and every movement which convenient and safe block signaling may make necessary; and derails, as substitutes for diverging tracks, are not needed.

SIGNAL CABIN

The signal tower, 12 ft. by 38 ft. 4 in. outside dimensions, is a two-story frame structure set on a concrete foundation. The lower floor contains the hot water heating plant and the relay track. The second floor contains the interlocking machine, the operating board, a group of unit type indicators strung across the top of the windows, and the operator's table. In the relay track on the lower floor there are 112 wall type glass-enclosed relays of the Hall Switch & Signal Company's type.



POWER

Power is supplied to the power room at 220- 110-volts, three-phase, 60-cycles, transformed from a 2,200-volt a. c. high tension transmission line of the Rome Gas & Electric Company, which is converted to d. c. by a mercury-arc rectifier and a motor generator set; the former for the indicator, interlocking and local track battery and the latter for track batteries in automatic territory outside the interlocking limits. The switchboard arrangement is such that the local track batteries, one of the duplicate six-cell batteries, and the main battery may be charged either separately or in series in any combination. Overload and reverse current circuit breakers are provided to protect against excessive charging or a reversal of power from the battery.

In addition to the ordinary rectifier equipment, a resistance is provided which may be cut in when operating the interlocking direct, in case of failure of the battery. This resistance has an increased tube capacity to take care of the heavy current rushes incident to the simultaneous movement of several switches or signals. The motor-generator set consists of two separate two-bearing machines mounted on a common base, connected by a flange coupling. The motor is of the three-phase induction type, 15 h. p., 1,800 r. p. m., 220-volts, 60 cycles, and the generator is shunt wound, 10 k. w., 600-volts, d. c.

The storage battery has a capacity of 400 a. h. and is located in a separate room of the powerhouse. The main battery stands on shelves at the sides of the room, while the low voltage and track batteries occupy a space in the center of the room. The low voltage and track batteries have a capacity of 120 a. h. The storage battery consists of 34 cells in duplicate, feeding 17 track circuits. The powerhouse is heated from the hot water plant in the tower.

Wooden trunking above ground and vitrified tile below ground are used for carrying wires. Loricated conduit is used in the powerhouse. Concrete relay box posts were used wherever necessary.

THE DIAGRAM

The automatic signals are indicated in the drawing by numbers which explain distances and track numbers. For example, signal No. 24803, at the east end of the plant, is 248.0 miles from New York, and is for track No. 3. At the other end are signals 251.6 miles from New York for tracks 1, 2, 3, 4, 5 and 6. The interlocked switch farthest from the machines is No. 64, in track No. 1, which is 1,122 ft. east of the tower. The letters on the tracks are used to identify the track circuit sections.

The tracks were laid by the engineers of the New York Central & Hudson River, and the signal equipment was installed by the Federal Signal Company. In November the railroad company called upon the Federal people for a quick job, so as to make it possible to open the new line by January 1; and, responding to this call, the manufacturers installed the whole of the interlocking in 41 working days. Much of the time the temperature was around zero. Many of the men worked extra hours, at times, and a small night force was organized.

Atlanta, Fourth Telegraph Center—A telegraph authority says that Atlanta is the fourth largest telegraph center in the United States. For the past four months the Western Union has handled in Atlanta an average of 1,080,238 messages a month, of which 191,792 originated in Atlanta. The traffic department is composed of thirteen supervisors, 210 operators and forty-four clerks. With the other departments there is a total of 339 employees in the main office proper, eighty messengers and thirteen branch offices. The payroll runs about $30,000 monthly.

Railway Construction in Portuguese East Africa.—The engineer in charge of the proposed Mozambique-Nyasaland has been authorized to spend some $185,000 on commencing work. The line will be about 342 miles long, of which 62 miles will be in British territory and will extend from Mozambique on the east coast of Portuguese East Africa inland to British territory to the west. The cost is estimated at about $17,500 per mile.

CONVENTION OF TRAVELING ENGINEERS' ASSOCIATION

The twenty-second annual convention of the Traveling Engineers' Association was held at Chicago, September 15-18, President F. P. Roesch, presiding. The convention was opened with prayer by Dr. Samuel Fallows. J. F. DeVoy, assistant superintendent of motive power, Chicago, Milwaukee & St. Paul, called attention in an address to railroad conditions in this country, showing how earnings have declined, wages increased and freight rates decreased. He also compared shipments of staple commodities this year with those of last year, showing the decrease in business, and urged associations of this kind to take active interest in these affairs and exert all the influence possible to better conditions. Mr. De Voy also spoke of the development of the traveling engineer and his importance in railroad work; he must be capable of thoroughly instructing men and should ride with all those under his charge at least once every month. He should keep in close touch with conditions on the road, and with the train despatchers.

President Roesch in his address advised everyone to make the best of the conditions imposed on the roads by the commissions and to educate the enginemen along the lines designed to bring the best out of such improved devices as brick arches and superheaters. He stated that the mental qualifications should be raised for new men, and firemen should be under constant training for the position of engineman. He considered that greater intelligence is necessary to operate the large power of today than the small power formerly used. Enginemen should report engine defects thoroughly, as he considered that they would find more than terminal inspectors.

SMOKE PREVENTION

In order to eliminate dense black smoke, three conditions must exist, viz., to supply the fire with sufficient air, to thoroughly mix the combustible gases and air, and to maintain the temperature in the firebox to cause the combustible gases and oxygen of the air to unite. In stationary practice this is much easier to accomplish than in a locomotive. It is found that inadequate draft is usually responsible for smoky chimneys; therefore it is evident that it is necessary to have a properly designed front end, including the exhaust nozzle, ample grate opening and ash-pan opening large enough to insure free access of air. Grate opening is more generally found to be restricted by failure to clean clinkers from between the bars than by faulty design. Trouble is sometimes caused in properly designed from ends, by air leaks in the smokebox. The effort to overcome fires along the right of way has resulted, to some extent, in restricting the air opening in the ashpan. The ash-pan openings are frequently permitted to fill up with ashes, especially in winter on account of freezing.

The brick arch is a great aid in smoke elimination, as it increases the travel of the gases and gives them a chance to combine with the oxygen of the air before coming in contact with the comparatively cool firebox sheets. When fresh coal is applied, the steam jets, beside giving a small mixing effect, are helpful in furnishing the necessary air over the fire. Special effort should be made to furnish a uniform grade of coal because it is hard for the best fireman to obtain the best results with a grade of coal which is continually changing. Better results will be obtained if an inferior grade of coal is furnished at all times, because where it is changed frequently the locomotive is drafted to burn the inferior grade and the better grade is wasted. In regard to the relative cost of fuel in connection with smoke elimination, it has been proved beyond reasonable doubt in stationary practice that where plants have been remodeled to overcome smoke a saving in fuel and increased efficiency have resulted. In locomotive practice the same results have been obtained where the smoke-preventing devices have been judiciously used, but to obtain these results constant watchfulness is necessary.

Locomotives must be maintained in good shape at all times

to enable the crews to eliminate smoke. Of course this costs money, but it pays in the long run on account of the efficiency obtained when this is done.

The question is frequently asked: "Why do railroads in this country fail to control the smoke problem as well as they do in European countries?" A communication from F. R. Wadleigh, of the firm of Wadleigh & Osborn, consulting engineers, Philadelphia, shows that conditions are entirely different in Europe and much more favorable for smoke elimination. The following is taken from his letter:

"In the first place, it must be remembered that the European railways pay much more attention to firing than we do; their men are more carefully instructed, the observance of proper methods is strictly enforced, and every appliance is made use of that will decrease fuel consumption.

"Then, they are much more particular as to size of coal used. For instance, on the French railways, each class of service has its locomotive fuel carefully divided as to lump and slack or briquettes and slack, by weight; passenger service uses 20 per cent slack and 80 per cent lump or briquettes; fast freight, 40 per cent slack; yard engines, 80 per cent slack, etc.

"Large quantities of briquettes are used. The following contracts were placed in 1912 by the Paris, Lyons & Mediterranean Railway, the largest in France: The total amount used is 1,830,000 tons, of which 600,000 tons was imported from England, Germany and Belgium; ninety thousand tons large Welsh Monmouthshire steam. This is all double screened coal running about 25 to 29 per cent volatile. One hundred and forty thousand tons Welsh smalls; this is for making briquettes. Volatile, 13 to 15 per cent. Sixty thousand tons German smalls for making briquettes; will run about 28 to 30 per cent volatile. These two coals mixed in briquettes giving about 20 per cent volatile. Sixty thousand tons German briquettes. One hundred thousand tons Burham coking unscreened; will run about 23 to 27 per cent volatile. This is used as slack without briquettes. The specifications require:

"First: Coal must not produce adherent clinkers.

"Second: Ash—large Welsh, 6 per cent; smalls, Welsh, 9 to 13 per cent; briquettes, 8 to 10 per cent.

"Third: Large steam coal must contain from 25 to 35 per cent volatile substance and the smalls and patent fuel (briquettes) about 20 per cent."

Mr. Wadleigh's letter indicates that the use of briquettes is a large factor in the elimination of smoke from European railroads, but the cost of a good grade of coal is so small in this country as compared to the cost of briquettes that their use here is prohibitive.

The report is signed by Martin Whelan, chairman; A. M. Bickel, P. K. Sullivan, W. A. Heath and B. J. Feeny.

Discussion.—The discussion brought out that without the proper instruction and conscientious co-operation of engine crews, smokeless firing cannot be expected even though locomotives are equipped with efficient smoke consuming devices. Engines must also be correctly designed, with not less than 90 per cent ashpan air openings and 46 per cent openings in the grates. Brick arches were strongly recommended by E. W. Pratt, Chicago & North Western, for use on all engines. One member reported 20 per cent saving in fuel by increasing the ashpan openings.

CARE OF LOCOMOTIVE BRAKE EQUIPMENT

The care of locomotive brake equipment on the line is a question in which the engineman, trainman and car inspector are concerned. The engineman is concerned regarding the complete equipment, the trainman in regard to the proper handling of the angle and cutout cocks, hose and also the use of the retaining valves, all efficient brakes, and to see that the brake pipe leakage is kept as low as possible at all times. The car inspector is concerned as to the brake pipe leakage and the general condition of the train brakes. With the increase in the weight of locomotives and tenders it is necessary that the braking power be maintained at its maximum efficiency in order to reduce draft gear strain, liability of wheels sliding, and to provide smooth handling of trains in so far as possible. The engineman should be responsible for properly inspecting and caring for the air brake apparatus while it is in his charge, or for the proper reporting of all existing defects on the arrival at terminals. The committee is unanimously of the opinion that the brake equipment should be tested and inspected by the repair men at the terminals, and correct the defects without waiting for the report of the engineman. On one of our large roads the official in charge of mechanical matters has recently issued instructions that the compressors and other air brake equipment on freight and passenger locomotives should be tested each trip before the locomotive left the roundhouse for the train and by so doing has reduced the air pump failures from 231 in 1912, to 123 in 1913.

The committee also included in its report complete instructions for testing air brake equipment, together with instructions for repairing the various troubles. The report is signed by George H. Wood, chairman, B. Hyanes, R. E. Anderson, W. V. Turner, E. Bales.

ADDRESS BY H. C. BAYLESS

H. C. Bayless, mechanical engineer, Minneapolis, St. Paul & Sault Ste. Marie, in an address called attention to the increasing importance of the traveling engineer, especially in investigation work connected with new locomotive devices. He also said that there is a large field for them in increasing the efficiency of operation.

The balance of the proceedings of the convention will be published in next week's issue.

THE DUTIES OF A STATION AGENT*

By R. Morgan
General Manager, Savannah & Northwestern

The general term "agent" as applied to men in the service of railroads, covers a multitude of duties. An agent must be a diplomat. He must know when to assume a stern and uncompromising manner, and also when to be gracious and appealing in his attitude towards his patrons. He must have at his command a regular bureau of information for the benefit of the public, and be fully able to forecast future weather conditions, as well as keep well posted concerning the conditions of the market, and when to sell a clergy ticket to a preacher. He should also acquire early in his experience as an agent the art of carrying from the train the pouch of United States mail, the bundle of railroad mail, from three to five suit cases, the package of express bills, pulling at the same time a truck of express, and in passing consult his watch and give the correct time to Old Man Jones, who in all of his life never had occasion to hurry, except to get a drink of ice water before the train pulled out from the station.

In other words, as a rule, an agent is usually the sole representative of the company at his station. It is up to him to see that his company is well represented. If the agent makes for himself a good reputation with his patrons, he likewise strengthens the reputation of his company, as the company is always governed by his representations concerning matters pertaining to its business and patrons at such stations. The agent is on the ground and can form more accurate conclusions regarding all matters concerning the company's affairs there, than can be formed by others at a distance. He is in close touch with conditions as they exist, and therefore must be the source of the company's information, and his influence has everything to do with the current opinion existing in reference to the company.

Along this line it is well to mention the benefits to be derived from the sociability of the agent. By this, it is not meant that he should be sociable with those whose society would be distasteful, but his disposition should be such as to reach as many people

*Address at Station Agents' Meeting, Savannah, Ga., on August 16.

as possible, making them feel that they have a friend and a neighbor, who will go to trouble to accommodate them, giving them the benefit of such privileges as are due them, and one who will ably and gladly represent them in their business relations with the company. Much competitive business is secured by agents of such amiable disposition, which after all redounds to the good and credit of the agent. It increases the amount of business at his station, it increases his worth to his company, and will in time make his services sufficiently valuable to warrant the company in giving him promotion which he has really earned.

Personal neatness on the part of an agent is also to be commended. It has its effect on old neighbors as well as strangers to come into your office and find everything in orderly and systematic array, showing signs of having recently had a touch of a feather duster, floors clean and walls minus spider webs. Neat station grounds will always attract the eye of the passenger passing through on the train, and may possibly have some effect, in some instances at least, in inducing people to locate in your town. It is not always things of much magnitude that influence the casual observer, but sometimes little things have far-reaching effects, and bring about results astonishing in view of the minute circumstances to which their origin is due. Therefore, do not wait until opportunity presents some great thing for you to do, but perform the little duties, the little things that come up day by day. The result will be gratifying, and it is certain you will not have to grow old awaiting your opportunity.

It is well also for agents to benefit from observation. It is not meant by this assertion that the agents are the only class of employees who could be benefited through means of observation. Each class of employees could become more efficient if they would observe closely the methods and plans of others in the same line of work. If you observe a method of billing cotton by another agent, that you are sure is an improvement over the method you have previously used, it is the better part of judgment to adopt the same method. Or if you observe the loading of merchandise by some particular agent is an improvement over your method, you will benefit by adopting the same method. If you find that the local freight train by following certain modes of procedure in doing your yard work could thereby save time, and at the same time reduce the amount of work to be done, make up your switch list so as to accomplish this end. Unless you observe closely the switching as performed in your yard, you can hardly hope to be instrumental in improving the service.

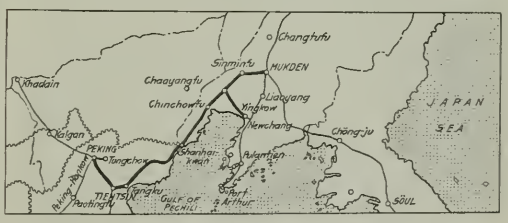
"Safety First" has been extensively preached to trainmen and all employees in yard service, but very little has been said in reference to this matter to agents. "Safety First" cannot mean more to engineers and conductors than it means to an agent. You can be the means of preventing many accidents in the course of a long term of service. Leaving express trucks too close to the tracks oftentimes results in personal injury accidents. This, you can prevent, by keeping a watchful eye on the parties handling the trucks. The agent is probably the only one who can prevent improper loading of inflammables and explosives, which otherwise might result in serious accidents. It is hardly necessary to call attention to what "safety first" means with reference to train orders. When the despatcher calls you to take an order for a superior train giving certain rights to an inferior train, the superior train then being due at your station, "safety first" would mean that you should put out your signals to the superior train, indicating that you have orders for it. This, of course, should be done before you take the orders; otherwise the train might possibly get by you, and the result be a serious accident. These are only a few instances of "safety first" as referring to agents. There are many others.

Next to "safety first" agents would do well to consider "self protection first," which in almost every instance would also mean company protection. The interests of the agent are so closely allied with those of the company, that the protection of one invariably means the protection of the other. For instance, if an agent signs a bill of lading for a car of lumber before ascertaining that it is properly loaded for transportation, he fails to protect himself or the company, and the lumber is adjusted or reloaded at the expense of the company, and the agent is open to criticism and reprimand from his superior officer. Or if an agent signs a bill of lading carrying the endorsement "Shipper's Load & Count" for a shipment less than carload and the shipment checks short of the number or quantity shown, then the agent does not protect himself or the company, for less than carload shipments should not be accepted as "Shipper's Load & Count," but should be checked by the agent before issuing bill of lading. These are only a few of the instances of "self protection" and "company protection" on the part of an agent. There are many other instances, and all agents should always exert their uttermost efforts towards such protection.

The manners and general behavior of visitors at the station should also come under the observation of the agent. It is a matter of history that many people congregate around the depot who would not be welcomed in ordinary good society, and unless it is compulsory, their behavior would not be becoming in the presence of ladies and gentlemen. This is where the agent must be the diplomat, and if necessary put on the stern and uncompromising manner already referred to, in seeing that such visitors conform to the demands of decent society. This will not only meet with the approval of the better element of your patrons, but will greatly add to the respect accorded you by the other element.

Railway Construction in Honduras.—The construction of several new lines in Honduras was started in 1913, and it is expected that the work will be pushed to completion in the near future. The Tela Railroad is building a 90-mile line from Tela to Progreso, through the banana lands along the Ulua river valley; about 10 miles of this line has been completed, and a 2,000-ft. wharf is to be built at Tela. This company is also building a line to be about 15 miles long, to Colorado, where connection is to be made with the line now in operation from a point 20 miles up the Lean valley. The Tropical Timber Company has in operation about five miles of railroad and will build 10 miles additional into a timber section.

The Peking-Mukden Railway of China.—The Peking-Mukden railway, formerly known as the Imperial Railways of North China, earns the greatest revenue of any of the Chinese government railways. The principal part of the railway was completed in the early nineties. The main line extending from



The Peking-Mukden Railway

Peking to Mukden is 522 miles long. The principal branch, to Newchang, is 57 miles in length and there are other small branches which make up the total of 606 miles. Sidings are numerous, totaling 148 miles, and extensions of the line have been proposed, aggregating 180 miles. The line for the most part is built in easy country. The sharpest curve has a radius of 1,000 ft., and the heaviest grade is 0.9 per cent, but occurs in a few short lengths only. The weight of rails from Peking to Tongshan is 85 lb., but from Tongshan to Mukden it is only 60. The ties are of Japanese hard wood. The line has no competing railroad, and it is said that rates on it are high and that facilities are not of the best. By means of the railway it is possible to travel from Peking via the Trans-Siberian to Europe.

TRAIN ACCIDENTS IN AUGUST[1]

Following is a list of the most notable train accidents that occurred on railways of the United States in the month of August, 1914:

Collisions.

Date.	Road.	Place.	Kind of Accident.	Kind of train.	Kil'd.	Inj'd.
*†5.	Kansas City So.	Tipton Ford, Mo.	bc.	P. & P.	39	30
15.	N. Y. N. H. & H.	New London.	xc.	F. & F.	1	1
23.	Mo. Kan. & Tex.	Smithville.	bc.	P. & P.	0	8
30.	Atlantic C. L.	Fayetteville.	xc.	P. & F.	0	5

Derailments.

Date.	Road.	Place.	Cause of Derailm't.	Kind of train.	Kil'd.	Inj'd.
3.	Pitts. & L. E.	Beaver Falls.	b. flange	F.	1	2
12.	Southern	Tuxedo.	d. switch	P.	1	6
13.	Tenn. Central	Mount Juliet	unx.	P.	0	11
25.	St. Louis & S. F.	Kelleyville.	d. track	P.	0	35
28.	Kansas C. So.	Marble City.	b. rail	P.	0	12
29.	Lancaster, O. & S.	Tweedale, Pa.	.....	F.	0	3

The trains in collision on the Kansas City Southern near Tipton Ford, Mo., on the fifth were a northbound passenger of the Kansas City Southern and a southbound passenger of the Missouri & North Arkansas, the latter consisting of a single car, a gasolene motor. Thirty-six passengers and three employees were killed, all of them on the southbound train; and twenty-seven passengers were injured. It is possible that other persons were killed, the bodies of some being so badly burned that identification was impossible. The cause of the collision is given as disregard of a meeting order by the men in charge of the southbound train. They should have waited at Tipton Ford. This accident was reported in the *Railway Age Gazette* of August 7 and August 14.

The train involved in the collision at New London, Conn., on the 15th was a switching freight. The engine was run into at the side by a string of empty passenger cars and four cars were wrecked. The fireman was killed and the engineman injured. The cause of the collision was negligence in switching operations.

The trains in collision on the Missouri, Kansas & Texas, near Smithville, Tex., on the 23rd, at about 3 a. m., were passenger trains Numbers 1 and 2. The southbound train, No. 1, had been brought to a stop. Both engines were badly damaged and five passengers and three employees were injured. The collision was due to an oversight on the part of the despatcher. He had given these trains an order to meet at Kirtley, five miles south of Smithville, and subsequently annulled this order; but the annulling order was not sent to train No. 1.

The trains in collision at Fayetteville, N. C., on the 30th were a passenger and a freight, both of the Atlantic Coast Line; passenger No. 85 ran into the freight at a crossing of two tracks, the main line and the Yadkin branch, and two freight cars were wrecked. Three passengers and two trainmen were injured. The cause of the collision was disregard of signals on the part of the passenger train.

The train derailed near Beaver Falls, Pa., on the morning of the 3rd, was an eastbound freight and six cars were wrecked. The cause was a broken flange. Three trespassers were injured, one of them fatally.

The train derailed at Tuxedo, N. C., on the 12th, was an excursion bound for Asheville, and the locomotive was overturned. The fireman was fatally scalded and six passengers were injured. The accident was caused by a broken switch rod.

The train derailed on the Tennessee Central, near Mount Juliet, Tenn., on the 13th, was an eastbound local passenger; two passenger cars fell down a bank and nine passengers and two trainmen were injured. The cause of the derailment was not discovered.

The train derailed near Kelleyville, Okla., on the 25th, was passenger No. 408. Four cars ran off the track, but remained upright. Thirty or more passengers were injured, but none seriously. The cause of the derailment was a low joint, and this appears to have been due to water which had accumulated in the ballast because of imperfect drainage, aggravated by heavy rains. The train was running about 45 miles an hour on a straight line, and the tender was the first vehicle to jump the rail.

The train derailed near Marble City, Okla., on the 28th, was southbound passenger No. 1, and the mail car and first two passenger cars were overturned. Twelve passengers were slightly injured. The cause of the derailment was a broken rail.

The train that was derailed on the Lancaster, Oxford & Southern, near Tweedale, Pa., on the 29th, was an eastbound mail train, consisting of a single gasolene car. Three men were injured. The derailment was due to a pile of stones on the track, believed to have been placed there maliciously.

[1]Abbreviations and marks used in Accident List:
rc, Rear collision——bc, Butting collision——xc, Other collisions——b, Broken——d, Defective——unf, Unforeseen obstruction——unx, Unexplained——derail, Open derailing switch——ms, Misplaced switch——acc. obst., Accidental obstruction——malice, Malicious obstruction of track, etc. ——boiler, Explosion of locomotive on road——fire, Cars burned while running——P. or Pass., Passenger train——F. or Ft., Freight train (including empty engines, work trains, etc.)——Asterisk, Wreck wholly or partly destroyed by fire——Dagger, One or more passengers killed.

THE PRESIDENT'S RESPONSE TO THE RAILROADS

President Wilson, responding to the appeal presented to him by the committee of railroad presidents last week (*Railway Age Gazette*, page 462) sent to Chairman Trumbull, on Thursday, the following reply:

"Since you read it to me yesterday, I have read again the statement you made me on behalf of the committee of railroad presidents whom I had the pleasure of meeting and conferring with at my office. It is a lucid statement of plain truth.

"You ask me to call the attention of the country to the imperative need that railway credits be sustained and the railroads helped in every possible way, whether by private co-operative effort or by the action, wherever feasible, of governmental agencies, and I am glad to do so, because I think the need very real.

"I cannot say that I entertain any deep anxiety about the matter, except, of course, the general anxiety caused by the unprecedented situation of the money markets of the world; because the interest of the producer, the shipper, the merchant, the investor, the financier and the whole public in the proper maintenance and complete efficiency of the railways is too manifest. They are indispensable to our whole economic life, and railway securities are at the very heart of most investments, large and small, public and private, by individuals and by institutions.

"I am confident that there will be active and earnest co-operation in this matter, perhaps the one common interest of our whole industrial life. Undoubtedly men, both in and out of official position, will appreciate what is involved and lend their aid very heartily wherever it is possible for them to lend it.

"But the emergency is, in fact, extraordinary, and where there is a manifest common interest we ought all of us to speak out in its behalf, and I am glad to join with you in calling attention to it. This is a time for all to stand together in united effort to comprehend every interest and serve and sustain it in every legitimate way.

"The laws must speak plainly and effectively against whatever is wrong or against the public interest, and these laws must be observed; for the rest and within the sphere of legitimate enterprise, we must all stand as one to see justice done and all fair assistance rendered, and rendered ungrudgingly."

New Mileage of Brazilian Railways.—During 1913 the railways of Brazil put in operation 1,438 miles of new lines, making a total of 15,246 miles now in operation, of which 2,185 miles are government lines, 5,716 miles privately leased roads, 3,447 miles granted to various enterprises by government concessions, and 3,897 miles operated by private corporations under state concessions.

Annual Meeting of Master Painters' Association

Discussions on the Finishing of Steel Passenger Cars, Standard Freight Car Lettering, and Apprentices

The forty-fifth annual convention of the Master Car and Locomotive Painters' Association was held in Nashville, Tenn., September 8 to 11, Oscar P. Wilkins, master painter of the Norfolk & Western, presiding. The opening prayer was made by Mr. Spain, secretary of the Nashville Y. M. C. A., after which the association was welcomed to the city by W. S. Mitchel, chief of factory and shop inspection for the state of Tennessee. He was followed by Mattison Wells, secretary to the Mayor of Nashville.

PRESIDENT'S ADDRESS

President Wilkins spoke of the value of these annual conventions, and called upon the members to co-operate in the exchange of ideas, as without this the association could not hope for success. The master painter should be progressive, seeking to increase the efficiency of his department. Attention was also called to the necessity of developing young men in the painting trade who will be called upon later to take charge of departments.

TEST COMMITTEE'S REPORT

In order to successfully cope with the ravages of rust on steel equipment the designer must lend a helping hand providing a construction that it will be possible to protect. The rain guard on cab roofs has been found difficult to protect properly as it catches dust and cinders from the locomotive, which, with moisture, forms an acid that will penetrate the paint. The protection of steel under-frames of tenders and cars is also a greater question than even the steel cab, and a careful study should be made with a view of providing an absolutely protective paint. An elastic paint film is necessary to stand the vibrations the equipment receives in railroad service. When red lead is used a pigment should be used that has a tendency to minimize the oxidizing influence of this material. When mixing paint for the second or protective coat of the primer, the facts that linseed oil will absorb moisture, and that all vegetable oils are readily attacked and disintegrated by sulphurous and other acids, must be taken into consideration.

From tests made by the committee in different parts of the country it was proved conclusively that the baking process retains the lustre of the varnish, and is more free from checks than the air-dried plates. The report was signed by J. W. Gibbons, chairman, H. Hengeveld and A. S. Baldwin.

FINISHING STEEL PASSENGER EQUIPMENT

J. B. Wright (B. & O.): While it has been found that the baking oven has given very good results in painting steel equipment, it is believed that it will not be universally used on account of the expense of painting the equipment in this manner, especially in establishing the plant. This process also eliminates the opportunity for doing other work on the cars while they are being painted. While this is very advantageous from the painters' standpoint, it will require holding a car for a longer time. The surfacers used in painting steel equipment are of great importance. They must be inhibitive and elastic. In order to decrease the number of necessary coats applied a smoother metal surface must be provided by the metal workers. The decks, deck screens and roofs of the steel passenger equipment cars are causing the greatest trouble. These parts should be well painted when the cars are built and carefully watched while in service, repainting as often as necessary for their protection. Our road has adopted the practice of sprinkling sand in the last coat of paint on the roof in order to eliminate the trouble caused by hot cinders which fall thereon, burning and destroying the paint coating. It is believed that the use of plain colors for finishing the interior of steel cars will be found very much more practical and economical, as with the grained finish it is difficult to repaint parts which frequently become scratched or chipped.

Discussion.—A. J. Allen (D. L. & W.): The most essential part of painting begins with the man who inspects the cars while they are being built. The greatest care should be exercised in seeing that every concealed part is well painted with some good, elastic paint and all joints, especially, should be red leaded, for I do not think that anything has as yet been discovered to take the place of red lead. I have also found that the cement or paste used to apply the insulation to the car sheathing will eat the life out of the paint, and allow the sheet to rust. On the same car where the cement had not been applied the paint was in splendid condition.

The roof and deck are also very important. The paint should be carefully applied and the surface thoroughly cleaned before painting as this will save an endless amount of trouble. Where it is possible, every sheet that goes on the roof should be sand-blasted and primed with red lead immediately after it has been cleaned with the sand-blast. Red lead has given us the best results as a primer. It is also a good plan to sand on top of the paint as it prevents the hot cinders from making holes through the paint to a certain extent. We do not sand the entire roof, but simply the parts most exposed to the flying cinders. We have experienced no trouble in painting or taking care of the body of the car if it is painted according to a system and the proper amount of care taken in applying the different coats. I do not think that a steel coach should be painted in less time than 22 days, although with some elastic paint good results may be obtained in a much shorter time, but the number of coats should not be curtailed.

From the discussion the consensus of opinion seems to be that the metal should first be carefully prepared by having all rust and dirt, grease, etc., removed from it, and then apply carefully a coating of proper thickness and maintain it properly, not at the regular shopping, but at certain times throughout the year, keeping the paint well ahead of the rust and not allowing it to get too thin on account of wear.

INTERIOR WOOD FINISH FOR PASSENGER COACHES.

F. E. Breese (L. S. & M. S.): Almost the entire passenger equipment of the Lake Shore & Michigan Southern is finished in mahogany color. On receiving a new car from the shops the surface is carefully sanded and cleaned, and is then stained to our standard shade. It is then covered with a coat of paste filler tinted to the same standard shade. After the paste filler has been applied the surface is alternately sanded and covered with a coat of rubbing varnish three times, and finally a fourth coat of rubbing varnish is applied. After this the surface is rubbed with water and pulverized pumice stone. The average shop time for finishing a coach is about 19 days.

Mr. Breese closed his remarks by outlining in detail the method of handling the headlinings, the saloon, doors, sashes, seat arms, etc.

A. R. Given of the Canadian Pacific presented a paper explaining the methods used in finishing colonist, tourist, suburban, first class, sleeping, dining, observation and parlor cars. In the colonist and tourist cars birch is used for finish. Mahogany is used in the suburban and first class cars, and also in sleeping, dining, observation and parlor cars. Mr. Given went into the details of finishing these cars, laying particular stress on the headlining.

J McCarthy (G. T.): Our natural wood finish consists of

corn starch made with pure linseed oil to a semi-paste form with a quantity of sienna and other staining colors to give the required shade. This filler is thinned with benzine to a working consistency. An interior wood finish that is well filled with the required color and the necessary staining, shading, toning and blending, covered with two coats of good white shellac and three coats of good pale rubbing varnish, will when rubbed down or polished with pure raw linseed oil or renovator produce a rich, silky appearance, and good, permanent results will be obtained.

(Mr. McCarthy also included a more detailed description of the practice followed at the Montreal, Que., shops.)

PAINT SHOP APPRENTICE SYSTEM

B. E. Miller (D., L. & W.): The painters' apprentice system has been in effect on the Lackawanna for 15 years. Schools of instruction have been maintained at Kingsland, N. J.; Scranton, Pa., and Buffalo, N. Y., for the past four years. The apprentices are entered between the ages of sixteen and eighteen, and the average age is 16½ years. A four-year course is prescribed for the painters as in the other trades, a total of 10,000 hours being required before a diploma is issued. The rate of pay is advanced at the expiration of every 2,500 hours as follows: First period—8.5 cents per hour; second period—11.5 cents per hour; third period—15 cents per hour; fourth period—18 cents per hour. Upon the recommendation of the apprentice instructors, the general foreman and other officials, a diploma may be granted after serving three years of 2,500 hours each, if it is believed the apprentice is capable of earning a mechanic's wages.

No hard and fast rule is followed as to the assignments and periods of service in the various classes of work into which the four year term is divided. In general six months is given to the following work: General locomotive work; varnish room work; general work on the floor; body work and surfacing; interior finishing; general work and glass painting; striping and lettering; and the last six months' work is governed by conditions. Piece work is allowed in the fourth year.

It has been found particularly difficult to secure good material for paint shop apprentices, the other trades seeming to draw the more desirable applicants. Of the men that have taken the paint shop course 25.35 per cent. of all apprentices employed during 14 years are still in service. The greatest number leave during the first year of service, the percentage being 45.09. The percentage leaving the second year is 8.45, and for the third and fourth year the percentage is only 2.82 and 2.81, respectively.

Discussion.—It was believed that if more attention was given the paint shop apprentice in the apprentice school and elementary lessons in chemistry pertaining to paints and oils given in the place of other subjects they are now required to study which do not pertain to their trade, much better results would be obtained and a better class of boys could be interested in the work.

THE SAND BLAST AS A PAINT REMOVER

W. O. Quest (P. & L. E.): We are firm in the belief that the sand blasting method of cleaning metal or stone surfaces is the best, the most effective and the most economical to use. This preparatory cleaning must be figured upon regardless of cost in order to avoid making the costly mistake of painting over live corrosion or mill flash scale. If a sand blast system is properly installed and handled its work can be depended on for a maximum of service results. The average cost of removing paint, etc., from an 8,500 gallon tender tank by the sand blast is a fraction less than eight mills per surface foot, and the total piece work price is $3.33. The same tank cleaned with the best known non-dry-hardening caustic mixture, soluble in water, will cost $7.10, and even then the flash scale will not be wholly removed. The cost of chemically removing the flash scale, and of neutralizing the acid used is prohibitive. This leaves the sand blast as the only practical metal cleaning method that will provide a clean, inert surface to receive paint.

At the McKees Rocks shops all large sand blast work is done in an elevated track sand storage house. The sand used for blasting is used again for sanding locomotives. This also eliminates the trouble from dust in other shops. The sand blast can also successfully be used for glass ornamentation work, and is, in fact, superior to the acid method of cutting. There are, nevertheless, cases where the chemical removers can be used to much better advantage than the sand blast, especially on small castings, driving wheels, dome and sandbox base castings.

F. A. Weis (C. R. R. of N. J.): The sand blast not only removes the paint, rust and flash scale, but it leaves a roughened metal surface to which the paint will readily adhere. This not only better protects the metal surface, but gives a longer life to the paint. The cost of the sand blasting has been found to be cheaper than chemical methods.

Discussion.—The members were agreed that the sand blast gives much the best results, and is cheaper than other methods everything considered. The New York Central & Hudson River at the Albany shops have sand blasted a first class vestibule car in five hours with two men, but find that about 7½ hours is the average time. If a good silica sand is used it may be possible to use it over two and three times. Shot has not given satisfactory results on cars. The advisability of using the sand blast on the inside of cars was questioned by some members.

STANDARD FREIGHT CAR LETTERING

The standardizing of freight car lettering was strongly favored by the association, and many instances were mentioned where, on account of the lettering not being standard, considerable trouble had been caused. The following resolution was adopted in this regard:

"Whereas, The Master Car and Locomotive Painters' Association recognize the advertising value of the trade marks of the railroads that have been in use for years, and realize it would be useless for us to ask them to dispense with this invaluable medium of reaching the public, but

"Whereas, A uniform stenciling of freight cars is very desirable from the standpoint of shop efficiency and economy, and efforts have been made in the past, both by this association and by the M. C. B. Association, to accomplish this end, with more or less success; be it therefore

"Resolved, That we renew our efforts to arrive at this desirable end; and that we appoint a committee to design a series of letters and figures for this purpose, said committee to confer with the M. C. B. Association for its general adoption on all railroads."

OTHER BUSINESS

In considering the subject of the classification of repairs it was the consensus of opinion among the members that by classifying interior and exterior repairs separately a much more accurate estimate of the total cost could be made. The Pennsylvania Railroad has been using this system very successfully.

Other papers were presented on Rust Inhibitive Paint and Non-whiting Varnish for Locomotive Tenders.

The secretary reported a membership of 292.

The following officers were elected for the ensuing year: President, T. J. Hutchinson, formerly of the Grand Trunk; first vice-president, H. Hengeveld, Atlantic Coast Line; second vice-president, John F. Gearhart, Pennsylvania Railroad, and secretary-treasurer, Alfred P. Dane, Boston & Maine. Detroit received the greatest number of votes for the next place of meeting.

New Railway Tunnel in India.—Work is now under way on a 1,507-ft. tunnel for the Great Indian Peninsular Railway in the Western Ghats, about 100 miles from Bombay, India. The contractors are Pauling & Company, Bombay. Work on the tunnel was begun in December, 1913, and it is expected that the tunnel will be completed by July, 1915.

THE EUROPEAN WAR, THE SOUTHERN RAILWAY AND ITS EMPLOYEES

In the course of an address on Labor Day at Spencer, N. C., Fairfax Harrison, president of the Southern Railway, discussed as follows the effect of the European war on the Southern Railway, its employees and the people of the south:

We have on the rolls of Southern Railway Company a splendid body of employees. I am proud to say that, individually and collectively, our organization will compare most favorably for efficiency and loyalty with that of any other railroad system in the United States, be it north or south, east or west. In the broad sense of the word we are all employees. As the words are generally used the organization is composed of officers and employees, but the line between these two classes is not a barrier. Under the Southern Railway policy of filling vacancies in the higher grades by the promotion of qualified and loyal subordinates the line between employees and officers is constantly being crossed and in every department of the service there is a wide field for promotion. Like Napoleon's soldiers every one of us carries a field marshal's baton in his knapsack.

More than this: Aside from adhering to the policy which assures promotion so far as opportunity may arise, the management of the company believes that it has shown its appreciation of its employees by just, and even liberal, treatment in the matters of wages and conditions of employment. For all classes of skilled labor Southern Railway Company and the railways of the south are paying as high wages as any railroads in the United States and higher than many, especially those north of the Ohio and Potomac rivers and east of Chicago in territory where the density of traffic which creates railway revenue is much greater than along our lines. We have met most of the expectations of our employees and, were it possible consistent with our whole duty, we would be glad to meet them all. Nothing in my career has given me more profound and sincere satisfaction than to be connected with a company which has been able to advance so notably—as Southern Railway Company has done—the social welfare of the sturdy, hard working and faithful men who are its responsible employees, and I feel this whenever I have the privilege of shaking hands with and looking into the face of one of our older men—as I am always proud to do—a man who has known something of what conditions on the railroad used to be and what they are today. These older men have, themselves, largely made possible what we have been able to do for our employees generally and should have the credit for the advantages the younger men now enjoy almost without knowledge of where they came from. I look forward with confidence to the efficient and sustained loyalty of these men making possible still further improvement in their own condition and that of their juniors. We can not, however, accomplish this without regard to the business conditions which make a railroad a living thing.

While the element of danger can not be entirely eliminated from some kinds of railroad employment, the management of Southern Railway Company is constantly endeavoring to reduce this danger to a minimum and to safeguard its employees and the public. Accidents by which employees or others are injured are systematically studied with a view to installing such appliances or issuing such instructions as will tend to prevent them in the future. The best practice of other companies for the prevention of accidents is being closely studied in connection with our own initiative and every device and practice that is an improvement over what we already have is adopted so far as it is practicable for us to do so.

Our high level of wages and conditions of employment at least as favorable as substantially all of the other railroads in the United States were established at a time when the business of the company was normal and when there was reason to expect increased earnings rather than the reverse. Suddenly we find today that the entire situation as affecting the business of the company has been changed. Under the modern systems of world-wide exchange of commodities and of international credits, though the American people are at peace with all nations, the war in Europe has profoundly disturbed all lines of business in the United States and has brought about a curtailment of production and a consequent falling off in transportation, the full extent and duration of which no man can now predict with certainty. We know, however, that, although the war is being waged three thousand miles from our shores, its effects are being felt to a greater or less degree by practically every family in the United States. We also know that, unfortunately, the effects of the war are being felt in no part of the United States more seriously than in the south.

But a few weeks ago the south was looking forward after a winter of hesitating business to a season of unsurpassed prosperity. Rejoicing in having a substantial monopoly in supplying the world with cotton, the southern people were looking with satisfaction upon the bountiful crop maturing in the fields which they had every reason to believe would be sold at a remunerative price. When Europe plunged into war, because of the fact that a large proportion of the crop must seek foreign markets, the cotton monopoly of the south, instead of being a source of strength, became an economic weakness. The market for cotton was wiped out. Steps are now being taken by the federal government and by patriotic bankers to relieve the situation and prevent widespread bankruptcy and distress throughout the south. However successful these may be, they can afford only partial relief, for, excluded from foreign markets, a large proportion of the crop must be stored in the south and will not be offered for shipment for many months. The situation is made worse by the fact that the activities of American cotton mills are being hampered, not only by financial conditions, but also by inability to secure dyes which in the past have been supplied only by European countries involved in the war. Likewise southern farmers will have to restrict their acreage of leguminous crops this year, because of inability to secure supplies of seed from Germany and Austria. Looking forward to next year, we find that, unless the war shall be of short duration, the manufacture of some kinds of commercial fertilizers, which are an important article of freight for the railroads of the south, will be greatly restricted because Germany is the sole source of supply of potash.

Under present conditions and prospects in the south all lines of business have fallen off and railroad traffic and earnings are showing substantial decreases. We hope for the best and are doing all in our power to bring about improved conditions. We are continuing the extensive construction work for which, fortunately, capital funds were secured before the war began. The disbursement of this money in southern communities will be helpful, not only to the men employed, but to southern business enterprises generally. We realize that, with all the great manufacturing and commercial nations of Europe involved in the war, there is splendid opportunity for the expansion of the export trade of the United States, especially to the markets of Central and South America, and we are actively co-operating with southern manufacturers and merchants who desire to enter this field. But, under most favorable circumstances, it will take time for the business of our section to recover, and while we hope for better conditions for the south and the Southern Railway, we can not be blind to the present situation of declining traffic and decreasing earnings. It is then a time for caution. The Manufacturers' Record has this past week given an admirable statement of the duty which this situation imposes on us all. I venture to quote a paragraph:

"Every responsible citizen of the United States, in whatever calling he may be, should lose no time in adjusting his material affairs to meet the economic emergency created by the temporary paralysis of civilization in Europe. The very conveniences with which civilization has equipped mankind have begotten a world-wide sensitiveness to any action anywhere interrupting the play of the forces of civilization. In war involving directly seven peoples of Europe, and indirectly all peoples of that continent,

the material influences for the advancement of the human race have virtually collapsed. Consequences are already felt in this country. They will become more manifest day by day and will persist for a while even after wholesale murder and rapine have ceased in Europe. The people of the United States are today beginning to pay the bills for the destruction wrought. Such payments mean resources taken from productive enterprises here and unjustified burdening of every capitalist and wage-earner, every farmer, every manufacturer, every banker, every merchant, every broker in the United States."

In this situation the interests of all officers and employees of the company are identical with the interests of its owners. Wages and dividends are drawn from the same fund—the earnings of the company—with this important difference, that wages must be paid first regardless of whether there is anything left for dividends or not. But the owners of the property who have adventured their money in the provision of this great railroad system which gives employment to tens of thousands of southern people have rights which can not be disregarded, and, but for the fact that it was anticipated that the company would earn reasonable profits, it would have been impossible to secure the money with which we are now making it not only a more efficient carrier for the people of the south and a safer plant on which our employees may work, but are putting it in a position to afford employment to increased numbers of men when business shall have once more revived.

The earnings of the railroad, which are at once the source from which its expenses must be paid and the basis of its credit, can not be advanced by the mere volition of its managers. We are powerless to raise a single passenger or freight rate without the approval of a state or federal commission, and we are now faced with the fact that earnings are decreasing, and that since August first each week's revenues have been less than for the previous week, though the falling off has as yet been rather an indication of a tendency than of an actually serious condition.

I do not anticipate any trouble for the company, but my point is that manifestly this is no time for consideration of wage increases or the eight-hour day. I should be lacking in frankness if I did not say that these matters can not now be considered by the management of Southern Railway Company and if I did not at the same time express the hope that our decrease in business may not become such as greatly to curtail opportunity for employment and make necessary a policy of strict retrenchment. Like the general staff of one of the warring nations of Europe we have long had a plan of retrenchment ready for the emergency and I may say that, disagreeable as retrenchment always is, we have the courage to put our plant into operation, if that shall seem to be the best interest in the long run of the company and of the southern people. But, please God, it may not be necessary. What shall be the event lies largely in the demonstration of character, and patience, and cheerfulness of southern men and women, and I venture to believe that we, as southern men and women, will be as ready, as ever our ancestors were, to accept sacrifices when that shall prove necessary. If such shall become the necessity of Southern Railway Company, the sacrifice will be borne by officers as well as men, but I pledge you my word that I will keep the interests of our men and those dependent upon them faithfully in mind and that no sacrifice will be asked until it shall be necessary. As one responsible for the ultimate decision, I pray for strength to decide right and I ask with confidence the understanding and the support of all you men and women here assembled with whom I am linked in a strong bond of common service to the public and the attachment of many years of association.

Harbor Improvements at Antofogasta, Chile.—A bill for harbor improvements at Antofogasta, Chile, to include the construction of a railway connecting Antofogasta with the Longitudinal Railway is now before the Chilean senate. The work will cost about $7,600,000, and will be completed in six years.

STRIKE THREATENED ON THE ST. LOUIS SOUTHWESTERN

Conductors and trainmen on the St. Louis Southwestern have taken a strike vote because of the refusal of the management to reinstate a passenger conductor, J. R. Tillman, who was discharged about 16 months ago on a charge of being intoxicated on May 16, 1913, while on duty on passenger train No. 1 from St. Louis to Jonesboro, Ark. The controversy arises from a dispute as to whether Tillman was intoxicated at the time or sick. When he arrived with the train at Jonesboro on the day in question his actions while at the station were such that over a dozen employees of the road who saw him made statements to the general yardmaster, on request, that he was intoxicated, and he was dismissed from service. Nearly all of the statements were very positive, giving details of his actions while around the station, and several said that they had smelled whiskey on his breath, while a few were unwilling to state positively that the man was intoxicated, but said that he bore every appearance of being so.

Tillman claims that he was not intoxicated but sick, and to offset the written statements obtained by the company produced an affidavit from a physician at Jonesboro that he had treated him for acute indigestion and that he had found no evidence to indicate that he was suffering from the effects of alcohol in any form.

The matter was taken up by the officers of the Order of Railway Conductors, who claim that Tillman had been a marked man ever since he gave some testimony unfavorable to the company's contention in a controversy regarding provisions of the schedule when the men had asked for an additional crew on a certain passenger run. A strike vote was taken, whereupon F. H. Britton, president of the road, agreed to conduct a hearing of the case, and all of the witnesses who had given statements were heard at a hearing in President Britton's office in St. Louis, on August 28, 29 and 31, of this year.

A complete printed transcript of the evidence taken at the hearing before a notary public, amounting to 113 pages, has been distributed by the company to all employees in the train, yard and engine service. The hearing was conducted before President Britton by General Manager J. W. Everman for the road, and by W. C. Turner, vice-president of the Order of Railway Conductors, for Mr. Tillman. By agreement each witness was assured by the general manager that he could tell the whole truth in the Tillman case without fear or favor, that the company would fully protect him, that he would be in no danger of being dismissed from the service or disciplined in any way for anything he might say, and Mr. Turner also gave each witness assurance that nothing he might say would thereafter result in causing him any trouble in the hands of the organization. The physician was examined and cross-examined at great length by Mr. Turner and by Mr. Everman regarding Tillman's appearance and condition when he came to him for treatment late in the afternoon. He had arrived on the train in the morning. The examination went into great detail regarding the symptoms of intoxication and of indigestion. Following the doctor's examination the witnesses who had made written statements were asked if they would change them in any way. Two or three who had made positive statements that Tillman was intoxicated changed their testimony to an expression of opinion, but only one reversed his opinion.

It was testified among other things that when Tillman arrived on his train in the morning he staggered when he walked, could not write intelligently in attempting to make out his delay report, could scarcely talk so as to be understood; that he smelled strongly of whiskey; that he fell asleep and was carried into a baggage room, where he spent the afternoon asleep, having been left there by the employees who thought he was intoxicated. There was no evidence that

Tillman had actually taken a drink during the run in question, and the physician attributed his whiskey breath to a swallow of "Peruna." Several persons who had been on the train asserted that he had shown no signs of intoxication during the trip from St. Louis to Jonesboro, and several witnesses asserted that they had never known him to take a drink, although others had seen him apparently intoxicated. At the conclusion of the hearing officers of the Order of Railway Conductors summed up the evidence, asserting it had not proved that Tillman was intoxicated, but that he had been discharged at the first opportunity because the company had decided to get rid of him. But President Britton announced that he could not change his decision and that the company had evidence that Tillman had been in the habit of getting drunk. He said this evidence was not produced at the hearing because of the agreement not to go outside of the case in question. Later, however, the company gave out an affidavit signed by a traveling salesman who had known Conductor Tillman for seven years, who said that he had seen him intoxicated while on duty several times. On the day in question he had boarded his train and found Tillman intoxicated and asleep in the negro compartment neglecting his work.

NEW PETITION IN 5 PER CENT RATE ADVANCE CASE

The railroad companies in official classification territory have filed the following petition with the Interstate Commerce Commission:

"Your petitioners, 112 railroad companies, comprising the thirty-five railroad systems in official classification territory, parties to the above-entitled proceedings, respectfully petition the commission for such a modification of the order of July 29, 1914, which will permit the carriers to make effective the rates specified in the tariffs which were made by said order directed to be canceled. Since the filing of the report and entry of the order by the commission in these cases facts and circumstances have arisen which, taken in connection with the facts already before your commission, your petitioners believe, will justify the relief herein prayed for. These facts and circumstances are briefly as follows:

"First: During the month of October, 1913, your petitioners published and filed with this commission the tariffs involved in these proceedings. At the time of the filing of the report of the commission, there were available for the information of the commission the annual reports of your petitioners for the year ending June 30, 1913, as well as the monthly reports of your petitioners up to and including May, 1914. Since that time the complete income accounts of your petitioners for the fiscal year ending June 30, 1914, have become available.

"The reports of your petitioners for the year ending June 30, 1914, as compared with the year ending June 30, 1913, show a decrease in total operating revenues of approximately $44,700,000, while during that same period operating expenses have increased about $23,300,000. After deductions of taxes and deficit in outside operations, there was a decrease in operating income of approximately $74,700,000 notwithstanding an increased property investment. Thus the tendency toward a diminishing operating income, found by the commission in its report, is emphasized by the figures covering the complete year to June 30, 1914, while the reports for July and such figures as are available for August, 1914, show a continuance of this declining tendency, notwithstanding the extraordinary efforts that have been made to reduce expenses.

"Second: The unforeseen European war has brought about an unparalleled destruction of wealth and dislocation of credit throughout the civilized world. It is certain that the competition for capital will be keener and interest rates higher for some years to come than in any corresponding period within living memory. The emergency thus resulting is extremely serious. It is conservatively estimated that the railroad companies of the United States have obligations maturing in the next fifteen months amounting to well over five hundred millions of dollars, and it is imperative in the public interest that these obligations shall be duly met. A large part of this sum is owed by your petitioners and they will further need from time to time in the next few years large amounts of money to provide for improvements which will be necessary in the public interest to prevent a serious deterioration in the standard of transportation service. In order to compete effectively for this new capital they must have a material increase in revenues.

"Third: The commission in its report made certain tentative suggestions as to measures which might be taken by the carriers to secure additional revenue. Your petitioners are proceeding as rapidly as possible to put into effect the increase in freight rates in Central Freight Association territory authorized by the report of the commission, and are giving earnest attention to the other recommendations and suggestions of the commission with respect to other rates and practices.

"It is believed, however, that the additional revenue which may be secured by the adoption of means other than a general advance in freight rates cannot be obtained in the near future, and when secured will be inadequate to meet the needs of the carriers for increased revenue in the present situation.

"Wherefore, your petitioners ask that the commission modify the order aforesaid, so as to permit the carriers to make effective the rates specified in the tariffs, which were by said order directed to be canceled, except so far as they have been or may be superseded by advances filed in accordance with the report of the commission and that your petitioners may have such other and such further relief in the premises as the commission may deem proper."

THE PLEA OF THE RAILWAY BUSINESS ASSOCIATION

The general executive committee of the Railway Business Association, which held a meeting in Chicago, on September 16, authorized the following statement:

The Railway Business Association commends the spirit in which the railway presidents recently conferred with the president of the United States upon the grave conditions confronting the railways aggravated by the European war, and is profoundly appreciative of the appeal made by President Wilson on behalf of the railways. We are moved thereby to say that the logical sequence of the president's appeal is for business men to plead that the Interstate Commerce Commission may find a way to grant immediate relief in response to the petition which the eastern railways have now filed. This association has always observed an attitude of respect for the commission and has by its utterances ever voiced our appreciation of the burdens imposed upon it and of the perplexities involved in the issues presented for its adjudication. Our appeal to the commission now is made with a friendly desire that it cope, as the exigency demands, with a portentous situation, the factors of which have never before existed in their deliberation.

The president in his conference with the railway executives manifested earnest sympathy with them and showed great familiarity with the facts as presented. The president in certifying that the statement made to him by the railways was a "statement of plain truth," called the attention of the country "to the imperative need that railway credit be sustained," and in urging co-operative effort to that end included, "the action, wherever feasible, of governmental agencies." It was unnecessary to specify the Interstate Commerce Commission, which is the only tribunal possessing information, facilities and authority to afford the immediate relief required.

The substitute methods of increasing income pointed out in the decision of July 29, were volunteered by the commission to meet what it considered to be then existing conditions. It seems to us that it would be entirely proper, as it

is surely important, for that body now to volunteer a solution to meet the unlooked-for emergency. The previous investigation was so recently concluded that the data already at hand is ample. Legally, the tariffs suspended in that case have now been withdrawn but physically they exist. The commission has already given exhaustive consideration to the details of the decree which would have been issued had it been decided to grant an advance to the trunk lines and to New England. In any event, upon return of normal conditions the commission can at any time readjust rates if revenue is regarded as too large.

Out of the war has risen an emergency affecting the railways which has no parallel and which demands extraordinary measures. Reports of earnings and expenses for the year ending June 30, 1914, which were not yet available when the commission decided the five per cent case, have now been laid before the commission and show a serious decline of operating income in face of increased property investment. The war has influenced and is inflicting still further losses in gross earnings. It was evidently the commission's expectation that current earnings would be sufficient to tide the roads over until the new sources of revenue should materialize into money. The war has put an end to that hope. The roads are now vigorously taking steps to follow the recommendations of the commission as to passenger rates, unremunerative freight rates, free services and other matters. It is, however, a work exceedingly intricate and of large volume and considerable time must necessarily elapse before any of these resources can be made to yield income. Neither the roads nor the country can afford to wait. Immediate relief is required in the interest of all concerned.

It would be difficult to overestimate the value and the importance of the stand taken by President Wilson in counting the problem of railway credit as among the imperative measures for national protection against the evils of the war.

"This is a time," says the president, "for all to stand together in united effort to comprehend every interest and serve and sustain it in every legitimate way."

The price level and strength of railway securities has a potent influence upon the financial transactions of all other corporations. If railways cannot renew their notes or refund maturing bonds this fact severely impairs the confidence which lenders feel in other companies. Current prices for old issues cannot decline far without destroying the market for renewals and refundings, not to mention new securities, of which no one at this moment thinks. The outbreak of hostilities caused the wholesale return to this country of American railway securities held abroad and prices slumped violently. This sacrifice was temporarily suspended by the closing of the European and American stock exchanges. The government cannot by legislation provide volume of tonnage; but impairment of credit may be mitigated to some extent by an advance in freight rates. This would stay the downward tendency of income somewhat and the sanction itself would be invaluable as making good in substantial fashion the declared purpose of the commission "to aid, so far as we legally may, in the solution of the problem as to the course that carriers may pursue to meet the situation."

We would respectfully urge upon Congress that in consideration of railway mail pay the recommendation of the congressional joint committee points a way whereby the railways may be dealt with in a spirit of greater liberality than is provided in the house bill now under consideration in the Senate. This is surely a time when the government should be actuated by a desire to pay adequately for an important public service rather than to drive a hard bargain with the carriers because it has the power to do so.

We earnestly hope that the prayer of the railway executives that the roads be relieved as far as possible of further immediate burdens involving additional expense will be heeded by legislative and regulatory bodies and that railway employees will refrain from pressing at this time demands which, if granted or awarded, would result in higher labor cost.

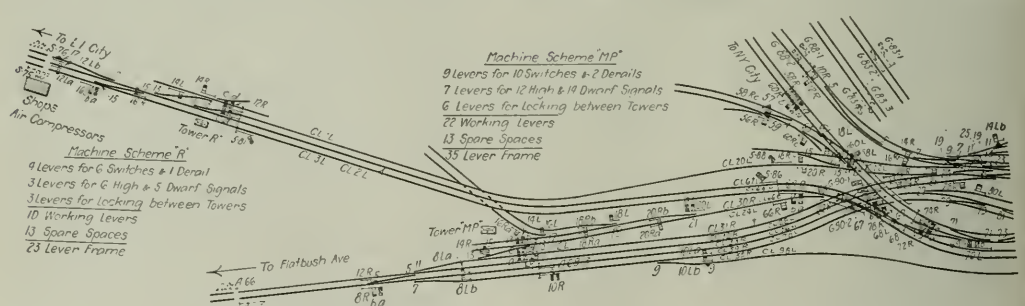
Extensions and Improvements to Railways in Honduras.—A 10-mile railway, to be operated by the Trujillo Railroad, was built in 1913, from the port of Trujillo to Juticalpa, and it is probable that it will be extended this year for a considerable distance. Work has been started by the Cuyamel Fruit Company on an extension of its line from Vera Cruz to Omoa, nine miles, and it is expected that work on a wharf 800 ft. long at Omoa will be finished this year.

EXTENSIVE INTERLOCKING AT JAMAICA, LONG ISLAND

An unusual combination of interlocking plants has been installed at Jamaica, Long Island, on the Long Island Railroad, to protect train movements through that terminal. A complete description of the terminal track and station improvements was published in the *Railway Age Gazette* of August 1, 1913, page 184.

The signaling installation consists of four electro-pneumatic interlocking plants, one east and three west of the station, together with a considerable number of electro-pneumatic automatic block signals, all of which are shown in the track layout, herewith. The interlocking plant east of the station, known as "J E," has a machine of 71 levers, controlling 36 switches, 3 derails, 7 double-slips with movable-point frogs, 29 signals, and 27 dwarf signals, and has 11 spare spaces. This plant governs switches and signals for train movements to or from Rockaway Junction, Springfield Junction, and the station, as well as main-line movements between Jamaica, Montauk Point, and intermediate stations.

The interlocking known as "J" is the largest of the four and



Track Layout, Jamaica Interlocking, Long Island Railroad—Continued on Next Page

is located, with two other plants, west of the station. The machine has 86 working levers and 21 spare spaces, controlling 54 single switches, 4 derails, 9 double-slip switches with movable-point frogs, 1 pair of movable-point frogs, 39 signals, 29 dwarf signals, and has 21 spare spaces. The other two plants are known as "M P," which has 22 working levers and 13 spare spaces, and "R," which contains 10 working levers and 13 spare spaces.

INTERLOCKING TOWERS

The interlocking towers are of brick, each two stories high, and are of artistic design. The upper floors contain the interlocking machines, while the ground floor houses the motor-generators, switchboards and cabinets which hold relays, fuses, etc. A basement is provided for storage batteries, transformers, etc., and also a heating apparatus and workshop for maintainers.

POWER SUPPLY AND DISTRIBUTION

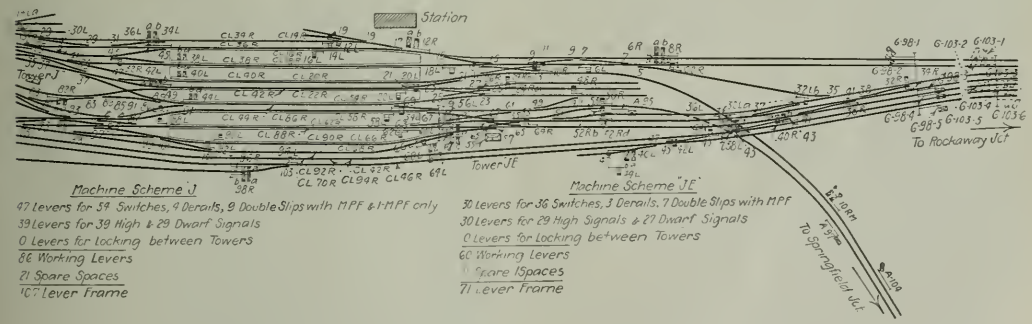
Power is furnished from the Woodhaven substation and is transmitted at 2,200 volts, 25 cycles, a. c. Oil-cooled static transformers cut this down to 220 volts for lights, motor-generator sets, and two small air-cooled transformers which supply the track circuits. Motor-generator sets supply direct current at 12 volts, through the medium of storage batteries for operating switches and signal units. Compressed air is supplied from the Morris Park carshops, for operating the electro-pneumatic signals and switches.

The storage batteries charged at 12 volts d. c. by motor driven generators, consist of duplicate sets of seven cells each, and have sufficient ampere-hour capacity to supply direct current of from 12 to 14 volts for the operation of all switch and signal controlling magnets, etc., as well as to operate the generators as motors when for any reason the primary current is cut out. Each of the duplicate power-generating sets is made up of a 15-volt, d. c. generator and an a. c. synchronous motor. A failure of the primary supply causes the d. c. generator to be driven as a motor by current from the storage batteries, and the synchronous motor becomes a generator giving 220 volts 25 cycles a. c. Provision is made for automatic changes in the field connections, so that the reversing of the motor-generator necessitates no field adjustments whatever. If the primary power fails when the lights are not needed, the apparatus is so arranged that no emergency shifting of connections takes place.

Jamaica Interlocking Looking East, Long Island Railroad

INTERLOCKING MACHINES

The interlocking machines are the Union Switch & Signal Company's standard electro-pneumatic type, with equipment for electric detector circuits, which are used throughout the plant in place of detector-bars. Each machine has a track model, as shown in the illustration. Small lamps, which illuminate small round disks set in the sections of the model representing sections of track indicate whether the different track sections are occupied.



Track Layout, Jamaica Interlocking, Long Island Railroad—Continued from Preceding Page

ELECTRIC LOCKING

Approach electric locking is provided throughout. Indicators are also provided to show the presence of trains in these approaching sections. Route locking is provided throughout, which, through the track circuit, locks all levers governing any route as soon as a train passes the signal governing that route. The

switch-levers are released as soon as the rear end of the train passes the switch point of the trailing switches or the fouling points of the facing switches, which allows for the maximum number of movements consistent with safety.

A system of locking is provided between towers, affording all needed facilities for using tracks in both directions, and this is so arranged that clear signals cannot be given for conflicting movements between towers; but for emergencies there is a clockwork time release. By the use of this release low speed movements can be made into a section which is already occupied.

SIGNALS

The controlling valves for the compressed air are arranged so that any failure of the controlling current will de-energize the magnet controlling the valve and will prevent air entering the cylinder. Thus any failure will result in the signal giving the stop indication.

The top arms of the high speed signals are used for indicating

Machine at "J" Tower, Long Island Railroad

straight route only, and the lower arms indicate for diverging routes. All signals are three-position, operating in the upper quadrant.

CONSTRUCTION

The apparatus in the four plants was installed by the Union Switch & Signal Company, under the supervision of E. M. Weaver, engineer of maintenance of way of the Long Island Railroad, Charles Soper, supervisor of signals, and L. S. Vieillard, inspector.

A CONCLUSIVE ARGUMENT

[From the Portland, Ore., Oregonian.]

There has recently come to light a story which indicates the present predicament of some of the railroads. In a small town the city council determined that the railroad should build a new station. The president of the road pointed out to the council that no funds were at hand and none could be borrowed to build such a station.

"A way will have to be found," said the council.

"Well," said the railroad president, "I'll tell you what I will do. I'll give you the railroad. I don't mean sell it to you, but give it to you. You can have it, equipment, right of way, property, debts and all. I'll turn it over to you right now."

The bonded indebtedness of the road was large, there was an annual deficit and the city refused to take the railroad that was handed to it virtually on a silver platter. But the demand for a new station was withdrawn. The argument of the railroad president had been conclusive.

FLANGE OILERS

F. W. Edwards, mechanical engineer of the Ohio Injector Company, presented a paper on this subject at the September meeting of the Western Railway Club. Mr. Edwards briefly sketched the history of the development of the flange oiler, and in speaking of the advantages of the flange lubricator he said in part:

There are numerous cases where a new locomotive was put into service and after thirty days it was necessary to take it into the shops to change tires because the flanges were worn down to the minimum; many other cases where 60 days' service would wear the flanges to minimum, while on numerous roads 90 days appeared to be the absolute limit of service for a set of new tires. Every 1/32 in. flange wear requires the removal of 1/16 in. of metal from the tread of the wheel, and 1/8 in. flange wear would require the removal of 1/4 in. from the tread. On many roads this represents one year's tread wear. Taking this as our basis, we must figure on the removal of 1/2 in. to 5/8 in. of metal from the wheel tread every time a pair of wheels is taken into the shop for turning, on account of the flanges being worn to the minimum. This represents a loss of two years of actual mileage metal. The amount chargeable to the turning of a pair of locomotive driving wheels when the flanges are worn down to the minimum will vary. It was found that on an average it costs $40 for every pair turned. If this one expense could be eliminated, it does not require very close calculating to prove that a great saving has been made, and the cost of the maintenance per engine mile greatly reduced.

The application of the flange oiler works in with one of the foremost subjects of today—"Safety First." One instance that stands out more clearly than others was a switching engine in a Buffalo yard. This engine was working on a sharp lead going into the freight house tracks. The driving wheel flanges had worn so that they came in direct alinement with the worn sides of the rail, but were not down to the minimum. Just as soon as these two lines come together, the driving wheel flange would grip on the rail, raising the engine over the rail and off the track. This was an almost daily occurrence. The flange oiler was applied in July, 1909, and the engine placed in the same service, leaving the flanges just as they were. A careful record kept on this engine up to December, 1912, shows that the engine was not off the track once during that entire time. Another engine in switching service that could not be run longer than three months without its being necessary to turn the driving wheels on account of sharp flanges was equipped with a flange oiler and oil applied to the forward and back drivers on each side of the engine; this engine ran 20 months instead of three months and made 39,785 miles, and the driving wheels were then turned for tread wear only. On one road, four heavy Pacific type passenger engines without flange oilers could make about 39,770 miles when flanges were reduced to the limit. These same engines in the same service with flange oilers applied made an average of 91,850 miles. On another road one Atlantic type passenger engine without flange oilers would only make 20,000 miles, when the flanges would be worn to the minimum. After flange oilers were applied in the same service this engine made 110,000 miles, a gain of 450 per cent, and the front tire flanges showed 1 5/32 in. full and the back tire flanges 1 3/16 in. full. There are other records of success fully as interesting.

In order to give some idea of the saving in dollars and cents, we have one instance where a road in switching service had one engine working in a yard by itself, and after one year's service with this engine equipped with flange oilers they showed a total saving of $480. On another engine doing similar work in another yard, $160 was saved. The amount of saving in both instances is based upon oil, driving wheel tires, track material and labor. These examples can be

duplicated on any division or any number of divisions where flange wear is a source of annoyance.

It is a known fact that where there is excessive wheel flange wear there is also excessive rail wear, and the remedy for one is the remedy for the other. The flange oiler is the remedy and it has proven so effective that it would be a paying investment for the railroads if they equipped their engines with flange oilers for the saving of the rails only. The flange oiler is also an important factor in fuel economy, as it will reduce the friction between the wheel and the rail.

The initial cost of a flange oiler which will reduce the cost of locomotive repairs and track maintenance, and show economy in fuel is approximately $75 to $85 applied to a locomotive. The oil will cost from 16 cents to 18 cents a gallon, and one gallon is sufficient for from 500 to 800 miles of engine service, which would make the cost about 2 cents or 3 cents per 100 miles for oil. The cost of turning the tires on the average locomotive and the value lost in service, which on an average is about $125 to $200 per day, will more than pay for the initial cost and application of the flange oiler, to say nothing of the increased tonnage, fuel economy, derailments eliminated, saving on switch points and frogs, higher speed on curves with the greatest element of safety and more than doubling the life of rails on curves.

Discussion.—The discussion brought out that care is necessary in the application and maintenance of flange oilers. Flange wear is often due to incorrect alinement of driving wheels and by placing more weight on the leading truck it has been found possible to reduce it 50 per cent. The greatest benefit is found on curved track.

PORTABLE STEAM STERILIZER

The accompanying illustration shows a portable steam boiler for sterilizing drinking water coolers in passenger cars as provided by law. It is sold by the West Disinfecting Company, 12 East Forty-second street, New York City. It consists essentially of a steam boiler of 10 gal. capacity, which is heated by a kerosene vapor flame from three Lovett Giant flash burners in a tank under the boiler. The boiler is well lagged with two thicknesses of asbestos, that next to the boiler being composed of soft fiber and that next to the jacket being asbestos mill board. The jacket extends below the boiler and forms the furnace within which the oil tank is placed.

Steam Sterilizer for Water Coolers

The boiler is constructed of galvanized steel, the joints being welded by the oxy-acetylene process. It is built to stand a test of 200 lb. steam pressure, which gives an ample factor of safety for the working pressure of 40 lb. to 50 lb. The fuel tank is also built of galvanized steel in the same manner, to withstand a test pressure of 75 lb., the actual working pressure being about 7 or 8 lb., which is secured by means of a hand pump incorporated in the construction of the tank.

The device is mounted on wheels so that it may be easily moved from one car to another throughout the yard. The steam is taken from the top of the boiler and is discharged through a ⅛-in. outlet into the cooler, which is turned upside down over the outlet, as shown in the illustration. With this sterilizer one man has sterilized 157 coolers from 34 cars in eight hours, using 4 gal. of low grade kerosene costing approximately 5 cents per gallon, and 16 gal. of water. In this specific case the cost of labor for performing this work was $1.52. To do this work it was found necessary to refill the boiler four times, and to replenish the burner twice. The boiler is easily filled by simply removing the nozzle from the end of the discharge pipe, placing a water hose thereon. The water is then turned on and allowed to pass into the boiler in this manner, the top gage cock being opened to provide the necessary vent. In this way it is not necessary to draw all the steam off the boiler nor to extinguish the light. When being filled in this manner only 15 min. is required to raise the pressure sufficiently high for operation. On starting up in the morning, however, 30 min. is required to bring the boiler up to a working pressure. Tests have shown that it is only necessary to sterilize the coolers by this method for one minute, very satisfactory results being obtained in this time.

While the number of coolers that can be handled by one man has been found to be about 160 per eight hours, it is believed that two men would be able to handle between 250 and 300 coolers in the same time if necessary. The roads using this system have found it more satisfactory than the yard steam line system. Dryer steam is obtained, and where these machines are in service the yard steam line has been discontinued entirely, thus eliminating the losses due to condensation. It is also estimated that this device will save from 25 to 30 per cent in the cost of labor for sterilizing the water coolers. Each sterilizer is provided with a steam gage, water glass, three gage cocks, washout plug and safety valve. The whole device weighs 325 lb. when loaded for operation.

LEGISLATION RELATING TO OPERATION

The Special Committee on Relations of Railway Operation to Legislation has compiled a table similar to that which has been issued in previous years, which is reproduced herewith, showing the classification of bills introduced and laws enacted relating to railway operation in the state legislatures which were in session in 1914. The table shows that in 14 states in which the legislatures were in session, including special sessions, 236 bills relating to railway operation were introduced of which only 27 were enacted. A comparison with the three preceding years is shown in the following table:

	1914	1913	1912	1911
Legislatures in session	*14	42	*19	37
Bills introduced	236	1,393	292	512
Laws enacted	27	230	48	†

*Including special sessions.
†This data not compiled in 1911.

As in previous years laws relating to employees, equipment and stations were the most numerous among those passed. There were 16 laws enacted relating to employees, of which 6 relate to terms of employment, 4 to hours of service, 4 to service letters and time of payment, 1 a full crew law, and 1 relates to

shelter for employees. There were 3 laws relating to equipment, including 1 pertaining to cabooses, 1 a headlight law, and 1 a safety appliance law, and there were 3 station laws. Only one law was enacted relating to crossing protection, in New Jersey, and none were enacted relating to freight trains, cars, block signals, clearances or maintenance of way. There was one law in South Carolina regarding the stopping of passenger trains, one law regarding the time of payment of claims in Virginia, and one law is classified under the head of miscellaneous. One law regarding trespassing was enacted in Louisiana.

Thirty-one bills were introduced in Louisiana and in Mississippi, of which five were enacted in each state. South Carolina and Virginia each passed 6 bills out of 28 introduced in South Carolina and 29 introduced in Virginia.

Bills Introduced and Laws Enacted in State Legislatures, Relating to Railway Operation
(sessions of 1914)

Subjects	Colo.*		Ga.		Ky.		La.		Md.		Mass.		Miss.		N. J.		N. Y.		Ohio*		R. I.		S. Car.		Texas*		Va.		Total	
	Introduced	Enacted	Introduced	Enacted	Introduced	Enacted	Introduced	Enacted	Introduced	Enacted	Introduced	Enacted	Introduced	Enacted	Introduced	Enacted	Introduced	Enacted	Introduced	Enacted	Introduced	Enacted	Introduced	Enacted	Introduced	Enacted	Introduced	Enacted	Introduced	Enacted
Employees—																														
Full crews	..	..	1	..	1	..	2	..	..	..	1	..	1	1	..	..	1	..	..	..	..	..	2	..	..	..	1	..	10	1
Hours of service	..	..	..	..	..	..	..	..	6	1	4	2	3	1	2	..	2	..	..	..	..	..	..	..	..	..	1	..	18	4
Service letters and time of payment	..	..	1	..	5	..	6	1	1	..	3	..	5	2	1	..	..	..	..	..	..	..	2	1	..	..	2	..	26	4
Terms of employment	..	..	2	..	2	..	7	3	..	..	9	1	11	1	1	..	6	..	..	..	6	..	2	..	..	..	4	1	50	6
Experience of	..	..	..	..	..	..	1	..	..	..	..	..	2	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	4	..
Shelter for	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	1	..	..	1	..	4	1
Arbitration—																														
a. Compulsory	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	4	..	..	..	..	..	..	..	6	..
b. Voluntary	..	..	1	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	..
Equipment—																														
Caboose	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	1	2	1
Headlights	..	..	..	..	..	..	1	..	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	3	1	6	1
Safety appliances	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	1	..	..	..	..	..	3	..
Repair of	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..
Appliances required	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	3	1	4	1
Passenger Trains—																														
To be run	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	1	..
Stops	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	2	..	..	..	..	..	3	1	..	..	..	..	5	1
Equipment of	..	..	..	..	1	..	..	..	..	..	1	..	1	..	..	..	2	..	..	..	1	..	2	..	..	..	..	..	8	..
Baggage	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..
Make-up of	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	2	..
Freight Trains—																														
Speed of live stock	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	2	..	1	..	..	..	..	..	4	..
Sunday trains	..	..	4	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	5	..
Handling of explosives	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	1	..
Make-up of	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	..	3	..
Cars—																														
To be furnished	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..
Demurrage	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	1	..
Block and Other Signals—																														
Block and interlock	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	2	..
Crossings—																														
Required	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	2	..
Protection	..	..	..	..	1	..	..	..	..	..	..	..	..	..	3	1	1	..	..	..	..	..	..	..	..	..	1	..	6	1
Separation of grades	..	..	..	..	..	..	..	..	3	..	..	..	1	..	3	..	3	..	..	..	..	..	1	..	..	..	1	..	12	..
Maintenance of Way—General—																														
Track scales and weighing	..	..	..	..	1	..	..	..	..	..	..	..	1	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	3	..
Burning weeds	..	..	..	..	..	..	1	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	..
Stations—																														
Required	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	2	..	..	..	..	2	2
Equipment of	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	3	..	3	..
Track connections	..	..	..	..	..	..	..	..	..	..	..	..	1	..	1	..	..	..	..	..	..	..	..	..	..	..	2	1	4	1
Hospitals and Relief Dept's.	..	..	..	..	..	..	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	..
Claims—																														
When to be paid	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	1	2	1
Trespassers	..	..	..	..	1	..	3	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	4	1
Reports—																														
Accidents	..	..	..	..	1	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	3	..
Miscellaneous	..	..	4	..	1	..	5	..	..	..	..	..	2	..	1	..	2	..	..	..	..	..	5	1	..	..	1	..	21	1
Total	2	0	13	0	18	0	31	5	13	1	21	3	31	5	12	1	23	0	0	0	15	0	28	6	0	0	29	6	236	27

*Special sessions.

SAVING CAR DAYS

O. C. Castle, car service agent of the Sunset-Central Lines, has issued a bulletin on the subject of "Saving Car Days," giving figures to show that during the fiscal year 1914 the system made a saving in car hire balance of $430,865, a daily average saving of $1,180, or the equivalent of 2,622 car days. The average mileage per car per day for all cars on the line increased from 20.4 in 1912-13, to 21.9 in 1913-14, while the movement of foreign cars increased from 21.4 to 28.6 miles per car per day. The bulletin states that these results were accomplished by eternal vigilance and persistent "plugging" on the part of hundreds of loyal employees in the campaign to save car days; and it urges all the employees and the officers to continue their efforts in this direction. The bulletin concludes with the following:

"From the present unsettled outlook, due to the European war, the company is going to need every 'car day' we can put away in our savings banks.

"Let's watch the little car days, and make the slogan 'Save the Car Days' next in importance to 'Safety First.'

"I'll be glad to get a note from any one any time, telling how you have saved a 'car day.' Am sure the assistant general manager will take time to look at such notes as I may pass along to him. And the president, too—he is never too busy to hear about a piece of good work in the line of car movement.

"After all, when you come to think of it, that's what we are all here for—to move cars; and if we move the cars the 'days' will take care of themselves."

New Railway Line for Greek Government.—Early in 1914, the government of Greece made arrangements to secure control of the railway known as the La Societe des Chemins de Fer Hellenique, and the government also entered into a contract with La Societe de Constructions Batignolles to connect that railway with the railways from the port of Salonica to Monastir and from Salonica to Scopia. It is expected that the work will be finished and the new line put in operation not later than April, 1915. The contract price for the work is $2,316,000, and plans are now being made for the purchase of the necessary locomotives and other rolling stock.

Maintenance of Way Section

In order to present a complete report of the convention of the American Railway Bridge & Building Association, which will meet in Los Angeles on October 20-22, inclusive, the October maintenance section will be postponed from the regular date of October 16, to October 23.

An interesting contrast of ideas was brought out in the discussion of the curving of rails at the Roadmasters' convention last week. The committee originally recommended that rail for all curves over six degrees should be curved. In the discussion, one member advocated curving all rails for curves of three degrees and over. Several other members opposed curving rails for curves of less than 10 or 12 degrees and some would eliminate it under all conditions. The tendency on the better maintained roads is to curve rails for curves down to three degrees, the object, of course, being to obtain a better riding track and one that can be maintained to line more easily. It is evident that curving the rails before placing them in track should promote these results. On the other hand, the general objection to this practice on the part of the roadmasters shows a serious difficulty. The objection is not to the practice itself, but is based on the difficulty of curving the rails in the field at a reasonable expenditure of time and money. Various devices have been perfected which will curve rails, but few give a sufficient output with the heavy sections of rails and hard metal now employed. It was for this reason that the association finally decided to recommend that rails to be curved should be curved at the mill and eliminated the recommendation regarding the degree of curve at which this work should be started. The curving of rails at the steel mills will probably meet with the opposition of the manufacturers, since it will require additional and slow work on their part. It will also add somewhat to the difficulties of loading and shipping the curved rails. As an alternative, it would seem advisable for the roads to establish a power driven rail curver at some centrally located point on their lines where rails could be curved for particular locations, as desired. With the necessity for continually increasing standards of maintenance, the curving of rails is to be desired, and the problem is how to do this economically and expeditiously.

The Curving of Rails

It would appear unnecessary to suggest that if any device or material is considered of sufficient merit to warrant a test of it being made, such test should be conducted in such a way as to secure the greatest amount of comparative information. Observation shows that this often is not done. A new type of crossing is inserted at a single intersection where there are little or no data regarding the life of former crossings, and where there is no opportunity of comparing the life of the new crossing with that of others carrying the same traffic under the same conditions. Again, a curve is laid entirely with rails of a new composition, and an attempt is made to compare the results secured with those of standard rails laid on another curve several miles away with different conditions of grade, curvature and traffic instead of laying half of the curve with the experimental rail and the remainder with the standard material. In selecting a location for a test it is also advisable to choose a place where conditions are severe to secure an accelerated test in order that the results may be made known at an early date. For this reason it is better, for instance, to place experimental rails on curves of high degree rather than on tangent. If a material or device gives indications of possessing considerable merit it is of as much advantage to the railway as to the manufacturer to determine this fact, and both should co-operate fully in the conduct of the test. When the manufacturer furnishes the material, frequently at or below cost, in order to have the test made, it would seem only fair that the road should co-operate to the extent of placing this material where the most comprehensive results may be secured. Manufacturers frequently complain that this is not always done. Where this condition exists the difficulty commonly arises from the fact that the man who authorizes the test and arranges with the manufacturer to secure the materials turns them over to his subordinates to install with very incomplete instructions and pays little or no further attention to them. Not knowing the purpose of the test, and taking very little interest in it, the subordinates frequently place the materials where they will require the least expenditure of energy on their part, regardless of the purpose of the test.

More Care in Conducting Tests

FIXED DATES FOR SEASONAL MAINTENANCE WORK

THE suggestion is made in one of the papers on handling material, published in this issue, that economy could be promoted by fixing certain dates for some classes of maintenance work that are seasonal in nature and requiring all foremen to attend to such work at the specified time. The author had in mind particularly classes of work requiring large quantities of material, and that the plan he suggests would enable the store department to carry a minimum stock of such material except immediately in advance of the date specified, when a heavy demand could be anticipated. The regular stock of crossing planks, tie plates, bolts, fencing material, etc., could be considerably reduced the rest of the year with a resulting saving in interest on the investment in such stock.

In addition to this advantage the suggested practice has another strong point in its favor which alone has warranted its use to some extent. On one eastern road a general order is issued each year to all section foremen that the right of way must be mowed during a certain week. The considerations which first prompted this order were the desirability of insuring the cutting of all weeds at the time when their propagation would be at least partially arrested and of maintaining a uniform appearance along the line, particularly just before the early fall inspection. Experience has shown, however, that the absolute check provided on the performance of each gang on that particular work is one of the most important advantages of this system. Foremen who are poor organizers and who, as a result, waste considerable time in changing from one job to another and moving around over their sections are forced to apply themselves diligently to the one task until it is completed. By this means a direct comparison between different gangs is afforded, due allowance being made for differences in conditions on the various sections.

The same advantage would be gained in handling other maintenance work seasonally as in mowing the right of way, and in so far as this system is applicable it would tend to attain the same end as the equating of track sections which has been tried to a limited extent on some eastern roads. This consists in the establishment of some unit by which the performance of section gangs can be measured, a thing highly desirable inasmuch as the determination of a unit should be the first step in any attempt to increase the output of laborers.

PERMEABILITY OF CONCRETE

IN the design of many railway structures it is necessary to assume that water will not penetrate a concrete slab or wall. To secure this condition of impermeability reliance is sometimes placed on the impermeability of the concrete, in other cases slacked lime, alum, or some other ingredient is added to the mixture, and in probably the majority of cases a coating of some waterproofing material is spread on the surface. In most solid floor bridges, arch structures and foundation walls below the ground-water level it is considered necessary to adopt the latter method, although for retaining walls, buried abutments, etc., opinion seems to be divided between three general views. The first is that no provision need be made for excluding water, concrete mixed in the usual proportions and in the usual way being impervious enough; the second, that extreme care should be taken in removing the water pressure by laying porous material next to the concrete and by placing blind stone drains or tile lines leading to weep holes at frequent intervals; and the third, that the entire surface exposed to the water should be carefully waterproofed and ample drains also provided.

The application of waterproofing coating to a concrete surface adds materially to the cost, and some are questioning whether an equal degree of imperviousness could not be secured at less expense by paying more attention to the quality of the concrete. It has been demonstrated repeatedly that watertight concrete can be made, a notable example being the concrete water tank on the Baltimore & Ohio, in the construction of which a 1:1⅞:3½ mixture was used, slacked lime was added in mixing, and the entire inner and outer surface was coated twice with a cement coating. Little data is available as to the amount by which the cost of concrete is increased in making it impermeable. While it is evident that the elaborate precautions taken in the Baltimore & Ohio tank work would be prohibitively expensive for structures in which a degree of permeability is less objectionable, the experience of many engineers leads to the belief that at least in many cases, a slight increase in cost to secure more careful proportioning, mixing, placing and curing of concrete would be more than repaid by its impermeability.

In general, it has been recognized that a rich mixture and wet mixing decrease permeability, but there has been a lack of definite data to guide men in the field in attempting to place concrete that would not require waterproofing. Tests along this line have in the past been concerned chiefly with neat cement and mortar. A series of tests now under way at the University of Wisconsin are the basis for a number of interesting conclusions in a paper by Morton O. Withey, read before the Western Society of Engineers on September 14, covering the degree to which ordinary gravel concrete can be made to resist the passage of water and suggestions for increasing its resistance to.

As to the most suitable mixture, a 1:1½:3 by volume was shown to be very impervious, although in nearly all cases the mixtures of 1:7, or richer, showed a rate of flow for a 50-hour period under a head of 40 lb. per sq. in. less than 0.0001 gal. per sq. ft. per hr., which is negligible for ordinary structures. It is, of course, to be remembered that for many cases other objections in addition to the cost could be advanced against the rich mixtures, and the author mentions the fact that a rich mixture is subject to greater changes in volume under alternate wetting and drying, necessitating added provision for reinforcement and expansion joints. The tests also showed that the permeability of such concrete can be decreased by grading the sand and gravel to reduce the voids, by increasing the fineness of the cement for 1:9 mixtures, by mixing the concrete longer than is customary, with a short period of dry mixing of the aggregate before the water is added, and by exercising more care in the curing of the concrete.

When a graded mixture approaches the theoretical curve of minimum voids, the concrete is practically watertight under pressures up to 40 lb. per sq. in. The best results with 1:9 mixtures were secured when the mixer with a rate of 30 r. p. m. was run at least 1½ to 2 min. For richer mixtures 1 min. seemed to be long enough.

THE OPPORTUNITY OF THE ROADMASTERS' ASSOCIATION

THE convention of the Roadmasters' Association, held last week in Chicago, was one of the best in the history of that organization. While it did not equal that of last year in point of attendance, the discussions and reports were equal to those of any previous meeting.

This association has made a very gratifying growth during the past three years. But, while the active membership has now passed 800, it includes only 40 per cent of the roadmasters of the country, exclusive of their assistants. No association has a more important field for study and the exchange of ideas. Over $350,000,000 is spent annually for maintenance of way and structures. Over $225,000,000, or 60 per cent of this amount, is spent under the direction of the roadmasters. In other words, the average roadmaster is responsible for the proper expenditure for labor and material of over $100,000 annually. It is to study of the application of these large sums that this association is devoted.

The comment is sometimes heard that the Roadmasters' Association is no longer necessary since the formation of the American Railway Engineering Association, and that its work is being done by the latter association, resulting in unnecessary duplication. However, a glance at the reports of these two associations will show that there exist the same distinct fields for association work that are to be found in the railway organizations themselves. The activities of the two organizations should be correlated but not conflicting. With the many important problems now confronting the maintenance of way department, there is a demand for all the constructive work each association can do without duplicating the work of the other. In planning committee work for the year, the officers of these and other maintenance associations should bear this point in mind, since all of them are working to the same end, that of promoting the efficiency of maintenance of way work. For this reason it would have seemed advisable for the committee on Track Accessories not to have attempted to recommend definite dimensions for frogs and tie plates, since the American Railway Engineering Association has already adopted complete specifications and designs for these materials, and especially since this report was prepared without considering these other designs and is in conflict with them. On the other hand, reports on such subjects as The Laying of Rail, The Organization of Forces, and The Policing of Right of Way, are distinctly within the province of this association, as they discuss problems with which the roadmaster is continually confronted. There is a wide field for the Roadmasters' Association in the investigation of economical maintenance methods and organization in the track department. More money is spent for track labor than for all track material, and it is in the study of means for economizing in the use of this labor that the greatest opportunity of the Roadmasters' Association should be found.

BRIDGE AND BUILDING CONVENTION

The next convention of the American Railway Bridge & Building Association will be held at the Alexandria hotel, Los Angeles, on October 20-22, inclusive. Committee reports will be presented on Ice Houses and the Preservation of Ice for Railway Service; Warning for Overhead and Side Obstructions; Railroad Crossing Gates, Towers, etc.; Reinforced Concrete Bridge Work; Station Buildings for Passenger Service; Mechanical Coaling Stations; Care of Traffic While Constructing Bridges to Eliminate Grade Crossings; Water Supply; Concrete Culvert Pipe and Piles; Heating, Lighting and Ventilating Roundhouses and Shops, and Concrete Posts, Poles and Signs.

From present indications a large number of members are planning to attend. For the benefit of those going from Chicago and east, arrangements are being made by the secretary, C. A. Lichty, C. & N. W., Chicago, for special cars going via the Santa Fe with a stop at the Grand Canyon en route. Sufficient reservations have already been made for two cars and it is probable that a third will be required.

The Roadmasters' Thirty-Second Annual Convention

An Abstract of the Committee Reports and Discussions at the Meeting Held Last Week in Chicago

The thirty-second annual convention of the Roadmasters' and Maintenance of Way Association of America was held at the Auditorium Hotel, Chicago, on September 8-11, inclusive. While the attendance did not reach the previous high record established last year, the convention was more than usually successful in point of interest and value of the discussion to the members, while the exhibits of the Track Supply Association were more numerous and representative of maintenance of way materials than at any previous convention.

Over 225 members were present, the average length of railway service of these men being 28 years.

The convention was called to order by President T. F. Donahue (B. & O.) at 10:30 Tuesday morning, and was opened with invocation by Past-President A. M. Clough. The association was welcomed to Chicago by Mr. Mathias, corporation counsel, speaking in behalf of the mayor; by R. H. Aishton, vice-president, Chicago & North Western, and by Walter Allen, president of the Track Supply Association. In his remarks Mr. Aishton particularly emphasized the importance and responsibility of the track department in the efficient and economical operation of the railways, stating that over $1,100 was spent for labor and almost $900 for materials every minute by the track departments of railways of the United States. Past-presidents T. Hickey (M. C.); J. A. Kerwin (C. P. & St. L.); James Sweeney (C. & E. I.); T. Thompson (A. T. & S. F.); A. M. Clough (N. Y. C. & H. R.), and W. Shea (C. M. & St. P.), spoke on various activities of the association, emphasizing the value of the association in general, and particularly the discussions to track men.

The officers of the association for the past year were: President, T. F. Donahue (B. & O.); first vice-president, C. H. Gruver (C. R. I. & P.); second vice-president, B. C. Dougherty (C. M. & St. P.); secretary and treasurer, L. C. Ryan (C. & N. W.). The reports of the officers reflected the healthy condition of this association, 170 new members having been received during the past year, the largest number for any similar period in the history of the association, while the total membership now exceeds 800. The financial statement was equally encouraging, the report of the treasurer showing a balance of $1,075 on hand.

The following committee reports and discussions were presented at the four days' sessions:

NEW AND IMPROVED TRACK TOOLS

During the last 20 years, our track has increased in weight 37 per cent. With this increase in weight of track the unit load hauled over it has in some instances increased over 300 per cent, which in turn has increased our work proportionately. When we had light rail and few ties to the rail, four or five men could line track. Today it takes six or eight and sometimes more. In maintaining the track under light power it was only necessary to go over the track twice during the summer and it was in good shape; today under heavy power if track is maintained as good as formerly it has to be re-surfaced almost continuously. Accordingly it is plain that if our work is as nearly complete at all times, as it should be, it would require twice the number of men now apportioned for each mile of track.

In order to diminish the necessity of putting on this many men we urgently recommend the more general adoption and installation of power driven machinery and tools for all kinds of work pertaining to the building and maintaining of tracks.

Section Motor Cars.—The use of section motor cars is considered by the committee an important development toward increase in efficiency. There have been diverging views existing among some railway men concerning the advisability of installing motor cars on sections and while their use may not be equally advantageous on all territories it is evident to the committee, after careful investigation and actual experience by some of its members in the use of these power driven cars, that there is absolutely no doubt of the economy and advantages in their use as the following illustration will show:

Price of one hand car	$36.00
Labor cost to run hand car 12 mi. per hour, 5 men and foreman	$0.0906
Depreciation and wear of car	.0006
Total	$0.0912
Motor car	$200.00
Fuel, including repairs, per mile	$0.0173
Depreciation and wear of car per mile	.0034
Men's time, including foreman, riding on car 20 miles per hour	.0505
Total	$0.0712

This is a saving of $0.02 per mile in favor of the motor car.

In view of the above facts, we recommend the adoption of motor cars instead of hand cars, on the same basis of foremen and men now allowed, as experience shows that greater efficiency and long hours of work are secured and men are more easily obtained on sections where they now have been installed, and, therefore, their adoption will help to a certain degree to increase the amount of work accomplished per day per man.

Ballast Cars, Unloaders and Spreaders.—In the handling of large quantities of ballast or waste material on improvement work, the use of specially designed unloaders and spreaders is recommended.

Rail Handling Machines.—There are a number of these machines now on the market and we do not feel that any certain make ought to be recommended as the local conditions should be the main factor in deciding the design most suitable. In order to prevent tieing up too much capital in machinery, machines suitable for different kinds of work should be adopted. Where heavy ditching has to be done in the spring and autumn, machines that can be utilized for ditching and handling rail should be assigned, while in territories where ditching is very light machines operated by air seem to answer the purposes more suitably, but under all conditions rail should be handled by power driven machinery, as this kind of work can be done at a cost of 50 per cent less by power than by manual labor.

Rail Benders and Curvers.—We recommend that when we find it necessary to curve the rail, it be done at the mill. We also recommended the use of the lightest rail bender that will kink the rail used.

Rail Laying.—The relaying of rail is one of the big jobs we all have to contend with during the summer. It requires a large force of men at the present time and, no doubt, even larger ones in the future as all our work has to be done in such a manner that there shall be no detention to traffic. Accordingly it can easily be seen that more or less time must necessarily be lost while the gang is waiting on trains. If, however, machines were substituted so that rails could be laid with a smaller force, a great saving in the cost per lineal foot of track laid would thereby be obtained. There is now on the market a machine known as the "three men" track layer that has been tested and approved by practical track men. We recommend the general adoption of such labor saving devices.

Snow Handling Machinery.—Keeping the track, particularly the switches and interlocking apparatus, in a serviceable condition during severe snow storms, constitutes a heavy item of expense on the railroads of the northern states. Large size snow plows are indispensable in cold climates, the rotary plow equipped with flangers proving most satisfactory. All snow car equipment should have the flangers operated by air.

In busy and complicated yards and terminals where train movements are frequent, it is a physical impossibility to keep the switches in an operative condition by the hand method of

cleaning. The unskilled laborers hired to assist in such emergencies do not and cannot understandingly perform the duties required of them. Therefore, any labor saving appliance that will minimize the danger to the men and effectually keep switches in operation should receive earnest consideration.

From experience it has been found that the method of cleaning snow from switches by chemicals is more effective than any other. The switches, intricate mechanism of interlocking, etc., in busy yards by this method are kept in working order by the regular, experienced forces during the heaviest snow storm. This method consists in melting the snow by pouring the chemical upon it. It is applied to switches by hand distributing cans which hold about 3 gal. The cans have a long spout of ⅜-in. pipe and a valve. The opening at the end of the spout is 1/32 in. diameter and the spout is wrapped with asbestos for several inches from the end. This method is very efficient in removing snow from the intricate mechanism of interlockings, switches, slip crossings, etc. It is estimated that the efficiency of a man at interlockings is increased 200 to 300 per cent by using the chemical cleaning method.

Ditching Machinery—The thorough draining of road bed is the first and most important thing to be done in order to obtain good track. To obtain this different methods have been used, but practically all of it is done by manual labor. This is a slow and expensive process, especially when trains are frequent and work trains have to spend most of the time in sidings.

Suggestions have been made to do the ditching by the use of wheelbarrows and ditching cars. This can be done to good advantage if ditching is done to a side cut or short through cut where material removed can be wasted at the end of the cut over an adjacent embankment, provided there is no place in the vicinity where the road-bed does not actually need to be strengthened. In most cases the roads that have heavy ditching also have very narrow fills. Therefore, material should be hauled to these places and the ditching should be done by machinery, in order that the biggest quantity that possibly can be moved in a short time will be removed from cuts while the work train has the main track. There are on the market for this purpose several machines, all of which are good.

Miscellaneous.—Under this head almost every tool used in maintenance work could be mentioned. In passing we might speak of lining jacks, ratchet track wrenches, tie adzing and boring machines, appliances for drawing screw spikes, etc. There is also a possibility of installing pneumatic tools in our department. In nearly every yard of any size on all railroads, air power is distributed for the use of the motive power and car departments. When air will drill steel plates on cars and engines, why can we not drill rails? When air will drive rivets, why can it not drive spikes? When air will lift cars and engines, why can it not be utilized in jacks for lining tracks, etc.?

J. W. Dahl (N. Y. C. & H. R.) Chairman.

Discussion.—In opening the discussion, the chairman stated that in throwing track, men will ordinarily be distributed at intervals of 2 ft. along the track. A 2-ft. section of track weighs 182 lb., while the resistance against throwing laterally is 10 times this amount or 1,820 lb. The average man can lift his own weight, or 142 lb. With a lining bar he can lift four times his own weight or 568 lb. He also deprecated the tendency to install motor cars as a substitute for section foremen, stating that the foremen have all they can do and that increasing the length of sections adds to their duties and decreases their supervision and efficiency in direct proportion.

In discussing the benefits derived from the use of motor cars, M. Donahoe (C. & A.) stated that he did not believe motor cars would make as great mileage during their life as hand cars. He also called attention to several types of engines which can be attached to hand cars at an initial expenditure considerably less than the $200 referred to in the committee report. W. F. Muff (A. T. & S. F.), stated that while he has several such cars on his sections, his company does not allow the men to purchase their own cars, but that if they are considered advisable, the company purchases the engines and mounts them on the hand cars. Other members stated that their roads allowed the men to purchase their own engines and mount them on the hand cars if they desired.

P. J. McAndrews (C. & N. W.) believed one of the obscure benefits he has secured from motor cars lies in the fact that while it has not been practicable for him to reduce his forces with the adoption of motor cars, he has been able to avoid the necessity of increasing forces during the past two years in spite of the continually decreasing efficiency of labor. While unable to show exact figures, he believed that on sections employing seven or eight men, motor cars effected a saving of one man in each gang.

J. Buel (Ark. Cent.) stated that he has used motor cars for five years, eliminating alternate sections. The hand cars were kept for use when the motor cars were in the shops for repairs, but it has been found that whenever a gang was required to go back to the hand car, the laborers left. J. P. Corcoran (C. & A.) also stated that his laborers tend to move from sections equipped with hand cars to adjoining sections supplied with motor cars and that he has no trouble keeping these latter gangs to their desired quota. On the other hand, W. F. Muff stated that the Mexican laborers employed on his division complain about the increased hours of labor now spent on the track where motor cars are used.

The consensus of opinion was that motor cars should be strongly recommended, but that no sections should be eliminated. Some opposed their use on lines with many curves or heavy traffic, while others reported using them safely on such lines. L. C. Ryan stated that during June and July, 1914, the North Western paid $35 per minute for track labor. If the motor cars saved only 20 min. per day for these forces the economy is evident.

In the discussion of rail handling machines there was a diversity of opinion regarding the type best suited for different conditions. D. O'Hern (E. J. & E.) stated that he uses a locomotive crane with a magnet in loading scrap, this machine picking up twelve 33-ft., 100-lb. rails at one time. It is also used to pick up angle bars, bolts and spikes. It is used principally in yards where the ordinary air or steam-operated rail loaders are too slow.

There was also a wide diversity of opinion regarding the necessity for curving rails. The committee report originally advocated curving all rails for curves of 6 deg. and over. T. Hickey (M. C.) advocated curving all rails for curves over 3 deg., stating that he has found that rails properly curved will stay in line as well as on tangent. D. O'Hern, H. Van Gorder (C. & N. W.); M. Burke (C. M. & St. P.), and others opposed the curving of rails for all curves less than 10 deg., believing that money so expended is wasted and that the necessity for curving rails for such curves has disappeared with the gradual change in the practice of laying rail with broken rather than square joints. It was finally voted to amend the report to recommend that where necessary to curve rails they should be curved at the mills.

C. King (L. I.) and A. M. Clough (N. Y. C. & H. R.) described the operation of a type of tie tamping machine, 12 of which are now in use on the New York Central. This machine is mounted on a push car, is self-propelled and is driven by a gasolene engine operating an air compressor. It works similarly to a riveting machine with two tampers having a stroke of about 1½ in. This machine requires two men to operate it and will tamp 350 to 450 ft. of track per day, replacing 10 men.

PROPER METHOD OF RAIL RENEWAL

The roadmaster or supervisor of track who is in immediate charge of a division should be the one to recommend when rail should be renewed. He sees it under all conditions; sees it either too light or gradually deteriorating under traffic, and knows from year to year just how much more difficult and expensive it becomes to maintain it. The question of the weight of the new rail to be laid should be determined by the chief en-

gineer or other official conversant with the probable increase in traffic or tonnage or acceleration of speed contemplated over that district which is not always known to the man in charge of the track.

Rail should be laid as early in the spring as possible, weather and other conditions permitting. It should be furnished from the mills on flat cars when practicable and all full length rails should be loaded separate from short lengths.

Rails loaded in gondola cars should be unloaded with a power unloader operated by air or steam as provided. Rail can be unloaded with skids from the side of the car or by pulling them off from the ends of cars with an incline arrangement to permit the rail to reach the ground easily, the main object of all concerned being to use care so that rail will not be injured while being unloaded.

Rail should be laid with broken joints. In laying rail around curves, rails cut from 6 to 12 in. shorter at the mills should be used on the inside of curves so that a joint on the inside rail would never get more than from 3 to 6 in. ahead of the center of the opposite rail until a short rail is put in. Any extra effort to keep joints properly broken is fully repaid in the proper spacing of ties on curves, one of the most vital points.

Rails shorter than the standard lengths should be marked green on the ends, except those cut special for curves, which should be marked red. All second quality rails should be marked white. Full length rails, of course, do not need to be marked.

Where conditions permit rail should be laid in track one rail at a time and great care should be used to see that they are not bumped against the last rail laid in. Proper expansion shims should be used to keep the rails the right distance apart according to the weather conditions. The shims should be made of hard steel. Rails of the same width of base should be laid from the inside which will permit the ties to be adzed and rail set up level without interfering with outside spikes, and all bad spikes should be renewed.

If a rail with a wider base than existing rail is being laid, one rail should be laid from the outside and one from the inside with the same care in adzing ties so that the wheel will tread the full width of the head of the rail as in laying from the inside. The track should be put to true gage when the rail is laid.

When the proper tables for expansion are not given the tables recommended by the American Railway Engineering Association should be used. This table is herewith given with a slight variation:

20 deg..... 5-16 in.	80 deg..... 1-8 in.
40 deg..... 1-4 in.	100 deg..... 0 in.
60 deg..... 3-16 in.	

No rail should be laid in temperature below zero.

A foreman laying rail should be provided with a thermometer to enable him to know what the temperature is and to use expansion shims accordingly and he should also have a steel tape-line to check frequently the positions of his joints and understand the importance of keeping the joints uniformly broken, without which uneven spacing of ties between joints and unsightly and improperly laid track will result.

Three or four bolts in a joint, properly tightened up during the day while laying operations are going on, are sufficient to permit traffic to go over, but all joints should be full bolted and bolts made reasonably tight and all spikes driven down before quitting work at night.

The practice of using switch points to make temporary connections while laying rail is gradually losing favor and the safer way of having compromise joints made to fit both sections of rail that are being handled is recommended, having in mind, of course, to do the least cutting of full length rails possible. The foreman should carry forward with him the portions of the first cut rail and while laying rails longer than the existing rails or where rails run away from the old location of joints, he can always make his closure where a shorter rail will answer until the full rail is used up.

As the proper expansion between the new rail being laid nearly always varies from that being taken out, rails should be laid without regard for holding the joints on the old joint ties and enough rail anchors used to hold it from creeping until the ties are spaced and the joint ties properly spiked. It is also recommended that a sufficient number of rail anchors be used permanently, according to conditions, to keep the rail from creeping, the idea being that in the past too much was expected of the only way we had of holding the rail, viz.: the slots in the flanges of the angle bars.

Ties should be spaced as may be required and all defective ties renewed and track properly surfaced, gaged and lined as soon as possible after the rail is laid. All bolts should be tightened to as near the same tension as possible—a most important feature in getting the best results from new rail, as nothing so effectually destroys or nullifies the good work of a foreman in getting rail laid with the proper expansion than to have some joints tight and some loose, the heat or cold always pulling the rails apart or closing them up where there is the least resistance. No poor spikes should be redriven.

In handling relayer rail the same general methods should be used; in addition care should be taken not to relay any poor rail or worn out joints. The proper place and time to guard against this is when the rail is being removed from track; flaws are easier detected then and the condition of joints is more readily seen.

Rail laid near depots or water stations where trains stop and start will be worn down more than out in the open and this rail should either be kept together or culled out entirely. All good rails from one side should be loaded on the same cars and as near in rotation as possible and unloaded the same way, so as to put the rails back in as near the same relation to each other as possible.

Great care should be exercised to see that rail is properly in place. When a new rail is laid where an old joint was slightly low, it should be tamped or blocked up to prevent it being surface bent by the first train over it.

There are many other details that the foreman who is considered capable of handling a rail gang will see to of his own accord. The organization of his gang, the rules of flagging, the time of day to run rail and the amount that can be well and safely laid, can reasonably be left to him and the prime object should be, not how much can be laid, but how much can be well laid and with the least interruption of traffic or anxiety to the officers who are immediately responsible for its proper laying and maintenance and with the results that the higher officials expect from the money expended.

The following is an outline of an arrangement of a steel gang of 58 men:

Two men, one flagman in each direction at all times when gang is at work; two men, taking up and putting down crossings and handling insulated joints; one man, with hand car, handling tools, switch point, rail bender, etc.; four men pulling spikes; three men throwing in old rail; ten men adzing ties; twelve men lifting in new rail; two men barring in new rail; two men spiking joints and quarters; four men spiking; one man adzing ties for new joints; six men or more putting on new joints and wrenching; one man removing expansions shims; four men throwing out old rail; one man carrying water; one foreman of the gang; two assistant foremen, and one time keeper.

A. M. CLOUGH (N. Y. C. & H. R.), Chairman.

Discussion.—The extent to which rails should be allowed to wear before being renewed aroused discussion. Several members stated that rail worn out is evidenced by the increased cost of maintenance to keep the track in proper condition and also by the increase in the number of breakages. There is no rigid line of demarcation between safe and unsafe rail. J. P. Corcoran (C. & A.) called attention to the economy in transferring rail from main to branch lines before it has been entirely worn out in main line service, the effect of this being to decrease the cost of maintenance on both main and branch lines.

In reply to a question, Chairman Clough stated that one important advantage of laying rail in the spring is that the more

uniform temperature enables the rail to be laid with less difficulty from expansion. It is also possible to get more work from a gang of men at this season.

To expedite the unloading of rail along the track, J. P. Corcoran stated that he has transferred rail from coal cars to flat cars with a rail loader in a yard at a cost of $2.10 per car. W. Shea (C. M. & St. P.) defended the shipment of rails from the mills in stock cars as practiced on many western roads, because of the ultimate economy to the railroads in reducing empty car mileage. He also stated that he would rather load released rail into stock cars than on flat or gondola cars as there was less danger of injury to the men.

G. H. Prentice (L. S. & M. S.) stated that he has found difficulty in preventing the tongmen from bumping the adjacent rails and closing up the expansion so he leaves several shims between the last rails laid. A. M. Clough stated that he avoids this by setting the rail on the ties close to the old rail and moves it laterally into its final position.

In discussing which line of spikes should be removed, W. Shea stated that he has found ordinary spikes on the outside of the rail to be badly corroded and cut whenever the rail required renewal and he did not believe it advisable to allow such spikes to remain in the track. He advocated pulling all spikes, which is, of course, necessary when tie plates are used.

While it was the general opinion that rails should be laid singly as recommended by the committee, M. Griffin (C. R. R. of N. J.) stated that on his subdivision it is impossible to secure the use of the track to exceed 15 to 30 min. at a time. Under these conditions he bolts up 100 rails on the ends of the ties, bonding all but the last joint and throws this stretch in at one time. On curves he places 25 to 30 rails in a string. Expansion is maintained by holding the shims in position until the rail is in place and spiked.

The original recommendation of the committee that ties should be spaced immediately after the rail is laid, aroused a vigorous discussion. L. C. Ryan (C. & N. W.) stated that he had recently examined a New York Central track where care is taken to secure a supported joint. He had also studied the Pennsylvania track where a suspended joint is used and had gone over the Lehigh Valley track where either suspended or supported joints are used without the spacing of ties and found that all this track rode well. He therefore questioned the necessity of spending a large sum of money to secure a standard spacing of joint ties. W. Shea stated that anchoring the rail to the joint ties loosens these ties and mainly for this reason, the St. Paul has abandoned slot spiking the joints and the spacing of joint ties. They have found that rail can be fully anchored on intermediate ties, although this requires a special joint tie plate. With these tie plates he has found that rail can be laid and maintained on single track much cheaper than where the ties are spaced. P. Madden (C. M. & St. P.) stated that he had found the same results on double track. Other members spoke of the practice of the Michigan Central and Lake Shore along the same lines, the former road having abandoned the spacing of ties when laying rail on some divisions for the past three years. While other members strongly opposed this practice, the association decided to amend the report as printed above.

The original recommendation of the association that rail in double track be laid in the direction of the traffic was also attacked. M. Donahoe (C. & A.) stated that he had found that rail could be laid better against the traffic. A. M. Clough stated that on the other hand, when laying rail with the traffic on a road equipped with block signals, there was less danger of a train running into open track. W. F. Muff (A. T. & S. F.) stated that until this year it had been his practice to lay rail with the traffic. During this season he has laid rail against the traffic and finds that it creeps less. He also believed that there was less danger of accidents when using point connections. T. Thompson (A. T. & S. F.) and P. J. McAndrews (C. & N. W.) stated that they are able to maintain the expansion better when laying rail against the traffic. A. E. Muschott (E. J. & E.) stated that he has laid rails both ways and could see no difference in the results. M. Griffin (C. R. R. of N. J.) stated that it is the practice on his road to lay rail with the traffic. No switch points are used at connections but rails are cut as required, and it has been found that when laid with the traffic the new rail is not battered at these connections.

PROPER ORGANIZATION AND ECONOMICAL USE OF LABOR AND MATERIAL

Additional supervision has been provided in all other departments of our railways as the need became apparent, but on many important roads we find today practically the same scheme of track organization as existed as much as 40 years or more ago. It would seem the time has arrived for careful consideration of the needs in the track department for such supervision as will guard against waste.

Under the organization in effect on some lines, where the division superintendent has the division roadmasters or supervisors immediately under him, it is thought that some measure of efficiency is lost because often the superintendent is not familiar with track matters and especially so during the early years of his experience as superintendent before he has had opportunity to study and absorb some of the essential principles of track maintenance.

Each division has a master mechanic under whose direction road foremen of engines, traveling foremen and various inspectors are employed to supervise the men and machinery, a master car builder whose business it is to keep the cars in condition to handle the traffic, trainmasters and their assistants to instruct and direct trainmen, each of those mentioned being a specialist in his line. There should therefore be an experienced trackman at the head of the track department on each division whose knowledge properly applied would enable his company to get maximum results from all money expended for material and labor used in track maintenance.

No plan of organization can be worked out that would exactly fit conditions on all railways nor perhaps on all divisions of any large systems, but the following proposed plan with modifications might be found suitable for many of the principal lines with heavy or medium traffic.

Division Superintendent or Division Engineer.
Division or General Roadmaster.
Roadmaster or Supervisor.
General Foreman.
Extra Gang Foreman.
Section Foreman.
Student Foreman.
Laborers.

A general roadmaster should have jurisdiction in the same district as his division superintendent. On heavy divisions, roadmasters should have districts not exceeding 50 miles of double track or 100 miles of single track while on lighter divisions through prairie country 125 miles should be the maximum length of district.

All records should be kept at the office of the general roadmaster and the district roadmasters should only conduct such correspondence as may be necessary to direct the work of the foremen, a sufficient force to be employed at the office of general roadmaster to keep the necessary accounts showing expenditures for material and labor with correct distribution thereof to the various prescribed divisions of charges. Through the elimination of office work, the district roadmaster would be in a position to spend the greater portion of his time out on the line among his foremen and laborers, giving the personal supervision and instruction which is essential to efficiency.

A general roadmaster should exercise supervision over his assigned territory, carrying out the policy of the management, distributing to his district roadmasters, necessary material and making such allowances for labor on the various districts as conditions warrant, placing the material and labor to the best advantage. Necessary general instructions to roadmasters should be issued from his office, proper data for cost records should be secured and worked out to determine the efficiency of those employed under him and a careful survey should be

made of conditions on the various roadmasters' districts at frequent intervals.

All pay rolls, vouchers, requests, etc., should be carefully scrutinized and a system of checking be adopted to insure the accuracy of all time rolls.

District roadmasters should devote their entire time to the supervising of the work being done by the various extra gangs, section gangs or other crews employed in track work on their districts, looking after all material to avoid any waste. They should carefully watch the work done by all foremen and promote the most efficient men to better positions as opportunity is presented.

General foremen should report to the district roadmasters working under their instructions, spending such amount of time with the various extra gang and section foremen as will secure maximum results in safety and efficiency and should pay special attention to the instruction of foremen with least experience.

Extra gang and section foremen should render all accounts of material and labor to general roadmasters and work under the direction of the district roadmaster and the general foreman.

Student foremen should work on the section or extra gangs under the immediate direction of the foremen and be given instruction and opportunity to become familiar with the work, so as to fit themselves for promotion to the position of foreman.

The maximum length of sections should be 3½ miles of double track or 6 miles of single track, and where a number of sidings or yard tracks are included, the length of sections should be reduced correspondingly.

Forces should be assigned to the various sections based on the number of miles of main track, miles of sidetracks, industry tracks, interlocking plants, extent of station grounds, number of highway or street crossings, etc., on each section. The number of laborers that should be assigned to sections, depends largely on the physical characteristics of the line, the amount of traffic handled and the degree of excellence or refinement desired by the management.

Thus far organization has been discussed only as it pertains to supervision, but unless the standard of track laborers can be raised, all efforts to increase the efficiency of the supervising officials will amount to but little. In order to compete with other industries in securing laborers, a reasonable rate of compensation should always be paid with an "all year round" program of work for extra as well as section gangs, and the majority of laborers should be retained in service continually.

The general practice at present on most systems is to reduce section forces to the minimum and dispense entirely with all extra gangs about the time of the first frost and tie up track maintenance until the following May or June. This practice of all the railways trying to do their year's work in a few months creates an abnormal demand for labor during the short season and makes necessary the payment of much higher wages than would be the case if men were steadily employed and the work spread out over the year. The cost of additional supervision recommended above would be more than saved if the men were kept all the year round as in this way a great many local laborers could be secured for section and extra gangs, dispensing with the inferior class of foreign laborers that must be used during the short season of track work.

Where it is necessary to use foreign laborers, good facilities for the men should be provided, with necessary attention to sanitary conditions and an endeavor should be made to educate the foreign laborers in a manner that will result in their becoming better citizens.

It is suggested that an all year round program of work would result in a reduced cost of material, such as rails, fastenings, tie-plates, rail anchors, frogs, switches, etc., for the same reasons that economies for labor could be shown. A more uniform demand for materials would enable the various mills and foundries to produce a more regular output, thus employing a nearly uniform force of men steadily rather than increasing their output spasmodically during the summer months as at present. If this improved practice would not result in a reduced price for track supplies, it would at least tend to improve the quality. General roadmasters with a program of work covering all or nearly all the year would be in a position to give the stores department advance notice and get materials in such quantities and at suitable times to avoid accumulation of large stocks.

P. J. McAndrews (C. & N. W.), Chairman.

Discussion.—The discussion was devoted mainly to that portion relating to the proper length of roadmaster's and section foremen's territories. It was generally agreed that these present limits are too great for best results and that the recommendations of the committee, if followed, would improve conditions. The committee's suggestion that a general roadmaster be appointed on those divisions with three or four roadmasters, also met with general approval, the advantage being pointed out that this general roadmaster could so correlate and distribute the work of the different roadmasters on the division to secure the most economical operation of work trains and extra gangs and the distribution of material. C. King (L. I.) described the practice of his road of employing track forces on a yearly basis, which was described in the *Railway Age Gazette* of October 24, 1913, and March 13, 1914.

PROPER TYPE OF TRACK ACCESSORIES

Rail-Joints.—A plain four-hole angle bar joint, 24 in. long, with sufficient weight and proper distribution of metal, in accordance with the rail section it is applied to, to best resist deflection, is recommended. The bolts for 90-lb. rail section should be one inch in diameter, U. S. standard thread, with a good make of spring nut lock, square head tap, staggered in joint. Where traffic is very dense and heavy a separate plate is recommended. This base plate should be about ⅜-in. thick, 2 to 3 in. wider than the angle bar, turned up at ends of angle bar, and might also have a longitudinal rib under center of plate to act as a strengthener or truss for additional support under the rail ends. Base plates can be eliminated where the traffic is light.

Switches and Manganese Separable Points.—For split switches in common use the reinforced point is recommended, with length and planing in accordance with the length of lead or angle of frog it is commonly used with.

For plates we recommend a ⅝-in. Gage plates should be about 6 in. long, by 6 in. or 6½ in. wide and not less than 9-16 in. thick, insulated where necessary and turned up at each end to form a shoulder for a rail brace. The slide plates should be at least 9-16 in. thick, 6 in. wide and 12 in. long for plain plates and 20 in. long for brace plates with a riser three to four inches in width, rolled or planed and a shoulder for a brace to be applied against. This brace should be a separate part of the plate punched and fitted to spike through the brace and plate. These plates should be on every other tie from the gage plate at switch point to heel of switch, every other plate to be plain. Special tie plates without braces should be used commencing with the joint tie at heel of switch and extending some four ties from the heel of switch to a point where the regular tie plates can be applied. These long special plates should be properly spike-punched for the road's standard turn-outs, the spike-punching for turnout rail to be made large enough to care for a ⅝-in. variation in line.

For a heel joint, it is recommended that a 20-in. cast heel block filler be used. It should be made to fit snugly between the joint and traffic rail, bolted through the block filler and joint to an angle bar on the gage side of the point independent of the traffic rail. The bolt heads should be countersunk in the cast filler block so the latter will set up snug against the traffic rail, answer for a foot guard and be free from creeping of the traffic rail under one-way traffic.

For yard use, at inside switches, where work is heavy, we recommend the manganese separable switch point. The cutting or sawing off of worn points and applying the manganese point should be done at terminal roundhouses where there is a blacksmith employed and at local shops when they are not too far distant. The stock rail supporting the turnout point in switching

yards and at all inside switches should have the double kink to protect the switch point from excessive wear and to prevent the switch from being split by a wheel flange on account of a loose-fitting switch point. We do not recommend a switch point shorter than 12 ft.

Crossing and Other Frogs.—The committee recommends the solid manganese frog for crossings, other than where the traffic is light and the wear in either direction only moderate. In frogs where the inserted manganese filler is used, the common steel rail should join onto the manganese with a square cut end, and in such a manner that the track-men can renew the section of common rail should it become necessary. We also recommend solid manganese rigid frogs in all terminals, on busy switching leads, and where the Bessemer or open hearth rail would wear out in less than one year. Manganese crossings for steam railroads should be made up in two or four sections, depending upon the angle The outside arms should be made as short as possible for better service as well as saving in material.

For rigid frogs of planed "T" rail, we recommend the cast filler bolted frog with spring nut lock and square head lock nut, bolts to be of Mayaria heat treated steel. Rigid frogs of a flat angle can be used right and left hand, by having the short point on turnout side of frog, turnout rail at toe of frog to be enough longer than the lead rail, or tangent rail of frog, to square the switch points at head block when enclosure rails of same length are used between frog and switch.

Spring rail frogs should have tie plates attached in accordance with proper tie spacing, except under joint ties, at the heel and toe of frog, where special detached plates should be used, slot punched to mate with gain holes in the angle bar joints. An anti-creeping device should be used about midway between throat and joint at toe of frog. The rail for a sufficient distance back of all spring rail frogs, on one-way traffic, should be securely anchored with anti-creepers to prevent rail from crowding the frog, or wing rail of frog.

Switch Stands.—The committee recommends the automatic switch stand for use on main line switches about yards and terminals where the switch is subject to being run through, as well as to operate all busy yard or inside switches. We recommend round holes in the base of switch stands instead of square ones with the stand fastened to head blocks with ¾-in. lag screws instead of spikes. When fastened with screws an adjustable connection rod should be used.

Guard Rails and Fastenings.—The committee recommends an eight-foot guard rail, curved out at the ends to a clearance of five inches from the traffic rail. The ends of the guard rail are to be bolted through a cast filler to the traffic rail with one large size bolt (1 in. for a 90-lb. rail). This cast filler is to serve as a foot guard as well as to help hold the guard rail secure. A good make of guard rail clamp is to be applied at center of guard rail or opposite throat of frog. Tie plates should reach under both guard rail and traffic rail, slotted for spiking on outer side of traffic and guard rail. The guard rail should be planed on inner side sufficiently to permit it setting up to the proper clearance for flangeway In placing this style of guard rail, set the center of the guard rail opposite or at right angles to the throat of the frog, or just ahead of the theoretical point of the frog.

Tie Plates.—This committee recommends a wrought iron plate, 6 in. by 9 in. by ⅜ in for 5-in. 80-lb. rail, with a shoulder for the outside flange of the rail, punched for two spikes on the gage side of the rail and one spike on the outside of the rail. Tie plates should be used on all curves, on all soft wood ties on tangents as well as on curves and on all ties where traffic is heavy.

Anti-Rail Creepers.—The boltless, self-maintaining, wedge, skew, spring or clamps, in our opinion, is the best type of anti-creeper on the market.

Nickel chrome steel frog, crossing and track bolts, screw spikes, and the "frictionless" rail were also discussed at length in the report

M. Donahoe (C. & A.), Chairman.

Discussion.—In discussing rail joints, some objection was raised to the recommendation that base plates be used and there was considerable difference of opinion as to the value of joints of this type. It was finally decided to receive the section on rail joints as information.

Speaking on the second paragraph of the section on switches and manganese separable points, A. E. Muschott (E. J. & E.) objected to gage and slide plates less than ¾ in. thick on account of their liability to buckle under heavy traffic. Several members spoke in favor of plates with double shoulders, one for the rail and one for the brace. A number of other minor suggestions were adopted in this paragraph.

Referring to the recommendation of the committee providing for three hold-down devices on the spring rails of frogs, B. C. Dougherty (C. M. & St. P.) stated that he has found that two such devices are not sufficient. T. F. Donahue (B. & O.) referred to the difficulty in renewing bolts on spring frogs without cutting the frogs apart. To eliminate this difficulty the report was amended to add that "the design of spring frogs should be such that the wing rail may be removed to permit bolts to be renewed."

The recommendations of the committee with regard to the adoption of automatic switches created a spirited discussion. Referring to yard work, J. W. Guffey (S. A. & A. P.) stated that he has found that switching crews would run through automatic switches rather than to stop to throw them for the desired track and has had much difficulty in breaking up this practice. D. O'Hern (E. J. & E.) has installed automatic switches in one yard so that the switch engines can run through them without stopping, facilitating their work. M. Burke (C. M. & St. P.) vigorously opposed this practice, believing that automatic switches were never intended to be run through, but were designed to prevent damage when a switch was run through accidentally. He did not believe a stand would endure such service for any length of time.

There was an even greater division of opinion regarding the advisability of installing automatic switches on main tracks. B. F. Brown (B. & M.) stated that automatic switch stands are used exclusively on main lines on his subdivision. Other men opposed them and some roads were reported to forbid their use in such locations.

W. Shea (C. M. & St. P.) objected to the recommendation of the committee that guard rails should be bolted or clamped to the main track rails. Where such bolts or clamps are used he has found that they will loose the spikes holding the main rail, resulting in derailments. He pointed out the necessity for a better device and advocated as one solution, a guard rail independent of the running rail. T. F. Donahue (B. & O.) avoids difficulty with derailments by placing heavy tie plates under the guard rails and running rails and applying from two to five rail braces to each guard rail. M. Donahoe (C. & A.) advocated short guard rails, believing that a length of over 10 ft. was detrimental and that the shorter length was sufficient to guard the point.

The committee's recommendations for size of tie plates were attacked and after considerable discussion it was decided to amend the report to recommend that tie plates be used with a minimum thickness of ½ in. and of a width equal to that of the standard tie.

CLEANING AND POLICING THE RIGHT OF WAY

On some eastern trunk lines the right of way is given the same care as the tracks. The weeds and grass are kept cut down at stations each week and papers and refuse dropped from trains are picked up each day.

In the Middle West the right of way should be mowed of weeds and grass as soon after July 1 as possible, or sooner where weeds will go to seed before this date, to prevent fires from spreading into wheat, oat and hay fields which annually cause heavy losses to the railroads. Where the ground is level, the

right of way should be cut with a mower and team, paying from $8 to $10 per mile.

As soon as the weeds and grass are dry the section men should go over the ground and burn off the right of way, either by placing a piece of waste at the end of a wire and drawing it over the right of way cut, or by using a 2-in. pipe, 8 or 10 ft. long, filled with waste and soaked in kerosene oil. This pipe has very small holes bored in it to allow fire to work from the oil in the waste. In burning of right of way great care should be exercised by the section foreman to do the work when the wind is blowing from the field, to prevent the fire from getting away from the section gangs. Every vestige of old wood, trees and other rubbish should be burned while cleaning the right of way.

Rail.—New or relay rail, when unloaded, should be properly distributed and not scattered along the right of way on the ends of ties or down in ditches but should be set off the ends of ties onto the ballast. As soon as the new rail is laid the old rail should be unbolted and loaded as soon as possible to be taken to headquarters or to points where it is to be used. Every vestige of scrap, such as old bolts, spikes, short pieces of rail, old frogs and switches, should be picked up by the rail loader and the right of way should be left clean. It is much cheaper to load rail with a rail loader than by hand with section labor and at the same time injury to laborers is avoided.

Ties.—Ties unloaded in the fall and winter for next season's work should be piled in accordance with the standards, the piles set at certain distances, so that the section forces will not have too long a haul in distributing them for spring work. These ties should be set up out of ditches on high ground so that spring freshets will not wash them into openings of bridges and block the water, thus causing it to go over track.

All treated ties should be covered with two inches of dirt to prevent them catching fire and weeds and grass should be cleaned away from each pile of ties to prevent fire and give it a tidy appearance.

When ties are distributed on outlying sections they should not be placed between tracks as this might invite boys or mischievous persons to place them on the main track. Ties used in yards should be distributed as used. Old ties removed from track should be picked up each night and not allowed to remain between tracks to cause some switchman or trainman to be injured.

Where practicable ties removed from tracks in cuts should be hauled out of the cut for burning. If burned in the cut the dirt is likely to wash down and fill the ditch. Foremen should be working close to the spots where ties are burning to prevent fires spreading to adjoining fields and also to see that all ends of ties are properly burned.

Scrap.—All track scrap such as old spikes, bolts, splices, rail and frogs, should be picked up at the close of each day's work and taken to the scrap pile. Crooked or bent spikes should be sorted out and set in tool house and on rainy days the section gang can straighten them and use them in side tracks. Old bolts picked up should be sorted over and bolts found good for use in side tracks should be oiled and nuts placed on them, so that, when wanted, they will be ready for use.

Ditches.—Section forces should watch their ditches and waterways very closely and keep them cleaned out and open. In the fall the section men should go over their sections, clean out all ditches and waterways and, where possible, use the dirt for subgrade.

Ditches to drain the ballast are better than none at all, but they will not aid materially in maintaining good surface. All ditches should be deep enough to properly drain the subgrade. The bottom of the ditch should be from two to three feet below the bottom of the tie, depending on the nature of the soil. Such a ditch, if properly constructed, will keep the roadbed fairly well drained and aid materially in maintaining the surface; and, in addition, will reduce to a considerable extent the liability of track heaving during the winter months.

Particular attention should be paid to drainage at frogs, switches, railroad crossings and street and highway crossings. The remedy depends on the local conditions. This depends, in turn, on the matter of providing sufficient rapid drainage and supplementing it by subdrainage wherever necessary. Blind drains of cobble stone, broken stone, or tile, laid parallel to the track four inches outside of the tie and six inches lower than the bottom of the tie, will carry off the surplus water, avoid the puddling of the joints in crossings and save considerable work and money.

Fences.—Right of way fences should be built substantially with the posts set firmly in the ground and in good line. Corner posts should be well braced and anchored so that fences will not sag. Light convenient gates should be provided at private crossings, and the hearty co-operation of the farmer and land owner should be solicited in keeping those gates closed when not in use. It is economy for each supervisor or roadmaster to have a fence gang of five or six men and foreman, to repair or rebuild fence out of face. In this manner a uniform fence is secured much cheaper than if built by section gangs.

Bridges.—Section foremen passing over bridges and culverts should note their condition and see that they are safe. Weeds should be cut from around all wooden and pile bridges, and taken from under the bridges to avoid catching. All bird's nests in pile trestles or wooden bridges should be removed by the track walker as he passes over the track each day, to prevent the bridges from catching fire from cinders dropping from the engine.

Water barrels at bridges should be filled at intervals; and, in dry weather, where there are long trestle bridges, the local freight trains should be stopped to fill the water barrels.

The Track Walker.—The track walker should be the best and most intelligent man in a section gang. He should be able to read and write and should study the rules of track work and flagging, so that in case he found a broken rail he would know how to flag trains until he could send word to his foreman to come and replace it.

The track walker's duties are numerous. In passing over the section he should examine and open every unlocked switch, switch stand and guard rail each day and know that they are positively safe for the day; he should tighten any loose bolts found; drive down any loose spikes to the rail; change any broken angle bars found; reset, if possible, any planks found heaved up in road crossings which are liable to catch the pilots of engines; watch fences and farm gates as he passes over the track, patch any broken fence wires and close farm gates which are left open. The track walker should keep a very close watch for track spreading and spike it back to gage. If it continues to spread he should call the foreman's attention to it.

Cleaning Around Yards, Freight Houses and Station Grounds.—In cleaning freight yards at terminals the dirt and scrap scattered between the tracks should be gathered up in piles on three or four tracks so there will be no delay to work train waiting for the dirt to be gathered up to load. A work train with 12 or 14 flat cars should then be furnished to load up this dirt the same day it is put in piles to avoid injury to train or switching crews. To handle this material with a wheel-barrow or box is too expensive and dangerous for men working between tracks where cars are being switched.

In cleaning around freight houses a side dump car should be set and litter and dirt cleaned from the cars should be wheeled to and thrown in this car by the freight house employees. A wagon with two wheels that will hold a half yard of dirt should be furnished to freight houses and in that way no rubbish or dirt is allowed to accumulate at freight house tracks. This committee has investigated two railroads where this method is employed and freight house tracks are only cleaned once a year by the section men.

Driveways at freight houses and stations not over 1,000 ft. long should be cleaned by using a wheelbarrow with a car to wheel it on. Where drives are longer a horse with a dump cart should be used to pick up the dirt and take it to a car to load.

All old paper and litter around station grounds should be picked up and burned at least twice a week to give the station grounds a tidy appearance.

Sign Posts.—All sign posts, mile posts, crossing and whistling posts, etc., should be watched closely, kept set up plumb and weeds and grass kept cleaned from around them to give them a tidy appearance.

J. P. Corcoran (C. & A.), Chairman.

Discussion.—In discussing the proper time to cut weeds, several men preferred doing this work before July 1, and again later in the fall. Chairman Corcoran stated that where weeds are cut in July and the ground then burned over, few weeds will grow to any considerable height that season.

In discussing the subject of drainage, W. Shea (C. M. & St. P.) stated that he would be unable to maintain track in cuts on his division with ditches three feet deep with the heavy motive power operating on that line. He is forced to place a large amount of cinders under the track, to install subdrainage and then to construct shallow ditches.

THE ANNUAL BANQUET

The third annual banquet of the Track Supply Association for the Roadmasters' & Maintenance of Way Association was held in the Auditorium hotel on Thursday evening, with about 200 members of the two associations attending. President Walter Allen of the Track Supply Association acted as toastmaster. In introducing the first speaker, Mr. Allen compared the duties of the roadmaster during recent years with those of the officer who "carried the message to Garcia." He referred to the fact that in spite of reductions in appropriations and forces, the roadmasters were expected to keep their lines open for traffic in times of storm and to keep them safe for operation at all times.

J. A. Spielman, district engineer maintenance of way, Baltimore & Ohio, Pittsburgh, Pa., spoke on the conditions under which the track department is operating today. He referred to the advantages of precedents in methods and variety of appliances the roadmaster now has as compared with 25 years ago and stated that he thought the manufacturers of track appliances might be considered one department of the railways, taking the burden of developing new devices off the roads themselves. Efficiency has replaced the dollar as the standard of track maintenance today and with this in view, he strongly urged that the Roadmasters' Association go on record as protesting against the present limits of the fiscal year.

T. F. Donahue, president of the Roadmasters' Association, spoke briefly on the necessity of the roadmasters spending more time among their men on the track, endeavoring to develop them as track men and to increase their efficiency. He also urged the roadmasters to take more interest in public affairs affecting the railways and to use their influence against adverse legislation.

W. C. Kidd, secretary of the Track Supply Association; E. M. Fisher, president-elect of the Track Supply Association; P. J. McAndrews, president-elect of the Roadmasters' Association, and past president A. M. Clough of the Roadmasters' Association also spoke briefly on various phases of their organizations.

CLOSING BUSINESS

The selection of a location for the 1915 convention aroused considerable discussion between the advocates of Chicago and New York. The vote was so close that on the first ballot, when St. Louis was also being considered, New York stood one vote ahead of Chicago, but did not have a majority. A second ballot from which St. Louis was dropped, showed a slight majority for Chicago. It was then proposed that the selection of Chicago be made unanimous and a motion to that effect was carried. It was decided to hold the next convention the second week in September, 1915, convening on Tuesday, September 14.

The election of officers resulted in the choice of the following: President, P. J. McAndrews (C. & N. W.), Belle Plaine, Ia.; first vice-president, Coleman King (Long Island), Jamaica, N. Y.; second vice-president, M. Burke (C. M. & St. P.), Chicago; secretary and treasurer, L. C. Ryan (C. & N. W.), Sterling, Ill.; W. H. Kofmehl (C. M. & St. P.), Elgin, Ill., was elected a member of the executive committee for the full term of three years, and A. Grills (G. T.), St. Thomas, Ont., was elected to fill the vacancy on the executive committee caused by the election of Mr. McAndrews to the presidency.

P. J. McAndrews (C. & N. W.) suggested that it might be wise to publish in the form of a manual of recommended practice, a resume of the important action taken by the association at recent conventions and after a short discussion, a motion was passed to request the executive committee to consider this matter and act if it is deemed advisable.

TRACK SUPPLY ASSOCIATION

The meeting of the Track Supply Association held in connection with the convention showed that organization to be in a flourishing condition. The officers for the past year have been: President, Walter H. Allen, Pennsylvania Steel Company; vice-president, E. M. Fisher, Fairbanks, Morse & Co.; secretary-treasurer, W. C. Kidd, Ramapo Iron Works, and members of the executive committee, Henry Fisher, Verona Tool Works, and L. P. Shanahan, American Steel & Wire Company. The exhibit in the corridors of the hotel was larger than ever and as in the past, was exclusively an exhibit of track appliances.

At the annual meeting held on September 10, the following officers were elected for the ensuing year: President, E. M. Fisher, Fairbanks, Morse & Co.; vice-president, F. A. Preston, P. & M. Company; secretary-treasurer, W. C. Kidd, Ramapo Iron Works; director for one year, L. P. Shanahan, American Steel & Wire Co.; director for two years, R. A. Van Houten, Sellers Manufacturing Company.

EXHIBITS

The following companies had exhibits at the convention.

Ajax Rail Anchor Company, Chicago.—Double grip rail anchor. Represented by H. C. Elfborg.

American Guard Rail Fastener Company, Philadelphia, Pa.—Vaughan guard rail clamp. Represented by David L. Vaughan.

American Hoist & Derrick Company, St. Paul, Minn.—Transparency and photographs illustrating American railroad ditcher. Represented by Edward Coleman and C. C. Austin.

American Steel & Wire Company, Chicago.—Steel fencing, posts and gates. Represented by L. P. Shanahan, C. J. Boon, J. F. Alexander and J. W. Collins.

American Valve & Meter Company, The, Cincinnati, Ohio.—Anderson interlocking switch stand and safety switch lock, quick repair and economy switch stands. Represented by F. C. Anderson and J. T. McGarry.

Buda Company, The, Chicago.—Motor cars, switch stands, grinders, jacks and drills. Represented by G. J. Slibeck and Emil Johnson.

Carnegie Steel Company, Pittsburgh, Pa.—M-28 insulated and non-insulated steel ties, various sections of Duquesne bars and Braddock insulated rail joints. Represented by Robert Coe.

Commercial Acetylene Railway Light & Signal Company, New York City.—Acetylene flash light signal lighting and acetylene signal lightng. Represented by H. G. Doran.

Creepcheck Company, The, New York City.—Dinklage Creepcheck rail anchor. Represented by O. Metcalf, John R. C. Long and M. S. Schmalholz.

Crerar, Adams & Co., Chicago.—Calumet track drill, Eureka bonding drill, carbic light, Mac-it set screws, enameled signs, jacks. Represented by Russell Wallace, W. J. Clock, J. A. Martin and G. D. Bassett.

Daniels Safety Device Company, Chicago.—Bull dog nut. Represented by C. W. Rhoades and B. E. Dettman.

Duff Manufacturing Company, The, Pittsburgh, Pa.—Jacks. Represented by C. W. Thulin and G. A. Edgin.

Fairbanks, Morse & Co., Chicago.—Kerosene and gasoline motor cars. Represented by E. M. Fisher, L. H. Matthews, E. C. Golladay, F. M. Condit and A. A. Taylor.

Fairmont Machine Company, Fairmont, Minn.—Fairmont engines. Represented by F. E. Wade and H. E. Wade.

Frictionless Rail, Boston, Mass.—Frictionless rail. Represented by T. F. Dwyer, Jr., and Geo. H. Bryant.

Gosso Company, The, Chicago.—The Gosso bed. Represented by A. E. Gosso and T. J. Burke.

Hatfield Rail Joint Company, New York City.—Hatfield rail joint. Represented by T. B. Bowman and C. P. Williams.

Hayes Track Appliance Company, Richmond, Ind.—Hayes derails. Represented by S. W. Hayes, E. L. Ruby and E. W. Brown.

Heller Forge Works, East St. Louis, Ill.—Holdfast guard rail connector, R. S. A. switch stand. Represented by C. T. Coates and W. J. Webb.

Hubbard & Co., Pittsburgh, Pa.—Track tools. Represented by Edward Youngquist.

Indianapolis Switch & Frog Company, Springfield, Ohio.—The Eymon continuous crossing. Represented by E. C. Price, James H. Eymon and W. E. Harkness.

Kelly-Derby Company, Chicago.—Combination rail brace and tie plate, rail laying machine. Represented by C. W. Kelly and W. B. Holcomb.

Keystone Grinder Manufacturing Company, Pittsburgh, Pa.—Keystone tool grinders and attachments. Represented by H. C. Holloway.

Lackawanna Steel Company, Buffalo, N. Y.—Lackawanna hook shoulder tie plate, Abbott rail joint plate, spikes and bolts. Represented by C. H. Hobbs, F. E. Abbott and A. H. Weston.

Madden Company, The, Chicago.—Three-man track layer, Brown rail loader. Represented by T. D. Crowley and H. C. Holloway.

Morden Frog & Crossing Works, Chicago.—Guard rail clamps, rail braces, compromise joints. Represented by Arthur C. Smith, W. J. Morton and W. H. Hartz.

Mudge & Co., Chicago.—Motor cars. Represented by B. W. Mudge, R. D. Sinclair and George W. Bender.

National Lock Washer Company, The, Chicago.—Hi-power nut locks. Represented by John B. Seymour, Jesse Hough and John T. Patterson.

National Malleable Castings Company, The, Cleveland, Ohio.—Rail braces, tie plates, wrecking hooks and washers. Represented by J. J. Byers.

Northwestern Motor Company, Eau Claire, Wis.—Casey Jones engines. Represented by R. R. Rosholt and F. W. Anderson.

P. & M. Company, The, Chicago.—P. & M. rail anchors. Represented by P. W. Moore, F. A. Preston, A. R. Sutter, W. W. Glosser, S. M. Clancey, George E. Johnson and R. Harris.

Pennsylvania Steel Company, The, Steelton, Pa.—New Century switch stands, steel and positive switch stands, Never-Turn bolts, Mayari shovels. Represented by W. H. Allen and Stanley H. Smith.

Pittsburgh Steel Company, Pittsburgh, Pa.—Wire fencing, nails, staples and barbed wire. Represented by W. Sidney Lewis and H. C. Woodside.

Pocket List of Railroad Officials.—Copies of publication. Represented by J. Alexander Brown and Charles L. Dinsmore.

Positive Rail Anchor Company, Louisville, Ky.—Positive rail anchors, Betts anti-creeper tie plate, Economy switch points. Represented by W. M. Mitchell, W. E. Marbel, J. A. Shoulty, John C. Haswell and Charles J. Webb.

Prince-Groff Company, The, New York City.—Wedglock track drills, Kwik-grip wrenches, Pressurlokd water gage systems. Represented by Sherman W. Prince and C. B. Groff.

Q & C Company, The, New York City.—Vaughan rail anchor, Bonzano rail joint, O'Brien insulated joint, Q & C special guard rail clamp. Represented by J. V. Westcott, E. M. Smith, A. R. Horn and A. E. Stokes.

Rail Joint Company, The, New York City.—Weber, Continuous, Walhaupter and 100 per cent rail joints, reinforced angle bars. Represented by E. A. Condit, D. C. Isbester, R. W. Smith, W. C. Boyce, Chas. Jenkinson, C. B. Griffin, G. T. Willard and G. H. Larson.

Railroad Supply Company, The, Chicago.—Tie plates and derailers. Represented by A. H. Smith and H. G. Van Nostrand.

Railway Age Gazette.—Copies of publication. Represented by E. T. Howson, H. H. Simmons, K. L. Van Auken and Walter M. Ford.

Railway List Company.—Copies of publication. Represented by William E. Magraw, W. A. D. Short and Dalton Risley.

Ramapo Iron Works, Hillburn, N. Y.—Solid rolled double shouldered switch slide plate, manganese switch points, automatic switch stands. Represented by W. C. Kidd, Thos. E. Akers, A. Germunder, Denby Germunder and E. P. Bigelow.

Reading Specialties Company, Reading, Pa.—Rail straightener, reversible rail bender, guard rail clamps, rail joints, compromise step joint, trolley car rerailer, car replacers. Represented by B. J. Buell, F. G. Dunbar and George W. Sargent.

Sellers Manufacturing Company, Chicago.—Tie plates. Represented by R. A. Van Houten, G. M. Hogan and T. F. Geraghty.

Southern Railway Supply Company, St. Louis, Mo.—Saunders car stopper, Whitman & Barnes tools. Represented by Dick Achuff.

Spencer Otis Company, Chicago.—Tiger steel bunks, absolute lock nuts, Economy tie plates. Represented by T. W. Blatchford, H. H. Hart and W. L. Doremer.

Suggitt, J., Minneapolis, Minn.—Reversible side guard plow. Represented by J. Suggitt.

Templeton, Kerly & Co., Ltd., Chicago.—Simplex jacks. Represented by A. E. Barron, W. B. Templeton and Arthur Lewis.

Union Switch & Signal Company, Swissvale, Pa.—Keystone insulated rail joints. Represented by J. J. Cozzens.

Verona Tool Works, Pittsburgh, Pa.—Track tools, nut locks, levels, gages and jacks. Represented by H. Fisher, E. Wooding and Howard C. Mull.

Wharton, Wm., Jr., & Co., Inc., Philadelphia, Pa.—O'Brien insulated switch rod, guard rail clamps, switch stands, car placers. Represented by Thos. O'Brien and George R. Lyman.

ABSTRACT OF ENGINEERING ARTICLES

The following articles of special interest to engineers and maintenance of way men, and to which readers of this section may wish to refer, have appeared in the *Railway Age Gazette* since August 21, 1914:

The Present Status of Clearance Legislation.—A discussion of existing conditions as to side and vertical clearances, a review of the legislation in force on this subject, and a study of the need for more legislation of this kind, was published in the issue of August 28, page 377. The article showed that only 1.4 per cent of all deaths and only 3.2 per cent of fatalities to employees resulted from limited clearances and that accidents of this kind have decreased 33 per cent in the past five years.

New Shop Building Construction on Sunset Central Lines.—The construction of several shop buildings by the Sunset Central Lines at Houston, Tex., entirely of reinforced concrete and including 65-ft. roof girder spans, which are thought to be the longest ever attempted in shop building work, was described in an illustrated article in the issue of August 28, page 394.

The Re-arrangement of the M. K. & T. Freight House, St. Louis.—A description of the changes which have been made since the use of the telpher system was discontinued in order to fit the house for operation by the drop truck system on two levels, was described and illustrated in the issue of September 4, page 433. An editorial comment calling attention to the value of the experiment on mechanical apparatus for handling freight at this point, was published in the same issue, page 417.

Pennsylvania Improvements in Cleveland.—The structures and methods used in elevating about 2¼ miles of the Pennsylvania's line in a densely settled portion of Cleveland and the construction of a new freight station and improvements to the Euclid avenue passenger station, were described in the issue of September 4, page 438.

Division of Maintenance of Way Expenses Between Passenger and Freight Traffic.—The difficulty of dividing maintenance of way expenses as tentatively outlined by the Interstate Commerce Commission and some of the units that might be taken as a basis for such a division were discussed editorially in the issue of September 11, page 458.

The Erection Equipment for the Quebec Bridge.—A description of the method adopted for the erection of the new Quebec bridge with its 1,800-ft. span and the details of the unusual traveler which was built for this purpose, was published in the issue of September 11, page 463.

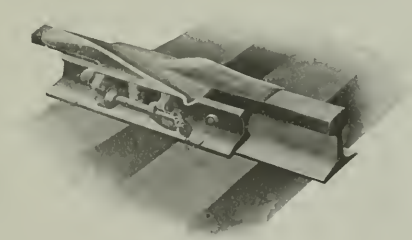
THE SUPERIOR DERAILER

The Superior derailer consists essentially of a main casting and two eyebolts, one of which has an enlarged head to permit a locking pin to pass through it, to which a padlock may be fastened. This derailer is designed for either hand throwing, or for connection with an interlocking tower. To apply this derail, it is only necessary to remove the two center bolts of any rail joint, and to substitute therefor the two eyebolts furnished

Derailer in an Open Position

with the derail. A shaft is inserted through these eyebolts on which the main casting hinges. Thus the device can be applied readily in a very few minutes' time.

In one of the accompanying illustrations the derailer is shown open, in which position it clears standard snow flangers and low hanging equipment, while it does not permit the packing of snow. The other illustration shows the derailer in position for



Derailer in Position for Service

service, from which it can be seen that it permits of cars trailing backwards over it without derailing the car, while it is stated that tests have shown that it would derail empty freight cars moving forward at a speed of 30 miles per hour. This derailer may be attached to any standard interlocking switch stand, ground target, or other device that the signal or maintenance department may require. It is manufactured and sold by the Track Specialties Company, New York.

Rebuilding a Pontoon Bridge on the St. Paul

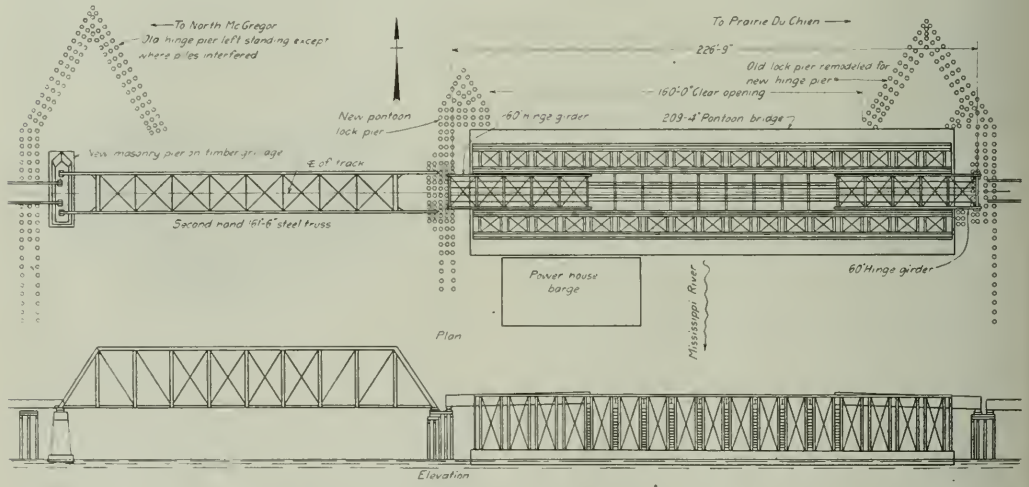
This Road Has Recently Completed a 209-ft. Span of This Unusual Type at Prairie du Chien, Wis.

One of the few roads on which the timber pontoon bridge is still used is the Chicago, Milwaukee & St. Paul, where four are in service—two crossing the east and west channels of the Mississippi river between Prairie du Chien, Wis., and North McGregor, Iowa, one crossing the Mississippi river at Wabasha, Minn., and one on the Missouri river at Chamberlain, N. Dak. The one over the east channel of the Mississippi river at Prairie du Chien, Wis., has been entirely renewed during the past year and was swung into place on August 2, while it is expected that work will be undertaken in the near future on the reconstruction of the pontoon across the west, or North McGregor channel. The deterioration of the old structure and the increasing weight of motive power made this work necessary. The new structure is designed for Cooper's E-50 loading, and in addition to allowing the operation of heavier motive power, it is an interesting example of modern design in this unusual form of construction.

Pontoon bridges have been used at this point ever since the line was first opened for operation over 60 years ago. When it became necessary to renew the structure at this time it was decided to rebuild it in kind, principally because of the heavy expenditure which would be involved in the construction of a steel bridge and in the raise in grade which would be required with the construction of a permanent structure since the extreme high water level is at practically the elevation of the present base of rail.

The present structure consists of a pontoon span across each channel with a pile trestle on an island between them and at each end. To offset the smaller first cost, this type of structure possesses several disadvantages. In the first place the maintenance cost of a timber structure is high, the life of the untreated timber pontoons previously used being only about 15 years. With the treated timber employed in the new structure a considerably longer life is expected. The cost of operation is also high. On the old pontoon two men were required day and night, while in the winter it was necessary to keep the ice cut away from the hull to prevent it being damaged. Also in the spring when the ice is moving and at times of extreme high water, it becomes necessary to swing the pontoon open for periods ranging from a few hours to two or three days at a time, requiring all traffic to be diverted via La Crosse, Wis., 60 miles north, or Savanna, Ill., 100 miles south. With the network of lines in this vicinity, however, much of the traffic normally crossing the river at this point can be diverted with little increase in mileage.

Preliminary to the renewal of this pontoon, permission was secured from the United States government to reduce the length of the span from 396 ft. to 209 ft. since the rafts which formerly comprised the main traffic through the east channel have now disappeared and the movements consist mainly of launches and small steam boats, the larger passenger boats using the west channel. As a part of the reconstruction a 160-ft. through truss was added to span the interval between the west piers of the new and old pontoons, enabling small boats to pass under this span at ordinary stages of the water without swinging the pontoon.



Plan and Elevation of Pontoon Bridge at Prairie du Chien, Wis.

The hull of the new pontoon is 209 ft. 4 in. long, 55 ft. wide and 6 ft. 3 in. deep from the bottom of the sheathing to the top of the deck at the center. It is built of creosoted material and is sheathed with 4-in. planks. As far as possible all material was framed before treatment and wherever cut or bored in the field, the exposed surfaces were painted with Carbolineum. The deck is also of 4-in. planking and is provided with three inspection and eight ventilating hatches, each 20 in. by 30 in. in size. The hull is braced laterally by 2-in. rods extending from the bottom to the deck, while it is divided longitudinally into six compartments by five bulkheads constructed of 8-in. timber.

The track structure is carried on 10 steel floor-beams spaced 12 ft. center to center and a 60-ft. steel approach girder span at each end. These floor beams are supported on blocks and are moved vertically between four guide posts at each end to maintain the tracks at a uniform elevation with varying stages of the river. These guide posts form the vertical posts of two of the four longitudinal trusses extending the full length of the pontoon. These trusses are spaced 9 ft. 2 in. and 19 ft. 2 in., respectively, from the center line of the barge and are designed to give it stability. The vertical members of these trusses con-

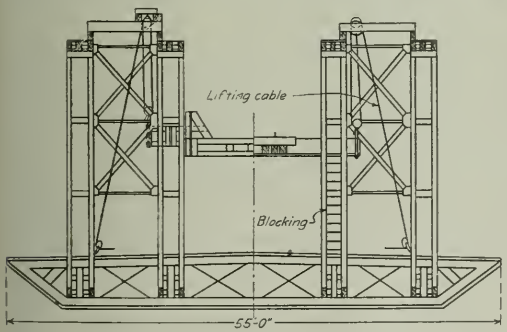
sist of four posts spaced 2 ft. between centers and connected by 2-in. inclined truss rods. The two trusses on each side of the center are also connected by inclined timber cross bracing and 1¾-in. diameter horizontal truss rods.

The floor beams rest directly on the blocking in the center group of posts. The amount of blocking inserted depends upon the stage of water, a maximum variation of 18 ft. being permitted in these guides As the greatest known variation between high and low water elevation is 22.5 ft., extreme high water conditions, which are encountered only at considerable intervals, are met by raising the tracks on the approach trestles at each end.

The floor beams are provided with hooks at each end to which

The Pontoon Nearing Completion Previous to Launching

are attached cables running over sheaves in the tops of the guide posts and then to a drum in the machinery boat. When it is necessary to raise or lower the track the floor beams are raised one at a time and blocking is inserted or removed as desired. The minimum depth of block used is 7 in., minor variations in water level being taken care of by the approach girders. About one hour is required to raise or lower the track. The approach girders are supported on ordinary steel shoes and nests of rollers resting on pile abutments at each end of the bridge and on cross girders carried on blocking on the pontoon.



Cross Section of Prairie du Chien Pontoon

These cross girders are raised and lowered in the same manner as the floor beams The track is given a camber of 8 in. when the pontoon is unloaded. Three stringers are provided under each rail with the ties resting directly on the stringers. Miter joints are inserted in the rails at each end of the pontoon, and they are raised before the bridge is swung.

The new pontoon is hinged at the east end. Its movement is controlled by a chain anchored to a pile buried in the bed of the river 100 ft. north of the fender piling at the free end of the bridge and also to a second pile cluster near the location of the swinging end of the pontoon in its open position. This movement is regulated by passing this chain over a sprocket wheel in the machinery boat, which is attached to the free end of the pontoon and swings with it. Under normal conditions the current is sufficient to swing the span open, while it is pulled back to its closed position by the engine on the machinery boat. Each end of the pontoon is protected by a pile fender, leaving a clear channel of 160 ft. Between 3 and 4 min. are required to open and close the span.

An average of about 10 trains cross this bridge daily. Flags are set in each direction before the bridge is opened, while all trains are required to stop and wait for a hand signal from the attendant before coming onto the pontoon. The maximum speed of trains is set at 10 miles an hour.

The hull was launched on May 22, 1914, after which the superstructure and lifting apparatus were applied. As stated above, it was floated into position on August 2. To reduce the inter-

View From Deck of Pontoon Looking Up Under the Track

ference with the operated lines to a minimum while placing the new pontoon in position, a detour trestle was built 38 ft. downstream from the permanent location and the old pontoon was floated to this offset line in January, 1913. Traffic was then directed to this line while the new pile abutment for the girder span and the concrete abutment at the west end of the steel spars were built. Permission was secured from the government to close this channel for four days while placing the new pontoon. It was started from its location on the bank ¼ mile above the bridge at 5 a. m., and the first train was run over at 4 o'clock in the afternoon of the same day. Shortly after the pontoon was connected up so that it could be opened for river traffic.

This structure was designed and built under the direction of C. F. Loweth, chief engineer, and J. H. Prior, formerly engineer of design. It was built and floated into position by company forces under the direction of Chas. Lapham, district engineer, and A. A. Wolf, district carpenter

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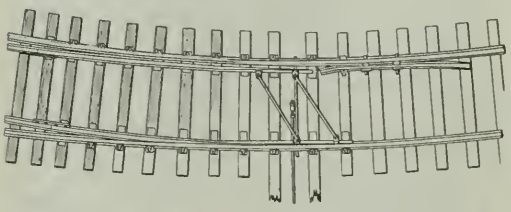
South American Railway Construction Company's Lines in Brazil.—A total of 471 miles of railway controlled by the South American Railway Construction Company is now in operation in Brazil. The company is building 29 miles on the line from Fortaleza to Macapa, three miles on the branch from Ico, 31 miles from Fortaleza to Itapipoca, 21 miles on the line from Camocim to Therezina, and 12 miles from Amaracao to Campo Naior, a total of 96 miles now under construction. In addition the company plans to build 709 miles of approved proposed line.

STAGGERED SWITCH POINTS FOR SPECIAL SERVICE

By W. F. Rench
Supervisor, Pennsylvania Railroad, Perryville, Md.

Considerable economy is effected in the wear of switch points in yards at points where the service is extreme by moving the point of lesser wear back a distance of 26 in., so that the first lug of the one point and the second lug of the other are opposite, and introducing a guard rail 9 or 10 ft. long curved sharply through 12 in. at the end which covers the switch and in the standard manner at the other end. The guard rail is set close to the one point which permits 12 in. of 2 in. flangeway opposite the longer point. This greatly increases the life of the point and is an excellent protection against derailment as well. One set of lugs must be connected with the standard head rod and for entire safety each lug should be connected with the one diagonally opposite. If made on a standard plan these rods may be of regulation design, but if resort must be had to makeshift designs a flat made rod of 2½ in. by ½ in. material is quite satisfactory. Care should be taken that the guard rail, which is subject to a severe strain, is braced by anchor clamps and at least one tie plate guard rail fastener.

This arrangement has been used in a number of places



Sketch Showing Arrangement of Staggered Switch Points On a Curve of Heavy Wear

where the wear is severe, but perhaps in none where the conditions are as extreme as at two switches in the Midvale Branch, a siding leading to the Pennsylvania's Nicetown (Philadelphia) freight station, and to the plant of the Midvale Steel Company. These two switches follow each other closely and spring from the inside of a 17-deg. curve. Approximately 30 movements are made over these switches every day.

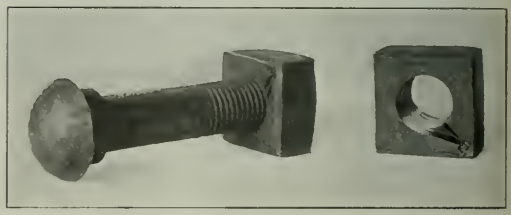
At each one of the switches the high side point, applied new of P. R. R. 100-lb. material, formerly lasted just two months, it being a matter of actual knowledge that 12 switch points were consumed in the two places within a period of one year. Besides, it was the rule for a derailment to herald the time for renewal which by reason of the difficulties of access to this location usually involved an expense for the wrecking and repair of equipment equal to the value of a new point. It is three years since the points now in track, which were then close to the limit of safe wear, were cut back and the guard rails applied and it is quite probable the points will still last two years longer. At this one location 60 switch points will have been saved in a period of five years, which represents at least $1,200 in money. As derailments have ceased there is the further saving along that line. It is doubtful if any single device or method in switch work is capable of effecting one-tenth the saving in expense of maintenance as the one herein described and illustrated in detail in the accompanying cut.

Safety First for Railroad Crossings.—At a certain particularly dangerous crossing on the Central Vermont the following significant sign has been erected: "Danger! This railroad crossing is a well designed death trap and is a disgrace to the state of Connecticut."

A NEW LOCK NUT

The "bulldog" lock nut has recently been placed on the market by the Daniels Safety Device Company, Chicago, and a number of railroads have given the new nut a thorough test. The design of this lock nut eliminates washers and separate nuts, the locking feature being secured by the insertion of a small piece of tempered steel into the face of an ordinary nut, as shown in the accompanying photograph. This pawl is set at such an angle that it will slide freely over the bolt threads when the nut is turned on, but when an attempt is made to reverse the nut the sharp edge of the pawl immediately cuts into the threads and effectually locks the nut against loosening. A variation of 1/32 in. in the diameter of the bolt thread does not interfere with this action of the nut. In case of the wearing away of the surface or of the stretching of the bolt the nut can be turned on further and will lock itself in the new position as effectively as when first applied, and it is claimed that in locations where the bolt is subject to vibration the lock nut will tend to tighten itself. The nut can also be made with the pawl on the outside or on the crown in order to make it possible to unlock it with a nail or wedge.

The principal advantages claimed for the new nut are that it saves in the length of bolt as compared with devices using two



The "Bulldog" Lock Nut

nuts, a cotter pin or washer, in the cost and the labor and inconvenience of applying such extra devices. It is impossible to put the bolt on the wrong way, as the locking pawl prevents its being turned in the wrong direction. When once started onto the bolt the "bulldog" nut cannot be removed after two threads of the bolt have been engaged.

The Chicago, Milwaukee & St. Paul put 26 of these nuts on bolts in frogs and joints in its Western avenue coach yard, Chicago, in December, 1913, which up to the present time have given very satisfactory service. The Chicago & Western Indiana equipped a crossing at Burnside, Ill., with the new nuts in March, 1914. It has been necessary to tighten these nuts once on account of the expansion of the bolts, but since the application of the new nuts no bolts have been broken, which is attributed to the fact that the nuts keep all of the bolts uniformly tight, making each take its share of the strain. Other roads that have test installations of the new bolts include the Elgin, Joliet & Eastern, the Chicago Great Western, the Chicago & Eastern Illinois and the Illinois Central.

An English Railway Storekeepers' Association.—A railway stores superintendents' association has recently been formed representing practically the whole of the railways of Great Britain and Ireland. The objects of the association are defined as follows: The promotion of the interests of railway companies in matters connected with the purchase and storage of material by (a) confidential interchange of information concerning markets, conditions of purchase, etc.; (b) the reading and discussion of papers on matters connected with the purchase, manufacture, sale, storage and distribution of material.

New Railway in Morocco.—The Spanish government has entered into a contract to build a railway from Tangier to Fez, Morocco.

The Handling of New and Scrap Maintenance Materials

The Second Series of Papers Discussing This Important Problem from the Standpoint of the User

THE SYSTEMATIC USE OF MATERIAL

By J. P. Costello

Roadmaster, Atchison, Topeka & Santa Fe, Pueblo, Colo.

I consider the distribution of new material with intelligent discrimination the most important item in a discussion of the handling of track material—not the restriction of distribution. When material is needed it is usually needed at once. Delays are always expensive and to have made plans which cannot be carried out, due to lack of material, is expensive not only to the job in view, but to other work which is being done pending the receipt of the material required.

In nearly all discussions which I have heard or read relative to the unnecessary holding of materials, the division engineer, roadmaster, supervisor or foreman is the one to whom the lectures have been addressed. Are these people always to blame? On nearly every division of every railroad there is to be found some piece of good material not in use which is being held to take care of some emergency which the store department is not able to handle with celerity. I have always found it advantageous to have on hand one left hand and one right hand standard main track frog. This, I know, is contrary to established "best practice." However, by so doing I can usually take care of a broken frog in one-third the time required by the storehouse. I *do not* think that every roadmaster should hold two emergency frogs—I *do* think that the store department should be able to deliver a frog so expeditiously, in case of emergency, that there would be no necessity of the roadmaster having them on hand. Aside from the handicap of a necessarily small stock, I have found greater efficiency in the division storehouse than in the large centralized storehouse.

Another thing which encourages the collection of unused material is the requirement, on many roads, that foremen must make their requisitions a month in advance of the receipt of the material. This causes the foremen to try "to be sure to have enough stuff to work with." Since the conditions of track work are variable and the right kind of foremen are naturally interested in having sufficient material to make the work progress, it seems to be asking too much of the foremen to expect them to foresee needs so far in advance? Why not cut this time down to about a week? If the store department takes three weeks to fill a requisition, then it is guilty of holding material too. Requisitions for certain materials, of which tie plates have been a striking example, have been held up from month to month until an accumulation sufficient for a mill order has been received and then the material comes in a deluge and quite likely at a time of the year when, on account of the other work, it is impracticable to use it.

In maintenance work there are many jobs, the accomplishment of which can be set for a certain date. For instance, bolts should be tightened in the spring and fall. Tie plating of curves can be done in winter. Replanking of road crossings can be done in the spring and fall. A complete job of tightening will require many renewals. Repairs to road crossings will require many new planks. Likewise tie plating requires a lot of necessary material. If jobs of this kind were set for a certain time, then unusually heavy requisitions about this time should be expected and at other times the minimum amount of material for this work should be on hand. I believe if I were engineer of maintenance of way or the corresponding official of a railroad I would set a certain time in the spring and also in the fall when every bolt in the main track should be tightened. I would see that sufficient new bolts were furnished. I would further see that no special job encroached on the allotted time. After that time any foreman, other than a yard foreman, who had more than a hatful of bolts would be subject to discipline. Jobs which can be timed can be handled satisfactorily both from the labor and material standpoint.

A proper balance should be maintained between material ordered and the amount of help allowed to use that material. A man may order a lot of material with the best intentions in the world, but due to a reduction in force it may be impossible to apply that material. Managements of various railroads do not object so much to new material in use as they do to unused new material. If the wastefulness of unused new material is to be measured by the loss of income which the capitalized value of this material would produce, then in the force allowance due regard should be given to the supplying of sufficient help to utilize this material.

Section foremen should gather up daily all scrap that comes to hand easily, but should not go to extraordinary pains to get it all unless the work being done is of such a nature that the scrap might be lost. A systematic "clean up" should be made about four times a year and the resulting scrap should be loaded. Foremen should be furnished full instructions as to the sorting of old material, so that various kinds can be loaded in separate cars eliminating further sorting. If a sorting or reclamation yard is maintained and all "pick up" material is sent there, it will be more economical to simply load all the stuff indiscriminately on cars and depend on the reclamation yards for sorting.

Much second-hand material is as good as new and such reclaimed articles should by all means be used. However, when a piece of material is used, it is certainly the intention to improve conditions, and the use of certain pieces of second-hand material is not consistent with the improvement desired or in keeping with the other material being used on the job. Considering the desired improvement, the cost of application, and the longer life of new material, the scrap value of the second-hand material would offset the saving of using it in preference to the new. I once worked for a railroad that was so parsimonious in furnishing spikes that about 90 per cent of the spikes in the track were "cutthroats." This is not economy.

Repairs to tools and material is an item of great importance. To be able to secure tools, which, though second-hand, are in good shape for use is a satisfaction and a pleasure. A road which takes proper care of its tools, equipment and materials not only saves money directly but also develops a good spirit among the workmen. Tools should be repaired properly and when the repairing is done on a large scale the quality of the work should receive more consideration than the amount of the output. Where a divisional repair shop is maintained each foreman should receive the same tools which he sent in for repairs. Of course where a large centralized plant is maintained this might not be practicable.

Credit should be given a division for tools or material sent to reclamation plants and this should be done with fairness so that there would be no necessity for making extensive checks and accounting of material, except at the plant. When a shipment is made figures should be furnished to the officers instrumental in the reclamation so that they would have the satisfaction of knowing the result of their efforts to save.

Measuring up scrap material merely to satisfy accounting purposes is useless and extravagant. When a rail is taken out of a side track because it is no good, it is scrap, and then the weight and not the lineal measurement is of interest. Definite but simple methods in the handling of scrap material should be adopted. It is unfortunate that railroads either have no definite methods of handling scrap and accounting for it or else the methods are so elaborate that they are not understood by all interested.

True economy in the handling of materials will depend more

upon the education of the foremen who have the direct handling than upon any other feature. This means the retaining of men in service long enough for them to learn the road's methods and to apply them.

The supervision of an engineer of maintenance of way or a general superintendent is necessarily superficial, hence the curtailing of requisitions by him must be to a certain extent arbitrary unless allowances are standardized. The adoption of a standard allowance of tools and materials for ordinary work is practical. The reason why it has failed has been not so much the fault of the foremen as the fault of the officers who should have allowed the tools. It is argued against the adoption of a standard list of tools that the size of the gang varies, hence, in order to have enough tools for a heavy section force we would have, at times, unused tools on hand. These unused tools comprise principally just picks and shovels, and picks and shovels are too cheap to interfere with a good system. I believe there are enough fair-minded roadmasters on any road to choose a standard allowance of tools.

Expeditious handling of requisitions, prompt deliveries of supplies, good repair work handled promptly, consideration as to the timeliness of certain work, education for foremen and others, standardization of tool allowances, figures showing in dollars and cents the extent of any reclamation project—these are things that will aid in the economic and satisfactory handling of materials.

A SYSTEM FOR THE DISTRIBUTION OF MATERIAL

By D. F. Stevens

Baltimore & Ohio, Baltimore, Md.

The reason men carry an oversupply of material is due primarily to the indiscriminate manner in which requisitions are "chopped." On one road this important item is turned over to a $25 clerk, unfamiliar with the road, the men or their various requisites. The usual procedure, when the operating head finds material is going up over last year's figures, is to get out a letter on the subject. This letter is repeated until every one is imbued with the idea of using just as little material as possible. The "ultimate consumer" then puts in a requisition for exactly the amount of material he can get through the month on. Every official from yardmaster or track supervisor up through all the various steps to the head of the department takes a whack at it, and when the material is eventually delivered to the man who ordered it, it reminds him of a 100 lb. piece of ice left out in the sun for hours in July, and next month he orders four times what he needs to allow for the cuts. A freight conductor once ordered two markers for his caboose and was surprised and amused to find that somewhere it had been cut to one. They might just as well have laid the main line with one rail instead of two.

The following system is based on divisional stores. The general storekeeper orders his material through the purchasing agent, who in turn has it shipped direct from the factory to the divisional stores and thus avoids extra handling. The individual requisitions are assembled in the division superintendent's office and, after being approved by him, are forwarded direct to the division storekeeper. On each division is a supply car which moves once a month over the division on the way freights. On the receipt of the requisitions the supply cars are loaded with each order and a triplicate blank filled out for each requisition. Before the trip is started all material in the cars are charged to the supply men, who go with the cars. The necessary empty scrap cars are carried with these loaded cars. An advance notice is sent out on the division outlining the movement of the cars. All scrap is located so it can be loaded where the good material is unloaded.

On arrival at a station, yard, section house, etc., the cars are met by the man receiving the supplies. At this point comes the secret of success of the plan. He is required to turn into the supply cars, scrap, second-hand or first class material for every piece of new material he receives, except in the case of waste, matches and other material of this nature. Only under this condition does he receive any material from the cars. Should a new tool be needed for which there is no old material to be turned in, the division officer directly responsible must personally sign the requisition and explain the necessity. When the cars arrive back at the stores, the man who accompanied the cars and distributed the material is obliged to check back an equal amount of scrap, second-hand or new material for every article he took out of the stores except in the case of matches, etc. The superintendent of the division assigns a trainmaster, chief despatcher, track supervisor or other officer to accompany the cars each month.

The success of this system is apparent. It teaches men to be economical with the material entrusted to their charge; it puts back into service first class material not applicable and second-hand material which is repaired and put back into stores; it collects scrap regularly to a common point which is sold and keeps the railroad from being cluttered up with a lot of material which takes up room, looks bad and goes to help swell the grand total of non-revenue producing investment. No cutting of requisitions is necessary here and an opoprtunity is afforded the division superintendent each month to check the supplies on his division. Old brooms eke out the last of their lives on engine decks or sweeping snow out of switches. Shovels are straightened up, track chisels are sharpened, lantern frames adjusted and all go back into service again, except the scrap. A 40 per cent saving can be effected in six months.

There are cases where the size of the division will not permit the supply of cars to be handled on the way freights and here a supply train is run, but the distribution is accomplished in half the time. When this system is installed for the first time it should be preceded by a general clean up of scrap. One year of this system cleaned up $380,000 worth of scrap material. This figure is net and not original cost.

LOCAL SUPERVISION IN THE DISTRIBUTION OF NEW MATERIAL AND THE COLLECTION OF SCRAP

By R. B. Abbott

Division Engineer, Philadelphia & Reading, Harrisburg, Pa.

For a number of years it has been the practice on our road to keep the emergency and maintenance supplies down to the lowest point consistent with safety and good judgment as to the probable requirements. As an aid to this plan, a monthly statement is prepared showing the material on hand as referred to an established basis of requirements determined jointly by the material and supplies department and the engineer maintenance of way. As this statement is itemized and worked up into money values, a very satisfactory check is afforded on the subsequent requisitions and it is very easy to see at a glance just where oversupply exists and how the excess can be distributed and interchanged.

Supplementary storehouses are located at each supervisor's headquarters and this prevents to a great extent the duplication and multiplication that would exist if the materials were shipped from the general storehouse direct to the foremen out along the line. Some extra handling is of course caused at the supervisor's storehouse, but this is many times offset by the saving in quantities.

The only materials sent direct to the foremen are oil and battery renewals. New rails and fittings are usually unloaded as soon after receipt as possible and distributed direct from the cars to the point where renewals are to be made. This saves double handling of heavy material and permits a prompt release of the cars. A monthly report is submitted showing the mill rail and relaying rail on hand for sale or interchange and orders for shipment are usually given first place on the work train schedule.

Years ago the loading of miscellaneous scrap was dependent on the market price of such material and much delay in cleaning up was occasioned by long waiting for orders to load and ship. Our plan is now, however, to load once a month regardless of

market conditions and send the scrap to the general storehouse where it is picked over and properly arranged for disposition. Much waste is checked in this way as the reclaim is considerable.

The assembling and loading of scrap is too often neglected, as it is work that does not appear important to the section foremen and they are usually so busy at other things that the collection of scrap will be put off as long as possible. Hard and fast rules covering this can hardly be carried out, but the supervisor and division engineer should make it their business to see that a general plan is outlined and followed as rigidly as conditions permit, so that the tracks and right of way can be kept as clean as possible all the time and the money value of the scrap promptly recovered.

Section foremen should assemble the scrap at junction points of branch lines, near the entrance to yards and also at their headquarters. The points should be as few as possible to save delay to the worktrain, and each foreman should send a statement to the supervisor showing where the piles are located. On minor branch lines it is often possible to load the scrap without the assistance of a worktrain. This can be accomplished by starting a car at one end of the line and moving it along by local freight, setting it off at each section foreman's headquarters and forwarding it along in turn as the scrap is loaded.

The method to be followed is variable and must be selected to suit the different conditions, but I think it will be generally conceded that the greatest difficulty lies in the fact that section foremen do not appreciate the importance of gathering their scrap and must be stirred up occasionally. This is where the supervisor enters into the scheme and the results obtained are in direct proportion to the degree of supervision maintained.

DISTRIBUTING, RECLAIMING AND COLLECTING BRIDGE MATERIAL

By F. L. Burrell

General Foreman, Bridges and Buildings, Chicago & North Western, Fremont, Neb.

Our plan is to make a careful inspection of all structures on the division, being accompanied by a representative of the engineer of maintenance, and, if possible, by the general bridge inspector or his representative. We recommend what is to be done and submit the results of our inspection to the proper department, where decision is made as to just what will be done the coming year. Schedules are written up in detail, showing what repairs, renewals or permanent work is to be done.

From these schedules we make up a bill of material required for the work shown. We then take an inventory of all the material on hand and check over the unfinished work for the current year, or period, making allowance, as emergency material, for at least one 15-span bridge. We then deduct the material required for the current and emergency work from our stock on hand and apply any surplus to the requisition for the work of the coming year.

Separate requisitions are made for the different classes of material. We ask that the piles be made in three deliveries, March 15, April 30 and May 15; also three deliveries for timbers, April 10, May 20 and July 15. Bolts and other iron should be on hand not later than May 1. Cast iron or concrete pipe for culverts, cement, crushed rock, sand and stone, for permanent work, depending upon the amount of work to be done, should be delivered not later than June 15.

As the material is received and unloaded in the yards it is checked and a daily report of all material is made at the close of the day to the office. We also receive a daily report of all material sent out. We do not send the material out until the gangs are ready for it. As the material is received, especially the piles, each piece is measured and marked as to length. Any piles that we can not use in bridges, on account of serious defects, are used for "stubbing."

Once a month an inventory is taken and checked against the in and out shipments. This method calls to our attention any surplus stock or scrap that can not be used in the work that we have to do. In spite of this care, we often have a surplus; sometimes from our own carelessness, at other times because the storekeeper will insist on sending us something "just as good," or duplicate orders.

It would, perhaps, be a good idea in making requisitions to bear in mind that a large amount of timber taken from a structure that is rebuilt can be used for other purposes as at stockyards, where no great weight is to be sustained, around scales or in similar places. About 60 per cent of timber from such bridges can be used as bulkheads; or, in very shallow openings for drains, under highway approaches at railroad crossings. About 20 per cent can be used for repairs to other bridges, and 15 per cent perhaps will have an inch or two of rot on the exposed face or under the ties and other bearings which can be trimmed off, allowing the balance of the timber to be cut into planks suitable for stockyard fences or light platforms. Five per cent will go to the wood pile, to be cut up for kindling fires in locomotives.

Short pile heads, say from 2 to 4 ft. long, or old piles removed from a renewed bridge, are used for platform supports. Sometimes they are used for stubbing piles in repairing bridges whose life has about expired; we also split and use them for fence posts. If the piles are good cedar and the fiber has not been too badly damaged in driving, they are used in making shingles. Washers and spools are used in renewing the structure. Old bolts with good threads are used for the same purpose. If the heads are broken off, we use them for drift bolts and dowels. We also cut them to shorter lengths for car repair and other work; old iron of every kind is scrapped for melting for castings, etc.

We gather this scrap from time to time by local trains if possible, and by worktrain, where locals can not be used. Before we pick up, we use all the material needed in making repairs to nearby bridges.

We attempt to eliminate obsolete material by paying close attention to our monthly check and sending such material that we may not be able to use to the shops. The clean up must be made once a month and include an inventory that will force a surplus of any material upon the attention of the official in charge.

COLLECTING MAINTENANCE SCRAP

By R. Huber

Roadmaster, Chicago, Burlington & Quincy, Brookfield, Mo.

Our system of loading and picking up scrap is as follows: All section foremen have instructions to keep scrap cleaned up on their sections at all times. Adjoining the section tool house is a bin for the assembling of all small scrap. All scrap found along the right of way is brought in at the end of each day on the car and put into this bin. Scrap rail is piled next to the bin. At the end of each month the local freight trains carry a stock car for the loading of small scrap and a flat car for the loading of scrap rail, frogs, etc. These cars are placed next to the caboose. On this day all section foremen pile the scrap near the depot, so that a couple of men —who have been left to clean up station grounds and put everything in order around the yards—can readily load this material, while the merchandise is handled at the station. This eliminates delay to the train and inconvenience to the station force. This system has proved successful, not only inasmuch as it adds no expense whatever to train service, but it requires only one day to pick up all scrap on the entire division. While trains are being made up at the division point the yard maintenance force look over the contents of this car to see if there is any material that could be used in repairs around the yards, and thus avoid ordering new material.

We use an air rail-loader for picking up our rail. Our rail is first examined and marked by the inspector in three grades, thus: I, II and III and O for scrap. We generally

have more of grade II, and this being the largest quantity, is picked up first.

It requires seven men to operate the rail-loader and aid in the loading of rail. One man handles the air and three men stay on the ground; one to handle the hook and one at each end of rail to steady it on the car. We have two men on the car, one to unfasten the hook and one to place the rail. The seventh man has general supervision of the work and gives the necessary signals, etc. We also have a car for the loading of scrap bolts and spikes, and usually employ two men in doing this work.

We have picked up as many as 700 rails in a day, but the average day's work is about 500 rails.

All the new material that is left over, such as tie plates, anglebars, bolts, etc., is loaded by one man on the rear end of the rail-loader. This keeps all new material cleaned up, thus avoiding the making of extra trips over the division to pick up such material.

When unloading new material, such as rail and fastenings, it is handled with the same worktrain. Rail is unloaded from flat cars and the car containing angle bars is unloaded by two men, who throw off one pair of anglebars with every rail. We also distribute bolts, spikes and nut locks at the same time, and when we have the rail distributed everything is in readiness for the rail laying gang to commence work.

DISTRIBUTION OF MAINTENANCE MATERIAL AND COLLECTION OF SCRAP

By J. W. Carey

Clerk to Supervisor, Pennsylvania Lines, Bellaire, Ohio.

To provide for the proper ordering and distribution of new material, I would suggest that a storeroom be established at some point on each division and the supervisors be given instructions from the office of the division engineer to furnish the storekeeper at a certain period of every month a complete list of the material that will probably be needed for the next 30 days.

The storekeeper can then compile all these statements to determine the amount of material to be kept in stock. This material can be ordered directly from the manufacturer and when received kept on hand for distribution to the section foremen.

Section foremen will order material as needed from the supervisor, who in turn will request the same from the division engineer, by furnishing the necessary order. The division engineer will then approve such order and forward to the storekeeper as authority to furnish the material to the section foreman. When received, the section foreman will unload where needed. The kinds of material coming under this heading are frogs, switches, guard rails, clamps, switch stands, bolts, nut locks, spikes, etc.

To properly care for such material as ties, rail, anglebars and tie plates, each section foreman should go over his respective section each year, accompanied by the supervisor, to ascertain the amount of material needed for the following year. Orders should then be made to have the material shipped directly to the supervisor. When received the supervisor will arrange to have his worktrain distribute the material where needed.

In the event of cross ties being received in the winter time, they should be unloaded in piles of 50, located as close as possible to the point where needed. If ties are received in the spring, however, they should be unloaded and scattered along the line where they are to be used, in order that the one handling will suffice.

As to the collection of scrap material, all heavy material such as frogs and switches accumulating from the track should be picked up and placed in piles by section foremen daily and all other heavy scrap placed in the same piles as soon as discovered along the track. To take care of light scrap material, each section consisting of three miles or less should be provided with a scrap box, located at the center of the section, while all sections consisting of four or more miles should be provided with two boxes, located about one mile from each end. As such material accumulates the section foreman should pick it up while running over the section on his hand car daily and place in the nearest or most convenient box.

The supervisor should make arrangements for a worktrain to go over his subdivision at least once a month for the purpose of picking up all scrap material, mill rail and old frogs and switches. The worktrain on such occasions should be provided with three cars, one to receive the mill rail, one for scrap frogs, switches, stands, etc., and the other for worthless scrap. When loaded, cars should be shipped to the storeroom and the storekeeper given a correct report of the amount and weight of the rail contained in the mill rail car, which will enable him to dispose of rail, without unloading, providing he has sale for it. All scrap frogs and switches and other scrap can be separated into bins at the storeroom while being unloaded and then disposed of by the storekeeper as rapidly as he can secure sale for it when the best price is prevailing.

The foregoing suggestions include some of the methods actually pursued on this subdivision.

DISTRIBUTION OF NEW MATERIAL AND DISPOSITION OF SCRAP

By A. M. Clough

Supervisor, New York Central & Hudson River, Batavia, N. Y.

My experience leads me to believe that the following methods of distributing maintenance of way department material will prove most satisfactory under present conditions. Rails, ties and switch timbers are furnished in accordance with the annual budget compiled in the office of the engineer of maintenance of way from estimates furnished by the various supervisors of track, after a careful inspection of their territory as to necessary track repairs and renewals for the coming year. The supervisor always advises the most advantageous point for this material to be shipped to prevent back haul or unnecessary handling.

New rail is unloaded as fast as received and set up between tracks at points where it is to be laid, the anglebars being handled in the same manner. The released rail is assigned to other tracks or subdivisions the same as the new rail and is loaded and shipped promptly when taken out of track.

When the ties are received late in the fall or during the winter they are unloaded into standard piles as near as possible to the points where the foremen will use them when they start the spring work. This refers more particularly to untreated ties, as our tie-treating plant does not usually start operations until about April 1, and when these ties are received they are distributed along the track on which the foreman is working, thus obviating the expense of more than one handling.

The annual allotment of switch timber is received during the fall and winter and is unloaded at headquarters, where it is sorted according to lengths and is sawed into sets to fit the various turnouts before being taken out on the road.

Frogs, switches, miscellaneous track material and tools are ordered monthly by the supervisor of track and are stored at headquarters, with the exception of a small amount of material, especially frogs and switches, at various points along the division for emergency use. Everything that can be should be placed under cover to prevent deterioration from weather and no more of any material should be ordered at one time than is needed as a supply for two months or the length of time required to get it from the manufacturer.

The section foreman should send in on the first day of each month a requisition to his supervisor for such track material, tools and supplies as he will need for the month. This is checked by the supervisor and given to the storekeeper to furnish. This is

shipped by local freight except in cases where it can be handled to better advantage and with more economy by a work train.

The foreman should keep an accurate record of all material on his section on blanks furnished him for that purpose which should show the material on hand at the beginning of the month, the amount received during the month, the amount used and the balance on hand at the end of the month, at which time it should be sent to the supervisor for his information and file and to enable his office intelligently to furnish foremen with material required and avoid any surplus material accumulating.

Each supervisor of track should prepare each month a statement showing a list in detail of all surplus and obsolete material he has on his division, these statements to be sent from one supervisor to another, thus enabling the various supervisors to see what is on hand at various points. If they can use any of the material they furnish shipping directions. If this method is followed up vigorously very little surplus material will remain inactive for any great length of time.

Scrap material should be handled in just as systematic a manner. The worktrain should make regular trips over the division to pick up all such material, loading separately each class of scrap, that is, car scrap in one car, miscellaneous track scrap in one, frog and switch material in another and rail in another, as this will save considerable sorting at headquarters.

All miscellaneous car and track scrap should be shipped in carload lots when possible to a scrap platform located at some central point where it is sorted as to iron and steel and wrought, cast, malleable, etc., after which it is advertised for sale by the purchasing agent, who keeps in close touch with the market value of this material and sells it when the price is right.

Regarding scrap steel rail, frogs and switches. This should be divided into three classes: First, straight rail free from frogs, switches and guard rails and over 5 ft. in length and weighing more than 50 lb. to the yard; second, all cropped rail ends under 5 ft. and over 50 lb. section; and, third, all sections of rail not coming under Classes 1 and 2, and including frogs, guard rails and switch points which are free from plates, fillers, etc. Rail is to be reported under these classes each month by the supervisor, who is furnished with a sale order later by the purchasing agent.

SUGGESTIONS FOR THE HANDLING OF MATERIAL

By Geo. E. Lowe

Supervisor, Delaware, Lackawanna & Western, Elmira, N. Y.

Making proper requisition for new material, preserving it in first class condition without loss or deterioration until used and assorting and reclaiming usable material from scrap amounts to a large saving to a railroad company. A large part of the gain in scrap is up to the maintenance of way department, as that department must gather all scattered scrap on the right of way. Therefore every man in the maintenance department should be instructed and drilled in the best method of handling scrap, which of course varies to some extent owing to the different conditions on the different roads, but the general principle of instruction can be the same.

Very good results have been accomplished by calling together as many of the division officers as possible. Going over the whole question of material and scrap, then spending one day on an inspection and observation tour over certain parts of the road and in the maintenance shop and scrap yard with the head officer of the maintenance department as pilot, will do more in the way of educating the men to the proper method of handling material and scrap than any number of circular letters could do, if not followed up with these meetings. These instructions should be passed along down the line to every man in turn and each division officer should call together as many men under his supervision as possible at different times and not only instruct them, but have them discuss between themselves the question of handling material and scrap.

There should be as few special requisitions as possible. All requisitions should cover the amount of material required until the following requisition is filled. This is very important, for to have to do unnecessary work, or have work held up on account of shortage of tools or material is equally as bad and expensive as to order and carry on hand too much.

A supply of material is usually kept on hand at the division headquarters. This should be well taken care of and a careful record and check kept of it. Each division officer whose duty it is to supply foremen under his supervision with tools and material should keep a record of the exact amount and date of tools and material received by each foreman from time to time. This will enable him to handle the foreman's requisition in such a manner as to prevent wastefulness, as by referring to his record at any time he can ascertain just which foreman is ordering more material or tools than is really required.

An inspection of all tool houses, tool cars and scrap yards should be made from time to time, and all excess tools and material should be collected and put into use where needed, or, if obsolete, scrapped. All material that is affected very readily by the weather should be kept under shelter. Metal material, including rails, frogs and switches, should be neatly piled, and either painted or oiled often enough to prevent rusting. This can be handled at a very small cost, if painting is done by the painters as they go over the division painting other right of way fixtures, and each foreman having a supply of material on hand is furnished with a barrel of oil and a sprinkling can or even a broom. The barrel of oil should be planted in the ground near the material yard, and should have a cover and lock. This will eliminate the necessity of keeping it in a car or tool house and lessen the danger of fire.

On the average section outside of yards the amount of material held in stock for repairs and emergency cases may be materially reduced by pairing the sections off in twos, then placing the rail posts or rail racks and supply material at the intersection of the two sections paired together. This will practically cut the amount of material of this kind down to one-half that necessary under the individual section plan.

The gathering and collection of reclaim and scrap material would be necessary from a safety standpoint, if from no other, as it is very dangerous to the traveling public to allow scrap to lie around where someone may fall over it, or some mischievous boy may place it on the rail, where it may cause a wreck. Also it is very dangerous to life and limb of employees, whose duty requires them to move around moving trains and cars, especially at night. A very good system to follow and one which has given excellent results is to have maintenance of way men from laborers up consider it part of their duty to remove every piece of scrap they may see at least 8 ft. from the nearest rail, wherever possible. One day of the week, preferably Saturday, should be set aside for cleaning up, gathering and sorting scrap, classifying it as much as possible, placing all small scrap in old kegs or boxes, so that it may be loaded by the worktrain gang without sorting and with as little delay as possible to the worktrain and traffic.

Each division should be cleaned of all scrap material at least once a month, it being the custom of most roads to hold scrap material until the market is good. This being the case, it should be neatly piled up along some siding where cars can be placed and unloading and loading done without the aid and expense of a worktrain.

On nearly all roads more or less good reclaim material will accumulate, especially metal fastenings, which on account of the increase of weight of load and weight of rolling stock necessitates the use of larger and heavier material. After being removed from track this should be sorted from scrap material, neatly piled up and preserved, and a list of such

material furnished the head of the maintenance of way department, who will order it shipped to minor divisions or points where it can be used, thereby saving the ordering of new material where this reclaim or second-hand material will answer as well.

ECONOMIES THROUGH LIMITING EMERGENCY STOCK AND THROUGH PROMPT DISPOSAL OF SCRAP

By W. F. Rench

Supervisor, Pennsylvania Railroad, Perryville, Md.

The period of semi-depression through which the railroads have operated of late has brought with it new economies that will be of benefit for all time. Chief among these are the great reduction in the amount of surplus and inactive material and the more active assembling and disposal of scrap material. It used to be the opinion of operating officers that every important switch layout should be protected by duplicates of the frogs and by an ample number of surplus switches. A slip crossing was not protected unless there was a complete set of rails, frogs and switches and even plates and chairs. But now a half slip set is recognized as supplying ample material and a length of rail that could be used to continue main line movement, together with a single switch, is sufficient to cover an important interlocking. The ordering of material for new work a long time ahead of its prospective use is an item of extravagance that is now discontinued. A case is known of material for new work to the amount of $20,000 having been ordered and received two years in advance of its application. Fortunately the exigencies of the hard times uncovered the error before much was lost through interest accruing on this large investment in unproductive material. A closer scrutiny of requisitions and comparison with amounts on hand, a more exhaustive check of material one section lacks against the excess on another section and even the interchange of lists of material surplus on the different divisions of the road have resulted in a reduction in the surplus stock accounts—it is no idle guess—of fully one-half.

It is doubtful if the average operating officer appreciates what it means to his company in money to dispose promptly of the scrap that accrues constantly, both from the source of repairs and of damage to equipment in passage. It is no unusual circumstance to find in various secluded places at times when its loading is mandatory as many as 30 carloads of scrap on a single superintendent's division. This amount, if the material were all scrap, represents a value of perhaps $20,000, and if held three months longer than necessary involves a dead loss of $250, which, applied to a grand division, means $1,000, or to an entire system $5,000. But the material is not all scrap. When it reaches the storehouse and is sorted at least half is found to be usable and no small part entirely new material.

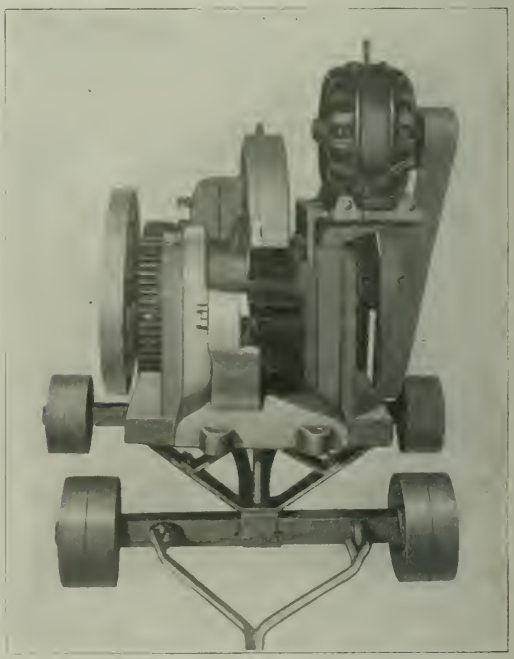
No system of scrap reclamation will furnish the desired results that is not automatic and routine. On many roads the rule is in force that Saturday, whether it be the entire working day or the short day, that is more common, is given over to policing and the general cleaning of the roadbed, which includes the collecting of small scrap. Every tool house is provided with a bin where this small stuff is stored, often until it overflows, but not infrequently the Saturday's collection lies in the center ditch awaiting a convenient time for trucking it to the section headquarters. If the supervisor were equipped to run a train over his division every Saturday afternoon this unsightly material might be disposed of at once, but the considerable time required for hand loading necessarily postpones the collection.

There is in use at some of our shops a type of locomotive crane with magnet, generator and switchboard which handles small scrap quickly and with a minimum of expense. Such a contrivance requires only the attendance of one man and the cost per ton of loading the scrap at the shop has been found to be as low as one cent. The cost would of course be very much greater loading it along the road, but with average opportunity to work would probably be no more than 6 cents per ton. Such a contrivance run special over the road, say every other Saturday, would result in a clean division for the holiday travel and would bring the scrap under the eye of the proper authority.

A PORTABLE MOTOR DRIVEN SHEAR

A motor driven alligator shear has been mounted on a truck by the Canton Foundry & Machine Company, Canton, Ohio, in order to make the shear easily portable and facilitate the cutting of scrap material in various parts of a yard or at different points along the line. The advantage to a railroad of cutting its scrap is evident when it is realized that much of the light scrap is sold to dealers at prices as low as $0.50 a ton, while the same dealers after cutting it, sell it for as high as $6 per ton.

These shears are made in two sizes, the No. 1 having a maximum capacity of 1½ in. square in soft machinery steel or iron



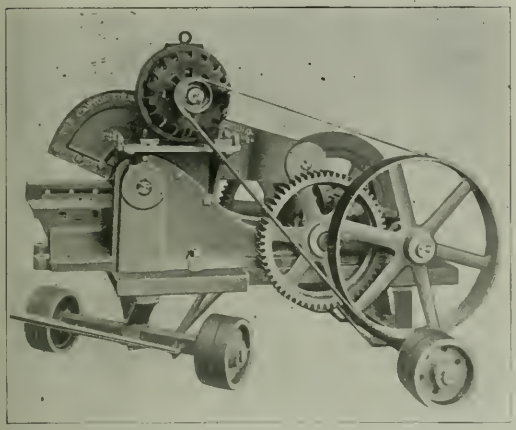
Portable Shear for Cutting Scrap

and making 50 cuts per minute. It has a 13-in. knife with a 6-in. opening at the widest point, weighs 4,200 lb. and requires 3 h. p. to operate it. The No. 2 size has a maximum capacity of 1¾ in. square, making 45 cuts per minute. It has an 18-in. knife, a 7½-in. opening at the widest point, weighs 8,000 lb. and requires 5 h. p. for its operation. Larger sizes could be mounted in the same way if desirable, although the larger shears are not as easily portable.

The trucks are substantially made, having wheels of good diameter and a 3 in. oak plank bed to which the shear is bolted. The front axle turns under to facilitate the turning and backing of the shear, while the tongue or pulling handle can be fastened to either the front or rear axle. This makes it possible to draw the shear up to a pile of scrap and after cutting it,

attach the tongue to the rear of the machine and pull it out backwards without turning or backing. The bed of the truck does not extend out to the front of the machine, so that in cutting scrap none of it can accumulate in and around the machine.

The shears are driven by a motor belt connected to the shear pulley. This method of driving has the advantage over direct gearing that in case of an accident which would overload the



A Motor Driven Alligator Shear Mounted on a Truck

machine either the gears or the motor must break if the connection is secured by direct gearing, while with the belt drive the belt can slip the fly wheel and no damage will be done. The Canton shears are double geared, making them smooth and easy running and prohibiting the breaking and twisting of the crank and countershafts. This is also said to decrease the amount of power required per square inch of cutting capacity.

PRACTICAL CONSIDERATIONS IN CURVE MAINTENANCE

By W. F. Rench

Supervisor, Pennsylvania Railroad, Perryville, Md.

The physical requirements of a curve having been amply met in perfect alinement and correct superelevation and the easement and run-off being in proper proportion and location, the supervisor is confronted with the task of maintaining the excellence of these features. It is well known that each is co-related to the others. Perfect line will not continue if the surface becomes deficient; the surface breaks down more quickly when the line is allowed to deteriorate, and the easement and the run-off suffer if one or the other develops defects.

The maintenance of good surface is more necessary on curves than on tangents. A ¼ in. variation in the level of a tangent, provided it is continuous, cannot be regarded as poor maintenance. Such a condition might exist for some time and its presence be undiscovered until a critical test was made with the level board. In ordinary practice no attempt would be made to level up a tangent track having no greater variation than this until a raise in face was being made, when, of course, the surface would be made true.

But on curves such a defect would be immediately objectionable. While superelevation is generally chosen to the nearest half inch, care is taken that any error is in excess rather than deficiency. Many main line curves are of light degree, 20 min. being most in favor. Experience has shown that at high speed ½ in. variation in superelevation makes the difference between satisfaction and discomfort. The difference is much more marked if the established superelevation of 1½ in. becomes as little as 1 in. in places through breaking down of the surface. Bad maintenance would soon be apparent, both in the line and the surface.

Uniform superelevation is the most important element in curve maintenance. This requirement can only be attained by consistent supervision. The track foreman is ordinarily quite faithful in his use of the track level when surfacing is being done, but he is not so apt to carry his level with him to try his curves for this defect. If the surface of the rail sights properly the track is in his view all right. A test under his eyes with the level is the best lesson that can be given. The line having been made correct, the maintenance of good surface is necessary to its continuance. But even with faithful maintenance there is a certain amount of slight shifting under the traffic which cannot be controlled and which requires periodical correction. If neglected these slight detail defects soon increase to the extent of a general deficiency and eventually the line of the curve is lost and another relining with the string is necessary. In no other feature of track work is the old saw regarding the stitch in time more aptly illustrated.

There is no permanent means of marking the correct line of a curve. Stakes are struck by dragging parts of cars and sometimes only slightly disturbed when they become worse than useless. Steel pins, old rails, even stone monuments are disturbed by frost and in any event their usefulness depends upon measurement with a varying tape line held in every position except the horizontal. Maintenance of the correct line by continued watchfulness is the better practice.

The correction of the short depressions often no more than two or three rail lengths in extent is an important item in curve maintenance. These dips are very unfavorable at any point, as they render fine lining impossible and, no matter how perfect the work with the level, their presence prevents fine results in surface. But they are particularly objectionable on curves. Doubtless in theory they cause no defect if symmetrical with the cross section. But the depressions in the two rails are seldom directly opposite and a rolling of the car is the inevitable result, which under extreme circumstances may become a lurch. They should be regarded as defects and carefully eradicated in the general surfacing program.

A raise in face is periodically necessary for all main tracks, the intervals depending upon the kind of roadbed and the character of the traffic. When such raising is being done on curves, it is customary for the low rail to be selected as the grade rail. But a very distinct advantage may be gained by using the opposite rail. In raising tangents it is very desirable to raise both rails together and usually against the current of traffic. But on curves many foremen prefer to raise the high rail to a proper grade, introducing for the time being added superelevation, and to follow this by bringing the low rail to the grade required for proper superelevation, and this procedure is usually the better one when the raise is moderate.

The basic requirement for curve maintenance is an ample renewal of the cross-ties to provide a firm bearing at all times. Generous tie replacement is desirable in all kinds of road, but it is essential on curves. This is not alone needed for maintaining the gage, although that is the prime consideration, but it is also necessary for conserving the surface, which in turn contributes to permanence of the line. A main line curve can hardly be considered adequate track for heavy service unless well tied and having each tie protected by a tie plate.

The importance of correct gage on curves cannot be overestimated. The superelevation of a curve is of course adjusted to just one speed. If the movement is at a very much slower speed the wheels will impinge upon the inside rail, if faster upon the outside rail. In either case a variation in the gage becomes immediately noticeable. The tendency of every curve to spread can only be met by a full equipment

of tie plates. These should be provided with a single rib across the axis of the tie, both on the top and on the bottom, the one to maintain the plate in its established place on the tie and the other to supply a bearing surface for the rail base. The tie plate should carry a third spike to draw the plate close against the rail base and to help hold it in place. When tie plates are being applied the gage should be made ⅛ in. tight, so that when the rib of the tie plate has settled into the tie the gage may be neat 4 ft. 8½ in. The gage should only be widened when the degree of the curve exceeds 10 deg. and should never be made more than 4 ft. 9 in. The best means of detecting imperfect gage by a casual inspection is to run the eye along both rails of the track. If an irregularity shows upon one rail and not upon the other the trouble is surely in the gage. Even where the track is plentifully equipped with tie plates there is constant need of gage correction and to this end it is the practice on many divisions to keep a gaging gang of three men constantly employed. If the leader of this gang is efficient the gage correction may be made a means of correcting the detail line as well.

The order of correction for the various defects of curves that are generally deficient should be: First, a roughing in of the line to render the test with the string more effectual; second, adjustment of the line after a careful study of the ordinates obtained; third, application of a proper superelevation, including the run-off, or correction of any deficiency that may be found in the existing superelevation; fourth, the regaging, which is readily apparent after the line rail has been made true, and, fifth, a fine detail lining.

The general correction of the line is nearly always the first operation, because if the throws should be several inches the fine surface would be disturbed and in the event that the established superelevation were excessive for the curve when made regular, this amount of elevation might be necessary even for safety at points on the curve where sharp places exist. Further, the proper superelevation and its limits and the approach and run-off can only be determined by the line study of the curve. A careful examination of the present run-off is quite essential, as it is no unusual occurrence to find the run-off improperly located, sometimes as much as several hundred feet from where it should be.

A very common defect which is of the tangents, but pertains to the curve adjustment, is the protruding of the ends of the curve outside the line of the tangents. This defect arises through the tendency of a curve to make its own easement and through the invariable practice of maintainers lining out the ends of curves to obtain the advantage of an easement. It is found when the curve is provided with proper easements in the relining, the natural shifting ceases and there is no longer a tendency of the foreman thus to distort the line in endeavoring to make a seeming correction. The elimination of this defect should be one of the main considerations in the preliminary lining, as its presence precludes a proper adjustment of the line.

When accurately adjusted and faithfully maintained curves are just as comfortable in riding as any other track. Although once the opposite of comfortable, the presence of curves is scarcely noted by the ordinary passenger and this result has been reached through the greater consideration that is now being given to curve maintenance.

Aeroplane Accidents.—The number of aeroplane accidents reported from various principal countries in the first six months of this year in which the pilots were naval or military flyers, and which had fatal results either to pilot or passenger, was as follows: Germany, seventeen; Russia, eight; Great Britain, seven; France, seven; Austria, three; United States, two; Italy, two; Turkey, two. The following was the number of fatal accidents in which the pilots were civilians: France, fifteen; Germany, four; Great Britain, four; United States, four; Russia, two; Italy, one.

AN INTERESTING USE OF PORTABLE TRACKS

An interesting use of portable tracks in construction work is illustrated in the filling of a large hollow at Golden Gate Park, San Francisco. Here one mile of 20 lb., 24 in. gage, portable track is laid, over which 75 steel dump cars of 36

Lifting Section of Portable Track off Street Car Rails

cu. ft. capacity are used to transport sand from a high bank to the hollow, the cars being loaded by specially designed excavators operated by gasoline and capable of loading 10 cars every 10 minutes. These cars are hauled down a city

Loading the Cars

street from the point of excavation to the fill, crossing one street car line, where a man is stationed who removes the section of portable track whenever a street car approaches, as shown in one of the illustrations. Both the cars and the track are of Orenstein-Arthur Koppel Company construction.

AN UNUSUAL ARTESIAN WELL FOR A WATER STATION

By C. R. Knowles

General Foreman Waterworks, Illinois Central, Chicago.

Two things are essential to an artesian water supply. First, that the porous water bearing bed receive its supply at a point, or in a region where it lies comparatively high; and second, that it be enclosed by comparatively impervious beds. If the enclosing beds permit no water to escape and completely surround the reservoir, except in the region of supply, then when the reservoir is penetrated by a well the water will rise to the height of the lowest point of supply.

This condition is never fully realized. The so-called impervious beds are never absolutely water tight and but few water bearing beds are completely enclosed by impervious material. The head of artesian water is therefore somewhat lower than the source of supply and it may be very much lower. It is a common belief that the head of water increases with the depth of the well, or that flowing wells may be secured anywhere if wells are sunk to a sufficient depth, but experience has shown that the sinking of wells far below the principal water bearing strata has commonly resulted in highly mineralized waters rather than an increased head.

Flowing wells are by no means uncommon, particularly in

the southern states, but a well delivering water sufficient for over one hundred locomotives daily at 50 ft. elevation deserves special mention. Such a well supplies the new water station of the Illinois Central at Roseland, La., which eliminates the old steam plant at Tangipahoa. Roseland is located on the McComb district of the Louisiana division, 72 miles north of New Orleans. The location of a water station at this point provides a better spacing, and permits an increased tonnage over this district.

The qualifications for an ideal railway water station are, first, an abundance of good boiler water; second, proper location with reference to grade, curvature and spacing; third, low cost of pumping. The new station at Roseland embodies all of these qualifications, the distinctive feature being the flowing well which delivers water direct to the tank without cost for pumping.

This well is 6 in. in diameter and is drilled to a depth of 924 ft. It flows over 700 gal. per min. at the surface of the ground, and the flow through the overflow pipe after filling the tank 45 ft. above the surface is over 400 gal. per min., sufficient to supply 125 trains daily. The total static head of the well is 90 ft. The quality of the water is excellent both for drinking and for locomotive use. It contains less than ½ lb. of incrusting solids per 1,000 gal. The chemical analysis is as follows:

Iron, aluminum and silica oxides	.93 grains
Calcium carbonate	1.16 grains
Magnesium carbonate	.88 grains
Alkali chloride	.93 grains
Alkali sulphate	.70 grains
Alkali carbonate	.72 grains
Total solids	5.32 grains

The flow was encountered in white sand at a depth of 720 ft. This stratum of sand is 204 ft. thick with an overlying stratum of hard clay 122 ft. thick. There is also a stratum of clay beneath the flowing sand, the thickness of which was not determined. The well was drilled by company forces with a rotary well machine. This method of drilling consists of rotating down the casing under water pressure, the water washing out the sand and clay as the pipe is lowered.

In drilling in sand strata great difficulty is experienced from caving and loss of wash water through the sand unless a mud laden water is used. No suitable mud could be found at Roseland for mixing with the water used for drilling and a sticky clay, or gumbo, was brought from Harahan for this purpose. It required a carload of this gumbo to complete the well. About 15 per cent of clay is mixed with the water. The action of this mud laden fluid on sands, or other porous formations may be likened to the action of muddy water in passing through a filter. Most of the sediment is deposited on the surface of the filter and some of it enters the filter, the portion diminishing as the filtering medium is penetrated. The clay from a mud laden fluid in a well will penetrate a porous formation in the same manner, the penetration depending on the porosity of the formation and pressure of the fluid in the well, but finally no more water will go through and the result is that the well is nicely walled up with mud. When the well is completed to the required depth, a strainer is placed in the bottom of the well and the casing withdrawn until the strainer is exposed. The Roseland well has 125 sq. ft. of strainer exposed to the sand.

The water is delivered to locomotives through two 12-in. penstocks located so as to serve both north and southbound mains. These penstocks are supplied by a 100,000-gal. cypress tank on a 20-ft. creosote frame. The foundations of the tank are of concrete set on 48 creosoted piles 25 ft. long.

Illinois Central Water Station at Roseland, La., Securing Supply from an Artesian Well

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CONTENTMENT.—W. Hanley, a signalman on the North Eastern Railway of England near Selby, has been 40 years in one signal box, and it is calculated that he has walked to and from his work 61,000 miles.

COST ACCOUNTING ON THE COLEMAN CUT OFF

By J. B. Skeen

Assistant Engineer, Atchison, Topeka & Santa Fe, Los Angeles, Cal.

A brief description of the construction of the Coleman Cut-Off was published in the *Railway Age Gazette* of February 13, 1914. It has been suggested that an outline of the methods of keeping the records on this piece of construction work would be of more than passing interest at this time, as the physical valuation of common carriers by the federal government now under way, as well as the valuation of railroads by various state commissions, makes the subject of cost keeping an important one. The rigid investigation of the carriers' records by the valuation engineers will, without doubt, bring to light the fact that with most roads this feature has been given little consideration in the construction of new lines in the past, and it will probably also be found that additions and betterments have not been recorded in sufficient detail to enable the roads to compile an appraisal of their property readily without an immense amount of searching of old records and files and extensive field investigations.

When the above work was commenced a system of bookkeeping in line with past practice on construction on this road was inaugurated on a plan that contemplated a completion report at the close of the work that would reflect the exact cost of each individual structure and facility, divided between labor, freight and material, with a further separation of charges in the case of bridges and like structures as between sub-structure, superstructure, etc. The simplest and most direct methods were employed, and if the results attained were more than ordinarily satisfactory, they were due to close application of the principles of accounting as prescribed by the Interstate Commerce Commission for expenditures of road and equipment, and a proper appreciation of the value of individual cost records that could be relied upon.

As charges accrued they were recorded by I. C. C. accounts in a journal provided with suitable headings for that purpose. This journal was balanced monthly with the auditor's books and any discrepancies were adjusted while matters were fresh, without waiting, as is often the case, until the completion of the work, to correct errors that are likely to creep in on work, involving expenditures of $500,000 to $1,000,000 per month.

A set of job ledgers covering the detailed cost of all structures was opened and every charge that it was possible to locate was entered in such a manner as to give a reference to where the minute details making up the charge could be located. Labor charges were posted in monthly order as they were incurred, the amount being entered under individual jobs and the source of the charge being given. Material charges were entered in a like manner, entries only being made of requisition or voucher number, amounts and a brief description of the material covered. All papers supporting expenditures of whatever nature were filed in monthly order, and the details of each transaction were readily located by reference to the ledger for the date charged out. Thus the same result was attained as though the details had been posted directly in the ledger, at a great saving of time and expense.

Many charges accrued every month that could not be located to definite jobs. To care for these, a "Miscellaneous" account was carried in connection with each I. C. C. account and at the completion of the work such unlocated items of expense were absorbed by applying them to the located expenditures on the basis of the relation of the unlocated charges to those that could be located, each account, of course, being treated separately in this respect. For instance, many thousands of dollars chargeable to Account 206, Bridges, Trestles and Culverts, could not be located to individual structures during the progress of the work. These items consist of the cost of pile driving equipment, tools and supplies, expense of train and enginemen distributing material, office expense, etc. This expense was carried in the books as "Miscellaneous Charges, Account 206," and prorated as above over individual structures on a cost basis at the completion of the work.

The total of the located charges and miscellaneous expense for each account was balanced each month with the account distribution, which, as before stated, was balanced monthly with the auditor's books, and errors in accounting, either in the engineering or accounting department, were more readily located, and adjustments made easier than if only costs by accounts were kept.

On a piece of work of this magnitude the economical ordering of material and supplies is a problem within itself. In this case this problem was solved in the following manner: A purchasing agent and storekeeper was installed in a field office at a point convenient to the headquarters of department heads directing the field work. Tentative orders for track, bridge, building, fence material, etc., were placed at the beginning of the work and the materials were stored at yards at either end of the line. Large amounts of other supplies were also ordered in a like manner. In order to avoid the delay that would necessarily ensue were the general practice adhered to, of requiring an approved requisition before issuing material and supplies and to fully protect the storekeeper in his issues, parties authorized to order material were supplied with memorandum requisition forms and orders for material and supplies were made on this form, the original going to the storekeeper and a copy to the chief engineer's office. These memos were given departmental and consecutive numbers and the storekeeper was instructed to fill all such orders, unless requested by chief engineer's office by wire to the contrary, after examination of the copy which reached the chief engineer's office about the time the storekeeper received the original.

At the end of each month regular requisitions were made from the memos furnished during the month and the storekeeper was furnished with approved form. They were then priced by him, covering the entire cost of the items furnished, including the cost of handling by the store department, freight, etc., and the invoice portions were forwarded to the chief engineer's office, where they were used in the scheme of cost keeping as above.

Special attention was given to the preparation of map data. Very complete right-of-way and station maps, profiles, bridge and building plans, yard layouts, ravine sections, etc., delineating the property as it was constructed, were prepared during the course of construction. In addition to the usual map data, there was compiled in considerable detail the following: Bridge list, station list, ballast statement, rail record, railroad crossing record, stock yard record, clearance chart, tie plate record, rail joint record, tie record, fence record, building record, side track record and water service record.

The value of the maps, records and cost data covering the construction of this line was fully appreciated in the preparation of the valuation of the property for the Texas railroad commission and will doubtless be appreciated as fully in the valuation for the federal government.

A New Field for Tourists.—The through passenger and freight train service between Fort William and Prince Rupert, announced recently by the Grand Trunk Pacific, will place Prince Rupert in direct touch with eastern Canada and the United States and provide a new avenue of commerce to Canadian agriculture and industry. The thriving townships in Central British Columbia which have grown up along the main line of the Grand Trunk Pacific, but which have hitherto been reached only by stage or river steamers, will quickly feel beneficial effects. The Grand Trunk Pacific now has 2,195 miles of main line in operation.

General News Department

Congressman Bryan of the state of Washington has introduced in the House a bill for the construction by the government of a railroad from Marysvale, Utah, southward into the National Forest in Arizona. Marysvale is the southern terminus of a branch of the Denver & Rio Grande.

Retrenchment on the Pennsylvania Railroad has extended to the closing of a number of small passenger stations, and it is announced that the following stations on the Pittsburgh division will be discontinued after October 3: Weaver's Old Stand, Brinkerton, Shoup, United, Trauger, Udell, Hecla, Mutual, Calumet, Rumbaugh, Mammoth, Pleasant Unity Crossing, Marguerite, Leith, Pennsville, Chambers and Biddle.

The creosoting plant of the Missouri, Kansas & Texas at West Denison, Tex., has suspended operations because of a shortage of creosote oil. Large quantities of timber and ties are on hand ready to be treated, but the company's sources of supply have been Germany and England, and both of these are now cut off. The Pennsylvania Railroad has on hand a supply of creosote sufficient for the needs of its timber preserving plant for a considerable time to come.

Thomas Cooper, land commissioner and assistant to the president of the Northern Pacific, has issued a statement announcing that during the last fiscal year the road has sold 800,000 acres of land, chiefly in Washington and Montana. A large area of eastern Washington land, suitable now only for grazing, brought 75 cents to $2.50 per acre. The company estimates the total land grant from Lake Superior to Puget Sound at 40,000,000 acres. The total sales to June 30, last, approximated 30,000,000 acres. Of the 10,000,000 acres remaining about half is still unsurveyed and unpatented. These figures were made public to refute many incorrect statements made during political campaigns, in which it has been alleged that the railway delayed federal surveying of its land to escape taxation. Mr. Cooper says that for 10 years the company has urged the government to hasten surveys, thereby enabling the company to sell its land and push development of its tributary country. The company has applied for a survey of practically all of the 5,000,000 acres still unsurveyed.

Passenger Train Disaster at Lebanon, Mo.

Twenty-seven persons were drowned early on the morning of September 15, before daylight, when a St. Louis & San Francisco westbound passenger train was derailed in a flood, caused by a cloud burst, two miles west of Lebanon, Mo., 182 miles southwest of St. Louis. Two passenger cars toppled into a deep gully filled with water. Eighteen persons were injured, but none seriously. Ninety-nine persons, including the train crew, were on the train. The fireman is among the killed, but the engineman escaped. The engineman had been running cautiously, because of the rain, and the train was moving about 15 or 20 miles an hour. A twelve-foot embankment on which the track crossed a ravine had been partly washed away by the rush of water. The locomotive and first two cars passed through on the sagging track, but the chair car and the smoking car rolled over into the torrent. The locomotive and the mail and baggage cars finally left the rails and fell into three feet of water. Four sleeping cars remained on the track. The chair car and the smoking car were submerged, and some of the occupants were drowned while they slept.

Brotherhoods Enjoined

Five conductors of the St. Louis Southwestern went into court at St. Louis on Wednesday and secured a temporary injunction restraining five vice-presidents of railwaymen's unions from bringing about a strike following an ultimatum delivered to the management of the road. The trouble arose when the management refused to reinstate a conductor who had been accused of drunkenness.

The five conductors said a majority of the engineers employed by the road had voted against a strike and that the engineers' brotherhood had withdrawn from the federation when it appeared that the strike order would be issued. The defendants must show cause next Tuesday why the injunction should not be made permanent.

Soon after the injunction was granted the railroad company asked the Federal Board of Mediation to use its offices to avert the strike. President Britton said that this action was taken in order to leave no stone unturned toward preventing the strike.

Traveling Engineers' Exhibitors

The following is a list of the exhibitors at the convention of the Traveling Engineers' Association, held in Chicago, September 15-18:

American Arch Company, New York.—Models of Security arch. Represented by Le Grand Parish, W. L. Allison, H. D. Savage, J. P. Neff, J. T. Anthony, M. K. Tate, R. J. Himmelright, E. H. Cook, T. M. Ferguson, T. F. Kilcoyne, T. Mahar, W. W. Neale, G. Wagstaff, L. S. Allen, G. M. Bean, C. E. Miller, G. E. Crisp, F. G. Boomer, C. T. Pfeiffer, G. C. Denney and C. A. Coons.

American Steel Foundries, Chicago.—Simplex couplers, coupler pockets, Vulcan and Andrews trucks, Simplex bolsters, cast steel bolsters; Ajax, Hercules and Vulcan brake beams, Economy draft arms, Davis cast steel wheels. Represented by F. A. Lorenz, Jr., W. A. Wallace and W. G. Wallace.

Ashton Valve Company, Boston, Mass.—Valves, gages and gage testing appliances. Represented by J. W. Milliwell, J. F. Gettrust and H. O. Fettinger.

Barco Brass & Joint Company, Chicago.—Metallic connections for tenders and cars, flexible joints. Represented by F. N. Bard, C. L. Miller and L. W. Miller.

Bird-Archer Company, New York.—Boiler chemicals. Represented by J. M. Robb and John Barnes.

Buda Company, The, Chicago.—Buda-Ross headlighting sets. Represented by J. W. Cleary, M. A. Ross and H. P. Bayley.

Chambers Valve Company, New York.—Chambers throttle valve. Represented by F. H. Clark and C. E. Coffee.

Chicago Car Heating Company, Chicago.—Car heating apparatus.

Commercial Acetylene Railway Light & Signal Company, New York.—Acetylene railroad signals.

Dearborn Chemical Company, Chicago. Represented by J. D. Purcell, W. S. Reid, J. F. Roddy, C. S. Murray, A. W. Cooley, F. Fosdick and C. B. Hennessy.

Detroit Lubricator Company, Detroit, Mich.—Cylinder and flange lubricators. Represented by A. D. Homard and A. G. Machesney.

Dixon Crucible Company, Joseph, Jersey City, N. J.—Graphite products. Represented by L. W. Brooks and J. E. Simpson.

Economy Devices Corporation, New York.—Ragonnet power reverse gear, Universal steam chest, Economy engine truck, Economy exhaust nozzle, radial buffer. Represented by J. L. Randolph.

Edna Brass Manufacturing Company, Cincinnati, Ohio.—Lubricators, injectors, water glasses, water gages, boiler checks, coal sprinklers and fire extinguishsers. Represented by E. O. Corey and H. A. Glenn.

Equipment Improvement Company, New York.—Solid end main rod, lateral motion plates, flangeless shoe and wedge, removable driving box brass, packing. Represented by F. H. Clark, R. H. Weatherly and C. W. Cross.

Flannery Bolt Company, Pittsburgh, Pa.—Tate flexible staybolts. Represented by W. M. Wilson and B. E. D. Stafford.

Franklin Railway Supply Company, New York.—Franklin locomotive drifting valve, Franklin fire door, Franklin water joint, Franklin strainer valve. Represented by W. L. Allison, W. H. Coyle, R. G. Coburn, J. Sinkler, C. W. F. Coffin, J. S. Coffin, Jr., and S. D. Rosenfelt.

Galena-Signal Oil Company, Franklin, Pa. Represented by W. O. Taylor, E. V. Sedwick, J. E. Linahen, Ed. McVicker, Louis Gleason, J. S. Brown, J. S. Graham, J. A. Roosevelt, P. H. Stack, M. Meehan, Fred Smith, D. L. Eubank, W. E. Brumble, Wm. H. Holmes, W. J. Walsh, W. F. Walsh, F. J. Walsh, J. G. Arn, H. H. Hale and Cbas. Royal.

Garlock Packing Company, Palmyra, N. Y.—Fibrous packing. Represented by M. E. Hamilton and G. H. Green.

Greene, Tweed & Co., New York.—Palmetto steam packing. Represented by Victor B. Nickerson and F. M. Thomson.

Grip Nut Company, Chicago.—New York pump nuts, Westinghouse pump nuts, knuckle pin nuts. Represented by B. C. Hooper.

Hammett, H. G., Troy, N. Y.—Trojan packing, Trojan bell ringer. Represented by E. C. Sawyer.

Henry Manufacturing & Grease Cup Company, Terre Haute, Ind.—Grease cups. Represented by M. Henry.

Hunt-Spiller Manufacturing Corporation, Boston, Mass.—Cylinder packing and bushing, valve packing and bushing, crosshead shoes, bull rings, piston heads, side rod bushings, driving box crown bearings. Represented by W. B. Leach, J. G. Platt, V. W. Ellet, J. M. Monroe and E. J. Fuller.

Jenkins Brothers, New York.—Extra heavy valves. Represented by B. J. Neely.

Keystone Lubricating Company, Philadelphia, Pa.—Model of Keystone driving box. Represented by J. N. Mowery.

King & Company.—Packing. Represented by J. K. King.

Leslie Company, The, Lyndburst, N. J.—Steam heat regulators and electric headlight pressure regulators. Represented by S. I. Leslie and J. J. Cizek.

Locomotive Stoker Company, New York. Represented by L. V. Stevens.

Locomotive Superheater Company, New York.—Superheater parts. Represented by H. B. Oatley, F. A. Schaff, G. E. Ryder, R. M. Ostermann, R. R. Porterfield, G. E. Spengler, W. G. Tawse, W. Boughton, G. Fogg, B. G. Lynch, J. E. Mourne, A. C. MacLacklan, A. S. McDonald, C. D. Hilferty, W. A. Buckbee, J. Bell and C. M. Wickham.

Long, Chas. R., Jr., Company, Chicago and Louisville.—Railway paints. Represented by Chas. R. Long, Jr., G. S. Turner, W. H. Heckman and M. E. Keig.

Manning, Maxwell & Moore, New York.—Hancock inspirators, Consolidated safety valves, Ashcroft gages. Represented by C. L. Brown and F. J. Wilson.

Mudge & Company, Chicago.—Model of spark arrester. Represented by Burton W. Mudge and G. W. Bender.

Murdoch & Co., H., Pittsburgh, Pa.—Babbitt metal. Represented by A. L. Dunlap.

McCord & Company, Chicago.—Force feed lubricator, pressed steel journal box. Represented by O. H. Neal and H. E. Creer.

Nathan Manufacturing Company, New York.—Steam boiler appliances, Nathan Simplex and Monitor lifting injectors, Nathan Simplex non-lifting injectors, Nathan Simplex lifting injectors, Bull's-Eye lubricators. Represented by George Royal, A. S. Work, W. R. Walsh and J. S. Seeley.

National Boiler Washiog Company, Chicago.—Model of Safety First fire door, model of locomotive cleaning device. Represented by H. A. Varney and E. B. White.

National Graphite Lubricator Company, Scranton, Pa. Represented by E. L. Pollock.

National Railway Devices Company, Chicago.—Model of Shoemaker fire door. Represented by J. D. Robinson, E. J. Gunnison and M. M. Auerbach.

National Tube Company, Pittsburgh, Pa.—Kewanee specialties. Represented by F. J. Kelley.

New York Air Brake Company, New York. Represented by R. G. Parker, W. Owens, L. W. Sawyer, G. Kleifges, B. Hyanes and O. Trieglaff.

Ohio Injector Company, Chicago.—Chicago lubricator, Chicago non-lifting injector, Ohio injector, Chicago flange oiler, hose strainer, boiler checks. Represented by F. W. Furry, W. S. Furry, F. W. Edwards, F. Wipperman and A. C. Beckwith.

Okadee Company, Chicago.—Hose coupler, drain valve, water gage, blowoff valve, locomotive sander, packing, sand dryer. Represented by H. Vissering.

O'Malley-Beare Valve Company, Chicago.—Multiplate valves, Duplex blow-outs. Represented by Edward and Thomas O'Malley.

Parkesburg Iron Company, Parkesburg, Pa. Represented by J. H. Smythe, L. P. Mercer, G. Thomas and W. H. S. Bateman.

Paxton-Mitchell Packing Company, Omaha, Neb.—Packing. Represented by C. A. Coons.

Pilliod Company, The, New York.—Model of Baker valve gear. Represented by R. H. Weatherly, F. E. Pilliod, R. Graham and F. Wilcoxen.

Pyle National Electric Headlight Company, Chicago—Electric headlights. Represented by J. Will Johnson, R. C. Vilas, W. A. Vilas, W. T. Bretherton, G. E. Haas, C. E. Kinnan, C. F. McGinnis, W. Miller and L. H. Steger.

Sellers & Co., William, Inc., Philadelphia, Pa.—Lifting and non-lifting injectors, strainers, boiler checks, coal sprinklers. Represented by John D. McClintock and L. H. Burns.

Simmons-Boardman Publishing Company, New York.—*Railway Age Gazette, Mechanical Edition; Railway Age Gazette.* Represented by L. B. Sherman, F. H. Thompson and R. E. Thayer.

Southern Locomotive Valve Gear Company, Knoxville, Tenn.—Model of valve gear. Represented by L. D. Tyson and E. L. Chollman.

Standard Heat & Ventilation Company, New York City.

Storrs Mica Company, Owego, N. Y. Represented by T. Brown.

Stroog, Carlisle & Hammond Company, Cleveland, Ohio.—Sheet lubricator and set screws. Represented by B. E. Carpenter and H. B. Prescott.

United States Graphite Company, Saginaw, Mich.—Lubricating graphite, boiler graphite and graphite paint. Represented by J. G. Draught and J. W. Eviston.

U. S. Metallic Packing Company.—King type piston, valve stem and air pump packing, Leach type pneumatic sanders, Gollmar bell ringers. Represented by B. Brewster, Harry M. Wey and James J. Grogan.

Vissering & Co., Harry, Chicago and Louisville, Ky.—Sanders, bell ringers and metallic packing. Represented by Harry Vissering, G. S. Turner, W. H. Heckman and M. E. Keig.

Westinghouse Air Brake Company, Pittsburgh, Pa. Represented by A. K. Holmyer.

Federation of Trade Press Associations

The ninth annual convention of the Federation of Trade Press Associations will be held at the Congress Hotel, Chicago, Thursday, Friday and Saturday, September 24-26, 1914. The opening addresses and committee reports will be made on Thursday morning, and on Thursday afternoon there will be an editorial symposium followed by a circulation symposium. Friday morning will be devoted to an advertising symposium and Friday afternoon to a subscribers' and advertisers' mass meeting, while the annual banquet will be held in the gold room of the Congress Hotel on Friday evening. A publishers' symposium on Saturday morning completes the program.

MEETINGS AND CONVENTIONS

The following list gives names of secretaries, dates of next or regular meetings, and places of meeting.

Air Brake Association.—F. M. Nellis, 53 State St., Boston, Mass. Next convention, May 4-7, 1915, Hotel Sherman, Chicago.

American Association of Demurrage Officers.—A. G. Thomason, Demurrage Commissioner, Boston, Mass. Annual convention in April.

American Association of Dining Car Superintendents.—H. C. Boardman, D. L. & W., Hoboken, N. J. Next convention, October 22-24, Washington, D. C.

American Association of Freight Agents.—R. O. Wells, Illinois Central, East St. Louis, Ill. Annual meeting, May 21-24, 1915, Richmond, Va.

American Association of General Passenger and Ticket Agents.—W. C. Hope, C. R. R. of N. J., 143 Liberty St., New York.

American Association of Railroad Superintendents.—E. H. Harman, Room 101, Union Station, St. Louis, Mo.

American Electric Railway Association.—E. B. Burritt, 29 W. 39th St., New York. Annual convention, October 12-16, Atlantic City, N. J.

American Electric Railway Manufacturers' Association.—H. G. McConnaughy, 165 Broadway, New York. Meetings with American Electric Railway Association.

American Railway Association.—W. F. Allen, 75 Church St., New York. Semi-annual meeting, November 18, Chicago.

American Railway Bridge and Building Association.—C. A. Lichty, C. & N. W., Chicago. Next convention, October 20-22, 1914, Los Angeles, Cal.

American Railway Engineering Association.—E. H. Fritch, 900 S. Michigan Ave., Chicago. Next convention, March 16-18, 1915, Chicago.

American Railway Master Mechanics' Association.—J. W. Taylor, 1112 Karpen Bldg., Chicago. Annual meeting, June, 1915.

American Railway Safety Association.—L. F. Shedd, C. R. I. & P., Chicago. Next meeting, November, Chicago.

American Railway Tool Foremen's Association.—A. R. Davis, Central of Georgia, Macon, Ga. Annual meeting, July, 1915.

American Society for Testing Materials.—Prof. E. Marburg, University of Pennsylvania, Philadelphia, Pa.

American Society of Civil Engineers.—Chas. W. Hunt, 220 W. 57th St., New York. Regular meetings, 1st and 3d Wednesday in month, except June, July and August, 220 W. 57th St., New York.

American Society of Engineering Contractors.—J. R. Wemlinger, 11 Broadway, New York. Regular meetings, 2d Thursday in month, at 2 P. M., 11 Broadway, New York.

American Society of Mechanical Engineers.—Calvin W. Rice, 29 W. 39th St., New York. Annual meeting, December 1-4, 1914, New York.

American Wood Preservers' Association.—F. J. Angier, B. & O., Mt. Royal Sta., Baltimore, Md. Next convention, January 19-21, 1915, Chicago.

Association of American Railway Accounting Officers.—E. R. Woodson, 1300 Pennsylvania Ave., N. W., Washington, D. C. Annual convention, April 28, 1915, Atlanta, Ga.

Association of Manufacturers of Chilled Car Wheels.—George W. Lyndon, 1214 McCormick Bldg., Chicago. Annual meeting, second Tuesday in October, New York.

Association of Railway Claim Agents.—C. W. Egan, B. & O., Baltimore, Md. Annual meeting, 3d week in May, 1915, Galveston, Tex.

Association of Railway Electrical Engineers.—Jos. A. Andreucetti, C. & N. W., Room 411, C. & N. W. Sta., Chicago. Annual convention, October 26-30, 1914, Chicago.

Association of Railway Telegraph Superintendents.—P. W. Drew, Soo Line, 112 West Adams St., Chicago. Annual meeting, June 22-25, Rochester, N. Y.

Association of Transportation and Car Accounting Officers.—G. P. Conard, 75 Church St., New York. Next meeting, December 8-9, 1914, Richmond, Va.

Bridge and Building Supply Men's Association.—L. D. Mitchell, Detroit Graphite Co., Chicago, Ill. Meetings with American Railway Bridge and Building Association.

Canadian Railway Club.—James Powell, Grand Trunk, P. O. Box 7, St. Lambert (near Montreal), Que. Regular meetings, 2d Tuesday in month, except June, July and August, Windsor Hotel, Montreal, Que.

Canadian Society of Civil Engineers.—Clement H. McLeod, 176 Mansfield St., Montreal, Que. Regular meetings, 1st Thursday in October, November, December, February, March and April. Annual meeting, January, Montreal.

Car Foremen's Association of Chicago.—Aaron Kline, 841 Lawler Ave., Chicago. Regular meetings, 2d Monday in month, except July and August, Lytton Bldg., Chicago.

Central Railway Club.—H. D. Vought, 95 Liberty St., New York. Regular meetings, 2d Friday in January, May, September and November. Annual meeting, 2d Thursday in March, Hotel Statler, Buffalo, N. Y.

Civil Engineers' Society of St. Paul.—Edw. J. Dugan, P. O. Box 654, August and September, Old State Capitol Bldg., St. Paul.

Engineers' Society of Pennsylvania.—Edw. R. Dasher, Box 75, Harrisburg, Pa. Regular meetings, 1st Friday after 10th of each month, except July and August, 31 So. Front St., Harrisburg, Pa.

Engineers' Society of Western Pennsylvania.—Elmer K. Hiles, 2511 Oliver Bldg., Pittsburgh, Pa. Regular meetings, 1st and 3d Tuesday, Pittsburgh.

Freight Claim Association.—Warren P. Taylor, R. F. & P., Richmond, Va. Annual meeting, June 16, 1915, Chicago.

General Superintendents' Association of Chicago.—A. M. Hunter, 321 Grand Central Station, Chicago. Regular meetings, Wednesday preceding 3d Thursday in month, Room 1856, Transportation Bldg., Chicago.

International Railway Congress.—Executive Committee, 11, Rue de Louvain, Brussels, Belgium. Next convention, June 23 to July 6, 1915, Berlin.

INTERNATIONAL RAILWAY FUEL ASSOCIATION.—C. G. Hall, C. & E. I., 922 McCormick Bldg., Chicago. Annual meeting, May 17-20, 1915, Chicago.

INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—Wm. Hall, 829 W. Broadway, Winona, Minn. Next convention, July 14-17, 1915, Sherman House, Chicago.

INTERNATIONAL RAILROAD MASTER BLACKSMITHS' ASSOCIATION.—A. L. Woodworth, C. H. & D., Lima, Ohio.

MAINTENANCE OF WAY AND MASTER PAINTERS' ASSOCIATION OF THE UNITED STATES AND CANADA.—T. I. Goodwin, C. R. I. & P., Eldon, Mo. Next convention, November 17-19, 1914, Detroit, Mich.

MASTER BOILER MAKERS' ASSOCIATION.—Harry D. Vought, 95 Liberty St., New York. Annual convention, May, 1915.

MASTER CAR AND LOCOMOTIVE PAINTERS' ASSOCIATION OF THE UNITED STATES AND CANADA.—A. P. Dane, B. & M., Reading, Mass.

MASTER CAR BUILDERS' ASSOCIATION.—J. W. Taylor, 1112 Karpen Bldg., Chicago. Annual meeting, June, 1915.

NATIONAL RAILWAY APPLIANCES ASSOCIATION.—Bruce V. Crandall, 537 So. Dearborn St., Chicago. Next convention, March 15-19, 1915, Chicago.

NEW ENGLAND RAILROAD CLUB.—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass. Regular meetings, 2d Tuesday in month, except June, July, August and September, Boston.

NEW YORK RAILROAD CLUB.—Harry D. Vought, 95 Liberty St., New York. Regular meetings, 3d Friday in month, except June, July and August, 29 W. 39th St., New York.

NIAGARA FRONTIER CAR MEN'S ASSOCIATION.—E. Frankenberger, 623 Brisbane Bldg., Buffalo, N. Y. Meetings monthly.

PEORIA ASSOCIATION OF RAILROAD OFFICERS.—M. W. Rotchford, Union Station, Peoria, Ill. Regular meetings, 2d Thursday in month, Jefferson Hotel, Peoria.

RAILROAD CLUB OF KANSAS CITY.—C. Maolove, 1008 Walnut St., Kansas City, Mo. Regular meetings, 3d Friday in month, Kansas City.

RAILROAD MASTER TINNERS, COPPERSMITHS AND PIPEFITTERS' ASSOCIATION.—U. G. Thompson, C. & E. I., Danville, Ill. Annual meeting, May, 1915.

RAILWAY BUSINESS ASSOCIATION.—Frank W. Noxon, 30 Church St., New York. Annual meeting, December 10, 1914, Waldorf-Astoria Hotel, New York.

RAILWAY CLUB OF PITTSBURGH.—J. B. Anderson, Room 207, P. R. R. Sta., Pittsburgh, Pa. Regular meetings, 4th Friday in month, except June, July and August, Monongahela House, Pittsburgh.

RAILWAY ELECTRICAL SUPPLY MANUFACTURERS' ASSOCIATION.—J. Scribner, 1021 Monadnock Block, Chicago. Meetings with Association of Railway Electrical Engineers.

RAILWAY FIRE PROTECTION ASSOCIATION.—C. B. Edwards, Fire Ins. Agt., Mobile & Ohio, Mobile, Ala. Annual meeting, October 6, 1914, Washington, D. C.

RAILWAY SIGNAL ASSOCIATION.—C. C. Rosenberg, Times Bldg., Bethlehem, Pa. Annual meeting, September 22-24, 1914, Bluff Point, N. Y.

RAILWAY STOREKEEPERS' ASSOCIATION.—J. P. Murphy, L. S. & M. S., Box C, Collinwood, Ohio. Annual meeting, May, 1915.

RAILWAY SUPPLY MANUFACTURERS' ASSOCIATION.—J. D. Conway, 2136 Oliver Bldg., Pittsburgh, Pa. Meetings with M. C. B. and M. M. Associations.

RAILWAY TELEGRAPH AND TELEPHONE APPLIANCE ASSOCIATION.—G. A. Nelson, 50 Church St., New York. Meetings with Association of Railway Telegraph Superintendents.

RICHMOND RAILROAD CLUB.—F. O. Robinson, C. & O., Richmond, Va. Regular meetings, 2d Monday in month, except June, July and August.

ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.—L. C. Ryan, C. & N. W., Sterling, Ill.

ST. LOUIS RAILWAY CLUB.—B. W. Frauenthal, Union Station, St. Louis, Mo. Regular meetings, 2d Friday in month, except June, July and August, St. Louis.

SALT LAKE CITY TRANSPORTATION CLUB.—R. E. Rowland, Hotel Utah Bldg., Salt Lake City, Utah. Regular meetings, 1st Saturday of each month, Salt Lake City.

SIGNAL APPLIANCE ASSOCIATION.—F. W. Edmunds, 3868 Park Ave., New York. Meeting with annual convention Railway Signal Association.

SOCIETY OF RAILWAY FINANCIAL OFFICERS.—Carl Nyquist, C. R. I. & P., La Salle St. Sta., Chicago.

SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—E. W. Sandwich, A. & W. P. Ry., Atlanta, Ga.

SOUTHERN AND SOUTHWESTERN RAILWAY CLUB.—A. J. Merrill, Grant Bldg., Atlanta, Ga. Regular meetings, 3d Thursday, January, March, May, July, September, November, 10 A. M., Candler Bldg., Atlanta.

TOLEDO TRANSPORTATION CLUB.—J. S. Marks, Agent, Interstate Despatch, Toledo, Ohio. Regular meetings, 1st Saturday in month, Boody House, Toledo.

TRACK SUPPLY ASSOCIATION.—W. C. Kidd, Ramapo Iron Works, Hillburn, N. Y. Meetings with Roadmasters' and Maintenance of Way Association.

TRAFFIC CLUB OF CHICAGO.—W. H. Wharton, La Salle Hotel, Chicago.

TRAFFIC CLUB OF NEW YORK.—C. A. Swope, 291 Broadway, New York. Regular meetings, last Tuesday in month, except June, July and August, Waldorf-Astoria, New York.

TRAFFIC CLUB OF PITTSBURGH.—D. L. Wells, Erie R. R., Pittsburgh, Pa. Meetings bimonthly, Pittsburgh. Annual meeting, 2d Monday in June.

TRAFFIC CLUB OF ST. LOUIS.—A. F. Versen, Mercantile Library Bldg., St. Louis, Mo. Annual meeting in November, Noonday meetings October to May.

TRAIN DESPATCHERS' ASSOCIATION OF AMERICA.—J. F. Mackie, 7122 Stewart Ave., Chicago. Annual meeting June 15, 1915, Minneapolis, Minn.

TRANSPORTATION CLUB OF DETROIT.—W. R. Hurley, Superintendent's office, L. S. & M. S., Detroit, Mich. Meetings monthly, Normandie Hotel, Detroit.

TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, N. Y. C. & H. R., East Buffalo, N. Y.

UTAH SOCIETY OF ENGINEERS.—Frank W. Moore, Newhouse Bldg., Salt Lake City, Utah. Regular meetings, 3d Friday in month, except July and August, Consolidated Music Hall, Salt Lake City.

WESTERN CANADA RAILWAY CLUB.—W. H. Rosevear, P. O. Box 1707, Winnipeg, Man. Regular meetings, 2d Monday, except June, July and August, Winnipeg.

WESTERN RAILWAY CLUB.—J. W. Taylor, 1112 Karpen Bldg., Chicago. Regular meetings, 3d Tuesday in month, except June, July and August, Karpen Bldg., Chicago.

WESTERN SOCIETY OF ENGINEERS.—J. H. Warder, 1735 Monadnock Block, Chicago. Regular meetings, 1st Monday in month, except January, July and August, Chicago. Extra meetings, except in July and August, generally on other Monday evenings.

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF JULY, 1914

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses					Net operating revenue (or deficit).	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
		Freight.	Passenger.	Total. inc. misc.	Maintenance Way and structures.	Maintenance Of equipment.	Traffic.	Transportation.	Miscellaneous.	General.	Total.			
Arizona Eastern	367	$194,644	$33,639	$241,671	$39,262	$21,543	$2,291	$58,996	$1,027	$9,479	$132,553	$109,118	$13,738	$95,239	$15,001
Atlanta, Birmingham & Atlantic	646	174,060	65,620	260,671	42,721	39,737	14,426	102,013	.....	10,608	209,505	51,166	14,337	36,628	12,034
Atlantic City	170	77,752	270,937	360,804	23,593	26,593	2,372	150,167	69	3,608	206,403	154,401	13,500	140,901	—15,854
Bangor & Aroostook	631	170,353	56,448	243,298	53,350	44,976	2,738	82,407	1,126	9,628	194,225	49,074	8,750	40,324	13,206
Boston & Maine	2,252	2,270,090	1,573,066	4,222,986	634,455	791,922	62,166	1,777,080	19,061	96,158	3,380,841	842,145	171,070	671,075	—247,677
Canadian Pacific Lines in Maine	233	39,197	19,567	66,103	27,178	13,732	6,654	31,557	.....	3,554	82,675	—16,572	12,000	—28,572	16,494
Carolina, Clinchfield & Ohio	248	171,121	21,171	196,966	19,022	26,178	7,125	38,252	.....	8,981	97,366	99,600	14,250	85,350	—36,640
Carolina, Clinchfield & Ohio of S. C.	18	8,936	1,772	10,928	792	97	1,698	2,116	.....	412	5,115	5,814	750	5,064	—2,230
Central Vermont	411	229,216	80,895	346,099	43,841	53,629	9,314	156,237	2,929	7,278	273,228	62,871	15,760	47,111	18,418
Chicago & Alton	1,033	782,073	396,085	1,279,437	162,339	290,197	36,366	411,422	10,549	28,999	939,871	339,567	44,650	294,719	—15,260
Chicago & Eastern Illinois	1,282	949,752	265,811	1,315,453	141,213	243,451	22,619	445,056	7,720	33,319	893,378	422,075	56,900	365,153	109,453
Chicago, Burlington & Quincy	9,264	5,067,898	2,119,251	7,861,573	997,763	1,390,164	128,304	2,356,820	68,070	168,735	5,109,855	2,751,719	332,528	2,419,191	132,295
Chicago Great Western	1,427	694,426	288,099	1,082,558	186,486	197,139	44,286	401,302	7,009	33,818	869,418	213,140	48,668	164,276	—119,067
Chicago, Rock Island & Pacific	7,852	3,652,177	1,731,128	5,801,511	959,288	1,065,660	147,602	2,246,571	47,241	140,009	4,599,687	1,201,824	231,202	970,385	90,467
Chicago, Terre Haute & Southeastern	375	165,229	19,326	190,313	31,344	37,448	2,826	50,759	780	8,795	131,952	58,361	11,500	46,861	27,749
Denver & Rio Grande	2,562	1,385,041	486,187	2,003,630	410,508	371,920	39,069	561,778	35,446	58,997	1,476,872	526,758	90,000	436,664	53,985
Denver & Salt Lake	255	90,143	52,657	151,079	21,969	25,698	3,145	46,656	.....	6,401	103,707	47,371	4,500	42,872	3,019
Duluth, South Shore & Atlantic	627	160,947	102,727	293,357	62,964	36,613	7,642	105,204	4,428	15,051	231,902	61,455	19,000	42,455	—13,285
Georgia	307	151,568	80,040	255,426	29,829	48,919	13,126	108,026	.....	8,582	208,483	46,943	3,089	43,854	26,565
Georgia, Southern & Florida	395	123,313	68,115	217,252	26,300	44,038	8,021	83,128	.....	8,842	170,329	46,923	10,943	35,972	14,773

REVENUES AND EXPENSES OF RAILWAYS

TWELVE MONTHS OF FISCAL YEAR ENDING JUNE 30, 1914

Name of road.	Average mileage operated during period.	Operating revenues			Maintenance of		Operating expenses			Net operating revenue (or deficit).	Outside operations, net.	Taxes.	Operating income (or loss).	Increase (or decr.) comp. with last year.
		Freight.	Passenger.	Total. inc. misc.	Way and structures.	Of equipment.	Traffic.	Trans-portation.	General.	Total.					
Arizona Eastern	367	$2,213,876	$447,362	$2,797,811	$373,251	$345,200	$25,171	$772,018	$129,212	$1,644,852	$1,152,959	$1,138	$160,658	$993,439	—$103,139
Atlanta, Birmingham & Atlantic	646	2,424,184	682,029	3,399,360	539,650	542,909	170,408	1,375,044	138,942	2,766,953	632,407	.....	172,042	460,365	58,299
Atlantic & St. Lawrence	167	1,147,275	369,656	1,657,507	262,754	258,355	52,554	784,997	52,603	1,411,263	246,244	.....	129,735	116,509	98,403
Atlantic City	167	759,793	1,478,530	2,362,004	449,004	372,975	31,146	1,155,175	15,348	1,823,712	538,292	—36,360	149,000	352,932	28,244
Bessemer & Lake Erie	204	7,949,046	406,834	8,488,073	888,155	2,412,139	119,963	2,213,179	162,751	5,796,187	2,691,886	.....	336,000	2,355,886	—1,254,138
Birmingham Southern	44	678,302	13,194	1,161,830	191,593	179,505	5,910	406,584	52,264	835,856	325,974	.....	25,222	300,752	—138,037
Boston & Maine	2,252	27,866,098	15,851,615	47,413,906	6,545,830	7,733,871	465,058	22,189,351	1,362,569	38,296,679	9,117,227	$186,240	2,059,017	7,244,450	—1,329,918
Central of Georgia	1,924	9,160,090	3,815,474	14,210,743	2,065,361	2,794,131	429,583	4,963,489	492,705	10,745,269	3,465,474	75,337	631,597	2,909,214	—95,639
Central of New Jersey	678	20,812,771	5,571,721	27,372,315	3,314,272	4,705,571	381,524	8,803,493	578,185	17,783,045	9,589,270	—80,022	1,339,454	8,169,794	—2,243,996
Central New England	299	3,122,565	461,176	3,764,255	586,407	466,038	15,259	1,394,418	53,241	2,515,403	1,248,852	—3,490	126,804	1,118,558	—496,270
Chicago & Alton	1,033	8,882,611	4,130,289	14,156,232	1,818,777	3,611,194	512,304	5,599,737	445,888	11,987,900	2,168,332	—41,673	569,070	1,557,589	—336,025
Detroit, Grand Haven & Milwaukee	191	1,544,811	651,056	2,558,130	338,695	388,176	82,432	1,392,177	69,781	2,271,261	286,869	981	40,272	247,578	181,080
Grand Trunk Western	347	4,624,961	2,140,959	7,184,559	893,497	1,280,033	271,630	3,364,384	229,330	6,038,874	1,145,685	—23,979	431,032	690,674	—728,222
Louisville & Nashville	4,941	42,868,078	13,082,509	59,682,778	9,323,206	12,239,795	1,334,264	26,038,428	1,247,015	44,782,708	14,900,070	25,118	2,777,540	12,147,648	—765,972
Louisville, Henderson & St. Louis	200	870,327	417,773	1,371,797	271,012	176,053	59,249	472,191	38,571	1,017,076	354,721	2,094	45,463	311,352	149,514
Missouri Pacific	3,920	19,490,425	4,848,431	26,622,040	4,100,381	4,974,142	680,954	11,179,598	841,007	21,776,082	4,845,958	—42,647	1,170,180	3,633,131	—1,189,271
New Orleans Great Northern	283	1,329,083	389,774	4,873,613	248,658	228,788	30,955	531,386	90,164	1,129,951	743,662	—880	53,583	709,199	8,658
New York, New Haven & Hartford	2,046	32,476,373	27,400,673	66,617,693	8,831,064	10,389,458	502,020	26,828,688	1,924,120	48,515,350	18,102,343	85,480	3,568,219	14,619,604	—3,697,251
Northern Pacific	6,325	48,058,812	15,707,000	68,544,802	9,363,824	8,063,102	1,276,881	21,710,988	1,063,258	41,472,053	27,072,749	304,820	5,030,584	22,346,985	—1,965,648
Philadelphia & Reading	1,020	37,889,771	7,011,549	47,123,370	5,324,868	8,720,246	519,858	16,440,045	788,191	31,793,208	15,330,162	369,766	1,267,503	14,432,625	—4,693,705
Port Reading	21	1,286,958	.....	1,335,956	169,016	2,871	466	447,831	5,206	625,390	710,566	394,838	174,000	576,254	—430,071
St. Louis, Iron Mountain & Southern	3,365	24,504,603	6,311,203	33,171,860	4,435,665	5,278,115	649,132	10,112,758	870,620	21,346,290	11,825,570	—30,717	1,343,253	10,451,600	224,847

Traffic News

The twenty-eighth annual convention of the Canadian Ticket Agents' Association will be held at the Hotel Sherman, Chicago, on October 6, 7 and 8.

After resisting the state authorities in the courts for several years, the Louisville & Nashville, it is said, has finally accepted a tariff of reduced freight rates prescribed for it in Alabama.

Passenger service between the City of Mexico and El Paso, Tex., was resumed on September 9, when the first through passenger train for public service arrived at the border at Juarez.

The principal railways in Missouri on Wednesday of this week filed with the Missouri Public Service Commission applications for authority to increase passenger rates to three cents a mile on main lines and four cents on branches.

The New York Central, in conjunction with the American Express Company will send two agents to the principal cities of South America with a view to promoting more intimate commercial relations between this country and Brazil, Argentina, Uruguay, Chile and Peru.

R. D. Sangster, who has been manager of the Traffic Bureau of Muskogee, Okla., has been appointed transportation commissioner of the Commercial Club of Kansas City, Mo., to succeed H. G. Wilson, who recently resigned to take a similar position in Toledo.

Representatives of the tap-line railroads of the southwest held a conference last week in Chicago to discuss the denial of milling-in-transit privileges in the tap-line order recently issued by the Interstate Commerce Commission. A conference with the trunk lines will be asked

The Official Classification Committee has announced a preliminary hearing to be held in New York on September 22, on proposed changes for the next issue of the classification. A preliminary hearing will also be held in Chicago, in the offices of the Central Freight Association, on September 17.

Congressman Clark, of Florida, has introduced in the House a bill directing the Interstate Commerce Commission to equalize rates on fruit and vegetables. The purpose of the bill appears to be either to reduce the rates on fruit from Florida or to increase those on similar commodities from California, with a view to removing existing differences.

An agreement has been reached between the Sunset-Central Lines and their telegraph operators in the wage controversy in which the employees some time ago took a strike vote. The agreement provides for an increase in wages of 5 per cent with no change in hours. The men had demanded a 12½ per cent increase in wages and a reduction of hours.

The Erie Railroad has made use of the Cape Cod Canal. One of the railroad company's tugs which is engaged in the coal carrying traffic between New York and Massachusetts ports, returning from Boston, August 11, passed through the canal on the 12th, towing three empty barges. The trip through the canal took two hours, forty minutes. For a part of the time the tide was running against the vessel, the speed of the current being estimated at about two knots an hour.

Gerrit Fort, passenger traffic manager of the Union Pacific, explains as follows the recent action of the Union Pacific in closing the Ogden gateway to through passengers via the Denver & Rio Grande, which has aroused a controversy among the western railways: "What we have actually done is to request our eastern connections not to 'short haul' us on business destined to territory which is strictly local to the Union Pacific system. Only the state of Idaho and a small part of southern Montana are involved, and we have not cut off a single privilege affecting the Colorado cities. The Union Pacific has its own line to Colorado, Utah and Idaho, and owns the short and direct line between Denver and Salt Lake City and all points on the Oregon Short Line. It has eight daily passenger trains operating over its main line and furnishes adequate service

for all passengers desiring to reach Oregon Short Line points. In deciding that it does not wish to longer divide this business with the Denver & Rio Grande railroad it is simply following a well-established precedent, as all the railroads of the United States undertake to secure, wherever possible, their long haul to and from their own local territory. For example, the Missouri Pacific Railway, a part of the Gould system, issued on May 6, 1913, a circular, No. 681, calling in all forms of one-way tickets destined to Colorado points and beyond reading over lines other than the Missouri Pacific west of Kansas City. The Gould system is, therefore, in the inconsistent position of objecting to a policy to which one of the units of that system is already committed."

The Department of Agriculture estimates that the total of all the grain crops of the country this year will be 4,853,000,000 bushels or 302,000,000 bushels more than the quantity actually harvested last year, an increase of 6¼ per cent. Because of the corn crop shortage, the estimated total is less by 680,000,000 bushels than the great harvest of 1912; but the aggregate value of the three principal grain crops—wheat, corn and oats—is $3,400,000,000, whereas their estimated value after harvest last year was $2,741,000,000. The wheat crop amounts to the unprecedented total of 896,000,000 bushels, which, it is estimated by the department, will allow for an export surplus of 300,000,000 bushels, exceeding all previous figures and more than doubling the export from the large crop of 1913.

Car Surpluses and Shortages

Arthur Hale, chairman of the committee on relations between railroads of the American Railway Association, in presenting statistical bulletin No. 175, giving a summary of car surpluses and shortages by groups from May 1, 1913, to September 1, 1914, says: The total surplus on September 1, 1914, was 165,244 cars; on August 15, 1914, 174,260 cars, and on September 1, 1913, 73,576 cars. The report for this period shows a further decrease in the total surplus of 9,016 cars from August 15, all of which decrease is in coal cars.

There is an increase in surplus box cars in the southern and western states of approximately 7,000, about half of which is in Montana, Wyoming and Nebraska (group 7), with reductions in eastern and central states and Canada.

The largest decreases in surplus coal cars are in the eastern states and central freight association territory (groups 2 and 3), with a smaller reduction on the Pacific coast, while a slight increase is noticeable in the northwest.

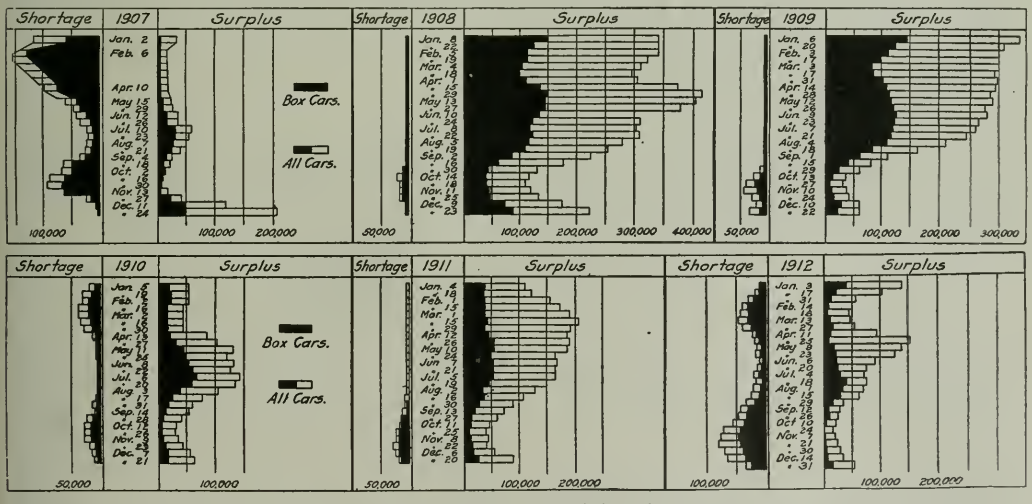
The total shortage on September 1, 1914, was 1,918 cars; on August 15, 1914, 2,115 cars, and on September 1, 1913, 15,270 cars. The shortage shows a further slight reduction.

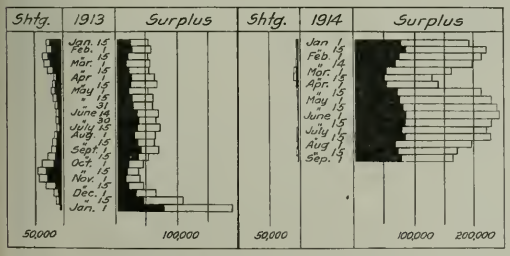
The accompanying table gives car surplus and shortage figures by groups for the last period covered in the report and the diagram shows total bi-weekly surpluses and shortages 1907 to 1914.

CAR SURPLUSES AND SHORTAGES

Date	No. of roads.	Surpluses Box.	Flat.	Coal, gondola and hopper.	Other kinds.	Total.	Shortages Box.	Flat.	Coal, gondola and hopper.	Other kinds.	Total.
Group *1.—September 1, 1914	9	817	426	1,288	622	3,153	416	0	0	13	429
" 2.— " 1, 1914	32	703	148	11,343	5,068	17,262	206	0	0	0	206
" 3.— " 1, 1914	30	1,601	762	18,394	3,273	24,030	533	100	0	213	846
" 4.— " 1, 1914	12	7,620	1,410	3,176	1,472	13,678	0	0	0	0	0
" 5.— " 1, 1914	24	2,498	343	2,779	2,505	8,125	0	2	0	30	32
" 6.— " 1, 1914	27	18,676	1,271	4,078	5,447	29,472	167	4	3	2	176
" 7.— " 1, 1914	4	5,055	55	665	510	6,285	0	0	0	0	0
" 8.— " 1, 1914	15	7,512	623	1,848	3,477	13,460	0	1	46	0	47
" 9.— " 1, 1914	14	2,058	178	241	941	3,418	31	6	13	3	53
" 10.— " 1, 1914	22	7,961	1,022	2,329	9,378	20,690	111	10	4	4	129
" 11.— " 1, 1914	5	21,885	1,118	0	2,668	25,671	0	0	0	0	0
Total	194	76,386	7,356	46,141	35,361	165,244	1,464	123	66	265	1,918

*Group 1 is composed of New England lines; Group 2—New York, New Jersey, Delaware, Maryland and Eastern Pennsylvania lines; Group 3—Ohio, Indiana, Michigan and Western Pennsylvania lines; Group 4—West Virginia, Virginia, North and South Carolina lines; Group 5—Kentucky, Tennessee, Mississippi, Alabama, Georgia and Florida lines; Group 6—Iowa, Illinois, Wisconsin and Minnesota lines; Group 7—Montana, Wyoming, Nebraska, North Dakota and South Dakota lines; Group 8—Kansas, Colorado, Missouri, Arkansas and Oklahoma lines; Group 9—Texas, Louisiana and New Mexico lines; Group 10—Washington, Oregon, Idaho, California, Nevada and Arizona lines; Group 11—Canadian lines.





Car Surpluses and Shortages, 1907 to 1914

Commission and Court News

INTERSTATE COMMERCE COMMISSION

The commission on September 11 received a protest against the tariffs recently issued by important eastern roads increasing by 12½ per cent the prices to be charged for mileage tickets.

The Interstate Commerce Commission has postponed the effective date of its recent order in the southeastern fourth section case from October 1 to April 1, 1915, in order to give the roads more time to make the necessary readjustments in their rates, and to compile tariffs. The commission has also postponed the effective date of its orders in the intermountain case from October 1 to November 15. The commission has also issued an order allowing the roads in Central Freight Association territory to file tariffs embodying the 5 per cent advance on 10 days' notice.

Rates on Coal to Geneva, N. Y.

Empire Coke Company v. Buffalo & Susquehanna et al. Opinion by Chairman Harlan:

Rates for the transportation of coal from mines in the Clearfield region of Pennsylvania to Geneva, N. Y., not found to be unreasonable or unduly discriminatory. The withdrawal of a rate of $1.25 per ton applicable only on coal to be coked in transit at Geneva, N. Y., is held to have been justified by the carriers, on the ground that it was a preferred rate to a single city and industry, and was not in fact a true milling-in-transit rate. Complaint dismissed. (31 I. C. C., 574.)

Rates on Salt from Michigan Field

Colonial Salt Company et al. v. Chicago, B. & Q., et al; Same v. Illinois Central et al. Opinion by Chairman Harlan:

Present rates for the transportation of salt from the Michigan field to destinations in various western states are unduly prejudicial as compared with salt rates from Chicago and Milwaukee to such destinations. Salt rates from the Michigan field to points in Illinois should not exceed by more than 2½ cents per 100 lb. those from Chicago and Chicago rate points to the same destinations. No change should be made in the present relationship in salt rates as between the Ohio and the Michigan fields. A readjustment should be made which will place the salt rates from Chicago, Detroit and Akron to the Ohio river crossings upon a more equitable basis. Subsequent hearing will be had upon the fourth-section applications. Reparation denied. (31 I. C. C., 559.)

Switching Rate at Arcade, N. Y.

Buffalo, Attica & Arcade Railroad v. Buffalo & Susquehanna et al. Opinion by Chairman Harlan:

The switching rate on interstate traffic moving between the junction of the Buffalo & Susquehanna and industries and team tracks on the Buffalo, Attica & Arcade, at Arcade, N. Y., on commodities other than coal and coke is prescribed at $5 per car, and on coal and coke at 15 cents per ton, with a minimum charge of $5 per car.

This proceeding follows and is closely related to the case entitled *Switching at Arcade, N. Y.*, 30 I. C. C., 501 (*Railway Age Gazette*, p. 1560); the two roads could not agree and so this proceeding was begun. The commission increases the switching rate from $3 a car to $5 a car and expects the B. & S. to absorb all or a part of the increase. If, in 60 days, the roads do not act the commission will order a through rate. (31 I. C. C., 583.)

STATE COMMISSIONS

The Arizona Corporation Commission has issued a general order to the railroads authorizing free carriage of household goods and personal effects of employees who are transferred between points in the state.

F. W. Gomph, agent for the Pacific Freight Traffic Bureau, has asked the California Railroad Commission for authority to increase the charge for sanding stock cars from 50 cents to $1 for single-deck cars, and from $1 to $2 for double-deck cars, on the ground that the average cost of sanding single-deck cars is $1.25 and double-deck cars in proportion.

The Michigan Railroad Commission has rendered a decision that the Delray Connecting Railroad is a plant facility of the Solvay Process Company and the Semet Process Company of Detroit, and that trunk line railroads need not absorb its switching charges on business for these two companies. The commission holds, however, that the road is a common carrier as to other traffic and that the railroads must absorb the charges.

The railways in Central Freight Association territory have filed petitions with the state commissions of Ohio, Indiana and Pennsylvania for permission to publish tariffs embodying the five per cent advance in freight rates allowed by the Interstate Commerce Commission for interstate traffic, on less than statutory notice. The commissions have all reserved decision, and will probably ask for hearings.

The Washington Public Service Commission has recently had the novel experience of an application from a shipper for an advance in rates. The Granger Brick Company, of Yakima county, set forth that it had established its plant at Granger while the rate on brick from Seattle to North Yakima was 12 cents. Subsequently, when North Yakima needed a large quantity of brick for street paving, the rate from Seattle was reduced to 9 cents, greatly to the detriment of the Granger company's business.

James E. Quan, chairman of the Illinois Public Utilities Commission, has announced that the commission is contemplating a strong recommendation to the legislature for more stringent legislation against trespassing. The commission in investigating accidents has come to the conclusion that the state laws on this point are inadequate. "We hope, said Mr. Quan," to make railroad trespassing a serious offense so that the public will stay off the railroad property, such as bridges, yards and right of way. We would also include in the proposed legislation measures providing a penalty for the railroads that fail to do their share toward keeping the public off their property."

COURT NEWS

In the United States District Court at Nashville, Tenn., September 9, a decree was entered denying the government the right to have free access to the correspondence files of the Nashville, Chattanooga & St. Louis. This suit is the one which was brought by the attorney general in seeking to carry out the resolution of the Senate calling for a sweeping investigation of the doings of the Louisville & Nashville and its controlled lines.

In the Federal Court at Philadelphia, September 15, the Pennsylvania Railroad Company and Harvey C. Miller, and John F. McLoughlin of the grain firm of L. F. Miller & Sons, pleaded guilty to four counts of an indictment charging them with unlawful rebating. The court imposed a fine of $1,000 on each of the defendants for each count, aggregating $12,000. One of the charges was that the grain men made false reports of the weight of grain, and that the railroad in accepting these reports was in effect granting rebates. The government agreed to drop the other counts in the indictment and also six other indictments. This is the case in which a jury disagreed last summer after a six weeks' trial.

In the federal court at San Francisco, Cal., September 14, Judge Maurice T. Dooling issued a permanent injunction, restraining Attorney General U. S. Webb and the state railroad commission from enforcing the punitive provisions of the California pipe line act, passed by the last legislature, against the Associated Pipe Line Company, a subsidiary of the Southern Pacific Company. It was held that the fine, $15,000 a day, was excessive, and the effect of the decision is to remove what the court called the "dread of excessive and unreasonable penalties," until the state courts, or if need be, the United States Supreme Court, can pass on the constitutionality of the act. The pipe line act, which became effective August 10, 1913, declared all pipe lines common carriers, and ordered all pipe line companies to file their rates with the commission, or stand liable to a fine of 50 cents a barrel a day. The Associated Pipe Line has a capacity of 30,000 barrels a day.

Railway Officers

Executive, Financial, Legal and Accounting

Frank W. Blair, one of the three receivers of the Pere Marquette at Detroit, Mich., has resigned.

E. J. White, general attorney of the Missouri Pacific-Iron Mountain system at Kansas City, Mo., has been appointed general solicitor, with headquarters at St. Louis, succeeding the late Martin L. Clardy, and E. G. Merriam, assistant to vice-president and general solicitor, has been appointed assistant general solicitor, with headquarters at St. Louis.

Operating

J. B. Mertes, local freight agent of the Wheeling & Lake Erie at Toledo, Ohio, has been appointed inspector of yards and stations, with headquarters at Toledo.

B. C. Cooper, trainmaster of the Peoria division of the Vandalia at Decatur, Ill., has been transferred to Logansport, Ind., as trainmaster of the Michigan division, succeeding O. E. Linn, transferred.

W. E. Price, superintendent and traffic manager of the Carolina & Yadkin River, at High Point, N. C., has been appointed general manager, with headquarters at High Point, and the office of superintendent has been abolished.

J. F. Jones having been relieved of the duties of superintendent of terminals of the Grand Trunk on account of ill health, F. J. McKee, acting superintendent of terminals at Port Huron, Mich., has been appointed superintendent of terminals, with office at Port Huron.

Traffic

J. M. Andrews has been appointed livestock agent of the Texas & Pacific at Ft. Worth, Tex.

J. A. Scheurman has been appointed assistant general passenger agent of the Detroit, Toledo & Ironton, with headquarters at Detroit, Mich.

C. E. Jordan, Jr., has been appointed contracting agent of the Louisville & Nashville, with office at Knoxville, Tenn., succeeding Frank L. Salisbury, transferred.

E. L. Dalton has been appointed general agent freight department of the Chicago & Alton at Chicago, succeeding B. J. Libbe, resigned, to engage in other business.

W. S. Smith, traveling freight agent of the Frisco Lines, with headquarters at Houston, Tex., has been appointed assistant general freight agent of the St. Louis, Brownsville & Mexico, with headquarters at Kingsville, Tex.

F. J. Sizemore, assistant traffic manager of the Carolina & Yadkin River, at High Point, N. C., has been appointed traffic manager, with headquarters at High Point, succeeding W. E. Price, promoted; and the office of assistant traffic manager has been abolished.

G. C. Whitney, traveling freight agent of the Queen & Crescent Route at Dallas, Tex., has been appointed commercial agent with headquarters at Greensboro, N. C. This is a new agency and formerly this territory was under the jurisdiction of C. C. Elder, commercial agent at Charlotte, N. C.; G. F. Kay, soliciting freight agent at Houston, has been appointed traveling freight agent succeeding Mr. Whitney.

George E. Herring, district passenger agent of the Louisville & Nashville, at Nashville, Tenn., has been appointed division passenger agent, with office at St. Louis, Mo., succeeding R. C. Wallis, who has been appointed district passenger agent at Nashville, succeeding Mr. Herring. C. H. Mann, traveling passenger agent at Houston, Tex., has been appointed district passenger agent at Pensacola, Fla. H. H. Milner, city passenger agent at Atlanta, Ga., has been appointed traveling passenger agent at Houston, succeeding Mr. Mann. D. W. McDonald, traveling passenger agent at Pensacola, succeeds Mr. Milner, and the position of traveling passenger agent at Pensacola, Fla., has been abolished.

Engineering and Rolling Stock

Elmer H. Brown has been appointed roadmaster of the Northern Pacific at Dilworth, Minn.

A. E. Reid has been appointed supervisor of signals of the Chicago & North Western, at Boone, Iowa, succeeding K. E. Kellenberger, resigned.

E. H. Peck, assistant engineer of the Chicago, Burlington & Quincy, has been appointed engineer Missouri district, with headquarters at St. Louis, Mo., to succeed F. M. Paterson, resigned.

C. A. Zweibel has been appointed supervisor of car repairs of the Atlantic Coast Line, with office at Wilmington, N. C., succeeding E. A. Sweeley, resigned, to go to another company.

S. S. Senter, engineer of construction of the Wheeling & Lake Erie, at Brewster, Ohio, has been appointed superintendent of bridges and buildings, with headquarters at Brewster, and his former position has been abolished.

OBITUARY

Barney F. Keefe, general agent of the Chesapeake & Ohio, with office at Covington, Ky., died on September 6 at Toledo, Ohio.

N. M. Markley, for many years supervisor of bridges and buildings of the Peoria & Eastern division of the Cleveland, Cincinnati, Chicago & St. Louis, died at his home in Arcanum, Ohio, September 5, aged 67 years.

Amos Howard Calef, secretary and treasurer of the Missouri Pacific, with office at New York, died on September 16, at his summer home at Seabright, N. J., at the age of 71. The cause of his death was acute indigestion and heart disease. Mr. Calef was for many years closely associated with the Gould railroad interests. Mr. Calef was born in Gloucester, Mass., and began railroad work as a clerk. He was with the Kansas Pacific and the Denver Pacific, now a part of the Union Pacific system. In 1880 he went to New York as secretary and treasurer of the Missouri Pacific system.

Thomas E. Adams, superintendent of motive power of the St. Louis Southwestern, with headquarters at Pine Bluff, Ark., died at his home in that city on August 25 at the age of 63 years. Mr. Adams had been in railway service since August, 1865, when he began as a fireman on the Illinois Central. He was consecutively locomotive engineer on that road, the Illinois Midland, the St. Paul, Minneapolis & Manitoba and the Great Northern, from November, 1870, to February, 1893, when he was appointed division master mechanic on the Great Northern. Three years later he became superintendent of the Dakota division of that road, and from February, 1897, to April, 1901, he was successively master mechanic of the Fergus Falls division and at Superior, Wis. He then went to the St. Louis Southwestern as general master mechanic, and in July, 1905, was promoted to superintendent of motive power.

Export Coal Traffic.—With a view to aiding the coal operators of the United States to expand their markets at a time when the exporters of other coal-producing nations are inactive, the Bureau of Mines has issued a bulletin describing American coals, which, printed in Spanish, Portuguese and English, will be distributed among the large coal-users and importers of South and Central America. The bulletin lists as available for this promising export trade seven groups of coal fields. These are the Pocahontas and New River coals of West Virginia, with Norfolk and Newport News as shipping ports; the Maryland and eastern Pennsylvania coals, to go through Baltimore or Philadelphia; the Virginia, Kentucky and Tennessee coals, through Hampton Roads or Charleston; the Alabama coals, through Mobile or New Orleans; the western Pennsylvania coals, through New Orleans; the Illinois and Indiana coals, through New Orleans; and the Washington coals, through Seattle.

Equipment and Supplies

LOCOMOTIVE BUILDING

The San Pedro, Los Angeles & Salt Lake has ordered one Mikado type locomotive from the Baldwin Locomotive Works.

W. R. Grace & Co, New York, are making inquiries for three 2-8-0 type locomotives for a railroad in Chile.

The Louisville & Jeffersonville Bridge Company, Louisville, Ky., has ordered one superheater six-wheel switching locomotive from the American Locomotive Company. This locomotive will have 21 by 28 in. cylinders, 51 in. driving wheels and a total weight in working order of 163,000 lb.

CAR BUILDING

The Lehigh & Hudson River, reported in the *Railway Age Gazette* of August 21, as being in the market for 20 50-ton steel ore cars, has ordered that equipment from the Pressed Steel Car Company.

The Rutland, reported in the *Railway Age Gazette* of last week as having ordered 75 50-ton steel hopper cars from the Standard Steel Car Company, has ordered 100 of these cars from that company.

SIGNALING

Automatic Signals on the Burlington in Colorado

The Chicago, Burlington & Quincy has put in service 24 miles of automatic block signals near Akron, Col., the work being done by the Federal Signal Company. The section now completed is that from Akron, westward to and including the Brush (Col.) yards, at which place the Billings-Denver line forms a junction with the Chicago-Denver line. This installation comprises 19 one-arm home signals, 19 one-arm distant signals, 9 two-arm home and distant signals and one signal equipped with a calling-on arm in addition to home and distant arms.

All signals have the Federal Signal Company's type "4" mechanisms fitted with enameled corrugated steel blades, operating in two positions, 0 deg. to 60 deg., in the lower quadrant.

Separate distant signals are used, and they are set approximately 2,500 feet in the rear of the home signals, excepting the distant signal of the home signal governing movements out of the passing tracks. These distant signals are located on the same mast as the home signal at the entering end of the passing track.

The day indications are distinguished by the different types of blades. Absolute home signals have square end blades enameled red with a white stripe; distant signals fish-tail blades enameled green with white stripe. Two permissive home signals, one between Akron and Xenia, and one between Story and Brush, have yellow blades with square end and black stripe. These have yellow glass and are governed by special instructions.

An "absolute permissive" scheme of wiring, using neutral line circuits, developed by the signal department of the railroad company, is used throughout this section. A selecting interlocking relay, especially designed and manufactured by the Federal Signal Company, is used in this arrangement. One set of contacts is mechanically locked by the electrical releasing of another set. For example, a train moving westward releases one side of the interlocking relay which prevents the opening of the contacts on the opposite side, through which the westbound signals are controlled. Permissive indications are displayed for following movements as soon as all track circuit sections, in a block section, are clear. For the opposite direction the other side of the interlocking relay is similarly released.

All switches leading into the main tracks are fitted with style "D" switch boxes and style "C" switch indicators.

An additional length of 88 miles will be put in service about the middle of October.

Supply Trade News

W. E. Marvel, recently elected vice-president of the Positive Rail Anchor Company, has sold his entire interest in the M-C-B Company, Chicago, to R. L. Brown.

The Raymond Concrete Pile Company, New York, has been awarded a contract for the design and construction of concrete ore, coke and limestone bins, and ore and yard trestles, by the Pennsylvania Steel Company, Steelton, Pa. The work calls for several thousand concrete piles and a large yardage of concrete construction.

At a meeting of the board of directors of the American Locomotive Company, held September 16, S. L. Schoonmaker was elected chairman of the board, succeeding Pliny Fisk, resigned, and Andrew W. Mellon, president of the Mellon National Bank of Pittsburgh, was elected a director succeeding James McNaughton. Mr. McNaughton will continue as vice-president of the company. Mr. Schoonmaker is a director of the General Electric Company and the American Telephone & Telegraph Company.

American Locomotive Company

As predicted by President Marshall in March, the American Locomotive Company earned little more than expenses in the second half of the fiscal year ended June 30, 1914. During the first half of the year, however, the company had earned its fixed charges and 7 per cent dividends for the entire year on its $25,000,000 preferred stock. It, therefore, completed the fiscal year with a surplus of $326,127. This compares with a surplus, after the payment of 7 per cent dividends in 1913, of $4,435,305. The new locomotive orders received during the entire year amounted to but $14,454,831, which, as President Marshall points out in his annual report to stockholders, is only about 25 per cent of the company's capacity. As a matter of fact, during the first half of the year the company's plants averaged 67 per cent of their capacity, and in the last half of the year, 29 per cent; but at the beginning of the year unfilled orders amounted to $17,156,388, and at the end of the year, $4,162,365. Business was taken on a very small margin of profit; consequently it was impossible to cut down expenses in the same proportion as the loss in gross earnings. Thus, the gross earnings in 1914 were but $29,987,438, a decrease of $24,880,737, whereas expenses, including maintenance and depreciation, were $27,425,187, a decrease of but $20,616,505.

The company made the best of the falling off in business by strengthening its financial position. At the beginning of the year there were $13,326,031 accounts collectable, and the company had $1,562,474 cash on hand. At the end of the year there were $5,114,531 accounts collectable, and cash and cash items, including a little over $1,000,000 New York City stock certificates and city of Newark revenue bonds, of $8,411,467. Materials and supplies, which amounted to $5,749,234 at the beginning of the year, had been reduced to $2,707,505, the market value of materials and supplies having fallen very much during the year and the company having written down the book value of materials and supplies by a substantial amount and charged that amount against the year's income. Total current liabilities, including gold coupon notes, amounted to $7,085,917 at the end of the year as compared with $13,726,383 at the beginning of the year.

TRADE PUBLICATIONS

Cables.—The Western Electric Company, New York, has just issued a remarkably attractive booklet called "The Making of the Voice Highways," describing the processes entering into the making of lead covered copper cables for telephones. The booklet describes the production of the copper wire, the production of the paper, the production of the lead and the antimony, the testing of the raw materials, insulating, pairing and twisting, stranding, drying, putting on the sheet and the final testing. The booklet is beautifully illustrated and printed.

Railway Construction

Alabama Great Southern.—In connection with the construction of new double track between Chattanooga, Tenn., terminal station and Wauhatchie, improvements to cost $80,000 are to be carried out on the Belt Railway of Chattanooga, including the construction of second main track between East End avenue and the wye where connection is made with the extension line now being completed through the Lookout Mountain tunnel.

Arkansas Mining & Development Company's Line.—According to press reports, this company plans to build a railway from Hoxie, Ark., west via Smithville, Poughkeepsie, Evening Shade and Melbourne to Calico Rock, about 70 miles. J. A. Gay, Poughkeepsie, may be addressed.

Chicago & North Western.—This company has awarded a contract for the building of a logging road from Kingston, Wis., westerly a distance of five miles, to Cleary, White & Duffy, Chicago.

Evansville & Chisney (Electric).—It is expected that work will be started in October on an electric line from Boonville, Ind., east to Chisney, 15 miles. The line may eventually be extended east via Cannelton and Corydon.

Florence & Huntsville Interurban.—Incorporated in Alabama to build an electric line from Florence, Ala., east to Huntsville, about 65 miles. A branch line is to be built from Killen northeast to Lexington, 15 miles, which is ultimately to be extended to Pulaski, Tenn. T. H. Allen, president; T. W. Pratt, vice-president, and N. F. Thompson, secretary-treasurer, Florence.

Fourche River Valley & Indian Territory.—An officer of this company writes that in addition to the 14-mile line from Bigelow, Ark., to Bellevue, a 5-mile extension was recently put in operation. The company plans to build an extension of 38 miles, but the work will not be carried out in the near future.

Frederick & Brunswick.—See Hagerstown & Frederick.

Frontier Electric.—An officer writes that the company is just completing the purchase of a right of way between Niagara Falls, N. Y., and Buffalo, and may possibly do some grading on the line this fall, so that the line may be completed early next spring. J. S. Simmons, Niagara Falls, may be addressed. (August 15, p. 313.)

Greenville & Northwestern (Electric).—This is the new name of the Greenville, Whitewright & Northern Traction, which was organized in 1912, to build a 25-mile electric line from Greenville, Tex., northwest. The new company will have its headquarters at Greenville, and plans to build from that place northwest via Merit, Blueridge and Westminster to Anna, thence west to Denton and then north to Gainesville, about 110 miles. A branch is also projected from Westminster northeast to Bonham, about 25 miles. A. R. Nicholson, president, Greenville.

Greenville, Whitewright & Northern Traction.—See Greenville & Northwestern.

Hagerstown & Frederick (Electric).—According to press reports work is to be started in November on the Frederick & Brunswick. The plans call for building from Jefferson, Md., to Brunswick, about seven miles. (April 24, p. 966.)

Jefferson & Northwestern.—An officer writes that a grading contract has been given to C. T. Fitts, Greenville, Tex., for work on a change of line. The grade is to be reduced from 2 per cent to 1.5 per cent and the curvature reduced from 5 and 9 degree curves to 1 and 2 degree. The work involves handling 30,000 cu. yd. of earth, and clearing four acres of land.

Jellico Coal & Railroad.—Under this name a company has been organized at Chattanooga, Tenn., it is said, to build a railroad from a point near Pine Knot, Ky., on the Queen & Crescent Route southwest to Jellico, about 18 miles. It is understood that construction work is to be started in October. W. E. Wheelock, superintendent of terminals of the Queen & Crescent at Chattanooga, is president of the new company.

Louisiana Railway, Light & Power Company.—An officer writes that this company has secured a right of way, 75 ft. wide, for the electric line to be built from Lockport, La., northwest, via Thibodaux, to Donaldsonville, about 56 miles. It is expected that arrangements will be made to carry out the work in the near future. W. Ohlmeyer, president, Plattenville. (September 4, p. 452.)

Missouri Roads (Electric).—Plans are being made, it is said, to build an electric line from Keokuk, Iowa, west to Wayland, Mo., thence south via Williamstown, La Belle, Newark, Bethel, Shelbyville, Shelbine, Paris, Mexico and Fulton to Jefferson City, about 140 miles. H. W. Knight of Chicago, represents a number of capitalists who are back of the project.

New York Subways.—The New York Public Service Commission, First district, is asking for bids until October 9, for the construction of section No. 1 of route No. 48, the Park Place, William street and Clark street subway, in the borough of Manhattan.

Norfolk & Western.—The report of this company for the year ended June 30, 1914, shows that the double track work under way at the end of the previous year was completed and double track work is now in progress west of Suffolk, Va., on 1.60 miles and between Zuni and Disputanta on 26.6 miles. This work is expected to be finished by January, 1915. A double track tunnel 1,257 ft. long was built at Glen Alum, W. Va., and a twin tunnel, 1,000 ft. long, for second track, was completed at Hatfield, W. Va. The Tug River & Kentucky was organized in January, 1914, to build a 17-mile line in Pike county, Ky., and Mingo county, W. Va., to reach coal deposits. The line has been located from a point in Pike county, at or near the mouth of Poplar creek, and up the valley of Poplar creek, the valley of Peters creek, and the valley of Blackberry creek also down the valley of Tug river. Work is now under way on 1.5 miles of this line, including a bridge over Tug river, and is expected to be finished by June, 1915. On the North Carolina division grading work was completed during the year on 21 miles and was approaching completion on 28 miles; bridge work was well advanced, and 8.8 miles of track was laid and surfaced. The New River, Holston & Western is building an extension from Rocky Gap to Suiter's in Bland county, Va., about 14 miles, grading has about been finished and 8.1 miles of track has been laid.

North Carolina Roads.—Application has been made by J. T. Deal, of the Kinston Manufacturing Company, for a franchise to build a railroad at Kinston, N. C. The plans call for building from Kinston south to Maple Hill, about 50 miles. The Kinston Manufacturing Company now operates a logging line from Pink Hill to Beulaville, about nine mines, which is to form part of the new line.

Northern Pacific.—This company has completed work on a short connecting line, it is said, from Cedar Lake, Minn., northwest to a connection with the Minneapolis, St. Paul & Sault Ste. Marie at Ironhub.

North Louisiana (Electric).—According to press reports a contract was let recently for building from Shreveport, La., east to Monroe, about 100 miles. A. B. Blevins, president, Jefferson. (April 3, p. 812.)

Salisbury Interurban.—This company was recently incorporated in Maryland, and will soon begin construction work, it is said, on an electric line from Nanticoke Point, Md., north via Bivalve, to Tyaskin, thence east via Salisbury to Willards, about 40 miles. E. R. White, W. H. Bedsworth, H. J. Messick and W. H. Insley are said to be interested. (April 10, p. 856.)

Sutherlin, Coos Bay & Eastern.—A contract has been let to the McAllister & Son Construction Company, Portland, Ore., it is said, to build from Sutherlin, Ore., east about 27 miles to a tract of timber at the heal of Calapooya creek, and the line is eventually to be extended further east. Surveys are said to be made for an extension from Sutherlin west to Coos Bay. G. H. Glynn, A. Stark and C. E. Lemon, all of Sutherlin, are incorporators. (August 14, p. 310.)

West Virginia Electric.—Under this name application will be made in West Virginia for a charter to build from the eastern

terminus of the Little Kanawha, at Owenport, in Wirt county, W. Va., east to Weston, about 50 miles. The plans also call for building a branch from a point near Creston south to Spencer, about 10 miles. Residents of Parkersburg are said to be back of the project.

RAILWAY STRUCTURES

Boyce, Va.—The report of the Norfolk & Western for the year ended June 30, 1914, shows that during the year passenger stations and freight houses were built or enlarged at Boyce, Galax, Wilson and Evergreen, Va., at Willardsville, N. C.; Roderfield, W. Va., and Waverly, Ohio. A number of new turntables were installed at various places on the road. A new 1,200-ft. coal pier on concrete foundations was completed and put in operation at Lamberts Point, Va.; and new shop buildings were built and extension made to the existing structures at Roanoke, Va. The company also carried out a large amount of bridge improvement work during the year.

Buffalo, N. Y.—An officer of the Grand Trunk writes that a contract has been given to Metz Bros., Buffalo, for putting up a combined freight station and office building on Niagara street in Buffalo. The proposed structure is to be of brick construction, two stories high, 50 ft. by 200 ft. on the first floor and 30 ft. by 125 ft. on the second floor. The improvements will cost about $75,000.

Chicago, Ill.—The city council has extended from September 23 until December 23, the time within which the railways may file their acceptance of the ordinances for the new Union station, the Pennsylvania Lines freight terminal and improvements in connection therewith. The Union Station Company had asked for an extension of one year on account of the impossibility of financing the project at this time.

Jackson, Miss.—The Illinois Central has awarded a contract for the construction of a mechanical terminal at Jackson, Miss., to Geo. B. Swift & Company, Chicago. The improvement consists of structures as follows: A roundhouse having five 100-ft. stalls with walls of concrete and brick construction, and roof of wood, covered with composition roofing; an 85-ft. turntable electrically operated; a machine shop and boiler room 40 ft. by 75 ft. by 16 ft. high, with brick walls and a flat concrete roof covered with composition roofing; an oil house and storeroom 30 ft. by 60 ft. one story high, with a low wooden platform 40 ft. by 75 ft. at one end; a shelter and shop building 20 ft. by 140 ft. by 11 ft. high, of wooden construction, and sand bins, 9 ft. by 98 ft. by 9 ft. high, also of wooden construction. A 500-ton wooden coal chute which is being built by the Ogle Construction Company, Chicago.

Jefferson, Tex.—An officer of the Jefferson & Northwestern writes that the company has under consideration the question of building a combined passenger and freight station at Jefferson.

Memphis, Tenn.—An officer of the Southern Railway writes that a contract has been given to the Ragland-Baxter Morford Company, Nashville, Tenn., for the construction of shop buildings at Memphis, and a contract has been given to the R. F. Creson Company, Memphis, for putting up a pump house, also transformer house at Memphis.

New York.—The New York Public Service Commission, First district, will open bids on October 6, for the construction of the diagonal subway station under Forty-second street in front of the Grand Central station, New York. The diagonal station will be built on the line connecting the existing subway just south of Forty-second street with the new Lexington avenue subway just north of that street. It will be more than 100 ft. wide, and will have two platforms serving four tracks. A concourse is to be built above the level of the station to connect with the Grand Central station, the Lexington avenue subway, the existing subway, and the Hudson & Manhattan tubes when extended to this point. Elevators will be used to connect with the Steinway tunnel, which is at a lower level.

Richmond, Va.—An officer of the Southern Railway writes that a contract has been given to P. J. White & Son, Richmond, for the construction of shop buildings at Richmond, and a contract has been given to the J. T. Wilson Company, Richmond, for building a transformer house at South Richmond.

Railway Financial News

Central New England.—This company has declared the full 5 per cent interest on its general mortgage bonds for the year ended July 1, 1914.

Chicago & Western Indiana.—This company is owned jointly by the Chicago & Eastern Illinois, the Wabash, the Grand Trunk Western, the Chicago & Erie and the Chicago, Indianapolis & Louisville, each of which owns $1,000,000 of the capital stock. In the fiscal year ended December 31, 1913, as shown by the annual report the company's total operating revenue was $174,769; the operating expenses $152,123, and the net operating revenue, $22,646. The rentals from lease of road, however, made up the larger portion of the company's income and in 1913 amounted to $2,781,646. The total other income inclusive of this amount, other rental taxes collected from tenants, parcel room receipts, etc., was $3,351,946, and the total income $3,374,592. From this income there was paid in interest on bonds, $2,256,296; taxes, $440,338, etc., leaving a net income of $637,095. Dividends were paid, in addition, to the amount of $300,000, and $210,000 was paid out as the division of surplus under the inter-tenant agreement of November, 1, 1882. The surplus for the year was $83,476, so that the total surplus on December 31 was $533,655.

The company's total property investment on December 31, 1913, was $59,892,582. There was also an item of securities issued pledged of $1,351,000. The company's working assets in turn amounted to $5,907,035, $478,414 of which was cash in treasury, $3,051,988 was cash in hands of trustees, $748,980 was consolidated mortgage bonds in treasury, $783,730 was in miscellaneous accounts receivable, etc. The deferred debit items amounted to $2,153,598. The company's outstanding stock as noted above amounts to $5,000,000. The bonded debt is now $61,180,083. The working liabilities on December 31 were $1,981,622, $1,043,873 of which was included in audited vouchers and unpaid wages, and $835,320 in matured interest due on January 1. In 1913 the Chicago & Western Indiana expended $3,265,144 for additions and betterments, the principal improvements being those on the clearing yard and on track elevation.

Erie.—A special meeting of stockholders has been called for October 13, to vote on the approval of a "refunding and improvement mortgage covering the railroad properties, rights and franchises."

Grand Trunk.—This company has declared the regular 4 per cent dividends on the guaranteed stock.

Minneapolis, St. Paul & Sault Ste. Marie.—The stockholders at the annual meeting approved the plan of the directors to increase the capital stock from $42,000,000 to $62,000,000. No new stock is to be issued at this time.

O. C. Wyman, of Minneapolis, has been elected a director to succeed C. H. Petit, deceased.

Pere Marquette.—Frank W. Blair, one of the three receivers, has resigned.

Southern Railway.—President Harrison, in a letter to stockholders, says in part in regard to the annual meeting on October 13:

"An effort will be made to make this meeting more than the conventional routine, which current criticism finds to be characteristic of the meetings of stockholders of American railway companies, and the co-operation of the stockholder is necessary to that end. The principal officers will be in attendance to answer questions directed to the management or as to any detail of its business, and the report of operations during the last year will be before the stockholders for discussion."

Addition Service for Vancouver.—A large number of new steamships and sailing vessels are to be added by the various shipping companies that now maintain a service out of the port of Vancouver, B. C., to meet the anticipated increase in trade incident to the opening of the Panama Canal.

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WE GUARANTEE, that of this issue 8,900 copies were printed; that of these 8,900 copies 7,430 were mailed to regular paid subscribers to the weekly edition, 250 were provided for counter and news companies' sales, 1,098 were mailed to advertisers, exchanges and correspondents, and 122 were provided for samples and office use; that the total copies printed this year to date were 366,050, an average of 9,886 copies a week.

VOLUME 57 SEPTEMBER 25, 1914 NUMBER 13

Contents

*Illustrated.

The Interstate Commerce Commission deals with subjects which are highly controversial by their very nature. The way in which a body dealing with such subjects does its work is certain itself to become a subject of controversy; and in the course of such controversy the body in question is sure, at times, to become a target for criticism. Some of the criticism is bound to be just, because every man and every body of men makes mistakes that justify criticism. Some of the criticism is bound to be unjust, because critics are, perhaps, of all people, the most liable to make mistakes. And so, in the natural course of things, the Interstate Commerce Commission becomes the object of many criticisms, some just and some unjust. When one considers the complexity and magnitude of the work of the commission, especially just after having read a frank, manly and able address like that delivered by Commissioner Clark to the American Association of General Passenger Agents, and published elsewhere in this issue, he is apt to conclude that the commission is nowadays being given somewhat less consideration than it deserves from those who discuss its work, and somewhat too much criticism which is misdirected and unjust. Commissioner Clark evidently had some such thought in mind when he made his address. So far as the *Railway Age Gazette* is concerned, it probably publishes more discussion of the work of the commission than any other publication in the country; and it therefore gives us satisfaction at this particular time to express the most unreserved confidence in the ability, the public spirit and the honesty of purpose of the commission. We do believe that it would be a more useful body if it contained more members with experience in the businesses of the concerns which they regulate; but certainly no man in private or public life has ever worked harder or more faithfully to fit himself to perform his duties according to the highest standards than have the members of the commission, and of no member of it is this more true than of Mr. Clark himself. Criticism of the commission does not necessarily imply lack of confidence in it, as indicated forcibly by the fact that some who criticize it a good deal at the same time advocate giving it universal authority.

Criticism of the Commission

There is on almost any railway more or less friction between the minor operating officers and the engine house forces, but it is difficult to find a good reason for it. There is no question that trainmasters, yard masters and despatchers frequently exercise poor judgment and very little tact in their relations with the engine house staff and it is possible that if they were to spend a little time periodically with the engine house foreman, getting better acquainted with him and his problems, they would more fully realize the task which he always has confronting him; a great many tactless moves on the part of the transportation department officers can be directly traced to a lack of knowledge of the main essentials of engine house practice. On the other hand the engine house foreman is prone to a lack of tact in his dealings with the transportation department. He is likely to overlook the fact that locomotives are intended to haul trains and not to stand in the roundhouse undergoing repairs. There are engine house foremen in considerable numbers who have nothing but contempt for the ideas of a trainmaster or despatcher on the terminal handling of locomotives; such men go around with chips on their shoulders awaiting an opportunity to make sarcastic replies to inquiries from the despatcher's office. And in the engine house foreman's defense it must be said that many of these inquiries are calculated to stir up resentment. But in the great run of cases the transportation officer has this in his favor; he realizes that he is there to move traffic and all his efforts are used in that direction. The engine house foreman is probably a man whose training has been almost entirely in the shop and he is likely to find it difficult, unless he be broad minded, to see beyond the engine house conditions and surroundings. When an engine house foreman is appointed one of the points which should be most forcibly brought home to him is that he is there to help in every way possible in the moving of traffic; that he is expected to keep the locomotives in good condition but above all to furnish them quickly when they are required. On the whole what is needed on both sides is a little broader viewpoint of the other fellow's side of the question and the realization by all that their efforts should be all toward one end, the movement of trains.

The Trainmaster and the Engine House

The New York Railroad Club paper on delays in the handling of packages in Boston freight houses, which is reported in this issue, affords an interesting example of careful and scientific study of a subject which seems almost to defy systematic analysis. These investigators, in spite of the obstacles, have made a good beginning. They make no formal and definite recommendations, as they were commissioned only to get the facts, but, so far as wagon delays are concerned, they have plainly suggested the principal remedy —whether they meant to do so or not—and in a single sentence; that the main thing is the teamster. In other words, when you put teams in charge of the most energetic men that can be found, you have met the chief demand of the situation. The theorist can construct a perfect freight terminal, where boxes and barrels will move as smoothly and rapidly as a fifty cent piece moves in the cash carrier of a dry goods store; but in real life a city freight house is a great bunch of costly problems. Such a large share of the obstacles and hindrances are so difficult to deal with by rule or at arm's length, and so peculiarly amenable only to vigorous executive ability on the spot, that the personality of the man at the helm is by far the biggest factor in the whole business. As to the remedy for slow yard movements of inward cars, the investigators give us very little light; but the statement that large numbers of shipments, every day, are ready for the consignees an hour, or two hours, before the clerk is ready to hand them their freight bills, indicates reprehensible slowness on the part of somebody besides the switching crews. In both these features more detailed information is needed. Such dilatory handling of way-bills would come in for pretty severe criticism if it should come up for investigation before those officers of the government who investigated the express companies a year or two ago. Whether or not our present investigators' imposing array of average delays will afford a suitable lever by which to raise the level of efficiency, and to convey lessons to the managers of other freight houses, it is impossible to say; but there can be little doubt that a lot of the *maximum* delays, if suitably studied and explained, would be very instructive. Most freight agents and yardmasters who read this paper will look upon the investigation as having been only just begun.

Freight House Delays at Boston

SOLID IVORY

THE remedy advocated by most of the professional radicals and muckrakers for commercial and industrial ills is either government ownership of numerous industries, including railways, public utilities, coal mines, water power sites, and so on, or out-and-out socialism.

Pearson's Magazine claims the distinction of publishing articles muckraking business and advocating government ownership which are of such a character that no other magazine would publish them. And its claim is valid. It is the only publication in the country which impartially vilifies all classes of business concerns; and it regards socialism, or the practical equivalent of it, as the only avenue to social and economic salvation.

Imagine our astonishment, then, on finding in the current issue of Pearson's an article muckraking the Congressional "pork barrel." The most notorious railway wreckers in the country, the editor asserts in an introductory note to this article, have done nothing worse than the members of Congress who rob the public by habitually voting for such legislation.

Is it not true, after all, then, that the politicians who run the government are vastly superior in ability, honesty and zeal for the public welfare to the malefactors of great wealth who run the railways and other business concerns? Is it possible that our statesmen take advantage even now of such opportunities as they have to use their official positions to further their own selfish ambitions, and the interests of friendly business concerns and communities? The writer in Pearson's so asserts, and cites evidence. And yet, according to Pearson's, virtue can be enthroned and the social and economic welfare of the public promoted only by adopting government ownership of all kinds of business concerns and turning over their management to the very men or kind of men who are now engaged in frying fat out of the tax-paying public by means of the pork barrel!

Some people think, and some people just think they think. The bones in the heads of those who just think they think have varying degrees of thickness and power of resistance to facts and logic. But for real solid ivory we commend the skulls of those whose investigations and whose thinking that they think lead them at one and the same time to the conclusions (1) that government is dishonest and imbecile, and (2) that it is essential to the public welfare for government to be intrusted with the management of many or all of the business concerns of the country.

THE TRUE FUNCTION OF THE COMMISSION

THE prompt decision of the Interstate Commerce Commission to reopen the eastern rate advance case is gratifying. A majority, not only of students of transportation questions, but of the general public think that its original action in this case was wrong. But regardless of that, everybody recognizes the fact that a great change has taken place in the railway situation since then. The commission said in its opinion that it had found that the earnings of the railways in eastern territory were too small either for their own good or that of the public, and while granting a relatively small increase to the central freight association lines, it recommended the adoption of various means by which it believed that all the lines concerned could increase their net income.

The disturbance to business in the United States, and the consequent reduction in railway traffic, caused by the war in Europe, have led to a heavy reduction in railway earnings, thereby making them still more deficient than they were before. The loss of earnings thus brought about has come suddenly, while the means for increasing net earnings which the commission suggested to the railways could not be applied quickly. The situation is aggravated by the fact that the war has not only reduced railway earnings, but has also increased and will for an indefinite time increase the demands on earnings. Already it has made it practically impossible to market new securities and has caused a sharp advance in the return which must be paid on both new securities and those issued for refunding purposes.

Furthermore, this increase in the rate of return which must be paid on capital is not a temporary one. Every day the war is causing the destruction of millions of capital. It is thereby tending to reduce the ratio of the supply of capital in the world to the demand for it and thereby to push up the rate of interest. When the war is over there will be an enormous demand in Europe for capital with which to restore to their former condition the industries which are now deteriorating or being rapidly destroyed there, either because of their inability to get labor or hold markets for their products, or by the military operations themselves. It seems probable, therefore, that the rate of interest which will have to be paid on capital for a long time will be much higher than it has been within recent years; and, of course, a high rate of interest makes it necessary to pay proportionately high dividends on stock in order to market it at a reasonable price, for nobody will accept a dividend of 6 per cent on stock with the risks attendant on its ownership if he can get almost an equal rate of interest on bonds, the ownership of which does not involve such risks. If the railways are going to have to pay much higher rates of interest and dividends in the future in order to maintain and market their securities at fair prices, they must have larger earnings.

It is to be hoped that in reopening the case the commission will consider the important matters involved in a somewhat different spirit from what it did before. It complained in its opinion that during the original hearings it was the object of many criticisms because it did not hasten its decision, and the recipient of many letters, resolutions, etc., petitioning it to dis-

pose of the application of the railroads quickly and favorably as a means of improving business in general. It resented these efforts to influence it. It said in one place in its opinion, "The law fixes the standards by which the rates and practices of carriers must be judged, and the commission can act only in accordance with those standards and after a full hearing; we have no authority to approve rate increases with a view to stimulating business." Elsewhere it said, "These questions involved the exercise of quasi-judicial functions, and the law requires us to afford to all parties an ample opportunity to introduce evidence and to be heard in support of their objections to the additional burdens upon their traffic proposed by the carriers. . . . The law did not confer upon us the power of aiding general prosperity or of introducing new economic policies through railroad rates." These statements indicate that the commission was acting according to a somewhat different idea of its functions from that which it had expressed on former occasions. It will be recalled that in one decision it held that it was not necessary for it in deciding a case to confine itself to a consideration of the record made in that case, but that it might also consider facts of which it had special knowledge. The supreme court reversed this ruling. Is it surprising that some people have not looked upon the commission as they do on a court, when the commission itself has expressed such views regarding its functions? Again, the commission in one of its annual reports declared, in the course of a denunciation of the way in which the Commerce Court had been reversing some of its decisions, that in the fixing of rates it performed a legislative function delegated to it by Congress, and that therefore the court could review its decisions only to ascertain whether it had violated any statutory or constitutional provision.

Now, the commission doubtless is justified in resenting efforts to make it decide a case before it has ascertained the facts involved or to make it decide contrary to the facts which it believes it has found to exist. But it would seem that in the utterances referred to in its opinion in the rate advance case, it somewhat too completely forgot that, as it has said on other occasions, it performs legislative as well as judicial functions. It is a judicial function to determine what is a reasonable rate, and doubtless the commission should proceed in the performance of that duty much as a court would. But it has always been held to be a legislative function to fix a rate, and it is a recognized duty of law-making bodies in the performance of their functions to consider not merely questions of law or constitutionality, but questions of public expediency; and Congress in delegating to the commission authority to fix rates has clearly authorized it to consider questions of expediency as well as of law. Congress has authorized and required it to fix not the lowest rates which constitutionally can be fixed, but *maximum* reasonable rates. While, therefore, the commission cannot constitutionally fix rates that are confiscatory, it can consider what is expedient for the public and fix or permit the railways to fix the maximum rates which would be reasonable in the circumstances. Consequently, in saying, "The law did not confer upon us the power of aiding general prosperity," the commission expressed an entirely erroneous view. It is quite proper for a court to take this attitude, but entirely wrong for the commission to do so.

The commission cannot constitutionally fix rates that are confiscatory, but over and over again it has said in its opinions that it is its duty to so adjust rates as to cause enough capital to flow into the railway business to enable the carriers to make adequate improvements in and additions to their property. But what is regulating rates so as to cause an adequate amount of capital to flow into the railway business but so regulating them as to promote the general prosperity?

Since the commission should consider the questions of public expediency involved it follows that while it should not be pelted with petitions and resolutions intended to make it render a decision disregarding the facts, it ought to hear and give heed to individuals and organizations that are in a position to inform its mind on the broad question of public policy involved. The commission's continued usefulness depends upon it getting out, and keeping out of its head, the notion that it is a court trying law suits. The Commerce Court was merely a court trying law suits; but the Interstate Commerce Commission is an administrative body having at once legislative, judicial and executive functions, and created for the express purpose of performing a function which the courts cannot perform, viz., that of solving a great problem of public policy. It ought to act regardless of public clamor, but on the other hand, it should act for the express purpose of promoting the public interests. If, because of lack of ability or courage, or of an improper conception of its place in the machinery of government, it seeks to hedge itself about with the formalities, technicalities, traditions and precedents of the courts, its days of usefulness will be few in number. It has a great opportunity in passing once more on the eastern rate advance case, to show whether it has a proper conception of its duty and responsibilities and a disposition to live up to them.

TRAVELING ENGINEERS' CONVENTION

GREAT credit is due the members of the Traveling Engineers' Association for the splendid attendance at their recent convention, for the large number present at every session and for the thoroughness with which the subjects were discussed. Nearly 50 per cent of the membership of the association registered. Two sessions a day were held. The morning sessions started before 9:30 o'clock and the afternoon sessions closed some time after five in the afternoon with only about an hour and a half for lunch. It made a long day for men not accustomed to the confining work of a convention, but the interest was intense from first to last, and the discussions, while not always carefully restricted to the subject of the paper, were full of interesting, serviceable information for the members and the railroads they represent.

The point-of-view and the information obtained by the road foreman of engines in the performance of his duties is of great importance to the mechanical department, to the transportation department and to the railroads as a whole. Being on the road a large part of the time he is in a position to observe how the service may be improved and how the real work of a railroad, that is, the transportation of freight and passengers, may be performed in a better and more economical manner. He, therefore, fills an important position, and his suggestions for improvements should be given careful consideration. Likewise, he must realize the importance of his position and take advantage of his opportunities to better the service. In order to do this he must be constantly increasing his knowledge of locomotive design with a view of understanding why certain things must be done to obtain certain results. By thus enlarging his technical knowledge the road foreman of engines with his highly developed practical knowledge will be in a position to effect and recommend improvements that will greatly benefit locomotive operation.

The papers considered this year that were of special value in this respect referred to mechanical stokers, smoke elimination, locomotive air brake equipment and the practical chemistry of combustion. The papers and discussions by the various mechanical experts have provided the association with information that will make its 1914 proceedings a text book worthy of careful study.

NEW BOOKS

Foundations. By Malvert A. Howe, professor of civil engineering, Rose Polytechnic Institute. Size 6 in. by 9 in. 110 pages, 56 illustrations. Bound in cloth. Published by John Wiley & Sons, New York. Price $1.25.

Howe's "Foundations," is a short text book covering the supporting capacity of soils, wall footings and column footings, piles and pile foundations, chimneys and towers, bridge piers and abutments and methods employed in difficult foundations. The au-

thor has attempted to treat the fundamental principles of design in an elementary fashion and draw the illustrations from actual practice, eliminating most of the descriptive matter and depending on references to previously published descriptions of such work.

Rational Stock Speculation. By Walter Thornton Ray. 86 pages, 15 plates, 10½ in. by 6¾ in. Bound in cloth. Published by the author, Spartanburg, S. C. Price $2.

This book is intended as a help to putting stock speculation on a more secure basis by furnishing the data for estimating the future in the light of the past. It is based on the theory that the long swings of stock fluctuation are in relation to the variations in fundamental conditions, and that therefore the general course of prices may be estimated in advance by a correlation of the various factors which enter into the causes of such variations and by comparison with the existing records for previous years. The author states that the book is intended as an aid in forecasting long swings of stock prices, that such studies can never replace studies of the prospective and comparative futures of individual stocks and that he does not hesitate to place his investigations in the second rank. The book consists mainly of tables and charts giving the history of New York interest rates, foreign open market interest rates, foreign banks' official discount rates, prices of iron and steel, prices of non-ferrous metals, prices of commodities in general, iron production in the United States, bond transactions on stock exchanges and bond and security prices, volume of stock sales on the New York stock exchange, statements of New York City clearing house banks, bank clearings, building permits, and percentages of return on stocks and bonds. With these are given comments on the importance to be given to the various factors and instructions for interpreting them.

Power and Power Transmission. By E. W. Kerr, M. E., professor of mechanical engineering, Louisiana State University. Third Edition, revised. 373 pages, 6 in. by 9 in., illustrated. Bound in cloth. Published by John Wiley & Sons, Inc., New York. Price $2.

The first edition of this book was published in 1901 and the second in 1907. It has now been revised and contains 24 more pages of matter and 61 more illustrations than the previous edition. The book is divided into three parts. Part 1, which deals with machinery and mechanics, contains an introductory chapter dealing with definitions, terms, etc., and the other chapters in this section consider such subjects as shafting, bearings, friction and lubrication, friction wheels, pulleys, belt gears, toothed wheels, the screw, cams, the lever and some of its modifications, link work and pipe fittings. Part 2 is devoted to steam power with chapters dealing with elementary steam power plants, the simple steam engine, automatic cut-off engines and high speed engines, indicators, compound engines, condensers, valves and valve gears, valve diagrams and rotary engines and steam turbines. Part 3 is devoted to pumping machinery, internal combustion engines, water power and compressed air.

Railway Fuel Association Proceedings. 342 pages, illustrated, 6 in. by 9 in. Bound in Morocco. Published by the association, C. G. Hall, Secretary, 922 McCormick building, Chicago. Price $1; paper binding, 50 cents.

This book is the official proceedings of the sixth annual convention of the International Railway Fuel Association held in Chicago, May 18-21, 1914. It contains a very interesting address by Dr. W. F. M. Goss, reports of committees on Fuel Tests, Firing Practice and Fuel Stations. Also papers on Honeycomb and Clinker Formation, The Relation of Front End Design and Air Openings of Grates and Ashpans to Fuel Consumption and Sparks, Uniform Methods of Computing Fuel Consumption, Sizing of Coal for Locomotive Use, Storage of Coal, Morden Locomotive Coaling Station, Reheating Locomotive Boiler Feed Water, Fuel and Failures, and Economies in Roundhouse and Terminal Fuel Consumption. These proceedings contain valuable information on the subjects above mentioned and may be considered authoritative in questions pertaining to fuel economy on railroads.

Letters to the Editor

SIMPLICITY AND DIRECTNESS IN TRAIN DESPATCHING

Nashville, Tenn., August 30, 1914.

To the Editor of the Railway Age Gazette:

It has always been a puzzle to me why the initials of a superintendent or chief train despatcher should have to be added at the bottom of a train order to make it valid. They do not issue the order, are not aware of its contents, and often are made to appear ridiculous because of this old custom; and it also cheapens their positions. The names of the train despatchers should be printed on time-tables; and then if any initials must be used it should be those of the despatcher who actually gives the order.

This would give the despatchers the standing they ought to have and also make them more careful in their work. It would save all bother in having to search the records to see who authorized a certain order, in case of any exception being taken to it, or when necessary to produce an order as evidence. I hope officers will give this matter careful thought when they next revise their rules. The attention of the Train Rule Committee of the American Railway Association is invited.

H. W. Forman.

THE MACHINES IN R O CABIN

Chicago, September 14, 1914.

To the Editor of the Railway Age Gazette:

I have read the article, "Controlled Manual Block for Opposing Movements," in the *Railway Age Gazette* for September 11, page 475, and think I correctly understand the application of the system on the double-track freight line, as described, except as to the use of the eight electric locks shown on the shelf in R O Cabin, Fig. 4. By "putting two and two together" —taking into account the statement on page 478 that an additional section of the block instrument is provided for each additional switch controlled from a given block station—I conclude that one of the electric locks forms the block instrument for the eastward track in which, I assume, R O controls no switch, and that three locks form the block instrument for the westward track in which R O probably controls two switches. Possibly the other four locks serve as levers for operation of the signals.

Is this so? X. Y. Z.

[We are informed by Mr. Anthony that X. Y. Z.'s understanding is correct.—Editor.]

English Railwaymen Enlist.—As might be expected, all of the English railways have lost, for the present at least, large numbers of their employees who have enlisted in the ranks. The Navy and Army Reservists and Territorials who have joined the colors from the Great Western Railway, for instance, number over 4,000. There are 1,775 from the locomotive, 721 from the goods, 617 from the engineering, 566 from the traffic, and 158 from the signal departments. The general manager has announced that the posts hitherto filled by the men will, as far as possible, be kept for them on their return to civil life, and if the identical positions are not available, others will be found. The company will make good at its own expense the men's contributions to the Pension, Society and Widows' and Orphans' Fund, and arrangements will be made to see that the men's respective families do not suffer financially by their absence. The general manager of the Great Central has likewise announced that "Single men who join the colors for the period of the war will be treated as on leave with pay. Their subscriptions to the company's superannuation fund, or the mutual provident association, will be paid by the company in their absence. Scales of pay will continue to advance until their return."

Practical Considerations in Design of Large Stations

Features Which Should Be Studied in Planning a Large Passenger Terminal to Reduce Operating Costs

By A. H. Stone
Assistant Engineer, Kansas City Terminal Railway

In view of the number of large passenger stations in prospect and under construction at the present time, it may be interesting and helpful to those having the responsibility for their arrangement and design to discuss briefly some practical features affecting the general layout of the building and its operation that have come up during the construction of one of the new stations now being completed. Little if any published information is to be found bearing on these points and, while exactly the same situation may not be met in another terminal, yet the discussion may serve to call attention to modern requirements and thus help to prevent awkward and expensive operating conditions in other stations.

Designs for most of the large passenger terminals have been turned over to architects, working more or less independently of the railroad company; but unless full and free discussion is had with the operating and engineering officers as the preliminary plans are under way, the result is likely to be more ornamental than practical, owing to the difference in the viewpoint of the architect and the railroad man. The former is intent on producing a structure which will reflect credit on his ability as an architect, while the latter is more concerned with a proper layout for handling the business at the minimum of expense. A harmonizing of both ideas is the end to be sought.

The inspection of other stations should include not only a study of the general layout and building appointments, but also a careful study of operating conditions and their cost. The size and extent of a modern passenger terminal make it very expensive to operate, and the opportunity of reducing these costs without impairing the service rendered to the public is worthy of the best efforts of the engineer.

SITE AND GENERAL ARRANGEMENT

The selection of a site for a new passenger station is a difficult task and but little of a general nature can be said, as the circumstances affecting it are distinctly local in character, but, from the public standpoint, accessibility to principal streets and the city's transportation system is of prime importance. Where there is more than one terminal in a city, the one most accessible will get the greatest share of the competitive business.

One of the principal factors influencing the layout of a station is the track arrangement, that is, whether it shall be a stub end or a through terminal. Both have their advantages and disadvantages, although the consensus of opinion now seems to favor the arrangement of through tracks as enabling a greater number of trains to be handled with the same layout. In the case of a union station caring for a large number of roads, involving the transfer of a great number of passengers, baggage and mail from train to train, many of the operating problems are simplified with the stub-end arrangement, but these problems are made greater at a through terminal by the necessity for elevating or depressing the railroad tracks to remove grade crossings with streets.

The general outlines of the building should not be fixed until after a comprehensive scheme for operating trains and handling the baggage, mail and express has been tentatively agreed upon. Plenty of time should be allowed at this stage for a full and free discussion of the plans by all members of the operating staff to eliminate all chances for introducing faulty operating conditions, and those leading to unnecessary operating expenses. As soon as a definite arrangement has been agreed upon, the detailed designs of the building can proceed rapidly.

A secondary consideration to be given attention at this time, but one that is essential in securing additional revenue to offset the expense of the new building, is whether the designs shall be modified to include an office building which will necessarily detract somewhat from the appearance of the structure, or whether the owning company prefers as a matter of pride to omit this feature and assume the expense of operation and maintenance with such help as can be secured from the rental of concessions usually found in a railroad station. Whichever policy is decided upon, the location of these concessions should always be kept well in mind in order that the public, which has come to expect such conveniences, may be well served, and also that the revenue accruing to the railroad company may be the maximum. A slight change in the location of these concessions frequently increases their earnings by many thousand dollars a year, so the advice of someone experienced in handling them should be obtained in order that their value to the public and as a revenue producing medium may receive the proper consideration. The modern idea is to make these concessions regular stores, provided with ample facilities to display wares for sale. As an indication of the revenue to be obtained from a well located concession, a certain store selling general travelers' supplies, in one of the new stations, is reputed to do a yearly business in excess of $200,000.

Prior to the construction of the Pennsylvania station in New York, but little attention was given in this country to the separation of incoming and outgoing traffic, yet it is a subject which is growing in importance owing to the rapid increase in travel at the large railroad centers and to the congestion which occurs at certain hours of the day even in some of the smaller stations. This separation can be more easily provided in what might be called true terminals than in those stations which are, in effect, way stations, because the latter stations are usually junction points and provision must be made for the prompt handling of those passengers who must transfer from one train to another with close connections. Such a situation is found at Kansas City, where the larger proportion of those using the station are through passengers, and failure to make the outgoing train may mean a delay of possibly 12 to 24 hours.

No information can be found that will enable one to determine the proper size of public rooms to care for a given number of passengers. The size of the same rooms in other large stations per passengers handled varies between wide limits and leads to the conclusion that the dimensions selected were largely guess work. Where the new building takes the place of an old one, some idea of the amount of space required can be obtained from estimating the increase in size by a comparison with the business at the old station. The accompanying table shows the dimensions of the principal rooms in a number of modern stations, together with an estimated number of passengers handled.

WAITING ROOMS AND LOBBIES

In large terminal stations like those of the New York Central and the Pennsylvania in New York City there is not the necessity for providing a large seating capacity that there is at a large junction point like St. Louis and Kansas City because the frequent train service enables those passing

through to reach their destination with little delay. In the western cities where there are fewer trains serving a given territory, through passengers have longer layovers and consequently a greater area in waiting room must be provided per passenger using the station. The special retiring room for women and the smoking room for men should be located adjacent to this room.

Most modern stations have a space known as the concourse interposed between the waiting room and the train platforms, arranged with entrances and exits so that those who wish can reach trains without passing through the waiting room. There is some advantage in having such a space in that it

	M. C. Detroit Station	Penn. Station, New York	Grand Central Station, New York	Washington Union Station	St. Louis Union Station	Kansas City Union Station	Boston South Station	C. & N. W. Station, Chicago
Main building ..... sq. ft.	91,770	339,270	202,573	132,526	48,480	140,030	52,480	69,760
Main waiting room..... sq. ft.	22,932	33,000	17,156	26,280	10,068	26,100	14,625	23,000
Concourse ..... sq. ft.	15,912	131,400	.....	98,800	36,360	24,290	54,900	17,000
Emigrants' waiting room..... sq. ft.	.....	.....	.....	.....	3,590	2,000	.....	14,285
Grand lobby ..... sq. ft.	.....	*	81,122	*	8,940	22,060	.....	21,900
Women's waiting room..... sq. ft.	2,704	6,000	2,927	3,150	4,000	1,806	1,496	2,900
Women's toilet ..... sq. ft.	1,350	3,140	4,599	1,482	1,622	1,482	1,796	1,850
Smoking room ..... sq. ft.	1,500	6,000	3,779	1,998	3,930	1,978	2,146	1,200
Men's toilet ..... sq. ft.	2,033	3,600	4,516	1,743	1,198	3,498	1,525	1,450
Parcel room ..... sq. ft.	750	2,780	.....	1,020	1,475	2,040	2,100	1,456
Baggage room ..... sq. ft.	.....	50,000	.....	41,683	42,000	74,648	27,794	66,650
Ticket office, windows.....	19	16	48	8	.....	24	27	20
Restaurant ..... sq. ft.	4,056	6,900	10,090	8,000	4,920	3,891	4,356	4,000
Lunch room ..... sq. ft.	2,028	6,900	.....	3,000	3,956	4,830	4,891	4,600
Schedule trains, daily.....	75	315	421	241	314	260	784	310
Passengers handled, daily.....	5,000	.....	75,000	15,000	.....	25,000	100,000	50,000

*Same as main waiting room.

provides a place for those wishing to meet friends to get close to the exit from any platform and it further acts as an unobstructed passageway for outgoing passengers to find their particular train. On the other hand, it increases the distance from the waiting room to the trains, which is thought by some to be a serious objection. In the new Kansas City station this space is eliminated and the gates to trains are located along the sides of the waiting room, enabling passengers to sit close to the gates from which their train departs.

The room around which are the ticket offices, baggage check stand, etc., has various names; in the Pennsylvania station it is known as the general waiting room, although there are no seats in it; in the Grand Central station it is known as the concourse; in the Northwestern station, Chicago, it is known as the public space; in the Washington station it is the waiting room, where the seats are located; in the Kansas City station it is known as the grand lobby. As far as possible, all facilities required by a passenger in preparing for a trip should be located around this room where they can readily be seen.

If there is any considerable number of emigrants to be taken care of, as is the case in most western cities, comfortable quarters easily accessible to trains should be provided where the emigrants can be protected from confidence men and those ready to take advantage of their ignorance. There should be a lunch room in connection where wholesome food can be obtained at reasonable prices and this food should be such as they are accustomed to in the fatherland and not what an American would expect. In addition it may be advisable to provide a laundry room with a steam dryer, such as is furnished in the Northwestern station at Chicago.

Another room that will be found extremely useful is what might be called an isolation room where passengers whom it is desirable to keep away from the general public, such as prisoners, insane patients, or those who have been taken sick with some contagious disease en route, may stay. This room should be so located that it can be reached from incoming and outgoing trains without having to go through the waiting room and should be provided with toilet facilities.

Another desirable room is one where those bringing lunches may eat them in comfort without having the main waiting room littered up. This room should be immediately adjoining the main waiting room and should be equipped with tables and chairs. There should be little difficulty in inducing the public to make use of it, especially if there is a lunch counter in connection where they can supplement their meals with warm food. The revenue received would no doubt be more than sufficient for keeping the room in order.

More and more consideration is being given in modern stations to providing special facilities for women and children that make for their comfort and convenience in traveling. This is of greatest importance in those stations where the colonist and homeseeker travel is heavy, because those taking advantage of colonist rates comprise whole families. They are more or less inexperienced in traveling, and require considerable assistance from the station attendants. Since most western roads are interested in the colonization of their lines, special facilities for taking care of the women and children are now considered a necessary adjunct of the women's rooms. A room should be set aside for children where they may run around without being in the way. It should be provided with beds where the little ones may sleep, and with rattan couches for the mothers, who may secure rest knowing that their children are safe. There should be a woman attendant in charge to render assistance and give information. Besides this, a more isolated room for elderly or invalid travelers is needed, where they may be alone and practically undisturbed between their trains. Private bath rooms, shoe shining stands and telephones are also considered necessary in this department. In some stations the matron's duties are more like a chief janitress, while in others she takes a more active part in seeing that those in her charge reach their proper train and secure the services of the ushers. Where the latter is the case, she should be provided with means for quickly calling the ushers, with wheel chairs if necessary.

The rooms for the exclusive use of men should be grouped together, such as the barber shop, smoking rooms, bath rooms and toilets. Not nearly so much space is needed in the smoking room as was formerly considered necessary, as custom in this respect has changed until the room has become simply an ante room to the toilets. A desirable location for a cigar stand should be adjacent to the smoking room, if not in it. The barber shop should have private bath rooms and a shoe shining stand as well as a small stock of gentlemen's furnishings, such as collars, shirts, etc., provided these articles cannot be purchased elsewhere in the building.

PARCELS AND BAGGAGE

A well located parcel room with ample facilities for doing business will prove to be one of the best revenue producers in the station and its importance in this respect is frequently overlooked. Investigation shows that the space devoted to this business will net $1 or more per square foot used per day. To secure this revenue it is necessary to provide a convenient location with well designed layout of shelving so as to handle the maximum business with the minimum of attendance. Too frequently it is located in some out of the way corner in which

the shelving is crowded in without allowing adequate aisles, or another floor is used to provide the requisite amount of shelving considered necessary. All this tends to increase the cost of operation and to reduce the profits that would otherwise accrue. Shelving made of iron pipe is found the most satisfactory because it is cleaner and does not allow dust and dirt to collect. Provision should be made for checking overcoats and umbrellas; for the former a rod to which coat hangers are attached will be found the best arrangement, as more coats can be taken care of in a given space than by any other means. After the station has been in operation a short time quite a number of unclaimed umbrellas will be accumulated which can be rented on rainy days. The receiving and delivery windows should be located on one side of the room only, because they can be watched better than if located in any other way, but there should never be less than two such windows so that a separation of the receipt and delivery can be made. As a rule people do not call for their hand baggage until just before train departure and cases are not unknown where trains have been missed owing to delays at the parcel window, due to a rush of inbound business. An analysis of the business done at a number of the large stations has developed the fact that two parcels are handled every 24 hours per lineal foot of shelving.

The location of the baggage check stand should be as close as possible to the direct line of travel from the ticket office to the waiting room. Provision should also be made for handling the occasional pieces that come on a conveyance with the passenger, so that a claim check can be issued for it without delay and with the least inconvenience to him. It is usually necessary to provide for the handling of considerable hand baggage and this should be done at a point where it can be received and delivered promptly from trains and where it is convenient to the public. In most modern stations the checking of baggage is done at a different location from that at which the baggage is handled, necessitating some rapid means of sending checks back and forth, as well as informing the check stand of the receipt of baggage, its claim check number, and condition. This is usually accomplished by installing a pneumatic tube system. In large union stations used by a number of railroads, it is not usually considered advisable to have the checkman collect the excess charges on baggage, on account of the difficulty in keeping them posted on the various changes in tariffs and rules. This work is turned over to a cashier who should be located convenient to the public and the checkmen. He should be provided with cabinets for filing the tariffs and for the safe keeping of the C. O. D. and excess checks which are charged to him the same as money. The office of the official in charge of the baggage department should be accessible to the public so that claims for lost or damaged articles, the release of bonded baggage and all other matters of this character may be handled by the office force without taking up the time of the checkmen.

A great deal of thought should be given to the arrangement of facilities on the floor where the baggage and mail are actually handled, that the work may be prosecuted promptly and with a minimum force. The necessity for this is more apparent in those stations where there is a large amount of transfer business from train to train. Frequently mail connections have to be taken care of in 10 or 15 minutes with connecting trains at opposite ends of the station. Again some trains will arrive with a full car of baggage and express, the greater part of which is destined for the city and would warrant switching the car to tracks adjacent to the baggage room, but, in addition, they have a small number of pieces to go forward on connecting trains. All this means that plenty of platforms with cross connections should be provided, that the greatest flexibility in operation may be obtained without interfering with the passengers. Where the distances are great, motor driven trucks can be used to advantage. A sufficient number of scales should be provided with quick reading attachments that individual pieces of baggage received by each expressman may be weighed promptly. If the station is a junction point for a number of roads, it will be the business of the station company, to take care of the transfer of the mails, and, for mail weighing periods, scales of a size and capacity to take trucks should be so located as to require as little extra hauling as possible.

TICKETS AND INFORMATION

The location of the ticket office should be made prominent, at the same time providing quarters that will allow the maximum number of patrons to be served with economy and despatch. Where the station is in use by only one or two railroads, it is customary for each road to have quarters of its own, and each ticket seller has his own stock of tickets. In a union station used by a number of railroads, individual ticket offices are not practical, so only one stock of tickets is provided, which is used by all the sellers. Different designs of offices are required for these two cases; for the former, a long rectangular office best meets the conditions; while for the latter, one with the windows on a semi-circle will prove more desirable. By this arrangement the cases containing the local card tickets, which are in most demand, can be placed equidistant from all the windows, with the coupon forms behind them. It is possible to arrange the cases so that there is very little interference between the sellers, and so that the distance between the cases and the windows is reduced to the minimum. For the economical operation of the entire department, the ticket stock should be kept in a storeroom close at hand, but it need not be on the same level. With a little study odd space not otherwise available for use can be made to do, provided it can be reached directly from the ticket office. Quarters should also be provided for visiting auditors so that in checking the office there is little interference with the work of the regular office force. Plenty of natural light should be provided if possible, both for the ticket office proper and for the auditing force. It will be found that a baggage rack placed under the ticket windows will reduce the chances of passengers' hand baggage being stolen while they are buying tickets. Attention is also called to the fact that the marble plate at the ticket window is frequently made so thick that passengers have difficulty in gathering change into their hands without some of the pieces dropping to the floor.

The information bureau is one of the most important features in a station from the standpoint of the traveler and its location should only be made after thorough consideration of the service to be given and the necessity for keeping the expense of operation low. In the first place, a separation should be made of the telephone calls and the personal calls. It will be found desirable to place the attendants handling the telephone calls in a remote portion of the building where it is quiet and where the operators cannot be disturbed. The room should be provided with special desks fitted up so that folders and guides may be referred to promptly. Each operator should have a special headpiece with a transmitter and receiver combined, allowing both hands to be free. The wires should end in a jack board to permit calls to be held until answered. With the telephone calls handled at another location, the main information bureau can give better service than if the attendants are continually interrupted by the telephone.

There is another room which is needed especially in union stations where the depot passenger representative of the individual lines can give information to prospective passengers. It frequently happens that on Sundays or holidays when the city passenger offices are closed, people go to the station to get information concerning long trips and other information which would take considerable time to give even if the attendants could keep posted. This interferes with the regular work of the bureau and the idea would be to call the depot

passenger representative of the line over which the person wishes to travel, who would conduct him to this room, where the necessary time could be taken to answer fully all questions. The same room could also be used as an appointment room where an incoming passenger en route through the city with a layover could keep his business engagements without loss of time. Arrangements for the use of this room could be made through the station master.

RESTAURANT AND LUNCH ROOM

The problem to be solved in the restaurant and lunch room is to serve the maximum number of people in the minimum time and the first consideration should be to locate the kitchen as close as possible to the dining rooms, not only to reduce the time required by the waiters to pass back and forth, but to enable the food at the tables to be received in good condition. The arrangement of the kitchen equipment should receive the attention of an expert restaurateur and the selection of the manager of this department should be made as early as possible in order to have the benefit of his advice in the first stages of the design. The lunch room especially should be laid out to give quick service, as a greater net revenue can be made from this room than the restaurant, since more people will patronize it. Proper arrangements should be made so that silverware, glasses and linen can be handled close to the points where they will be used, to reduce the time a waiter must be away from his station. In this connection it will be found advisable to consider some means for communicating orders to the kitchen without the need of the waiter's going himself. By a satisfactory solution of these requirements the only time a waiter need be away from his station is when it is necessary to bring food from the kitchen. An entrance for the employees of this department should be provided so that they will not have to use the public entrances in reaching the kitchen.

As I indicated at the beginning of this article, it is impossible to make general statements concerning the size, layout and design of the different departments in a large passenger station that will be applicable in all places. It is hoped, however, that the above brief review of some of the practical considerations in modern stations may be of interest.

SOCIETY OF RAILWAY FINANCIAL OFFICERS

The annual meeting of the Society of Railway Financial Officers was held at the Hotel Aspinwall, Lenox, Mass., on September 15, 16 and 17. The society had a well-attended and instructive meeting, taking up among other things the matter of a uniform form of vouchers and agents' drafts, general railway clearing-house, loose-leaf system for treasury department records, methods of paying large shop forces, freight collection bureaus in large cities and other items of general interest.

President George A. Walker, assistant treasurer of the Pennsylvania Railroad, presented the president's address, in which he discussed the effect of the European war on the business situation, the rate decision of the Interstate Commerce Commission, the proposed war tax, and railway mail pay. He also described a plan by which the lines of the Pennsylvania Railroad system, both east and west, beginning with July, 1914, established a system of clearing all their accounts with other railroad companies through the treasurer of the Pennsylvania Railroad at Philadelphia, under which settlements are to be made on a net basis. The system embraces 23 separate reporting railroad companies and the plan involves the transfer of all charges and credits through the Pennsylvania Railroad, where they are consolidated in the office of the auditor of miscellaneous accounts. The consolidation will thus permit a foreign line making one draft for the balance in its favor, or one draft for several classes of accounts. It is the intention ultimately to include car repairs and overcharges, and in fact all items. If the balance is in favor of the Pennsylvania system one draft will be made by the treasurer of the Pennsylvania Railroad against a foreign line which will embrace the charges and credits as reported to and consolidated by the auditor of miscellaneous accounts. The plan is now in effect between the Pennsylvania system lines and the Chicago, Burlington & Quincy, Baltimore & Ohio, and Central Railroad of New Jersey. It is expected to prove a great saving in financial transactions if foreign lines will co-operate and adhere to the principle of making one draft or check for the balance due to or by them in connection with the adjustment of Pennsylvania system accounts. Charges and credits reported by the system lines to the Pennsylvania Railroad during a calendar month are settled by one draft for the balance on the fifth of the following month.

Secretary Nyquist read the report of the executive committee, which reported that important progress had been made during the year in the direction of the general railway clearing-house settlement plan. The membership is now 141, a net increase during the year of 21.

A. O. Wellman presented a paper by E. L. Copeland, secretary and treasurer of the Sante Fe, on "Curtailment of Credits by Railroads in Establishing Collection Bureaus."

Odell Smith, secretary and treasurer of the Norfolk & Washington Steamboat Company, presented a paper on "The Relations of Railroads and Financiers to Stock Values."

L. B. Franklin, vice-president of the Guaranty Trust Company of New York, addressed the society on the subject of "The Effect of the War on American Railroad Bonds."

A resolution was adopted expressing the sense of the meeting that the society's committee on Clearing-House Settlements should be continued, and that the meeting favored a sustained continuance of the efforts already made to bring about the establishment of a railroad clearing-house, in which the co-operation of the American Association of Railway Accounting Officers is, of course, essential. It was also resolved that the meeting suggest the redistribution to members in pamphlet form of copies of the last report of the clearing-house committee, with printed copies of the exhibits, together with the latest available estimate of the cost of establishing and operating the proposed clearing-house, to the end that each member may lend his best efforts to bring to the attention of his chief executive officer the scope of the plan, the benefits, advantages and saving in cost which it is believed will flow from it, with a view to ascertaining as soon as possible the attitude of each carrier.

The following officers were elected for the ensuing year: President, A. O. Wellman, assistant treasurer, Atchison, Topeka & Santa Fe, Topeka, Kan.; first vice-president, J. G. Stidger, president, Wheeling & Lake Erie, Cleveland, Ohio; second vice-president, C. W. Rhodes, assistant treasurer, Baltimore & Ohio, Baltimore; secretary and treasurer, Carl Nyquist, assistant secretary, Chicago, Rock Island & Pacific, Chicago.

The time and place of the next annual meeting of the society will not be decided until after the first of the coming year.

LABOR UNIONS IN POLITICS.—Pennsylvania's state police force, which has attracted general attention by its efficiency in dealing with labor disturbances and has afforded protection from tramps by patroling large sections of the rural districts of the state, is being made an issue in the election of members of the state's general assembly which will meet in January. Men connected with the State Federation of Labor are buttonholing legislative candidates on the subject of voting for the abolition of the force. On the other hand many property owners, especially in rural districts, are insisting that the police force be increased, because it furnishes protection to large areas where tramps formerly annoyed farmers and endangered barns. The Pennsylvania Conservation Association's committee on agricultural conservation has endorsed the police for rural patrol work, while the Pennsylvania Manufacturers' Association is combating the movement launched by the labor leaders.

Convention of Traveling Engineers' Association

Address by Frank McManamy; Papers on Mechanical Stokers, Operation of Locomotives and Speed Recorders

The opening sessions of the Traveling Engineers' Association convention were reported in the issue of last week on page 503. The following is a report of the remainder of the convention:

ADDRESS BY FRANK MCMANAMY

Frank McManamy, chief inspector of locomotive boilers, Interstate Commerce Commission, addressed the association Wednesday afternoon, calling attention to the many ways in which the traveling engineers and the government inspectors may be of assistance to each other. Attention was called to the increasing number of locomotives inspected by the 50 government inspectors, and the decreasing number of locomotives found defective, which is a credit to both the inspectors and the railroads. In the year 1912, 74,234 locomotives were inspected, of which 65.7 per cent were found with reportable defects; in 1913, 90,356 locomotives were inspected and 60.3 per cent were defective, and in 1914, 92,716 locomotives were inspected, of which 52.9 per cent were found with reportable defects. All of these, however, were not in direct violation of the law. Those that were in violation represented 4.5 per cent in 1912, 5.2 per cent in 1913, and 3.6 per cent in 1914, of the number of locomotives inspected. The number of accidents has also decreased during this period, as shown by the following reportable accidents due to the failure of locomotive boilers and their appurtenances:

Year	Number of accidents	Number killed	Number injured
1912	856	91	1,005
1913	820	36	911
1914	516	21	574

It is believed that these figures represent the results of the inspectors and the effect of the law. The greatest trouble from accidents has been with the failure of arch tubes and four out of every five of the accidents are caused by their improper application. The careful cleaning of them is also of vital importance.

All roads should insist on a proper inspection of the locomotives before they leave the terminal, and some roads provide blanks to be filled out by the engineer for this purpose. Some difficulty is being found in having the boilers washed out properly. All wash out plugs should be removed at every washing and the work should be done in a thorough manner. The government inspectors want to co-operate as much as possible with the railroads in correcting defects, and so far have found that most of the railroads are anxious to co-operate with them so that it has been unnecessary as yet to file suits in the courts regarding the violation of the boiler inspection law.

ADVANTAGES OF MECHANICAL STOKERS

The advantage to be derived from stoker firing of locomotives is the ability to fire the engine continually up to its capacity, and it is found that the stoker-fired locomotive can either take the same tonnage as the non-stoker over the road in less time, or a larger train can be handled in the same time. As a concrete example of this fact we note that in a recent test for the capacity of locomotives a stoker-fired engine was operated for six hours, firing an average of 7,800 lb. of coal per hour, which means a continual capacity of the locomotive firing in excess of that which could be maintained by hand firing.

It has also been demonstrated that mechanical stokers have permitted the enlarging of the exhaust nozzle area from 5 to 5¼ in., which means an increase of about 3 sq. in., thus giving the locomotive greater efficiency. Other advantages are obtained by not opening the fire doors, viz.: doing away with the glare or dazzling light which is produced after dark and which makes the observation of signals more difficult. It also prevents sudden change in firebox temperature which produces contraction of sheets or tubes.

A properly adjusted mechanical stoker will reduce the use of fire hook or rake on the fire bed, as the distribution of coal can be regulated to prevent banking. This is an advantage, as the frequent use of the rake disturbs particles of fuel which are carried by the draft onto the brick arch or lodged in the flues, reducing the draft.

The application of the stoker has proved to be a benefit from the standpoint of smoke abatement and there are some stoker locomotives at present being used in the heavy transfer service within the limits of large cities, resulting in practically complete elimination of smoke. Although all types of stokers are not showing an improvement in smoke prevention, the good results of some types indicate that future developments may be expected to produce good results along this line.

Those engaged in stoker firing do not have to devote as much time and attention to the use of the methods employed in hand firing, but are required to operate the mechanical stoking machine which furnishes them with a practical experience in the care of steam driven machinery. This mechanical education should greatly aid in the development from fireman to locomotive engineer. This, we believe, is an improved condition and should greatly increase the possibilities of securing a higher type of candidate for the position of locomotive engineer.

We have not received any information which indicates that the development of the mechanical stoker has reached a point where the utilization of cheaper fuel has been accomplished.

In conclusion, we will not attempt to state the cost of installation and maintenance of the mechanical stoker, as the different types will vary in these items, but from the developments up to date it is safe to say that the advantages may be expected to greatly multiply with the service of the machines and by the efforts of the various stoker manufacturers.

The report is signed by J. H. DeSalis, chairman; S. V. Sproul, O. E. Whitcomb, T. B. Bowen, O. B. Capps, T. B. Burgess, H. F. Hensen and A. L. Lopshire.

Discussion.—Those members familiar with mechanical stokers were very enthusiastic regarding their use. The Norfolk & Western is operating the Street, Hannah and Standard stokers and is obtaining good results from them all. It was stated, however, that a stoker failure usually meant an engine failure, as it was very difficult for a fireman to build up a stoker fire with the scoop without permitting the steam pressure to drop, on account of the light fire the stoker carries. Reports regarding the Standard stoker indicated that 7,670 miles have been made by one engine during July and August, with an average boiler pressure of 198 lb., and without once hooking the fire. The grates were shaken on an average of every 98 miles in July and every 71 miles in August. The efficiency of that stoker was 99.7 per cent in July and 100 per cent in August.

Fred Kirby (B. & O.) stated that between 225 and 250 stokers are in use on his road. They have found that the efficiency of the locomotives has been increased 15 to 20 per cent on account of the mechanical stoker. A smaller number of firemen will be required for the stoker engines and a better grade of men may be obtained. A cheaper grade of coal can be used on stoker engines which, of course, means economy in fuel. The best results are obtained with a gas coal. On the second division of the Baltimore & Ohio, where there are a large number of stoker engines in service, there was a period of 45 days in which the trains were not delayed over five minutes on account of the stoker locomotives. The stoker engine makes the work much lighter for the fireman and gives him the opportunity and training to better prepare himself for the position

of engineer. On this railroad the stoker engines are pooled.

Regarding the economy in fuel, Mr. Kirby believed that the stoker engines used no more coal than the hand fired engines, and E. A. Averill, Standard Stoker Company, quoted from tests showing that the stoker engine maintained an evaporation of about 6.5 lb. of water per pound of dry coal, whereas a hand fired engine of the same dimensions and working under the same conditions showed an evaporation of 6.37 lb. of water per pound of dry coal.

EFFICIENT OPERATION OF LOCOMOTIVES

The committee, in view of the broadness of the subject, has considered it under nine heads which will be taken up separately.

Assignment of Power.—It is self-evident that to obtain maximum efficiency at minimum cost the matter of assigning power should be made with due consideration from both operating and mechanical points of view, observing not only the physical condition of the road bed and bridges, the capacity and fitness of terminal facilities for the care, up-keep and turning of the power assigned, but also its adaptability to meet the requirements of service, in either freight or passenger, taking into consideration the weight and schedule of trains.

Shopping Engines.—The most profitable time for shopping of power depends very largely upon local conditions. Density of traffic in some localities with many high class freight trains, and other important traffic with an increasing public demand for better service, would not warrant the working of power in other than first class condition, while branch lines, unimportant freight or switch service, may provide suitable places to obtain additional wear from locomotives between shoppings. Power received from the general repair shops after overhauling should be known to be in perfect condition before being returned to the operating department for service. Mr. Adams, of the Cotton Belt, has said that power overhauled for the first time should be in better condition than when received from the builders, and in a measure justifies this statement by adding that power once in service usually develops certain weak points that should be changed and strengthened at the first shopping.

Injectors, Lubricators and Boiler Attachments.—Location of all boiler attachments for safety, accessibility and convenience of operation and repairs, is a matter which may appear to some to be of small importance yet may involve great expense if not properly placed. An injector or lubricator placed beyond the convenient reach of the engineer does not receive the attention and fine adjustment that economical service would demand, or that the device might receive if properly placed. Sander valves, hydrostatic flange oilers and other boiler attachments are equally important.

Terminal Inspection and Maintenance.—Modern equipment renders careful inspection a matter of increasing importance, and whether done by engineers or inspectors is an item worthy of close attention. A record should be maintained of the assignment of work, with a view to fixing responsibility for improper repairs, oversights, etc., which should be guarded against as an item possible of destroying efficient service and producing increased cost of operation. Terminal care for all locomotives is essential to good service, and beyond doubt has greater bearing on locomotive performance than any other one item. Periodical inspection should be made of all draft appliances and a perfect measurement maintained of the sizes of the exhaust nozzles, location of draft sheets, etc.

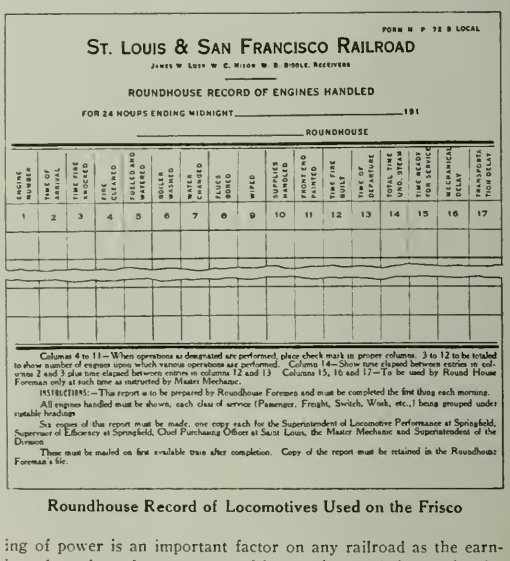
The cost of maintenance and up-keep of power can be greatly reduced with an increasing benefit and training to enginemen by the enforcement of strict rules requiring close inspection and properly defined work reports from them. Double inspection should make the engineer more careful in reporting work, especially if his attention is called to oversights on his part. Engineers should be in a better position to locate and report necessary work than an inspector who catches an engine at rest.

Proper record of the time that engines are at terminals should be maintained, this for the purpose of checking mechanical or transportation delays to power terminal fuel consumption, etc. For such purposes the accompanying form will be found very convenient.

Superheaters and Brick Arches.—The advantages derived from high degree superheated steam, are many, and with proper handling and care superheater locomotives will produce remarkable results in increased efficiency and economy over saturated steam power of equal size and similar build. Brick arches when used should be kept in perfect condition in order to insure maximum efficiency from their use. Locomotives drafted with the use of an arch will, as a rule, be more severe on fuel should the arch fail and the locomotive be run without it.

Engine Crews.—In selecting, promoting and employing new firemen, care should be exercised to secure men of good habits and possessing at least a common school education. Many railroads are now using the first, second and third year progressive examination questions for the edification and advancement of their firemen. Such examinations as a rule stimulate general interest, not only among firemen but among engineers as well. Coaching and training enginemen is an important factor in paving the way for skillful and efficient service and should be encouraged by all officials. Employees should be encouraged to take an interest in this work, to organize clubs and hold meetings at stated intervals for the discussion of subjects relating to their work.

Terminal Facilities.—The matter of prompt handling and turning of power is an important factor on any railroad as the earnings depend on the movement of locomotives and the service delivered. Terminal facilities suitable for prompt handling and up-keep of power are therefore correspondingly important. There should be co-operation between yardmasters, despatchers and roundhouse foremen, in order to get best results in turning power quickly. Another item of importance is the prompt placing of supplies, delivering coal to the coal chute, pulling cinder cars out of the way, etc.



FORM M P 72 B LOCAL

ST. LOUIS & SAN FRANCISCO RAILROAD

JAMES W. LUCE W. C. NIXON W. B. BIDDLE, RECEIVERS

ROUNDHOUSE RECORD OF ENGINES HANDLED

FOR 24 HOURS ENDING MIDNIGHT _____ 191

_____ ROUNDHOUSE

ENGINE NUMBER	TIME OF ARRIVAL	TIME FIRE KNOCKED	FIRE CLEANED	FILLED AND WATERED	BOILER WASHED	WATER CHANGED	FLUES BLOWED	WIPED	SUPPLIES HANDLED	FRONT END FLUES	TIME FIRE BUILT	TIME OF DEPARTURE	TOTAL TIME UNDER STEAM	TIME RECDT FOR SERVICE	MECHANICAL DELAY	TRANSPORTATION DELAY
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17

Columns 4 to 11—When operations as designated are performed, place check mark in proper column. 3 to 12 to be totaled to show number of engines upon which various operations are performed. Column 14—Show time elapsed between entries in columns 2 and 3 plus time elapsed between entries in columns 12 and 13. Columns 15, 16 and 17—To be used by Round House Foreman only at such time as instructed by Master Mechanic.

INSTRUCTIONS:—This report is to be prepared by Roundhouse Foremen and must be completed the first thing each morning.

All engines handled must be shown, each class of service (Passenger, Freight, Switch, Work, etc.,) being grouped under suitable headings.

Six copies of this report must be made, one copy each for the Superintendent of Locomotive Performance at Springfield, Supervisor of Efficiency at Springfield, Chief Purchasing Officer at Saint Louis, the Master Mechanic and Superintendent of the Division.

These must be mailed on first available train after completion. Copy of the report must be retained in the Roundhouse Foreman's file.

Roundhouse Record of Locomotives Used on the Frisco

Handling and Firing Locomotives.—The most poorly designed locomotive is made better by special care and handling, while the best designed locomotive will not do well if improperly handled or fired. Railroad operating costs are great, and the fuel bill is the largest single item of this expense. It is not unusual for a locomotive to burn from $20 to $40 worth of coal per trip, or per day, or from $600 to $1,200 per month, and all locomotives on some divisions burn from 20,000 to 50,000 tons of coal per month. Of this vast amount of fuel burned in locomotive operation, considerable of it does not come under the control of engineer or fireman. At least 10 to 25 per cent of

all fuel used by any one locomotive is consumed in the terminals. Close co-operation should prevail between the heads of the transportation and the mechanical departments in the matter of ordering power and firing up before needed.

In conclusion, the committee has endeavored to review this subject in a general way without regard to equipment. In doing this we are not unmindful of other possible losses through lack of proper car or train loading. Locomotives may be kept in perfect condition at great cost, may be operated and fired in a manner 100 per cent perfect, loaded to full tonnage capacity, yet fail in good returns. The matter of hauling empty or half-loaded cars of great weight and size, increases operating expenses and proportionately reduces net returns, therefore, should be a matter of mutual concern to every railroad in the land.

The report is signed by J. R. Scott, chairman; P. J. Miller, J. J. McNeil, W. L. Robinson, C. W. Hyde, F. W. Edwards, M. H. Haig and W. G. Tawse.

Discussion.—The unnecessary stopping of trains does not permit of good locomotive performance, tests with an ordinary passenger train with a superheater engine showing that an average of 300 lb. of coal and 2,100 lb. of water are consumed at each stop in addition to the wear of the brake shoes and equipment. The question of pooled engines versus regularly assigned engines was thoroughly discussed. The members were strong in their approval of the system of regularly assigned engines. A member from the St. Louis & San Francisco stated that with regularly assigned engines there was an average of 18,000 miles per engine failure in a recent six-months period, as against an average of 6,000 miles per engine failure when the pooled system was in effect. He also stated that by changing from the pooled system to the regularly assigned engines there had been a decrease of 6 per cent in fuel used with an increase of 2.33 per cent in tonnage hauled. It was believed that in most every case the engineers would take better care of their engines and numerous cases were mentioned where the mileage between shoppings had been increased by adopting the regularly assigned engine plan. While more engines are needed than with the pooled system it was believed that the additional investment would be warranted.

Superheater engines must be carefully maintained in order to obtain the full benefit of the device. One road keeps a record of the date when the flues were last cleaned in order that the roundhouse foreman may know when to clean them again, no matter on what part of the road the engine may be. The water in the boiler of a superheater locomotive should not be carried too high, as the temperature of the steam at the cylinders will not then be as high as it should be. It is believed by many that the use of a special grade of oil for the lubrication of the cylinders is not necessary, but when drifting the throttle should always be opened slightly.

Some roads give particular attention to the arrangement of the engine cab, seeking to have everything as convenient for the engineer as possible. This was believed to be good practice. If the engineers were required to make thorough inspection reports the terminal inspectors would be greatly assisted, for oftentimes a defect may be more readily detected while the engine is running than when standing.

Several members spoke of very marked success with the use of flange oilers on locomotives that had previously given considerable trouble from worn flanges. Instances were mentioned where the mileage of the driving wheel tires had been tripled by the use of the flange oiler and in some cases derailment troubles have been entirely eliminated.

SPEED RECORDERS

Frederick S. Kerby (Baltimore & Ohio) presented a paper on this subject, in which he briefly described the different kinds of speed recorders in service on the railroads replying to a circular he sent out in preparation for this paper. He also mentioned the use of an electric annunciator that can be attached to the speed recorders of any type for the purpose of ringing a bell when a certain definite speed has been reached. If the rate of speed is more than two miles above the limit the bell will ring until the decreasing speed reaches and passes below the limit at which the device is set. This has been tested out on six different engines and has proven successful. If the recording gage should become broken or for any reason is out of service the bell will operate just the same, which is a great advantage.

The chief advantage derived from the use of the speed recorder is the factor of safety. It can also be used to advantage for checking the speed of trains, and with those recorders provided with the time curve, the time at stops is readily ascertained. The speed recorder is also a great factor in settling disputes in regard to the speed at times of accidents and the speeds at which the engines run by slow orders. By thus controlling the speeds it has been stated that the roads using them are not as liable to have over-heated bearings. It also gives an engineer a better idea as to the speed he is running and helps him to make better time without the necessary spurting. Some roads claim that the fuel consumption has been increased on account of the speed restriction on descending grades, as a higher rate of speed will have to be maintained on the ascending grades. The cost of maintaining speed recorders has only been estimated. One road states the cost is from $120 to $140 a year, while another road estimates $75 a year.

Discussion.—Those roads using the speed recorders reported favorably as to their use, believing that derailments have been materially reduced. It has also been found that the number of hot boxes was decreased. The enginemen like them as it gives them a guide by which they are better able to maintain schedule speed. A leeway of five miles per hour was believed fair before disciplining an engineer for a violation. The El Paso & Southwestern test the recorders in case of a violation of the speed limit before the engineers are disciplined as the gages do not always register in accord with the record. All recorders should be carefully maintained, and on some roads the engineers are required to check the reading of the gage by taking the time between mile posts.

OTHER BUSINESS

A paper was read by Alonzo G. Kinyon, supervisor of locomotive operation, Seaboard Air Line, on the "Practical Chemistry of Combustion," which describes methods similar to those used on the Northern Pacific, a description of which was published in the *Railway Age Gazette* of May 1, 1914, on page 976. W. H. Corbett, chairman of the committee on the Revision of Progressive Examination for Firemen for Promotion and New Men for Employment, reported that a new book of rules has been made and will be distributed in the near future. The following is the list of subjects for 1915:

What effect does the mechanical placing of fuel in fire boxes and the lubrication of the locomotive have on the cost of operation?

Recommended practices for the employment and training of new men for firemen.

The advantages of the use of superheaters, brick arches and other modern appliances on large engines, especially those of the Mallet type.

How can the road foreman of engines improve the handling of the air brakes on modern trains?

The electro-pneumatic brake.

The effect of properly designed valve gear on locomotive fuel economy and operation.

Scientific train loading; tonnage rating.

The constitution and by-laws of the association were amended to include a fourth and fifth vice-president. The following officers were elected for the ensuing year: President, J. C. Petty (N. C. & St. L.); first vice-president, J. R. Scott (St. L. & S. F.); second vice-president, B. J. Feeny (Ill. Cent.); third vice-president, H. F. Henson (N. & W.); fourth vice-president, W. L. Robinson (B. & O.); fifth vice-president, G. A. Kell

(G. T.); treasurer, D. Meadows (Mich. Cent.); secretary, W. O. Thompson (N. Y. C. & H. R.). Mr. Thompson was paid special tribute by being elected to the office of secretary for life. He is one of the three living charter members of the association.

At the close of the convention the secretary reported a total membership of 1,137, of which nearly 50 per cent were registered at this convention. The treasurer reported a cash balance of $3,190. Chicago received the greatest number of votes for the next place of meeting.

NEW PASSENGER STATION AT POCATELLO, IDAHO

The Oregon Short Line has recently let a contract for the construction of a new passenger station at Pocatello, Idaho, to the Lynch-Cannon Engineering Company, Salt Lake City, Utah.

The main portion of the building is 77 ft. by 89 ft. in area, and is three stories high, with a two-story wing on each end 60 ft. by 68 ft. The building is of fireproof construction throughout. The first story is of gray stone, and the second and third stories are of dark red brick laid in ornamental patterns, with cut stone trim. The roof is of asbestos shingles.

The first floor contains the usual facilities for the accommodation of passengers and for handling baggage and express. The main entrance is from the south. To the left of the outer and inner vestibules, are the women's rest room and the secondary stair hall. On the right is the men's smoking room. The space on the opposite side of the general waiting room is devoted to the ticket office, with an exit to the tracks on each side. A newsstand and toilet room are located on the right, and the main stair hall and depot master's room on the left. The general waiting room is 41 ft. by 89 ft., with a balcony around it on the second floor. The left wing of the first floor is devoted to a lunch room on the track side, and a dining room, pantry and kitchen on the street side. In the right wing adjoining the general waiting room, are an emigrants' waiting room, a public space and the mail clerk's office. Next to these is the baggage room which is 30 ft. wide and 60 ft. long and extends over the entire width of the wing. At the end of the wing is the express room and express office. The floors in the general waiting room, public space, inner vestibule, rest and smoking rooms, stair hall and dining room are of tile, all others being of cement.

The second floor is devoted entirely to the railroad company's offices, those of the Montana division occupying the left half of the floor and those of the Idaho division, the right half. There is also a file room and a vault in each wing, and a telegraph room in the right wing. The building will be heated with a hot water system. The interior of the building will be decorated with a color scheme of chocolate red and gray stone color.

This station was designed by Carrere & Hastings, New York, and will be built under the direction of Carl Stradley, chief engineer. All endeavor will be made for its completion in time to handle the travel during the Panama-Pacific Exposition.

PACKAGE DELIVERIES AT BOSTON FREIGHT HOUSES

The subject for discussion at the meeting of the New York Railroad Club, September 18, was the delivery and handling of miscellaneous freight at the Boston freight terminals, a paper being presented by Harold Pender, H. F. Thomson and C. P. Eldred, who made a study of this matter on behalf of the electrical engineering department of the Massachusetts Institute of Technology. Most of the work was done about a year ago. The paper was read by Dr. Pender, who is now a member of the faculty of the University of Pennsylvania; and the discussion was closed by Mr. Thomson.

This investigation was undertaken because of complaints on the part of shippers, consignees and teamsters, of delays due to the methods employed in delivering freight and in sending out notices of arrival. The institute had already made an investigation of the use of motor trucks, in Boston, in the place of horses, for moving freight in the street. The New York, New Haven & Hartford and the Boston & Maine contributed between them the sum of $2,000 toward the expenses of the investigation and it was chiefly the freight houses of these roads which were investigated. The New Haven road has in Boston 11 freight houses and 2 piers, and the Boston & Maine has 35 freight houses.

As the result of a large number of observations, it was found that the average team spent about one-third of its time each day in the railroad yard. The studies were confined to package freight, brought to or taken from the doors of the freight houses. It was found, incidentally, that teamsters lose more time at the store doors than at the railroad yards. The average time spent by a wagon at an inward freight house was found to be 46.7 minutes; of which 10.3 minutes was spent in moving in the yard; 8.5 minutes at the cashier's office; 4.1 minutes searching for freight, including searches when nothing was found; 16.2 minutes loading; 2.2 minutes with the delivery clerk, 1.0 helping other drivers, 2.3 minutes roping, etc., and so on. The total includes 3.5 minutes charged to loafing.

Another observation showed a larger percentage of time spent

Street Front of Proposed Oregon Short Line Station at Pocatello, Idaho

in searching for freight, and Dr. Pender said that during the time that his men were making their observations, there was a marked improvement in this matter; the freight agents saw that the goods were more systematically placed in the house so that a teamster could find his shipment more readily.

In one set of observations it was found that about one-fifth of the calls of wagons at the doors were ineffective, the man got no freight. A part of the time shown in this calculation is due to going to the wrong door, and then having to go to another one. This delay was due to errors on the part of the clerks in making out the delivery checks, and also to mistakes by the drivers.

It was found that complaints by drivers of delays because of waiting for their turn at doors were largely without any real basis in fact. The average at inward freight houses was only 1.5 minutes, and at outward freight houses 4 minutes. The figures include the congested morning and evening hours. Figures quoted from reports of studies at Chicago, Detroit and New York City, show that Boston makes a much better record in this matter than the places referred to.

In all of the studies it was found that, on the average, wagons carry only about one-half their normal capacity. Studies in other cities have given results about the same as this.

Part second of this paper deals with the time elapsed between arrival of train in yard and delivery of freight. Excluding certain traffic, the conditions of which were not quite normal, it was found that the average time between the arrival of a train and the minute when the freight was ready for delivery was about 8 hours. In some, perhaps many, cases shipments were ready for delivery from one to two hours before the delivery checks were in the clerk's hands ready to be delivered to the teamster. The average time required to unload a car was from 30 to 45 minutes.

While large quantities of freight are taken away promptly, it was found that, on the average, at the terminal of the Portland division of the Boston & Maine, freight was not taken away until 18 hours after it was ready. This average, however, seems to refer to what may be called the active freight; for, outside of this, there were 1,027 consignments, amounting to 476 tons, which were not called for until after the third day. It is the rule to charge storage on goods left more than 72 hours. Again, it was found that large quantities of freight were left in the house for 24 hours or more after the teamster had taken his delivery check from the clerk.

Most of the cars coming into Boston with L. C. L. freight were loaded far below their full capacity; and the average of the cars examined was, at the New Haven Terminal 6 tons, and at the Boston & Maine 4 tons.

The authors of this paper profess to make no recommendations; first, because they were engaged only to report facts, and second, because they lacked the time and money to go further into the subject. They do, however, offer a number of observations which have the effect of recommendations. One of these is that, in curing wagon delays, the prime factor is the driver. Some estimates also are given of possible reductions in the time taken by the teamsters in making inquiries, searching for freight, and in moving about in the yard. They think that with the cooperation of the railroad the teamster who spends 67 minutes at the inbound freight house might possibly reduce this to 54 minutes and that the time at outbound houses, 39 minutes, might be reduced to 33 minutes. But, though it is held that these reductions could be made by the railroad, the reasons for this conclusion are not very fully set forth. One road has put on sorting gangs, whose duty it is to keep freight properly sorted in the houses, and to move forward, each night, all uncalled for consignments.

The recommendations deal only with the conditions as they are. To make improvements in the houses or in the general system would cost much money, and it is beyond the scope of this study to estimate these costs.

In regard to the time lost between the arrival of a train and having the goods ready for delivery in the house, the obvious recommendation is made that delivery checks ought always to be ready as soon as the goods are ready. It appears that at the New Haven terminal, the majority of the waybills do not arrive in advance of the freight; and some of the studies also showed that the preparation of delivery checks was not begun until the freight arrived, even if the waybills were in hand before. Delivery checks cannot be given to the teamster until the freight is unloaded, as the clerk must first mark on the check the number of the door where the goods may be found.

At one New Haven terminal freight was available on the floor of the freight house on the average two hours before the delivery checks were ready. At the Boston & Maine this time was about one hour.

DISCUSSION

In the discussion D. B. Rushmore, an engineer of the General Electric Company, commending the Massachusetts Institute of Technology for making this scientific study of a branch of industry which has been largely neglected, called for co-operation by engineers generally. Why should not the large number of manufacturers who make devices for use in handling freight in freight houses combine to promote their common cause? It is a shame that so little progress is made. Recently, in New York, a pier has been built costing a million dollars and it has no devices for handling freight more modern than were in use fifty years ago. The General Electric Company has made numerous studies and experiments, but as yet has not got anywhere. The time is ripe for doing something, and all interested should get together. Several men have set up as consulting engineers in this line, but no progress is reported as yet. Possibly the government should take a hand and try to correlate the efforts of men in different fields. However, the railroads should be wise enough to forestall the government.

S. G. Thompson, consulting engineer of the Public Service corporation of New Jersey, thought the railroads should feel flattered at the record shown in this paper, which refutes the charges of those critics who say that freight yards are not well managed. The paper shows that the best possible saving that could be made would save teamsters only 7 per cent of their time; and this 7 per cent, which is equal to 38 minutes a day, is not enough to enable them to make another trip. Therefore, the teamster would not be helped. Mr. Thompson thought that the "loafing" time shown in the records ought not to be charged to the teamsters. They were warming themselves or taking reasonable rest and were making good use of their time.

William McCellan commended the Boston railroads for having, as in this case, called in trained minds to study a problem which for so long a time has been left to those who use only rule of thumb methods. Scientific facts like these will demolish the allegations of those who have adjured the railroads to practice more economy, but have not told them how the advice could be carried out.

Mr. Thomson, replying to Mr. Thompson, observed that the average of 7 per cent to be saved by teamsters did not mean 38 minutes for each teamster; it meant rather a much longer time for some of them and much less for others. In many cases the time saved could, no doubt, be profitably used. He said that the time shown in the records as loafing time meant time really wasted, as where teamsters were found engaged in conversation for a half hour. The freight congestion in West street, New York City, having been referred to Mr. Thomson said that that was a place where the experiment of keeping freight houses open 24 hours a day might be hopefully tried. It would be necessary, of course, in any such plan, for a considerable number of shippers and consignees to co-operate.

A KOREAN LIGHT RAILWAY.—From the graphite mine at Denksu Dong, in North Choong-Chung province of Korea, a light railway, 13 miles in length, runs to Whang-Kan, a station on the Seoul-Fusan Railways.

RAILWAY SIGNAL ASSOCIATION

The Railway Signal Association opened its nineteenth annual convention at Hotel Champlain, Bluff Point, N. Y., on Tuesday morning of this week, President F. P. Patenall in the chair.

Mr. Patenall in his opening address complimented the committees on their arduous and successful labors, referring especially to the Manual of the association, which is a monument marking a great amount of valuable work done during the past few years. This manual now contains 150 standard designs; and the association, through it, is a real power in the railroad world, and in the commercial world as affected by signal work.

The financial standing of the association is good, but the speaker reminded the members that it is a voluntary association and that members must constantly work to increase its influence. There are now 1,250 members; this ought to be increased within the next 12 months to 2,500. There are large numbers of railroad men who are eligible, and who ought to be brought in.

The work of the signal engineer is expanding, and this must continue in spite of hard times. He is called upon more and more each year to devise means of checking the human equation; and this means more expensive and more delicate apparatus. The use of alternating currents in automatic signaling has now become extensive, and even much larger installations of this kind may be expected in the near future.

To be thoroughly up-to-date the signal engineer of today must be ready to meet the demand for operation of single track railroads safely by signal indications alone, for this demand now appears in many places. The successful accomplishment of this improvement will defer the expenditure of considerable sums of money otherwise thought to be necessary for double tracking.

Continuing, Mr. Patenall said:

"Other signal engineers tell me that to complete their lines from a standpoint of complete signaling will require expenditures in the future equal to the total amount spent in the last 20 years; so that there is left a vast amount of work for us to do. . . . Signal engineers of the present day are supposed to know the physical as well as all other characteristics of their roads, and very properly so if they expect to aspire to other important positions in the operating field. Their position in the engineering and operating department is becoming more important all the time, and they must know how, when and where to spend money that will insure the best returns. Congress has deemed it necessary to obtain a physical valuation of our railroads and it is estimated that the cost will be at least fifty million dollars. This amount must be earned, as well as the dividends. Some of our best railroad men have taken service with the government in this work, and I hope when this is completed, we shall be able to get a similar amount assigned for signaling purposes.

"Investigations are frequently being made by the railroads of the many automatic train control devices brought out, and assistance is being rendered the inventors, both technically and financially. . . . Taking into consideration the variable conditions on our railroads, a most difficult task has been placed before us; but the work is being prosecuted with diligence and we expect to surmount these obstacles. . . .

" . . . The time has arrived for me to step down but not out. I again assure you all of my appreciation of your hearty support during my term of office."

The treasurer's report showed transactions during the eleven months since the last meeting of over $10,000, and cash now on hand $2,245. The assets of the association are about $5,000 above the liabilities.

The report of the board of directors, reviewing the year, recommended that for the more efficient conduct of committee work, which is the life of the association, regional committees be formed; this would facilitate full and regular attendance.

On recommendation of Committee No. 1 the meeting after brief discussion adopted and ordered to letter ballot, the disk indicator, "Take Siding," for use at non-interlocked switches, as reported and discussed at the last meeting.* The committee proposes that at night this indicator be illuminated by reflected light. This committee reported a code of requisites for switch indicators, to be used as switches on roads having automatic block signals, which after explanations of a number of clauses by the chairman was adopted and ordered sent to letter ballot; and it was voted that if the letter ballot should be favorable, the code should be sent to the American Railway Association for its information. The meeting adopted as "correct information" a code of requisites for automatic train control, corresponding to those of the American Railway Association, as reported by this committee.

The forms of blanks for reports of trains stopped or improperly delayed by signals and for summarizing the records of signal performance, as discussed at several previous meetings and as further revised by a special committee, W. N. Manuel, chairman, were adopted for submission to letter ballot for inclusion in the manual of standards.

The committee on storage battery, R. B. Ellsworth, chairman, reported specifications for a concrete storage battery box which, after slight modifications were ordered to letter ballot.

This committee reported a code of specifications for nickel iron alkaloid storage batteries, which after a long discussion was disapproved as a standard, because certain paragraphs referred to an exclusive design; but the whole was approved to be printed as information. A code of specifications for electrolyte for lead type storage battery, after slight modifications was adopted and ordered to letter ballot.

Letter ballots were also ordered on plans No. 1,340 1,241, 1,343 and 1,342, which were fully discussed at the March meeting; and a glass jar (plan 1,224) and a storage battery separator (plan 1,341) presented at this meeting were likewise adopted; but the kind of wood for the separator was not specified. The afternoon of the first day was taken up with long and detailed discussion of lightning arresters and of insulation for wires. Concerning arresters there were so many differences that the subject was recommitted, to be taken up again on the second or third day. This committee, E. G. Hawkins, chairman, has done much original work, on a difficult subject, and the questions of members were varied and almost innumerable. All of the three codes of specifications—air gap, vacuum gap, and choke coil—were finally accepted as progress reports, the sentiment of the meeting being that the committee had made the best beginning possible in a work of this nature.

The wire committee, W. H. Elliott, chairman, had to answer about a hundred questions. Its code of specifications for galvanized messenger wire were finally, with a number of changes, ordered to letter ballot. It was the sense of the meeting that inches (decimals) should be the only terms in which diameters of wire should be expressed, the time-honored names "B. W. G.", etc., being abandoned. A table of recommended sags was accepted and ordered to letter ballot. Specifications for rubber insulating tape, after a number of changes, including a clause making the use of tin foil wrappers for packages optional, were ordered to letter ballot. The same action was taken concerning friction tape.

C. C. Anthony and six other prominent members of the association presented three amendments to the constitution which were adopted and sent to letter ballot. These broaden the qualifications for active membership in the association so that members and engineers of national and state commissions, editors, college professors and others, not engaged in the supply business, may be active members; establish a new class of "life members" so that old members may be kept on the roll without requiring them to pay dues; and provide for a variable date for the annual meeting. The board of direction are to be free to fix the time of the meeting, or to change the place, when necessary without going through the formality of a letter ballot. This amendment also entitles the board of direction to call special meetings.

The remaining sessions of the convention will be reported in next week's issue.

*Railway Age Gazette, June 5, 1914, page 1229.

Methods of Artificial Lighting for Railroad Offices

Four Requirements of Artificial Lighting Almost Universally Demanded. Advantages of Indirect Lighting

By John A. Hoeveler
Illuminating Engineer, Chicago.

Practically the only difference between railroad offices and the offices of any large corporation lies in the greater scope and wider range of activities carried on in the former. A railroad office building houses a large clerical force, a statistical department, an engineering department, a drafting department, telegraphers', despatchers' and numerous executive offices, and in many instances, a city ticket office. The illumination problems encountered are manifold and quite different in their essential

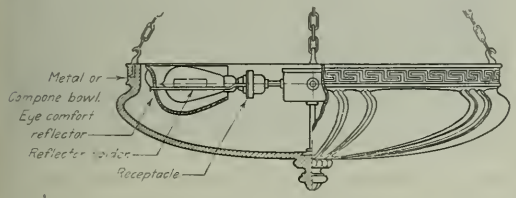


Fig. 1—A Shallow Type Indirect Bowl Equipped with X-Ray Silvered Glass Reflectors

features. However, they are not characteristic of the railroad business only, but are the same that countless other concerns in other lines of business must solve. Hence, the railroad may readily benefit by the experiences of others.

The standard of lighting is rising continuously, and from observation one is led to believe that the rise is inversely proportional to the decrease in the cost of light per unit of lumin-

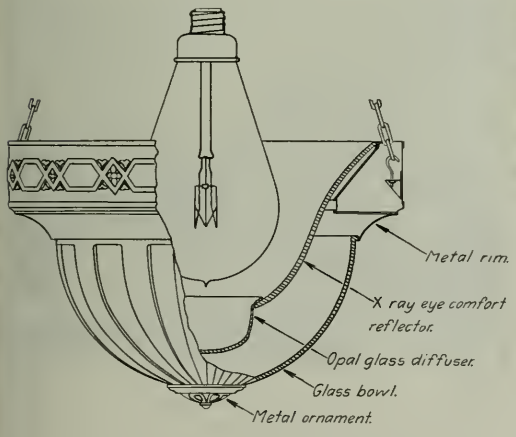


Fig. 2—A Luminous Bowl Indirect Fixture Equipped with a Silvered Glass Reflector and an Opal Glass Diffuser

ous energy, resulting from the ever increasing efficiency of the incandescent lamp. In the days of the carbon lamp, localized lighting at each desk and table or file with comparatively little general illumination, was the order of things. With the coming of the more efficient lamps in larger sizes, however, general overhead illumination, with its decided advantages, became more generally used. However, the highly efficient tungsten lamp, with its greatly increased intrinsic brilliancy, brought with it the evils of eye strain and rapid fatigue when working under this light. It was necessary to resort to the use of deep bowl reflectors totally enclosing glassware, semi-indirect lighting and totally indirect lighting, and of these the latter results in the greatest measure of relief. In fact, recent investigations show that indirect lighting has the qualities of well diffused daylight, and causes practically as little fatigue of the eye, as the result of several hours' work, as daylight. The consequence is very greatly improved lighting conditions, which merely demonstrates that constantly increasing lamp efficiencies are an incentive to more and better lighting. The standards of today are far in advance of what they were a few years ago; today we believe in plenty of well-diffused light everywhere. Good lighting is cheap and yet the benefits it bestows are vast. Poor lighting is expensive even when obtained for nothing.

Four requirements for the artificial lighting of offices are now almost universally demanded: First, sufficiently low brilliancy of the lighting units to avoid uncomfortable and injurious glare in the eyes from the light source; second, the elimination, as much as possible, of the irritating glare of specular reflection from the glossy surfaces, particularly of books and papers;

Fig. 3—A Large General Office Illuminated by Indirect Fixtures

third, the elimination of sharply defined shadows, which make vision difficult; and fourth, the use of correctly designed, scientific and efficient lighting equipment.

The first three of these are the most important, while the fourth is usually essential to the attainment of the others. In this article, the writer will show how the application of indirect lighting meets these demands of good lighting.

Taking up the requirements in order, with indirect illumination the light flux of the lamps is directed to the ceiling rather than directly to the desks. A relatively large area of the ceiling in this manner is made luminous. The extremely brilliant tungsten lamps are completely concealed, and the only source of illumination visible to the eye is the low brilliancy ceiling. The enlarged effective source of light, the ceiling, produces a very diffuse illumination in the room. This minimizes the bad effects of glare, due to specular reflection, since even with very glossy surfaces, there can be no specular reflection when there are no specular sources of light. The more nearly perfect the diffusion of the light from the ceiling, the more nearly completely will glare from paper be eliminated. Deeply defined shadows are

annoying and harmful to the eyes for two reasons: the density of the shadow in contrast to the surrounding bright area makes vision difficult, and sharp edges magnify this effect. With indirect lighting, there are no sharp shadows. There are what might be called shaded areas, i. e., shadows with indiscernible edges. Shaded areas merge so gradually into the lighter areas that vision is comfortable, even with the most densely shaded areas it is possible to obtain ordinarily with indirect lighting. It has been demonstrated that a shaded area of 50 per cent density, with indirect lighting, causes no difficulty of vision, whereas with direct lighting, it makes comfortable vision impossible.

In order that the light flux may be directed to the ceiling in the proper manner, so that the first three requirements may be attained, it is necessary to design the reflectors scientifically for the special conditions encountered in indirect lighting practice. For economy, they should be efficient. Up to the present, the silvered mirror reflectors have been most widely applied for indirect lighting purposes. A complete line of reflectors, distributing and concentrating, for all sizes of lamps, and interior supporting equipment have been standardized for the lighting of interiors of all types and sizes.

Fig. 1 shows a typical opaque bowl, whereas Fig. 2 shows a

Fig. 4—A Private Office of the Canadian Northern at Winnipeg

luminous bowl indirect fixture. The latter requires some additional explanation.

There exists a considerable demand for fixtures of the semi-indirect type due chiefly to the ornamental features of a lighted glass bowl. However, semi-indirect is only modified direct lighting and does not have the advantages of low brilliancy, reduction of specular reflection and elimination of sharp shadows to as great a degree as is desirable. Therefore the luminous bowl indirect fixture has been developed. It produces truly indirect illumination, and at the same time has a softly illuminated bowl. In the fixture of Fig. 2, a small portion of the light flux of the lamp passes through the opening at the bottom of the reflector, in which the opal glass cup rests. This glass diffuser cup redirects the light rays against the side of the outer glass bowl. The diffuser cup is designed of varying thickness to insure a uniform illumination of the bowl. The percentage of light flux utilized for illuminating the bowl is so small that the brilliancy of the latter does not exceed that of the ceiling.

OFFICE LIGHTING.

As an example of general office lighting which satisfies the four requirements of good illumination, Fig. 3 is shown. This is not a railroad office, but the conditions are similar. The size is 150 ft. by 170 ft., making a floor area of 25,500 sq. ft., which is illuminated by two hundred eighty-eight 100-watt tungsten lamps, equipped with silvered mirror reflectors, supported in inexpensive metal receptacles, hung from lamp cords. A remarkable uniformity of illumination is obtained, and the diffusion is such that glare from paper is practically eliminated and the shaded areas characteristic of indirect lighting are of such light density as to be barely noticeable.

What may be accomplished in the illumination of private

Fig. 5—A Large Drafting Room Illuminated by Indirect Lighting

offices by indirect means is illustrated in Fig. 4. The single central fixtures furnish ample illumination to all portions of the working area. The diffusion is good. The fixtures are ornamental and especially appropriate, since they have a monogram of the railroad incorporated in the design of the bowl. In fact, this is one of the important advantages of indirect lighting. The fixture may be designed to suit the fancy, but good lighting need not be sacrificed, since the same efficient reflectors and lamps

Fig. 6—The City Ticket Office of the Canadian Northern at Winnipeg

may be employed as are used with the most utilitarian and inexpensive fixtures.

DRAFTING ROOM LIGHTING.

The conditions to be satisfied in the illumination of a drafting room are somewhat more exacting than those ordinarily encountered in offices. The illumination must be exceptionally diffuse, and intense. Sharp shadows cause no end of trouble and eye-strain to the draftsman, making the exact setting of the T-square, triangle and other instruments very difficult, and

frequently causing errors which require laborious erasing. Therefore, the diffusion must be such as to completely eliminate any sharp deep shadows. The intensity must be sufficient to make it possible to see pencil lines through tracing cloth.

At the present time, the practical and economical means of producing a highly diffuse illumination is by making the entire ceiling of the interior the luminous source. This usually means a closer spacing of fixtures than is ordinarily required for office lighting. Fig. 5 illustrates a large drafting room in which some 40 draftsmen are accommodated, and which is lighted by means of twenty-eight 250-watt fixtures, equipped with silvered glass reflectors. This installation was planned to insure the best of diffusion. As a result, shaded areas on the plane of the tables are so very light and blend so gradually into the lighter areas as to be scarcely noticeable. The intensity of illumination on the table is eight foot-candles and proves ample for tracing.

All of these factors combined with the total absence of great brightness, contrasts, make the illumination most comfortable and satisfactory. From the practical standpoint, this installation has the advantages that every square foot of working space is adequately illuminated; changes in arrangement of office equipment entail no shifting or changing of the locations of lighting units; lighting units are overhead and out of the way, and lighting units are constructed with detachable arms permitting the reflector to swing free and facilitating cleaning, without the need of removing the lamp or reflector from the bowl.

CITY TICKET OFFICE LIGHTING

The general requirements for the lighting of a city ticket office are about the same as for general office lighting, with the possible exception that the lighting fixtures should be more ornamental and attractive in character. They present an appearance of elegance and unquestionably the lighting fixtures add to this effect. The cause of this appears to be the fact that even in the sale of transportation it is necessary to meet competition. Fig. 6 shows a ticket office of the Canadian Northern, in which the novel idea of incorporating the monogram of the railroad in the design of indirect fixtures has been applied. The fixtures are ornamental in appearance, harmonize with the interior and have a considerable advertising value. All of the above illustrations shown are night views, taken by the light of the indirect fixtures alone.

FREIGHT TRAIN HANDLING

An interesting paper on the proper handling of freight trains was presented at the January meeting of the Western Railway Club, by F. B. Farmer, of the Westinghouse Air Brake Company, St. Paul, Minn. Mr. Farmer presented a number of instructions for freight train engineers that were compiled after many years' study of the break-in-two question. In presenting these rules to the club Mr. Farmer spoke in part as follows:

The instructions are not self-enforcing, and habits are hard to

1965

.....RAILROAD

Conductor's Break-in-Two Report

Train .....Direction .....Date .....

Eng. No.....Engineer .....

CAR OR CARS DAMAGED			Total Cars Coupled		Were Mts.		Was Train					Name of Coupler	Part Failed						Defect		Nearest M. P. Branch Letter	Time of Accident	Delay	
Initials	Number	No. from Eng.	Lds.	Mts.	Ahead	Behind	Starting	Stopping	Running	Backing	Switching		Strap Yoke	Body	Knuckle	Pin	Coup. Eye	D. Timbers	Old	New			Hours	Min.

Indicate following causes by X, but also give full explanation in every case. In (1), (6) and (7) state how many cars from engine.

	Break-in-Two		
CAUSE	1st	2nd	3rd
(1) Burst Hose			
(2) Brakes Applied from Rear			
(3) Intentional Emergency			
(4) Releasing at Slow Speed			
(5) Start Before Brakes Released			
(6) Knuckle Slipped By			
(7) Coupler Unlocked			
Speed of Train?			
Was Air Cut in to Rear End?			
Were Eng. or Train Brakes Used?			

CONDUCTOR.....

Make report in duplicate. Mail original to Train Master and copy to Travel Engr.

break. Therefore, while an improvement may be expected by placing copies of the instructions in the hands of engineers and conductors, yet the possibilities of betterment will not be approximated until the traveling engineers and the trainmasters thoroughly understand and enforce them, and until their superiors keep in touch with the results. There has been too much instruction car work, and too little service instructions and supervision. Some roads have wisely closed these cars, so far as regular and general instructions to the enginemen and trainmen are concerned, using the instructors in the field to co-operate with and instruct the division officials whose duties are to see that the enginemen and conductors perform their work properly.

Break-in-twos is the best measure of the quality of train handling. Without reasonably accurate and complete records of every break-in-two, division officers are working largely in the dark, and accurate and complete reports are impossible without suitable forms. The conductor and engineer must be shown by such forms just what information is wanted. The best de-

_____ RAILROAD

Engineer's Break-in-Two Report

Train_____ Direction_____ Date_____ Engr. No._____ Condr._____

Total Cars Coupled Loads_____ Empties_____ Number Empties behind Loads_____

Time_____ Delay Hrs._____ Min._____ Nearest mile post or station (Give branch letter)_____

Was train Starting_____, Stopping_____, Running_____, Backing_____, Switching_____

If Starting was slack taken?_____ How?_____

Was steam being used?_____ Light_____ Heavy_____ Speed at break-in-two_____

Were brakes being released?_____ If so, at what speed?_____

Were engine or train brakes being used?_____ Speed when shutting off?_____

How long before brakes applied_____ Am't. first red'n_____ Speed then_____

Am't. final reduction_____ How far from stop_____ Total reduced just before final reduction_____ (Note: Where engine brakes, independent or straight-air used, give brake cylinder pressure where reduction asked for.)

Any previous severe shocks?_____ Where?_____ Cause?_____

No. of cars from engine where break occurred?_____

State fully your reason for break-in-two:_____

Engineer_____

Make reports in duplicate and mail original to Traveling Engineer and duplicate to Train Master

signed forms, one for the conductor and one for the engineer, are those used by the Duluth, Missabe & Northern, and are shown herewith. The engineer is the man most concerned, and the one who is usually assumed to have caused the damage. Therefore justice to him demands his report before attempting to place responsibility. Both trainmaster and traveling engineer get copies of these reports. They are the men on "the firing line." Both need the same information and promptly. If reports are too numerous for them to read carefully, and take action on, it is certainly time for a special and general investigation.

The superintendent should receive a monthly tabulation of break-in-twos, and should compare months on a train-mileage basis so as to note promptly and take action on any decrease in efficiency. This tabulation is made up easily by the receiving clerk making an entry on a suitable form as each report passes through his hands. A copy of these tabulations sent to the general superintendent allows him to compare months for each division and different divisions. On one large road the general manager takes personal interest in the monthly tabulations.

It is manifest extravagance of time and money to start out of a terminal with a modern freight train any cars of which have draft rigging defects, which, with fair handling, are quite liable to result in break-in-twos. The logical preventatives are, first, a careful inspection of incoming trains and the immediate repairing of any defects found or sending the defective cars to the repair tracks; second, as some of the defects on incoming trains will not be found, and as others will be made in switching, an equally thorough inspection of out-going trains at terminals where much switching is done, especially at the main or originating terminals. While it is quite undesirable to have to set out or switch to the rear a car or cars after a train is made up, yet is should invariably be done where a defect discovered is one that is liable to cause a break-in-two. The general tendency on the part of conductors, despatchers and trainmasters is to avoid the immediate delay, and "chance" the probable one. To an extent this may be justifiable, but the line should be drawn well beyond the point of almost certain failure.

In one investigation each of the two Westinghouse men was accompanied by a first-class car inspector, who made a record of any draft rigging which should not have been allowed to pass the previous terminal without repairs. This investigation was the result of excessive break-in-twos, following the introduction of heavier power and greater tonnage. Some engineers claimed the trouble was due mainly to defective draft gear. Some car men said it was due mainly to rough handling by the engineers. In 34 trains of from 40 to 69 cars there were three trains having no seriously defective draft rigging. Of the remaining 31 trains two had each one draft gear that was not in fit condition for service, 22 had from 2 to 5 each, 3 had 6 each, 1 had 7, 1 had 9, 1 had 14, and 1 had 17. While this apparently proved that the engineer's contention was right, yet as none of these trains was broken-in-two while the inspecting and instructing men were present (one man always on the engine directing the engineer or demonstrating for him), the proof was equally good that the car men's contention was right. It was a case of honors even and need for both to improve, the usual condition. The fundamental idea in the following instructions on freight train handling is control of the slack, on how to prevent it from running harshly. The fact that if this end is accomplished no damage will follow where draft rigging is in fair to good condition emphasizes its importance. The successful engineer is the one who by study, observation and intuition knows at all times how the slack is, recognizes the different factors that will change it, and so uses the steam, the brakes and the sand as to avoid sudden and harsh changes.

DISCUSSION

G. H. Wood, general air brake instructor of the Santa Fe, spoke highly in commendation of the rules as presented by Mr. Farmer, and stated that they had been used on the Santa Fe with a few minor exceptions, with the resultant effect of the reduction of 1,000 break-in-twos. The Santa Fe has also found the practice of stretching trains just before leaving the terminals to be highly satisfactory. This is done by setting the hand brakes in the last five or eight cars, and giving the train a good stretch, then setting the air brakes and disconnecting the engine. The inspectors then pass along the train looking for "long-necks" and any other defects that might possibly tie up the train on the road.

Mr. Wood also stated that the Santa Fe has discontinued the use of the instruction car in scheduled service, finding that much better results could be obtained by sending the air brake inspectors out on the road, giving practical instructions on the engines, and sending the instruction cars around to various division points for the benefit of those men who desire, of their own volition, to improve themselves in air brake construction and manipulation. Other members attending the meeting spoke highly of the rules, and believed that their adoption would tend to relieve a large number of break-in-twos.

AMERICAN PASSENGER SERVICE*

By E. E. Clark
Interstate Commerce Commissioner

I congratulate you on the part you have played in building up the most comfortable and luxurious passenger service in the world, and when quality of service is considered, it is the cheapest in the world. The reckless freedom with which free passes were granted in the years gone by and the liberality with which cheap excursion fares were accorded, led some, perhaps many, to think that passenger service on railroads cost the railroads nothing, or that the cost was very much below the compensation received from those who were unfortunate enough to pay full fare.

The ticket scalper thrived, assisted in his transactions, in many instances, by representatives of the road. Even the clergyman's wife boasted of riding under an assumed name on a contract ticket belonging to another. The feeling seemed to be entertained quite generally that it was no wrong to defraud a railroad company.

And so grew up a general expectation that every exposition, convention, fair or other gathering was to be made a success through cheap railroad fares, while those who clamored most loudly for low, and still lower fares, spent their evenings marking up the prices on the things which they expected to sell to the excursionists, and filled the hallways with cots for the use of which they charged advanced bedroom prices.

The railroad business is necessarily done in a hurry. Nearly everything except safety is subordinated to expedition, and unfortunately sometimes safety is given second place. The questions that must be decided are multitude in number. Frequently they must be decided quickly to make room for others that are treading on their heels.

Our railroads were not built to serve sections of developed country or of established towns and industries. They have, as a rule, been projected into undeveloped territory upon the faith of the resources to be developed. Government, states, counties and municipalities often extended aid. The great part which railroads were to play in development of our vast domain was recognized and the advent of a new road was hailed with joy.

For a long time it seems to have been the generally accepted idea that the railroad had the transportation to sell and that, like a private concern, it could sell it to whom it chose and at any price it chose. Each railroad sought to encourage and assist development along these lines. Efforts, sometimes overdone, were made to afford the shippers on its line access to widely separated competitive markets. Naturally, discriminations grew up and having sprung into being, grew apace. Finally it became necessary for the government to put forth a restraining hand and to assume regulation to some extent of these arteries of communication upon which the industrial and commercial life of the nation depends, and which serve in every walk and phase of private life.

The railroads were created and exist by virtue of grants of authority extended by organized government. They never could have been built without the right of eminent domain. From the beginning they and their operations were subject to the constitutional provision that the jurisdiction of Congress over commerce between the states is plenary. Certain powers to be exercised within definite limits are delegated by the Congress to an administrative commission. There are many angles to the many questions that are presented, or that present themselves, in connection with the administration of the act to regulate commerce, and yet the fundamental principles of the law and its requirements are few and simple.

All charges for services rendered by the carrier must be reasonable and just, that is, they must be reasonable and just to the carrier and to the carrier's patrons. Unjust discrimination in any form or through any device is prohibited. There can be but one lawful charge for a given service and that charge must be collected alike from all for whom that service is rendered.

The reasonableness and justice of a charge and the discriminatory or non-discriminatory character of a charge, rule or practice are questions of fact upon which widely divergent views might, and probably would be, entertained by those whose interests are involved on either side. Hence the necessity for a form in which such controversies may fully be presented and decided. The Supreme Court of the United States has said that the uniformity required by law would be destroyed if the several courts in different jurisdictions were to pass upon findings of fact by the commission and that, therefore, the finding of the commission on a question of fact is not reviewable by the courts if there is substantial testimony in the records to support the finding.

In some quarters we are accused of being unduly friendly to the railroads. In other quarters, at the same time, we are accused of being bitterly hostile to the railroads. As is generally true of all declarations coming from extremists on either side, neither of these accusations is true and neither of them is in any sense accurate. The term and principles of the law and our own sense of justice and right under the facts disclosed by the investigations are our guides. In so far as we exercise our judgment, we do it in a judicial spirit, and having satisfied our conscience as to what is right, just and lawful, we are free from worry as to whether or not the decision will be popular.

Among the terms which are frequently used to describe man's dispositions or natures is the word "conservative."

If, however, you ask those who use that description to define it, you find that the word means one thing to one and another thing to another. There is a conservatism which means to get in a rut and stay there. There is a conservatism which means nothing but laziness. Another form of conservatism is nothing short of cowardice. And still another form of conservatism means to move along with and help the progress of the age approaching important and far-reaching changes in such a way as to reach the desired end by degrees, never losing sight of the goal sought, but avoiding precipitate steps, which, if taken, will work unnecessary destruction or do irreparable injury. I am that kind of a conservative and of such conservatives the Interstate Commerce Commission is composed.

Some of the extremists on one side suggest freely that a commission composed of others than experienced railroad officials cannot be competent to deal with these questions. And yet we have the satisfaction of knowing from the mouths of railroad officials that our work is and has been helpful in many ways to the railroads.

A captain of a steamboat on the Mississippi river found himself without a pilot. A native approached the captain and tendered his services as pilot. The captain asked him if he knew where the sand bars were, to which the native replied, "Nope." "Then," said the captain, "how do you expect to be of service as a pilot?" The native answered, "I know where they a'int." It is far better to expend energy trying to find where frictions and obstructions "a'int," than to hunt them up and then face the necessity of removing them. It was because, after years of trial of the plan of leaving all these matters in the hands of the railroads, it was found to be generally unsatisfactory and in some directions, intolerable, that the government employed a new pilot and drew some new charts for his guidance.

We desire to assist you and other officers of the railroads in making the railroad service of the United States the safest, the best, the cleanest, the fairest and the most efficient in the world, and to render that service to your patrons at charges that are as low as possible, commensurate, with fair and liberal returns to the owners of the railroads. We know full well that the American people demand and will demand efficient railroads. Every one knows that the railroads' revenue must come from selling transportation. Every one should be willing, and if he

*Address before the annual convention of the American Association of General Railway Passenger and Ticket Agents, Boston, September 16, 1914.

is not willing he can be compelled, to pay what the service is worth, including a reasonable profit. On the other hand, the railroad being a public servant, operating and existing under public franchise, has no right to expect, and should not be permitted to extort more than, a reasonable return upon the investment in the property devoted to the public service.

Some day we will have better understandings between the railroads and the public, between the railroads and the commission and between the commission and the public. When that day comes, it will be generally realized that much apprehension was based entirely on misunderstandings or on lack of understandings as to facts, intentions, inclinations and policies. We desire to do a constructive, not a destructive work. We hope to help in bringing about these better understandings.

Sometimes the whole school is deprived of recess because the teacher is unable to locate the guilty one or two scholars, but the great majority are good boys, nevertheless. All criminal laws are necessitated by a small minority who have criminal tendencies. All civil law is necessitated by a minority who are unwilling to do right or by the necessity for a common rule of action. A custom recognized by a community as representing the right and just course often becomes a rule of law. There is, in the railroad business, a law of competition that, in some ways, to some extent, is inexorable. The most direct way to the poor-house would be an effort to charge more on desirable competitive business than is asked by competitors. All railroads cannot be equally profitable to their owners. Differences of location, development, capitalization, management and physical condition all have their effect.

The effort of every loyal officer and employee is to make a success of the operation of his road. The law requires only that all patrons shall be accorded just and equal treatment under similar conditions of service rendered by the same carrier. If we can be helpful in bringing about conditions satisfactory to the great majority of their patrons, and satisfactory to the owners of those roads that are operated and capitalized upon sound business principles and not as stock-jobbing concerns, we shall feel that the world will be better for our having lived, and so shall be content.

MUDGE-PEERLESS VENTILATOR

The new Mudge-Peerless ventilator, which is made and sold by Mudge & Company, Chicago, is being applied on a large order for equipment now being built by the Pullman Company, at Chicago. This ventilator, as shown in Fig. 1, is box-like in shape with the air ramming faces arranged transversely to the line of car travel. These faces are pressed in the form of a *V* at each side of the center line and at right angles to the ventilator opening of the car, the *V* shaped surfaces being inclined toward the exhaust outlets from the interior. The purpose of this formation is to prevent the air displaced by the ventilator from escaping around the side of the monitor type roof or over the top of the arch type roof.

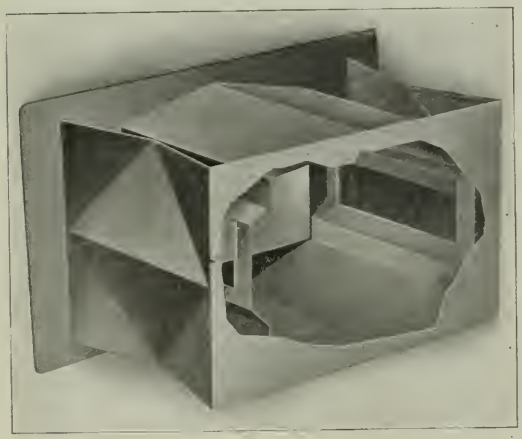


Fig. 1—Type 4 Mudge-Peerless Ventilator Showing Interior Arrangement

The sectional view, Fig. 2, shows the action of the outside air as it passes over and under the exhaust openings, drawing the vitiated air from the car body through the ventilator opening. The greater the velocity of the air passing over these openings the greater will be the efficiency of the ventilator. On the arch or turtle back car roofs the operating principle is identical except that the vacuum pockets are formed at the exhaust opening on the sides of the ventilators. An illustration of the ventilator for these types of roofs is shown in Fig. 3. The interior construction of this ventilator is hexagonal in form, the rear end fitting tightly over the opening into the car while the front is solidly joined to the outside wall. Protecting exhaust outlets are provided for practically the full length on both sides directly behind the air ramming faces. The angular baffle plates which virtually form the roof prevent rain or other elements from dropping down into the interior, and the outside ventilator face prevents down drafts being caused by side winds. Two small openings are provided in the bottom plate to discharge the condensation in case the atmosphere contains a great deal of moisture.

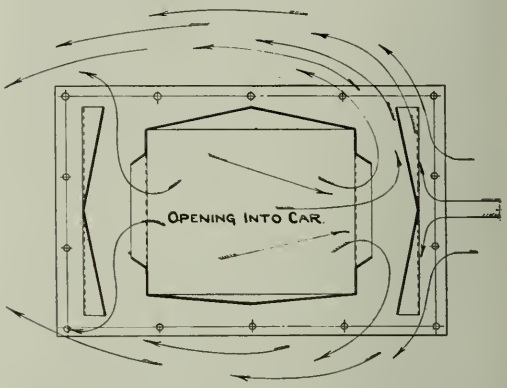


Fig. 2—Sectional View of the Mudge-Peerless Ventilator Showing the Action of the Air Currents

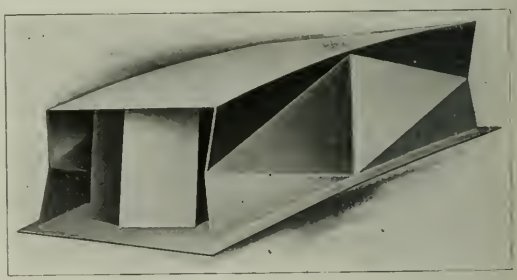


Fig. 3—Ventilator for Arch Type Roof

The efficiency of this ventilator and the ratio of the exhaust to train speed is shown in Fig. 4. This chart was compiled

from anemometer readings taken on a wooden frame car with all doors and windows closed during the test. Tests have also shown a strong exhaust action with the trains standing, if side

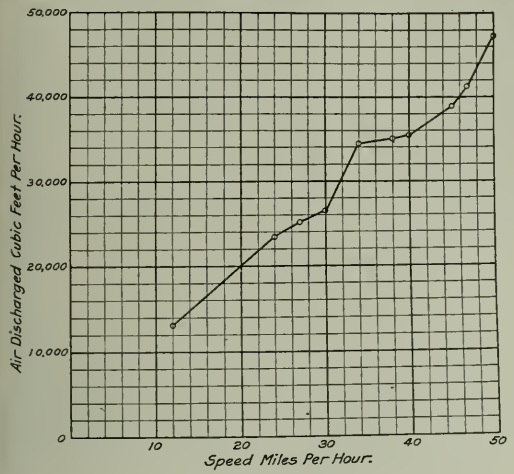


Fig. 4—Exhaust-Speed Curve of Mudge-Peerless Ventilator

winds are blowing from any angle. With a side wind blowing at a velocity of 4.25 m. p. h., an exhaust of 3,600 cu. ft. per

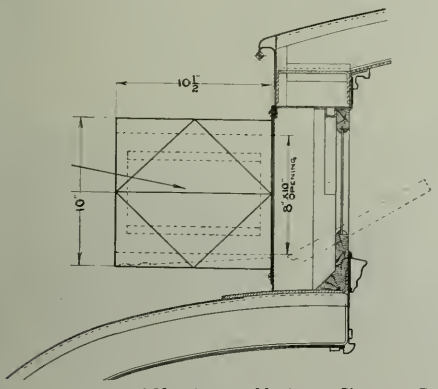


Fig. 5—Application of Ventilator to Monitor or Clerestory Roof

hour was obtained and at 7.5 m. p. h., 6,480 cu. ft. was obtained, the same car being used as mentioned in the running test.

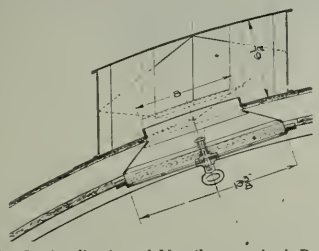


Fig. 6—Application of Ventilator to Arch Roof

The application of the monitor roof type ventilator is shown in Fig. 5. It is made in one standard size and design requiring no soldering or fitting, as it is simply bolted or screwed to the screen board. The standard deck sash behind the ventilator is then used for regulating the flow of air. The arch or elliptical roof type ventilator is shown in Fig. 6. It is applied in a different manner, since it is made to conform to the curvature of the roof. A 1½ in. flange is provided for soldering it to the roof sheets to insure water tight connections. Ventilation with this type of ventilator is controlled individually by operating registers applied to the headlining beneath each ventilator.

Fig. 7 shows the application of this ventilator in conjunction

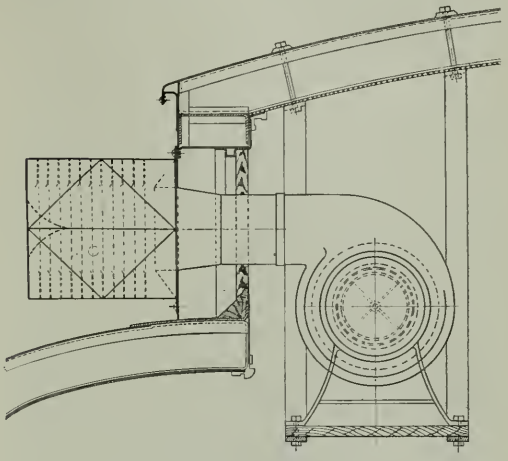


Fig. 7—Combined Ventilator and Blower

with an electric blower making a complete combination for the ventilation of dining cars which require the expulsion of fumes, smoke and kitchen odors while the car is standing. This type is provided with louvres as shown by the dotted lines. Its outside application to the screen board in the monitor roof car is the same as the type previously described. Simplicity has been carefully sought in both the construction and application of these various types of ventilators with a view to reducing the first cost and cost of maintenance.

ENGINEMEN'S EXPERIENCES*

Teaching the Fireman.—When you get a green fireman be fair to him, patient. Tell him what he can digest. Don't tell him about lap, lead, etc., as he cannot digest that just yet, but talk to him about the foundation of his work, which is: *How to burn coal and how to keep from burning coal;* in other words, an intelligent and economical system of firing. Impress upon him the importance of economy with fuel, as well as other supplies. Let him know that this coal is charged up to you as well as himself, and that you have an average coal record, and don't want him to spoil it; besides, he is wasting his energy if he puts in two scoops of coal when one is sufficient. Let him know that it is poor fuel economy to put in a fire at certain points, or under certain conditions, and then hear her "pop" for ten or fifteen minutes; let him know that it takes coal and water to keep a pop valve open, and both represent money which is being wasted and never will be recovered; let him know that fuel represents more cash than any other article the company buys,

*This is one of a half dozen aticles to be printed in these columns, made up of useful hints to locomotive runners, which were written in connection with the recent prize competition. These will give not only different views of topics treated in the articles printed last winter but also interesting experiences not before touched upon.

except labor, and that he can save or waste much by the way he handles it.

When you take coal get enough, but do not heap it up on your tender so that you will lose a hundred pounds before you have gone ten miles. The company I work for coals about 1,000 engines a day. If there is 50 pounds of coal wasted from each one of these tenders each day, and the coal costs two dollars a ton to put on the tender, it will amount to twenty-five tons a day, which equals fifty dollars a day, or $18,250 annually. This sum would pay the interest on $450,000 bonds at four per cent. From these figures we can see the importance of keeping the fireman and the coal chute men, as well as ourselves, lined up for fuel economy. When you show your fireman these things he will make an effort to help you maintain your coal record.—*M. C. Glenn.*

A Sobering Experience.—I was called to double head passenger train 136 (at 8 p. m.) from Paducah to Princeton, Ky. Mine should have been the second engine, but to save the delay of switching the engines, mine was put in the lead. The train was about 40 minutes late. We received several orders before leaving, one of which read: "No. 136 engines 1,200 and 1,198 will meet No. 51 engine 16 at Clarks." No. 51 was a second class train, and as we only checked the register against first class trains we, of course, did not know how many overdue second class trains were on the road. On arriving at Clarks I whistled for the station and discovered a train in the side track, without signals. The fireman took his lantern and held it out the cab window to see the engine number of the train in the siding. He said it was engine number 16, therefore I was convinced it was train 51. I called for the block signal and got a clear block to Stiles, the next station. Just after passing the block office the second engineer whistled me to stop. He came over and asked me if the train in the siding was No. 51. I told him the fireman got the engine number and it corresponded with the one on the order. It was our custom to rely on the fireman, in case the siding was on his side, for this information. We came to the conclusion that the train referred to was No. 51, and proceeded to the next block office, where we found a red board and No. 51, engine 16, going into the siding for us. The train we met at Clarks was No. 71 engine 36, seven hours late. The investigation disclosed the fact that since we did not check the register against second class trains it was our duty to stop and ask the crew of the train we met if they were No. 51. Had this been done we should have remained at Clarks until No. 51 arrived; had it not been for the block signal a disastrous collision would surely have occurred. Both engine crews, also the conductor, were dismissed from service for their concern in the affair; but were all reinstated a year later.—*J. H. Glenn.*

Be Sure You're Right.—One rule that I have adopted is not to accept signals unless I positively know they are for me. It is no use to have a vigilant lookout unless it is an intelligent lookout. One New Year's night at C——— there was a passenger train on siding giving proceed signals as we were rounding the curve on fireman's side. The fireman called out: "All right; high ball." I knew no one had a right to give me such signals, as every train should have been in the clear; I was the superior train and had no meet orders. So I set my brakes in emergency and turned on the sand. I barely got stopped in the clear. The rear coach of their train was just on the frog, and in the rearmost part where, had I not stopped I should have struck, was a happy family of mother and children. The conductor was giving desperate signals to his engineer to pull in to clear, for he had no flag out. The engineer, however, had coupled into other cars on the siding and could not move. The thought of what might have happened has greatly influenced me in being careful and keeping a constant lookout, even where everything could be expected to be clear. Once I had an excursion train of over 1,000 passengers, and my engine struck a bad place in the track and made a double lunge. How the engine regained its equilibrium I cannot tell, but it held to the rails, and nothing happened except the effect upon me. Since then I must be satisfied the track is good for the speed I am making. The idea of putting 1,000 people down the embankment for the sake of a good run would be no pleasant memory. Thus a constant lookout to know where you are is requisite even where there are no obstructions to encounter.—*William A. Murphy.*

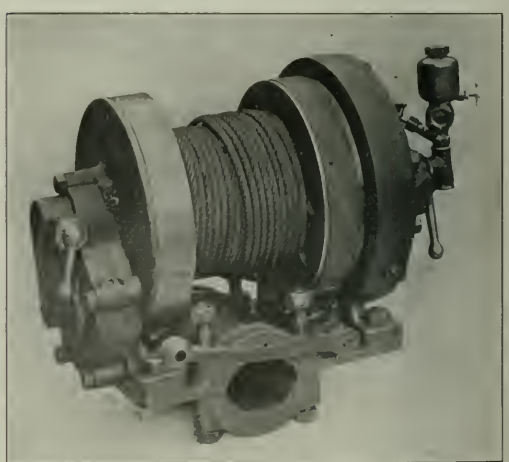
Give Whistle Signals with Care.—It is a great help in acquiring the habit of keeping a perfect lookout ahead to take care in giving correct crossing, station and block signal whistles, as provided by the rules. This is being done by only a very few engineers. To go on and on merely looking ahead and whistling now and then as an especially dangerous crossing is approached is the worst possible habit.—*C. H. Purcell.*

A Word to the Wise Is Sufficient.—As a young engineer I made a study of two or three older runners whom I knew to be successful. This, with a word of advice from a train director on one occasion—and it always pays to listen to older heads—has helped keep me out of trouble, so far. The admonition from the train director was very simply done. He stopped me one day and said: "Young man, you came into this yard too fast." I ran slower afterward. We are often tempted to disregard distant signals, but it is a bad habit to get into, and is sure to lead to trouble sooner or later. One may think the block is long or the grade is in favor of a short stop, and keep pulling the train. In the meantime your attention is taken up with other duties, when all at once you are face to face with a stop signal. In such a case you make a very rough stop at least, and possibly something more serious happens.—*Wolter J. Propert.*

COMPACT PORTABLE HOIST

A portable hoist which has a lifting capacity of 1,000 lb., and weighs less than 300 lb. complete, has recently been introduced by the Ingersoll-Rand Company, 11 Broadway, New York. The base is arranged so that it may be bolted to a timber foundation or clamped to a circular member such as a column, shaft bar or pipe, to which it may be quickly attached.

The dimensions of the hoist are 21¼ in. by 16½ in., the height



Portable Hoist for Attachment to a Column or a Timber Foundation

being 20⅛ in. The drum is 6 in. in diameter with a space between flanges of 7 in. This will accommodate 700 ft. of ¼ in. rope or 450 ft. of 5/16 in. rope. The capacity of 1,000 lb. is obtained at a rope speed of 85 ft. per minute and a steam or air pressure of 80 lb. per sq. in.

The motor is of the reversible square piston type giving four impulses per revolution of the engine. There are no dead cen-

ters and the hoist will start in any position. The drum is mounted independent of the motor shaft and is operated through a clutch and gears. Safety is provided by a powerful worm-operated band brake lined with Raybestos. All moving parts with the exception of the drum are enclosed, thus insuring against accidents to workmen who might be in danger of catching their clothing in the gears.

Due to its light weight this hoist is adapted to a wide range of service wherever loads within its capacity are to be handled. In manufacturing and power plants it is very handy for moving light machinery, for hoisting ashes and other waste material, for loading trucks, etc. It is particularly suited for service in foundries in lifting flasks and ladles. In ship yards, railroad shops and on construction work it can be put to a variety of uses.

GENERALSHIP IN THE YARD

By E. E. Swergal

Executive Office, Southern Pacific, San Francisco.

The question of efficient results in a given standard of yard facilities and traffic, depends almost wholly upon the ability of the men directly in charge to conceive and skillfully execute plans of operation suited to current and contingent conditions in the yard. The active operations should be under the direction of experienced men who are capable of clear thinking and prompt action. Operating a yard is playing chess in another form. When conditions are complicated openings will occur that are opportunities if the yardmaster is sufficiently alert to recognize and take advantage of them.

The duties of the terminal trainmaster or general yardmaster should be administrative in character with a view of co-ordinating all activities. The condition of the power and its assignment, the employment of men, the administration of discipline, the accounting of records, and the management of the relations between the yard and the division at large or connecting lines, are matters of such importance that his thought should be given chiefly to them. In other words he should hold himself in reserve as a commanding general; sufficiently poised in mind so that he may correctly analyze all the phases of operation and dispose his men and materials accordingly. When operations become extremely complicated because of extraordinary conditions he should then take active charge and encourage and direct the men in such a way as will arouse enthusiasm and greater activity; there is an element of psychology in this as important as are the elements of a material nature.

One of the principal causes of failure in yard operation is a lack of a realization of the value of time. The failure of plans shrewdly conceived, in-yard or other active operations, is often due to tardiness in putting them into execution. Briefly stated, a few minutes, or even a minute, wasted or made use of after plans are formulated may largely contribute to the success or failure of final results.

As all operations in the yard are interdependent, all employees should be cognizant in a general way of what the plan of operation will be during the shift. While night yardmaster at a junction yard in the southwest, it was my custom to go to the yard office early enough in the evening to enable me to study the transfer book and to obtain from the division despatchers a lineup showing the trains of all character that would arrive during the night. The freight traffic was largely manifest, of which there was a large volume, and there were several trans-continental passenger and mail trains in each direction that required considerable switching in addition to other coincident duties. After reviewing all information obtainable I condensed it and added thereto a tentative plan of operation for the night, showing particularly the standing of tracks. I made 10 or 12 sheets of this by manifold, giving copies to the engine foremen, the roundhouse foreman and the call boy, posting one in the yard office and keeping the original. By this method every man in the yard became generally familiar with conditions as a whole, and it was easier for them to co-operate, and easier for me to harmonize them with the various problems.

For example when a crew working at one end of the yard heard signal calls or saw a train entering the other end of the yard at 3.30, the program indicated that, in all probability, it was Extra 1652 and that the men at that end were heading it onto track 4. They knew the character of the train and the relation of their duties to it if it was of direct concern. As I altered plans or decided upon new ones it was my practice to make everyone familiar with them as soon as I could. Closely allied with this feature, is the necessity for rapid communication throughout the yard. Telephones should be located at all strategic points. The possibility of good results to be obtained from rapid means of communication is so apparent that division officers are inexcusably short-sighted when they do not provide or recommend provision for such facilities.

There are many yardmasters and line officers too, who would profit themselves and the interests they serve if they would try to develop within themselves those personal qualities which largely made for success in the lives of men who have been historically prominent in successfully directing the operations of an organization of men. The yardmaster should learn the value of a kindly smile and an encouraging word at trying times. The men must be made to feel that their good will and co-operation is necessary for success in the yard, and in order to instill this in their minds they must be dealt with as men and fellow workers—not as mere wage earners, for in the yard, as in all other endeavors, men are dependent upon each other either directly or indirectly, regardless of position. When I was in charge of yard work, if occasion required me to write our officers regarding conditions, unless there were reasons of policy to the contrary, I took the interested men into my confidence, allowing them to examine letters and reports regardless of their educational qualifications. This pleased them, as it indicated I had respect for their opinions regarding the work. Occasionally, when conditions permitted, I would relieve a man long enough to enable him to go to the eating house or loiter about for a little recreation, or if a train was due in during supper hour I personally relieved the switch tender at the end of the yard so that he might eat with the crowd.

We cultivated friendly relations with the train and enginemen working into our terminal, and I personally resorted to political methods with a view of harmonizing them. It had been the rule, rather than the exception, that trains could not get into the yard because of congestion primarily due to the heavy traffic of the then prosperous times, but partially due to lack of studious effort upon the part of the yardmasters and the crews. We established the rule of taking the trains into the yard with the least possible delay, and generally with no delay, hurried cabooses to the assigned track near the eating house, and frequently, if the power along the road was dragging because of failures or heavy trains, we ran outside the yard and helped trains in. In return for this treatment, the road men often picked up cars or threw out bad order cars as conditions developed at such times as the yard crews were rushed with work. Whenever I was confident of the result, rather than wait for extras to come up and signal for switches or inquire by wire, I wired them briefly that certain switches would be open for them, and they were usually safe in inferring from this that an engine would promptly switch their caboose. I suppose Webster would define endeavors of this character as the gentle art of dissimulation, politicians would say it was practical politics, conservatives would say it was something radical, while cynics would apply to it a less respectful term. Whatever they may call it, the fact remains that history is replete with evidence that mankind generally is responsive to it in a generous measure. I believe that a tactful policy under conditions such as I have described will accomplish very much more for good than a policy of aggression, or in other words the yardmaster, or any man in charge of men, can obtain good results if he works with his men upon a basis of frankness and fair dealing.

INCREASING THE CAR LOAD*

By J. Fred Townsend
Traffic Manager, National Tube Company

Rapid strides have been made during the last decade in rehabilitating railway property generally—reduction of grades, eliminating the curves, reconstructing the roadbed, replacing bridges and structures with larger and stronger material, and laying heavier steel rails, to care for the motive power and rolling stock that has been doubled in capacity, building second and third tracks and making extraordinary improvements in terminal yard facilities.

About 35 years ago, the maximum freight carload was 24,000 lb. The New York, Chicago & St. Louis Railroad was constructed at that time. It was built and equipped upon the most advanced ideas, which prompted some one to suggest its popular name, "Nickel Plate," and its new freight cars were all of 40,000 lb. capacity. This car would carry nearly double the load of the cars then generally in use.

All railroads throughout the country commenced enlarging their equipment, and during the next 10 years the 50,000 and 60,000 lb. capacity cars appeared. Today we have the 100,000 and the 140,000 lb. capacity cars, and it would be hard indeed to convince some people that the limit has not been reached.

However, when such a bulky commodity as coke can be loaded to the highest limit in the modern freight car, i. e., to 10 per cent. above marked capacity in the 100,000 lb. cars, it would seem to a layman that the unit of transportation should be increased, and instead of going through the slow and expensive changes of raising the limit 10,000 or 20,000 lb. at a time, a 200,000 or a 300,000 lb. capacity car should be adopted.

And it seems to me the railroads' opportunity to increase their net revenue irrespective of increased wages and expenses is here, and that they can accomplish this by following the example of the iron and steel manufacturers in increasing their facilities and then making the best use of them. This can be accomplished by doubling the capacity of freight cars, making the limit 300,000 lb. per car with six-wheel trucks. The gross weight of such cars loaded would not be as much as the new Mallet locomotives that are being very generally adopted.

During the last 20 years, the maximum freight car capacity has increased only 100 per cent., while the locomotive capacity during the same period has increased 400 per cent. The wide difference between the increase in the capacity of the locomotives as compared with the carrying capacity of the freight cars has necessitated the very long freight trains in order to give the heavy locomotives an economical load. This has resulted in an enormous increase in the maintenance of the small freight cars.

The question will naturally be raised as to why the railroads do not adopt a very much more substantial car of 150 tons capacity. The answer can be found in the records of all railroads in this country, which show that during the last ten years over 60 per cent. of the increased capacity of the freight cars has been unused in practice, while the extra cost of hauling the greater dead weight and the extra cost of maintenance have been incurred.

The fact is that everybody is complaining. Engineering experts who study these questions, as well as the railroad executives and operating officers, are surprised and disappointed because big engines and big cars have apparently failed to accomplish expected economies. Shippers whose business has been disturbed by periodical increases in minimum weight requirements are disposed to complain because the railroads disregard commercial conditions, which demand the small carload unit; while the railroad traffic managers, pressed on one side by their operating and executive officers to get bigger loads for the bigger cars, and on the other hand meeting shippers' protest against further increase in the minimum weight conditions of the tariffs, are discouraged and almost desperate.

*Abstract of a paper presented before the American Iron & Steel Institute, New York City, on May 22, 1914.

The demand for a small carload unit would not enter into the shipment of such commodities as coal, coke, iron ore, grain, building material and other commodities which are sold and handled in large quantities, under conditions which would make the shipper indifferent as to whether they moved in carloads of 20 or 100 tons, assuming the cost of loading and unloading to be the same.

The attitude of the shippers toward the big carload does not depend entirely upon the capacity or the cost of loading or unloading, but rather upon the way in which it is bought and sold —whether sold by a man who has a large quantity to sell or bought by a man who wants a large or small quantity—the desire of the retail merchant to get the minimum carload of flour, because of the original investment, interest in insurance cost of carrying the stock, depreciation in quality, chance of falling market, and so on. The same thing is true of sugar, canned goods, beans, and everything in the list of goods handled by small jobbers or very large retailers. In fact, when you get outside of the limited list of very large jobbers, nearly every buyer wants the smallest quantity on which he can get the minimum delivered price. If the railroads expect such people to buy a large quantity and co-operate in the loading of cars to capacity, their freight tariffs must not only offer indemnity for the greater cost of handling such larger quantities; and to get complete co-operation on the part of shippers, the tariffs should offer some material inducement to trade in large quantities, thereby loading cars to capacity.

SHOULD NOT THE "WHOLESALE" PRINCIPLE APPLY?

It would seem that any remedy must involve some practical application of the wholesale principle to the transportation business; and for the same reason that the price paid for the most commodities is in the inverse ratio to the amount purchased, the railroads should, within the limit of their maximum car capacity, give the lowest rate to the man who makes the largest shipment.

The freight tariffs of the European railways are based on the wholesale principle, all rates, generally speaking, being graduated according to the quantity shipped. The American railroads have made what seems to be the mistake of limiting their rates to two base units—the carload, which is anything more than 36,000 lb., or whatever may be the prescribed minimum weight, and the less-than-carload, which is anything under 36,000 lb. and within the limit of the money charge which would be made for the minimum carload shipment.

To have only the two units for rate making, the carload lot and the less-than-carload lot, was not advisable even 25 years ago, when the minimum was 20,000 lb. and the carload rate was applied upon relatively small quantities. Under the present day conditions, when the shipper is expected to furnish full loads for cars of 40 and 50 tons capacity and requested to load not less than 18 or 20 tons in order to get the carload rate, there is still less justification for the failure of the carriers to work out some graduated scale of rates, according to the weight of such consignments, or in some other way make freight tariffs which would permit the forwarding of any shipment, however large or small, at a rate which would bear some consistent relation to the cost of service.

Grain tariffs generally provide that the rates will apply only when cars are loaded to capacity. In other words, the minimum weight is the marked capacity of the car in case of corn, wheat, etc., while the minimum weight for oats or other bulky grain is based upon cubical capacity of cars used. Railroads are not building cars of capacity less than 80,000 lb. Therefore a shipper could not get the car load rate, which we will say is 15 cents per 100 lb., unless he forwarded 80,000 lb., or is able to get a smaller car. But it is difficult to get cars of 60,000 or 70,000 lb. capacity, and almost impossible to get cars of capacity less than 60,000 lb.

The question has been raised as to why the present method of rate making is considered better than the European method, or if not better, why the European method is not to a greater or

less extent observed in making American railroad tariffs. The average railroad traffic manager is usually obliged to say that any tariff which would fairly meet requirements of small carload shippers, and offer due encouragement to those who would load cars to capacity, would be altogether too complicated. And the same traffic manager is also likely to say that it is difficult, if not imposible, to change rules and practices which have obtained for long periods of time and on which business has been organized and built up. He will further say that the graduation of rates on carload shipments according to weight loaded, could not be made without loss of gross revenue, because the carload rates are now subject to minimum weights, which usually represent about 50 per cent. of the average car capacity, and any attempt to increase the rate on small carload shipments would meet the protest of shippers and the veto of state and federal authorities. It would be possible to encourage maximum loading only by offering rates considerably less than the present carload rates. And since the railroads are now able, in one way or another, to get a large proportion of their carload shipments on a capacity loading basis, any attempt to graduate the rates on a consistent basis would certainly result in a loss of revenue.

Nevertheless, this principle has been to some extent recognized in railroad freight tariffs in this country. The most numerous examples of such rate making are found in tariffs of the so-called transcontinental roads. In the case of canned salmon and several commodities which are commonly carried eastbound, these roads make two rates. For example, the rate on canned salmon from Seattle to eastern common points is 85 cents, subject to minimum weight of 40,000 lb., and 70 cents, subject to minimum weight of 60,000 lb.

A similar differentiation of rates according to minimum weights has been made to some items in the westbound tariffs of the transcontinental roads with result that nearly all of the tonnage moves under the lower rate, subject to the higher weight, thus proving that shippers can and will accommodate themselves to increased minimum weight requirements if there is any incidental saving in the rate.

Except as the trainload unit may be employed, the carload unit is the only useful basis for estimating railroad transportation cost. When any attempt is made by the railroads to measure the net revenue arising from any traffic, they consider the earnings per car. If the load is 80,000 lb., the revenue will be twice as much as it would be if the load was only 40,000 lb. But who will say whether it costs more to transport the 80,000 lb. load, and how much more?

Engineering experts have furnished various rules for determining the tractive resistance, or what is commonly called "the drawbar pull" of cars carrying different loads. With knowledge of conditions as to grades, curvature, wind resistance, and so on, these experts can estimate the weight resistance, wheel friction, and all other items to be considered in determining the relative cost of moving a car loaded with 20 tons of freight, and the cost of moving the same car loaded with 40 tons of freight, between two given points under the same conditions. But it has been impossible to state any rule or formula which may be commonly used with confidence. We know only in a very general way that the cost per ton of transporting freight in cars loaded to capacity is very much less than the cost per ton of carrying the same freight in cars half loaded.

Consider what the shippers of the Pittsburgh district generally could accomplish in the way of creating a car supply by increasing the average load per car. Based on the total Pittsburgh district tonnage for the year 1912, an increase in the average carload of, say, two tons per car, would have resulted in the same tonnage moving in 409,524 fewer cars.

While the Pittsburgh district tonnage is merely used for a basis of computation, there can be no question but that even a more remarkable showing could be made in increasing the average carload throughout the country generally, if the railroads would bring this subject before the shipping public. Shippers and consignees will be convinced that it is to their best interest to go to additional expense, if necessary, both in loading and unloading heavier cars, when they are made to realize that it means increased car supply; for there is nothing that interferes more with the general business of the country than a shortage of cars.

A SUGGESTION TO RAILROADS

It seems to me that the traffic officials of the railroads have it in their power to improve the situation in a very simple manner, by issuing graduated commodity rates based on increased carload minimum weights, i. e., commence on the present basis of rates with the present minimum weight and have a table of higher minimums with lower rates.

For instance, from Seattle to New York, the table of rates on lumber could be made as follows:

Minimum weight	Rate
20,000 lb.	$1.25 per 100 lb.
30,000 lb.	.85 per 100 lb.
40,000 lb.	.75 per 100 lb.
60,000 lb.	.60 per 100 lb.
80,000 lb.	.50 per 100 lb.

The present freight rate on lumber from the Pacific coast to New York is 75 cents per 100 lb., with 25 or 30 minimum carload weights that are based upon the cubical capacity of the car. The same method could be used by establishing graduated rates in the opposite direction, westbound. Take, for instance, the iron and steel commodities that are produced in large quantities in the East and needed along the Pacific coast.

Objections might be raised to the large number of carload minimum weights and various rates. To avoid this, the suggestion has been made by Henry S. Prichard to use, for instance, the same minimum weights and basis of rates that are in effect today, charging for the excess weight over the prescribed minimum carload weight, say, one-fifth of the tariff rate. Applied to the above example, under the Prichard method, $1.25 per 100 lb. would be charged for the minimum of 20,000 lb., and 25 cents per 100 lb. for the excess over the minimum, and the total resulting revenue would be the same as in the graded table above.

A similar schedule of graduated rates could be established between any other points and upon any other class of traffic, and perhaps even better examples could be made with flour and grain rates that are in effect today.

TRANSCONTINENTAL TRANSPORTATION

All will agree that the method of making all-rail rates to the Pacific coast must be entirely changed if eastern manufacturers are to enjoy any share of the Pacific coast trade. To see this clearly, it is only necessary to bear in mind the recent large reductions in import duties and ocean freights, and the near approach of the opening of the Panama canal, which will, if present all-rail rates of freight are maintained, shortly deliver the entire business to British, German and Belgian manufacturers. Very much of the business has already been delivered to them because of the causes named. But it seems to me that the railroads, by promptly adopting some such plan of making rates as I have illustrated, can hold the business for themselves and for American manufacturers and do so at a substantial direct profit. This will further have the beneficial effect of equalizing their traffic east and west.

Some people may reach the conclusion that this is a drive to lower freight rates. But if it does lower rates it spells increased net earnings for the railroads, because every buyer in the land would specify the very largest carload in every instance, hence heavy loads. The result would be an actual saving in freight costs to the shippers that would compensate them for building up the heavier loads, and, at the same time, result in a marked increase in net earnings to the railroads.

With a graduated schedule of rates to select from, the low minimum carload shipments would become the exception, and the small capacity cars would disappear entirely. There would be three of the present minimum carload shipments forwarded in one car.

To fully appreciate the value of this saving in equipment, consider the following items:

First. The more desirable traffic to the railroads means lower

cost of transportation and naturally lower basis of freight rates.

Second. The saving in switching expenses, avoiding congestion in the freight yards and expediting the movement of cars, both for the shippers and the railroads.

Third. The value to the railroads in having an enormous increase in the car supply without the investment of any additional capital.

Fourth. The actual saving to the railroads, in dollars and cents, of the cost of a large number of cars, and the additional saving in operating and maintenance expenses, and the valuable track room in terminal yards. The heavier loading of cars will, in itself, really create increased terminals without the expenditure of a dollar by the railroads.

For months past we have all, I have no doubt, been watching with a great deal of interest the effort being made by the railroads generally to secure permission from the Interstate Commerce Commission to charge rates of freight that would give them sufficient revenue to operate their properties properly, and give the public the service that the public is entitled to, and demands. The strongest argument that has been made in opposition to the views of the railroads has brought forward the fact tbat the railroads could themselves largely increase their net earnings by the practice of various economies. And while I am not here to argue the rate case pro and con, I know of nothing that has been advanced in the field of economics that would do more to stop the present waste of our transportation facilities, than some such basis of rate making as enumerated above. There are untold values of railroad equipment today that are not being utilized to their capacity or greatest efficiency because we are bound by an antiquated system of rate making.

Seriously, I believe that the members of the American Iron and Steel Institute can do a great deal toward greater car efficiency by taking up the campaign for heavier loading of cars that will naturally encourage the railroads to build cars of very much heavier capacity, and I ask your co-operation in this movement, which, viewed from the standpoint of transportation, commerce, economies or efficiency seems to spell progress.

DISCUSSION

Delos W. Cooke, vice-president and general traffic manager of the Erie, discussed this paper as follows:

The movement toward cars of larger capacity undoubtedly originated in a desire to economize in transportation cost. Whether this was the desire of the prosperous line to increase its profits or was forced on the weaker lines, as a clever lawyer once said, "By the scourge of crass necessity," is of little consequence; it was sound business policy.

With it, however, came the building of heavier power. The old-style car with the wooden underframe and weak draft gear connections passed out because it would not stand the strain of the hundred-car train. The car that took its place is of steel or steel frame construction. The most natural thing in the worl was to increase its capacity since the structural strength was there of necessity.

If the master minds of the earlier day who decided upon and built the large car were disappointed that the carload did not increase in proportion to the increased capacity, the truth may here be stated that when they built the large car they probably gave commercial conditions little or no consideration. They knew that if they had the car so constructed that it could be hauled in the longest possible train, somebody would be very busy trying to find a load for it no matter what its capacity might be. This had to do chiefly with the box car, which probably sees the greatest variety of service, but encouraged by the co-operation of shippers we are now building cars of 70 tons capacity for the iron and steel trade without a block of wood in them. The railroads must carry everything from feathers to pig lead, and, as Mr. Townsend says, commercial conditions—and it might be added the character of the commerce—govern the load.

The car of large cubic capacity is of great service to the railroads in enabling them to increase the load of light and bulky articles, which the varied character of commerce compels them to transport. It is practically impossible to secure a rate that will compensate for the light load on such traffic, but large cars will do much toward helping the situation in cases like:

	Average carload		Average carload
Automobiles	12,000 lb.	Agricultural implements	33,000 lb.
Excelsior	20,000 lb.	Apples	26,000 lb.
Hay, Straw, Canteloupes	22,000 lb.	Grapes, Cabbage, Tobacco	29,000 lb.
Rags and waste paper	23,000 lb.	Oranges	28,500 lb.
Sisal	24,000 lb.	Onions	30,000 lb.

Progress is being made, however, in securing heavier loading. On one trunk line the average loading on brick is 70,180 lb., where the average minimum is 40,000 lb., and on the same line the average on wheat is 71,463 lb., the average minimum being 60,000 lb. The average load of iron and steel on another trunk line which handles most of that traffic is 60,000 lb., showing that there is still room for improvement.

If the carload unit were the universal basis of commercial transactions it might be less difficult, even in these times, to endorse Mr. Townsend's suggested basis of scaled rates for increased loading; but the fact that in all big business the carload unit has little to do with the basis of sale, makes it seem that the already unjustifiable spread between carload and less-than-carload ratings is as far in rate reduction as the railroads can be expected to go.

There can be no doubt of the soundness of Mr. Townsend's suggestion, that the scaled rate would induce heavier loading in many lines of traffic, but this is by no means free from danger, especially in the mixed carload. The Supreme Court has decided that a railroad has no right to question the ownership of the goods in the application of carload ratings. This is developing the so-called forwarder or scalper to an extent that is positively startling, and it must be in some way corrected. Recent instances show that these forwarders by consolidating less-than-carload shipments of miscellaneous merchandise into carloads, and thus securing the carload rate, have a margin of 45 cents per 100 lb.. New York to Chicago, to divide with their patrons, making the railroad losses in many instances, as compared with their less carload rates to which they are entitled, over $100 per car. The loading secured by the forwarders is more than double the average merchandise loading of the trunk line railroads, and the scaled weight basis applied to this traffic would simply increase the profits of the scalper and diminish those of the railroad. In this situation we have the anomalous condition of the railroad being required by law to publish and maintain rates for certain quantities, while the scalper with no investment and absolutely no responsibility is able to make rates as much as 50 per cent. less than the railroad over the same line and divide his profits with the shipper. This, too, under a decision of the Interstate Commerce Commission sustained by the Supreme Court.

The four items of value to the railroads which Mr. Townsend gives as resulting from the saving in equipment are convincing, except as to the first, in which it could not be wholly agreed a reduction in rates naturally followed a reduction in transportation cost.

In the steel business it has been said that there is a bottom but no top. The top on railroad rates is so securely fastened as to make it absolutely necessary to keep any margin of profit intact, if any such thing exists. The railroads cannot afford to reduce their rates even to secure heavier loading, and we must appeal to you to continue your good work in helping us in this direction if for no other reason than it is to your interest to do so.

It needs no argument following Mr. Townsend's paper to show that we *must* get the heavier load, and it is likewise true that the heavier car must be built for the heavier load. The great importance to the iron and steel industry of co-operation in this direction is almost too manifest to permit suggestion, but let it be said that every part of the heavier car, from axle to running-board, calls for an increased use of metal and that metal is steel. The heavy train and the big car call for the big locomotive. A line I know has just built one containing 853,000 lb.

of steel, which is capable of hauling a train of loaded freight cars four and three-quarters miles long, *if the cars would stand it.* Bridges have been strengthened to the extent of 30 per cent. axle-load capacity in the past ten years, which means that most of them have been renewed with steel.

Heavier rails and fastenings call for steel, steel.

Have we not found in this, therefore, the ideal basis for co-operation between our great industries? You have only to do your part. We *must* do ours.

NEW D. L. & W. FREIGHT STATION AT UTICA, N. Y.

The new Delaware, Lackawanna & Western inbound freight house at Utica, N. Y., embodies a number of advanced features of design for this type of building. It is 51 ft. 4 in. wide and 402 ft. 4 in. long, the frame work being of reinforced concrete with the panels filled in with brick. The main floor contains a freight room 382 ft. 8 in. long and 48 ft. wide, and a public lobby, cashier's office, and locker and lunch rooms occupying 20 ft. of space for the entire width in one end of the building. A second story covers 82 ft. 4 in. of the length, containing private offices for the freight agent and the chief clerk, a general clerk's office, and a file room. A basement is provided under the office portion of the building, in which the heating and lighting plants are located. A new house, identical in most of the details, has also been built in Syracuse, N. Y.

The basement walls are of concrete, 1 ft. 8 in. thick with spread footings to keep the bearing pressure on the soil within the allowable maximum. The walls above the main floor level are 1 ft. thick with pilasters at 20 ft. intervals. The outer surface of the concrete walls is bush hammered. A timber floor is used in the freight room laid directly on a cinder fill. It consists of a ¾-in. maple wearing surface on creosoted planks running diagonally over creosoted sleepers. The wearing surface will be replaced when it has worn down ½ in. This floor is pitched ¼ in. to 1 ft. towards the street side to assist in moving freight. A scale is provided in the floor of each bay. A concrete floor is used for both the first and second stories in the office portion of the building, interior column supports being provided in line with the pilasters.

The freight doors along both sides of the building are counter-balanced and are equipped with the Wilcox horizontal bearings. They are 10 ft. wide and 8 ft. high, and are covered by canopies 9 ft. 4 in. wide, consisting of a steel frame supporting a concrete slab. In order to improve the lighting in the freight room the roof is raised high enough to provide for a row of Lupton steel sash above the canopy on each side of the house. Ventilation is also secured by the installation of the Pond operating device for a portion of the sash. The higher roof allows the use of a deeper and correspondingly lighter steel roof truss. The clear height under the trusses is 10 ft., and their depth at the walls is 6 ft., this being increased by the roof pitch of ¾ in. per foot to 7 ft. 6¾ in. at the ridge. Timber purlins over these trusses carry the 2 in. plank roof which is covered with a surface coat of tar and gravel. The roof on the office portion consists of a concrete slab carried by reinforced concrete beams and girders. An 8 ft. concrete platform on the track side is carried on the house foundation and a 12 in. wall under the outer edge.

The freight room is divided by three fire walls of brick with tin covered doors equipped with the Wilcox fixtures. The building is fitted with both gas and electric light. The offices on the second floor are well lighted by windows on three sides and are ample in size to care for all requirements. The record room is fitted with cases in which can be filed all records for seven years. A dumb waiter connects the two floors for the transfer of bills, receipts, etc., between the clerk's office and the cashier. The portion of the freight room under the offices is kept warm in the winter by the steam pipes under the platform on the car side and perishable freight is stored in this bay.

New Inbound Freight Station on the Lackawanna at Utica, N. Y.

Adequate fire protection, viz., a hydrant and hose stored in a rack, is provided in each bay. Toilets and wash room are also installed for the freight handlers, on the house floor, and separate toilets, locker rooms and lavatories for the male and female help in the offices.

Three tracks parallel the house and team tracks with a total capacity of about 74 cars join one end of the house. The driveways between the team tracks and along the house are paved with granite blocks.

This freight house was designed and built under the general direction of G. J. Ray, chief engineer, F. J. Nies, formerly architect, and C. E. Wickham, division engineer.

RAILROADS EARN LESS FROM MAILS THAN FROM EXPRESS

Ralph Peters, chairman of the railroads' committee on mail pay, commenting on the report of the joint congressional committee on railway mail pay, recently published, wherein it is found that the railroads are better paid for serving the express companies than for serving the government in carrying the mails, says:

"The committee has reported to Congress that the mail service costs the railroads more and yields them less than the express service; that the comparison of mail and express receipts furnishes no basis to support the claim that the railroads have been overpaid for carrying the mails, and that the express payments have been responsive to the growth in traffic, while the mail payments clearly have not.

"The evidence before the committee showed that in a typical passenger train the express car earned $6 while the mail car was earning $5.

"The report says:

"'Railway employees help to load and unload mail but not express matter, except where employees are jointly paid by the railroad and express companies. Express cars are cheaper than equipped mail cars. Railroad companies are liable for injuries to mail clerks but not for injuries to express employees. Express matter is handled at all times by express company employees. A railroad company not only handles the mail at and in stations, but in a great many instances bears the expense of transporting mail between the station and the postoffice. Mail must be carried on all trains, including the fast trains, while express matter is limited in frequency and speed of service.

"'Postal employees are carried free on railroads while on official business, whether connected with railroad mail service or not. Transportation of express employees is reciprocated by free services rendered by the express companies for the railroads.

"'Certainly there is no warrant in the oft-repeated assertion that the government is being robbed in its mail payments by comparison with what the express companies pay. There has been an amazing amount of reckless assertion on this subject.'"

V. J. Bradley, general supervisor of mail traffic of the Pennsylvania Railroad, presented a comparative statement of the differences between the two services. This, says Mr. Peters, shows the following facts:

DIFFERENCES IN THE REQUIREMENTS IMPOSED UPON THE RAILROADS

Subject	*Post Office Department*	*Express Companies*
1. Contracts	Post Office Department seeks to stipulate all the conditions and reserves the right to change many of them at will without consultation.	Express companies formally contract with railroad companies, the railroad companies being the controlling party and reserving important power.
2. Differences	Differences with Post Office Department not subject to arbitration as in England.	Arbitration would be naturally resorted to, and many contracts so provide.
3. Pay adjustments...	Post Office Department weighs the mails and adjusts the pay every four years and practically gives itself a rebate on the increased business for the intermediate period.	Express pay to railroad companies is automatically adjusted on the actual daily business.
4. Transp'n facilities.	Post Office Department demands unlimited frequency—practically on every train.	Express companies strictly limited to certain train movements.
5. Car space.....	Post Office Department requires excess car space for sorting the mails en route far beyond what the load requires.	Express traffic loads more compactly and therefore more economically.
6. R. P. O. cars.....	The railway post office cars are largely occupied by pigeon-holes and iron racks and are not available for general railroad use when not occupied by the mails.	Express traffic does not require specially equipped cars. Baggage cars serve the purpose and are available for general use.
7. Construction; maintenance	The law requires steel railway post office cars, and the Post Office Department prescribes the interior fittings and special sanitary fixtures and requirements. Light (electric or gas) is especially expensive, so much being needed. Hence high cost of construction and maintenance.	The express company accepts the cars that the railroad company can supply and is content with ordinary service and very little artificial light. Hence low cost of construction and maintenance.
8. Loading	The railroad companies pay for loading and unloading mail cars.	The express companies bear this expense themselves.
9. Employees in cars.	Probably three or four times as many railway postal clerks are carried for sorting the mails en route. The railroad companies are responsible for their lives and safety. Substantial amounts are paid annually on account of accidents.	Express companies relieve the railroad company from any responsibility for injury or death of their employees.
10. Station room.....	If the Post Office Department requires room for transfer clerks at stations, the railroad companies provide them without special charge and also furnish them and sunnly heat, light, iced water, etc.	The express company pays rent for any space occupied in stations, or builds its own structures.
11. Messenger service.	Post Office Department requires railroad companies to carry the mails between the station and the post office at many places.	No such service is performed for the express company.
12. Reciprocal service.	Post Office Department makes no concessions to railroad companies.	The express company usually carries free, money, tickets, valuable packages, etc., for the railroad company, not only on the contracting railroads, but also over the connecting lines over which the express company operates.
13. Mail cranes.....	Post Office Department requires railroad companies to erect and maintain these devices at several thousand places throughout the country.	No such requirement exists in connection with the express service.
14. Advance loading.	Post Office Department expects cars to be placed in terminals several hours before leaving time for distribution in addition to loading, and thereby avoids renting space in post offices for that purpose.	Express companies own or rent their own unloading or loading warehouses and pay all costs and expenses.
15. Handling traffic...	Post Office Department pays nothing extra to train baggagemen nor to station baggagemen for handling the mail traffic.	Express company contributes to the salary of railroad employees acting in the joint capacity.
16. Loss or damage..	The Post Office Department has not, so far as known, asserted the claim that the railroad companies are pecuniarily responsible for the general mails, but has imposed fines to cover the loss of registered mail or of mail bags or locks lost or destroyed as in railroad wrecks.	Express company accepts all responsibility for loss or damage to express traffic.
17. Penalties	Post Office Department imposes fines and deductions in many cases, some of which are dependent upon the idea that the particular mail (perhaps relatively unimportant) must be given preference over passenger and other traffic.	Express company accepts the railroad company's standard of efficiency and has no superior privileges of supervision.

PROTECTING THE FORTH BRIDGE OF SCOTLAND.—Special precautions are being taken to guard the Forth Bridge, and passengers are not allowed to take any hand luggage in the compartments while crossing the bridge.

General News Department

In connection with the buy-a-bale-of-cotton movement which has been discussed in the newspapers, the Nashville, Chattanooga & St. Louis has announced that it will buy 125 bales of cotton at 10 cents a pound.

On September 1 the Illinois Central acquired from the Central Fruit Despatch, a subsidiary company, all its refrigerator cars and such cars not already lettered "I. C. R. R." will be relettered, to be operated hereafter by the railroad company direct.

The legislative committee of the Order of Railroad Conductors in Pennsylvania has recommended an employers' liability law to the legislature which will meet next January. The legislative committee of the Brotherhood of Locomotive Engineers has declined to take any action.

The diary of a certain general superintendent shows that in one year he spent 101 days conferring with railroad commissions, committees of organized employees, city and town officers and officers of the courts; he was traveling over the road 155 days and spent 109 days at headquarters transacting business connected with the administration of the railroad.

The railroad companies have formally accepted the city ordinance governing the project for a new $65,000,000 union station and yards in Chicago to be used by the Pennsylvania, the Burlington and other roads, and to be completed within five years. In return for closing certain streets and alleys the city will receive $825,805 from the Union Depot Company.

On Tuesday of this week the Henry M. Flagler, the car-ferry which was built for the Florida East Coast for service between Key West and Cuba, was launched at the Cramp ship yards at Philadelphia. The ferry is built to accommodate 30 freight cars. It is 351 ft. long with 57-ft. beam. Its speed when loaded with 2,300 tons will be, it is estimated, about 12 knots.

In the derailment of passenger train No. 2 on the Alabama Great Southern near Livingston, Ala., on the morning of September 18 about 3 o'clock, eight passengers and two trainmen are reported to have been killed and 30 persons were injured. The wreck was due to a misplaced switch and the reports indicate that the switch had been tampered with. An investigation by the Interstate Commerce Commission has been asked by the railroad company.

The engineer and conductor of a Philadelphia & Reading train were killed by suffocation when the train stopped in a tunnel near Phoenixville, Pa. The train had run down and killed a woman at the entrance to the tunnel and was brought to a stop by the emergency application of the brakes, and the train crew and some of the passengers got out, but were overcome by smoke, and when a rescue party were later able to go forward they found the engineman and conductor both dead.

General Manager C. W. Galloway has issued a circular to the effect that telegraphing be done only where necessity requires the use of wires. Next to train orders, such messages as relate to car service to shippers and other messages of equal importance must take precedence. Abbreviating proper names is suggested. On the Baltimore & Ohio 30,000 messages are handled each day and the importance of being brief is obvious. As a substitute for the telegraph the railroad has adopted a "mailgram" service, messages of this character being handled by train with great despatch.

The New York, New Haven & Hartford reports that its plan for reducing the number of forest fires on Cape Cod by clearing wide strips along its right of way has met with marked success. This year from May to August inclusive there were only eleven fires attributable to sparks from locomotives and the territory burned over amounted to not more than 6¼ acres. In the same period last year there were 150 forest fires which burned over an area estimated at about 2,000 acres. Through all the wooded parts of Barnstable county a strip varying in width from 60 ft. to 130 ft. has been cleared on either side of the railroad's right of way. Pine trees have been left standing in these strips, as their leaves act as a screen. The areas cleared will be kept in that condition by the section gangs.

The Louisville & Nashville and the Nashville, Chattanooga & St. Louis have entered suits in the United States Court of Claims at Washington for $184,204 and $46,739, respectively, sums claimed to be due from the Government for carrying the mails since the parcel post was established. The petitions presented set forth the conditions of the contracts under which the roads carry the mails and allege that by the addition of the parcel post the Government has made an unreasonable addition to the quantity of matter carried in the mail cars and therefore has violated the spirit of the contracts under which the mails are carried.

At the regular monthly meeting of the board of directors of the New York, New Haven & Hartford, held in New York on September 17, the officers were authorized by the board to purchase power from the New York Edison Company. This purchased power, together with that now obtained from the power plant of the New York Central and that of the New Haven at Cos Cob, will enable the road to increase the number of trains operated electrically between New York and New Haven from 37 per cent to 70 per cent of the total. In order to have 100 per cent of electrical operation it will be necessary to purchase additional electrical equipment and additional power for the eastern section of the electric zone between New York and New Haven. At the present time all of the important passenger trains and a number of the important freight trains running between the two cities are hauled by electric locomotives.

Figures recently compiled show that the number of stockholders of the New York, New Haven & Hartford is rapidly increasing under the management of Chairman Elliott in spite of investigations and scandals growing out of acts of the old management. While the average increase from 1901 to 1912 was 1,194, the increase from 1912 to 1913 was 1,162, and from June 30, 1913, to August 31, 1914, was 2,305. The totals, with the number of women stockholders, about 43 per cent, are as follows:

	Total	Women
June 30, 1901	9,667	.....
June 30, 1906	12,627	.....
June 30, 1912	22,806	9,710
June 30, 1913	23,968	10,474
August 31, 1914	26,373	11,184

Street Car Disaster at Memphis

On the Illinois Central near Memphis, Tenn., on the evening of September 17 an electric car, run into by a freight train at a crossing, was overturned and many persons—reported from 10 to 30—were killed and 10 or more were injured. The wrecked car, a trailer, was thrown down a bank and the foremost freight cars toppled over on it. The motor car drawing the trailer cleared the railway tracks ahead of the engine. The accident occurred at a time when two freight trains were switching over the crossing. The street car conductor, it is said, gave his motorman the signal to go ahead after the first train passed and the car and its trailer were on the crossing when struck by the second train coming from the opposite direction.

A Device Which Records Telephone Messages

The "Telescribe" is an instrument recently perfected by Thomas A. Edison and his staff, capable of reproducing on the wax cylinder of the ordinary dictating machine both sides of an ordinary telephone conversation. The apparatus is in two essential parts; one is an amplifying device which intensifies the

sound from the regular telephone receiver, the latter during the conversation being merely placed in a rest on the amplifier and not electrically or mechanically connected with it, the speaker meanwhile hearing through an additional receiver cut-in on the telescribe. The sounds are then, in reality, telephoned to the other part of the device, a micro-recorder attached to the ordinary dictating machine, and are recorded on the cylinder of the latter to be preserved on the wax or copied in typewritten form as may be desired. The telescribe has not yet been placed on the market, so its possibilities in railway work are yet to be determined.

Air Brake Story Prizes

The judges in the Westinghouse Air Brake Company prize story contest have made their decision, awarding the first prize of $1,000 to James Cain, engineer of the Wabash Railroad at Peru, Ind. The second prize of $500 was awarded to H. C. Woodbridge, general manager's special representative, Buffalo, Rochester & Pittsburgh, Rochester, N. Y.; the third prize of $200 to Alexander M. Stewart, engineer, Illinois Central, McComb, Miss.; the fourth prize of $150 to D. Oxenford, road foreman of engines, Lehigh Valley, New York City; the fifth prize of $100 to Carl H. Fuller, chief engineer, Macon Railway & Light Company, Macon, Ga., and the sixth prize of $50 to Millard F. Cox, assistant superintendent machinery, Louisville & Nashville, Louisville, Ky. Considerably over 300 contributions were entered in this contest, the judges being W. E. Symons, consulting mechanical engineer, Chicago; Willard Smith, editor of the Railway Review, Chicago, and Roy V. Wright, managing editor of the *Railway Age Gazette*, New York City.

Foreign Electrification Projects

Among the many large and important engineering improvements which will undoubtedly be seriously delayed because of the war are the electrifications of steam railroads in Germany, France and other countries. The greatest delay may be expected in Germany, partly because of the diversion of government funds to war purposes and partly because of the fact that the latest electrification, that in Silesia, is close to the Russian border. In any event, the railroads will be so overcrowded because of troop and supply transportation that no such interruptions as are incident to a change from steam to electricity would be permitted. It is doubtful also whether the state railway electrification will be furthered in a time of such financial stress.

New York State Barge Canal

The engineers of the western division of the New York Barge Canal are preparing plans for the construction of sections of the canal under six railroad crossings each of Rochester and six west of that city. The work on this part of the canal has been postponed because of litigation as to the right of the State to take the land occupied by the railroads. A recent court decision affirms the right of the State to exercise eminent domain in these cases; but the State must build and maintain the bridges necessary for the crossing of the railroads. State engineer Bensel reports that the terminal facilities for the canal in Rochester, Syracuse, Oswego and other cities will be ready by the time the canal is finished. About 70 per cent of the work on the canal between Buffalo and Albany has been turned over by the contractors to the State.

Old Construction Data

The valuation committee of the Central of New Jersey and Philadelphia & Reading, has sent the following bulletin to all employees and former employees:

In order to co-operate with the Interstate Commerce Commission, under the federal valuation act, in the preparation of an inventory of the properties embraced in the "Central of New Jersey system," representatives of the railroad will accompany the government survey parties to point out the nature, locality, extent and corporate ownership of such properties. In addition to being familiar with the maps, profiles, plans and schedules of the properties, these representatives should have knowledge of all obscure and extraordinary items, quantities and costs that are not readily visible or determinable upon a field inspection.

A few examples of such special features of construction are: Sunken embankments. Old excavations filled up. Trestles and other structures which have been filled with earth embankment. Sink holes. Cuts which were wet during construction and therefore caused extraordinary costs, but which are now dried out. Disintegrated or earth covered rock cuts, which might now be classified as earth at a low price when compared to the original cost of rock excavation. Temporary roads, trestles, tracks, embankments, dams, and other structures required during construction, traces of which have disappeared. Excessively costly foundations of bridges, buildings and other structures. Unsuspected drains and culverts. Conduits, sewers, catch basins, water pipes, dikes, dams, cribbing, retaining walls, flumes, ditches, riprap, mattresses, etc., not readily discovered, and especially those which are outside of the right of way. Roads, channels and streams which have been diverted, but knowledge of which cannot be had from mere inspection. Materials which were originally ballast, but which have settled below the subgrade. Items incident to eliminating grade crossings, elevating, depressing or changing tracks, particularly under traffic, and similar extraordinary construction costs. Penalties paid contractors for delay in furnishing material or facilities. Extra cost of work owing to extraordinary weather and labor conditions, strikes, etc., or on account of suspension and later resumption of the construction. Curbing, paving, drainage, etc., of streets, and other improvements of various kinds off the right of way, paid for wholly or in part by the railroad companies. Special assessments levied against the railroad companies for general public improvements, etc., etc.

It is evident that information concerning such items as these can, in many cases, best be ascertained from: *A personal recollection and knowledge of conditions attendant upon the construction, improvement and operation of the property.* Therefore, in order that a comprehensive investigation and study of the construction records may be made, any person having information of the nature desired is earnestly requested to communicate in regard thereto with

Carl Tombo,
Principal Assistant Valuation Engineer,
143 Liberty street, New York.

It is important that such communications should give, if possible, the description and location of old field books, maps, profiles, plans, final estimates, vouchers, reports of engineers, "authority for expenditure" reports, and any other records containing information of the nature above described which may be in the general, division or other offices of the company or in the possession of contractors or others who have had connection with the construction, extension and improvement of the road, but who are not now in the employ of the company; also the names and addresses of retired or former officers and employees and others who may have knowledge of the construction, extension and improvement of the property.

The San Francisco Fair

An army of men is now busily engaged in completing the landscaping of the Panama-Pacific International Exposition. The era of construction on the exhibit palaces has passed and the installation of exhibits has begun. Within a few weeks thousands of exhibitors, with their army of attendants, will be installing their displays. Altogether more than 70,000 tons of exhibits will be brought to the grounds, the freight charges on which, it is estimated, will entail an outlay of more than $4,000,000. The traffic department of the exposition estimates that more than 1,000,000 people will cross the Rocky Mountains to the Pacific coast next year.

Railway Fire Protection Association

The second annual meeting of the Railway Fire Protection Association will be held at the Hotel Raleigh, Washington, D. C., on Tuesday and Wednesday, October 6 and 7. The program for the meeting is as follows:

Tuesday Morning Session 10 A. M.—Roll Call, Reading of Minutes of Last Meeting, Address of President, Report of Executive Committee.

Afternoon Session 2 P. M.—Report of Committee on Fire Hazards.

Wednesday Morning Session 10 A. M.—Report of Committee

on Statistics and Forms, Report of Committee on Fire Fighting Organization.

Afternoon Session 2 P. M.—Report of Committee on Fire Fighting Apparatus, Unfinished Business, New Business, Election of Officers and Executive Committee.

It is announced that if necessary the meeting will be continued on Thursday, October 8.

MEETINGS AND CONVENTIONS

The following list gives names of secretaries, dates of next or regular meetings, and places of meeting.

AIR BRAKE ASSOCIATION.—F. M. Nellis, 53 State St., Boston, Mass. Next convention, May 4-7, 1915, Hotel Sherman, Chicago.

AMERICAN ASSOCIATION OF DEMURRAGE OFFICERS.—A. G. Thomason, Demurrage Commissioner, Boston, Mass. Annual convention in April.

AMERICAN ASSOCIATION OF DINING CAR SUPERINTENDENTS.—H. C. Boardman, D. L. & W., Hoboken, N. J. Next convention, October 22-24, Washington, D. C.

AMERICAN ASSOCIATION OF FREIGHT AGENTS.—R. O. Wells, Illinois Central, East St. Louis, Ill. Annual meeting, May 21-24, 1915, Richmond, Va.

AMERICAN ASSOCIATION OF GENERAL PASSENGER AND TICKET AGENTS.—W. C. Hope, C. R. R. of N. J., 143 Liberty St., New York.

AMERICAN ASSOCIATION OF RAILROAD SUPERINTENDENTS.—E. H. Harman, Room 101, Union Station, St. Louis, Mo.

AMERICAN ELECTRIC RAILWAY ASSOCIATION.—E. B. Burritt, 29 W. 39th St., New York. Annual convention, October 12-16, Atlantic City, N. J.

AMERICAN ELECTRIC RAILWAY MANUFACTURERS' ASSOCIATION.—H. G. McConaughy, 165 Broadway, New York. Meetings with American Electric Railway Association.

AMERICAN RAILWAY ASSOCIATION.—W. F. Allen, 75 Church St., New York. Semi-annual meeting, November 18, Chicago.

AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—C. A. Lichty, C. & N. W., Chicago. Next convention, October 20-22, 1914, Los Angeles, Cal.

AMERICAN RAILWAY ENGINEERING ASSOCIATION.—E. H. Fritch, 900 S. Michigan Ave., Chicago. Next convention, March 16-18, 1915, Chicago.

AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION.—J. W. Taylor, 1112 Karpen Bldg., Chicago. Annual meeting, June, 1915.

AMERICAN RAILWAY SAFETY ASSOCIATION.—L. F. Shedd, C. R. I. & P., Chicago. Next meeting, November, Chicago.

AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—A. R. Davis, Central of Georgia, Macon, Ga. Annual meeting, July, 1915.

AMERICAN SOCIETY FOR TESTING MATERIALS.—Prof. E. Marburg, University of Pennsylvania, Philadelphia, Pa.

AMERICAN SOCIETY OF CIVIL ENGINEERS.—Chas. W. Hunt, 220 W. 57th St., New York. Regular meetings, 1st and 3d Wednesday in month, except, June, July and August, 220 W. 57th St., New York.

AMERICAN SOCIETY OF ENGINEERING CONTRACTORS.—J. R. Wemlinger, 11 Broadway, New York. Regular meetings, 2d Thursday in month, at 2 P. M., 11 Broadway, New York.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 39th St., New York. Annual meeting, December 1-4, 1914, New York.

AMERICAN WOOD PRESERVERS' ASSOCIATION.—F. J. Angier, B. & O., Mt. Royal Sta., Baltimore, Md. Next convention, January 19-21, 1915, Chicago.

ASSOCIATION OF AMERICAN RAILWAY ACCOUNTING OFFICERS.—E. R. Woodson, 1300 Pennsylvania Ave., N. W., Washington, D. C. Annual convention, April 28, 1915, Atlanta, Ga.

ASSOCIATION OF MANUFACTURERS OF CHILLED CAR WHEELS.—George W. Lyndon, 1214 McCormick Bldg., Chicago. Annual meeting, second Tuesday in October, New York.

ASSOCIATION OF RAILWAY CLAIM AGENTS.—C. W. Egan, B. & O., Baltimore, Md. Annual meeting, 3d week in May, 1915, Galveston, Tex.

ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.—Jos. A. Andreucetti, C. & N. W., Room 411, C. & N. W. Sta., Chicago. Annual convention, October 26-30, 1914, Chicago.

ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—P. W. Drew, Soo Line, 112 West Adams St., Chicago. Annual meeting, June 22-25, 1915, Rochester, N. Y.

ASSOCIATION OF TRANSPORTATION AND CAR ACCOUNTING OFFICERS.—G. P. Conard, 75 Church St., New York. Next meeting, December 8-9, 1914, Richmond, Va.

BRIDGE AND BUILDING SUPPLY MEN'S ASSOCIATION.—L. D. Mitchell, Detroit Graphite Co., Chicago, Ill. Meetings with American Railway Bridge and Building Association.

CANADIAN RAILWAY CLUB.—James Powell, Grand Trunk, P. O. Box 7, St. Lambert (near Montreal), Que. Regular meetings, 2d Tuesday in month, except June, July and August, Windsor Hotel, Montreal, Que.

CANADIAN SOCIETY OF CIVIL ENGINEERS.—Clement H. McLeod, 176 Mansfield St., Montreal, Que. Regular meetings, 1st Thursday in October, November, December, February, March and April. Annual meeting, January, Montreal.

CAR FOREMEN'S ASSOCIATION OF CHICAGO.—Aaron Kline, 841 Lawler Ave., Chicago. Regular meetings, 2d Monday in month, except July and August, Lytton Bldg., Chicago.

CENTRAL RAILWAY CLUB.—H. D. Vought, 95 Liberty St., New York. Regular meetings, 2d Friday in January, May, September and November. Annual meeting, 2d Thursday in March, Hotel Statler, Buffalo, N. Y.

CIVIL ENGINEERS' SOCIETY OF ST. PAUL.—Edw. J. Dugan, P. O. Box 654, August and September, Old State Capitol Bldg., St. Paul.

ENGINEERS' SOCIETY OF PENNSYLVANIA.—Edw. R. Dasher, Box 75, Harrisburg, Pa. Regular meetings, 1st Friday after 10th of each month, except July and August, 31 So. Front St., Harrisburg, Pa.

ENGINEERS' SOCIETY OF WESTERN PENNSYLVANIA.—Elmer K. Hiles, 2511 Oliver Bldg., Pittsburgh, Pa. Regular meetings, 1st and 3d Tuesday, Pittsburgh.

FREIGHT CLAIM ASSOCIATION.—Warren P. Taylor, R. F. & P., Richmond, Va. Annual meeting, June 16, 1915, Chicago.

GENERAL SUPERINTENDENTS' ASSOCIATION OF CHICAGO.—A. M. Hunter, 321 Grand Central Station, Chicago. Regular meetings, Wednesday preceding 3d Thursday in month, Room 1856, Transportation Bldg., Chicago.

INTERNATIONAL RAILWAY CONGRESS.—Executive Committee, 11, Rue de Louvain, Brussels, Belgium. Next convention, June 23 to July 6, 1915, Berlin.

INTERNATIONAL RAILWAY FUEL ASSOCIATION.—C. G. Hall, C. & E. I., 922 McCormick Bldg., Chicago. Annual meeting, May 17-20, 1915, Chicago.

INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—Wm. Hall, 829 W. Broadway, Winona, Minn. Next convention, July 14-17, 1915, Sherman House, Chicago.

INTERNATIONAL RAILROAD MASTER BLACKSMITHS' ASSOCIATION.—A. L. Woodworth, C. H. & D., Lima, Ohio.

MAINTENANCE OF WAY AND MASTER PAINTERS' ASSOCIATION OF THE UNITED STATES AND CANADA.—T. J. Goodwin, C. R. I. & P., Eldon, Mo. Next convention, November 17-19, 1914, Detroit, Mich.

MASTER BOILER MAKERS' ASSOCIATION.—Harry D. Vought, 95 Liberty St., New York. Annual convention, May, 1915.

MASTER CAR AND LOCOMOTIVE PAINTERS' ASSOCIATION OF THE UNITED STATES AND CANADA.—A. P. Dane, B. & M., Reading, Mass.

MASTER CAR BUILDERS' ASSOCIATION.—J. W. Taylor, 1112 Karpen Bldg., Chicago. Annual meeting, June, 1915.

NATIONAL RAILWAY APPLIANCES ASSOCIATION.—Bruce V. Crandall, 537 So. Dearborn St., Chicago. Next convention, March 15-19, 1915, Chicago.

NEW ENGLAND RAILROAD CLUB.—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass. Regular meetings, 2d Tuesday in month, except June, July, August and September, Boston.

NEW YORK RAILROAD CLUB.—Harry D. Vought, 95 Liberty St., New York. Regular meetings, 3d Friday in month, except June, July and August, 29 W. 39th St., New York.

NIAGARA FRONTIER CAR MEN'S ASSOCIATION.—E. Frankenberger, 623 Brisbane Bldg., Buffalo, N. Y. Meetings monthly.

PEORIA ASSOCIATION OF RAILROAD OFFICERS.—M. W. Rotchford, Union Station, Peoria, Ill. Regular meetings, 2d Thursday in month, Jefferson Hotel, Peoria.

RAILROAD CLUB OF KANSAS CITY.—C. Manlove, 1008 Walnut St., Kansas City, Mo. Regular meetings, 3d Friday in month, Kansas City.

RAILROAD MASTER TINNERS, COPPERSMITHS AND PIPEFITTERS' ASSOCIATION.—U. G. Thompson, C. & E. I., Danville, Ill. Annual meeting, May, 1915.

RAILWAY BUSINESS ASSOCIATION.—Frank W. Noxon, 30 Church St., New York. Annual meeting, December 10, 1914, Waldorf-Astoria Hotel, New York.

RAILWAY CLUB OF PITTSBURGH.—J. B. Anderson, Room 207, P. R. R. Sta., Pittsburgh, Pa. Regular meetings, 4th Friday in month, except June, July and August, Monongahela House, Pittsburgh.

RAILWAY ELECTRICAL SUPPLY MANUFACTURERS' ASSOCIATION.—J. Scribner, 1021 Monadnock Block, Chicago. Meetings with Association of Railway Electrical Engineers.

RAILWAY FIRE PROTECTION ASSOCIATION.—C. B. Edwards, Fire Ins. Agt., Mobile & Ohio, Mobile, Ala. Annual meeting, October 6-7, 1914, Hotel Raleigh, Washington, D. C.

RAILWAY SIGNAL ASSOCIATION.—C. C. Rosenberg, Times Bldg., Bethlehem, Pa.

RAILWAY STOREKEEPERS' ASSOCIATION.—J. P. Murphy, L. S. & M. S., Box C, Collinwood, Ohio. Annual meeting, May, 1915.

RAILWAY SUPPLY MANUFACTURERS' ASSOCIATION.—J. D. Conway, 2136 Oliver Bldg., Pittsburgh, Pa. Meetings with Master Car Builders and Master Mechanics Associations.

RAILWAY TELEGRAPH AND TELEPHONE APPLIANCE ASSOCIATION.—G. A. Nelson, 50 Church St., New York. Meetings with Association of Railway Telegraph Superintendents.

RICHMOND RAILROAD CLUB.—F. O. Robinson, C. & O., Richmond, Va. Regular meetings, 2d Monday in month, except June, July and August.

ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.—L. C. Ryan, C. & N. W., Sterling, Ill.

ST. LOUIS RAILWAY CLUB.—B. W. Frauenthal, Union Station, St. Louis, Mo. Regular meetings, 2d Friday in month, except June, July and August, St. Louis.

SALT LAKE CITY TRANSPORTATION CLUB.—R. E. Rowland, Hotel Utah Bldg., Salt Lake City, Utah. Regular meetings, 1st Saturday of each month, Salt Lake City.

SIGNAL APPLIANCE ASSOCIATION.—F. W. Edmunds, 3868 Park Ave., New York. Meeting with annual convention Railway Signal Association.

SOCIETY OF RAILWAY FINANCIAL OFFICERS.—Carl Nyquist, C. R. I. & P., La Salle St. Sta., Chicago.

SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—E. W. Sandwich, A. & W. P. Ry., Atlanta Ga.

SOUTHERN AND SOUTHWESTERN RAILWAY CLUB.—A. J. Merrill, Grant Bldg., Atlanta, Ga. Regular meetings, 3d Thursday, January, March, May, July, September, November, 10 A. M., Candler Bldg., Atlanta.

TOLEDO TRANSPORTATION CLUB.—Harry S. Fox, Toledo, Ohio. Regular meetings, 1st Saturday in month, Boody House, Toledo.

TRACK SUPPLY ASSOCIATION.—W. C. Kidd, Ramapo Iron Works, Hillburn, N. Y. Meetings with Roadmasters' and Maintenance of Way Association.

TRAFFIC CLUB OF CHICAGO.—W. H. Wharton, La Salle Hotel, Chicago.

TRAFFIC CLUB OF NEW YORK.—C. A. Swope, 291 Broadway, New York. Regular meetings, last Tuesday in month, except June, July and August, Waldorf-Astoria, New York.

TRAFFIC CLUB OF PITTSBURGH.—D. L. Wells, Erie R. R., Pittsburgh, Pa. Meetings bimonthly, Pittsburgh. Annual meeting, 2d Monday in June.

TRAFFIC CLUB OF ST. LOUIS.—A. F. Versen, Mercantile Library Bldg., St. Louis, Mo. Annual meeting in November. Noonday meetings October to May.

TRAIN DESPATCHERS' ASSOCIATION OF AMERICA.—J. F. Mackie, 7122 Stewart Ave., Chicago. Annual meeting June 15, 1915, Minneapolis, Minn.

TRANSPORTATION CLUB OF DETROIT.—W. R. Hurley, Superintendent's office, L. S. & M. S., Detroit, Mich. Meetings monthly, Normandie Hotel, Detroit.

TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, N. Y. C. & H. R., East Buffalo, N. Y.

UTAH SOCIETY OF ENGINEERS.—Frank W. Moore, Newhouse Bldg., Salt Lake City, Utah. Regular meetings, 3d Friday in month, except July and August, Consolidated Music Hall, Salt Lake City.

WESTERN CANADA RAILWAY CLUB.—W. H. Rosevear, P. O. Box 1707, Winnipeg, Man. Regular meetings, 2d Monday, except June, July and August, Winnipeg.

WESTERN RAILWAY CLUB.—J. W. Taylor, 1112 Karpen Bldg., Chicago. Regular meetings, 3d Tuesday in month, except June, July and August, Karpen Bldg., Chicago.

WESTERN SOCIETY OF ENGINEERS.—J. H. Warder, 1735 Monadnock Block, Chicago. Regular meetings, 1st Monday in month, except January, July and August, Chicago. Extra meetings, except in July and August, generally on other Monday evenings.

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF JUNE, 1914

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses						Net operating revenue (or deficit).	Outside operations, net.	Taxes.	Operating income (or loss).	Increase (or decr.) comp. with last year.
		Freight.	Passenger.	Total.	Maintenance: Way and structures.	Maintenance: Of equipment.	Traffic.	Transportation.	General.	Total.					
Central Vermont	411	$350,020	$86,766	$461,042	$46,588	$76,674	$8,676	$156,055	$6,895	$294,888	$166,155	—$663	$17,535	$147,957	$1,499
Chicago, Burlington & Quincy	9,264	4,979,646	1,877,297	7,511,840	1,337,603	1,348,887	162,861	2,290,079	210,403	5,349,833	2,162,008	6,472	662,970	1,505,509	248,382
Chicago, Indianapolis & Louisville	617	373,762	147,873	571,614	89,478	63,053	17,868	214,628	19,141	404,168	167,446	.....	32,665	134,781	40,952
Chicago, Terre Haute & Southeastern	375	152,614	15,646	173,613	20,257	37,601	2,961	46,772	9,828	117,419	56,194	—115	11,500	44,579	24,846
TWELVE MONTHS OF FISCAL YEAR ENDING JUNE 30, 1914															
Central Vermont	411	$2,839,688	$1,014,414	$4,140,289	$603,042	$785,937	$105,866	$2,062,642	$100,090	$3,657,577	$482,712	$7,716	$192,475	$297,953	—$359,490
Chicago, Burlington & Quincy	9,264	62,799,188	21,743,507	92,750,934	12,002,628	15,888,686	1,634,672	30,224,524	2,397,888	62,148,398	30,602,536	—140,248	4,016,658	26,445,631	—1,394,914
Chicago, Indianapolis & Louisville	617	4,610,933	1,722,479	6,944,005	1,038,340	1,068,264	230,912	2,644,581	202,631	5,184,728	1,759,277	.....	332,990	1,426,287	—161,682
Chicago, Terre Haute & Southeastern	375	1,906,655	202,813	2,162,058	315,928	613,308	43,138	693,976	109,577	1,775,928	386,130	—3,147	138,000	244,983	—60,104

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF JULY, 1914

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses							Net operating revenue (or deficit).	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
		Freight.	Passenger.	Total.	Maintenance: Way and structures.	Maintenance: Of equipment.	Traffic.	Transportation.	Miscellaneous.	General.	Total.				
Hocking Valley	353	$329,310	$79,782	$451,414	$78,810	$82,392	$8,357	$160,335	.....	$13,034	$342,928	$108,486	$38,800	$69,686	—$134,006
Lehigh & Hudson River	97	127,066	3,999	138,602	19,445	20,088	1,311	51,217	.....	3,748	95,809	42,793	4,150	38,643	12,903
Minneapolis & St. Louis	1,646	551,885	182,038	784,748	103,600	124,331	19,228	283,110	$76	17,026	547,372	237,376	36,840	200,536	3,921
Missouri, Kansas & Texas Lines	3,865	1,744,939	775,851	2,716,700	368,083	407,257	57,339	1,032,539	30,066	88,836	1,973,666	743,034	112,933	629,647	13,900
Missouri Pacific	3,920	1,833,277	476,901	2,517,904	306,699	456,039	56,797	898,145	9,522	60,147	1,787,348	730,556	98,590	631,827	117,117
Mobile & Ohio	1,122	909,338	129,856	1,098,606	127,780	226,265	42,531	408,622	3,330	29,329	837,858	260,748	33,245	227,501	—7,336
New Orleans, Mobile & Chicago	403	138,893	33,159	181,592	34,089	25,345	4,159	56,633	1	7,084	127,311	54,281	6,178	48,100	—12,461
Northwestern Pacific	401	136,248	252,582	428,799	56,932	40,812	4,715	124,855	.....	10,066	232,917	195,881	15,985	179,896	—8,963
Oregon Short Line	2,154	1,189,105	452,736	1,781,769	301,515	226,749	29,750	429,536	31,199	53,482	1,056,193	725,576	116,500	608,811	—13,007
Oregon-Washington R. R. & Nav. Co.	1,915	828,183	464,181	1,402,924	137,403	158,681	37,015	433,759	14,798	55,841	835,134	567,790	92,948	474,684	84,089
Pere Marquette	2,322	803,011	432,936	1,378,927	164,148	280,618	34,837	524,083	6,481	49,344	1,058,323	320,604	52,967	267,637	161,322
Philadelphia & Reading	1,020	2,956,057	608,398	3,742,799	416,054	706,858	45,573	1,310,960	10,646	73,140	2,563,231	1,179,568	99,826	1,079,357	—214,854
Port Reading	21	94,351	.....	114,602	10,467	10,227	38	37,781	.....	1,517	60,029	54,573	12,000	42,573	2,020
St. Joseph & Grand Island	319	155,012	30,087	196,108	31,074	19,031	4,676	59,172	.....	6,233	120,186	75,922	7,048	68,865	30,202
St. Louis & San Francisco	4,746	2,343,197	1,028,885	3,594,094	513,794	616,023	76,196	1,228,499	.....	85,329	2,519,839	1,074,255	117,039	956,570	—243,885
St. Louis, Brownsville & Mexico	548	110,572	73,681	199,577	35,553	24,040	5,266	83,159	.....	10,853	157,524	42,053	6,750	35,303	—10,015
St. Louis, Iron Mountain & Southern	3,365	2,002,183	541,500	2,735,067	377,922	480,497	54,570	861,477	10,267	60,283	1,845,015	890,052	112,832	777,069	18,578
St. Louis Southwestern	943	447,073	122,959	603,815	75,761	105,886	26,080	157,601	3,429	22,774	390,961	212,854	29,626	183,082	—7,191
Southern in Mississippi	281	46,402	31,694	86,382	26,711	9,123	2,416	40,860	.....	3,592	82,703	3,679	7,750	—4,071	12,361
Spokane, Portland & Seattle	556	242,933	190,412	470,694	55,080	36,303	9,738	97,329	3,890	12,980	215,321	255,373	53,400	201,933	18,970
Texas & Pacific	1,886	970,236	382,034	1,473,202	193,708	258,481	38,714	605,283	14,076	39,764	1,149,969	323,233	68,700	254,533	35,693
Virginia & Southwestern	240	147,199	17,151	169,302	24,179	37,715	2,173	45,962	.....	3,518	113,546	55,756	6,250	49,506	5,316
Western Pacific	943	395,089	134,209	561,238	131,880	73,159	25,195	168,067	13,564	24,912	436,777	124,461	30,036	93,667	—58,106

Traffic News

The Western Classification Committee has announced a hearing in Chicago on October 2, on electric fans.

A merchant in Winnipeg, Man., has received a shipment of 26 carloads of apples direct from Nova Scotia.

The semi-annual convention of the Railway Development Association is to be held at the Hotel La Salle, Chicago, on November 10 and 11.

The committee on relations between railroads of the American Railway Association reports that the total freight car surplus on September 15 was 136,049 cars, a decrease of 27,277 cars from September 1. The total shortage was 2,059 cars, an increase of 141.

The Boston & Maine announces that not more than two mileage books will be sold to a single customer. Since the announcement that the cost of mileage books is to be advanced on October 1, traveling men are said to have been buying up large quantities of books at the present rate of two cents a mile.

At a conference last week between representatives of the transcontinental railways and the Interstate Commerce Commission it was decided to extend the agreement covering reparation on shipments affected by the Spokane rate case to cover shipments made to and from intermediate points between Chicago and Spokane, made between July 15, 1912, and August 1, 1913.

The live stock exhibit at the Panama-Pacific International Exposition in San Francisco will last throughout the period of the exposition, from February 20 to December 4, 1915. Competitions in the department of live stock will take place in October and November of next year. In addition to $175,000 which has been set aside for cash premiums, other sums have been appropriated by interested live stock associations, bringing the total to $227,000. A like amount is offered in prizes for trotting races.

A remarkable record for regular and fast freight service has been made recently by the fast freight train No. 51 from Chicago to Atlanta, Ga., over the Illinois Central and the Nashville, Chattanooga & St. Louis. The train leaves Chicago at 11 p. m. and is scheduled to arrive at Atlanta at 12:30 a. m. the third day. From August 26 to September 6 its arriving time at Atlanta was 2 a. m., 12:10 a. m., 12:40 a. m., 2 a. m., 1:20 a. m., 12:50 a. m., 1:25 a. m., 5:30 a. m., 6:30 a. m. and 12:50 a. m., and with the exception of only two days the distance of 850 miles was made in 49 to 51 hours.

A preliminary hearing of the Official Classification Committee for the benefit of western shippers was held in the rooms of the Central Freight Association, Chicago, on Thursday, September 17, for the consideration of a large number of subjects enumerated in docket No. 20, including a large number of recommendations of the committee on uniform classification respecting uniform classification provisions and other matters. Among the items on which changes were proposed, based on recommendations of the committee on uniform classification, were acids, boats, boilers, furnaces and heaters, locomotive parts, machinery and machines, oils, ores, clay, coffee, fiber, fish, furniture, honey, rice, rubber goods, sugar cane, fire-fighting apparatus, glassware, and ice making or refrigerating machinery.

The largest cargo of merchandise that ever entered the harbor of San Francisco arrived from China and Japan on the Pacific Mail liner "Manchuria" on September 17 and was sent eastward in bond to New York on five special Southern Pacific trains. The cargo consisted of 270 tons of raw silk and silk pieces, and 2,700 tons of tea, matting and other Oriental merchandise; the total shipment requiring over 165 cars, 15 of which are of an especially constructed design to meet the requirements of the silk. For a week, the Southern Pacific had been obtaining every available car of the highest type of equipment in the neighborhood of San Francisco. These were lined up near the Pacific Mail dock, with several switch engines assigned to the duty of handling them preparatory to the departure of the trains on the transcontinental. Special train and freight handling crews were likewise held in readiness. The Southern Pacific is trying to make San Francisco the main point for the routing of Oriental freight destined to the East. Great Britain has barred the vessels of belligerent nations from the use of the Suez canal, and this means that the great bulk of Oriental merchandise consigned to New York and other eastern points must come to the Pacific Coast, here to be unloaded and re-shipped by rail. In this connection, the Southern Pacific and the Pacific Mail want to make San Francisco the transshipment point.

Traffic Club of New York

The next regular meeting of the Traffic Club of New York will be held at the Waldorf-Astoria on Tuesday evening, September 29. Addresses will be made by Charles S. Whitman, district attorney, on current events, and Alex. C. Humphreys, president of Stevens Institute of Technology on National Economic Conditions.

Illinois Manufacturers' Association for Higher Freight Rates

John M. Glenn, secretary of the Illinois Manufacturers' Association, is quoted as follows:

"The Illinois Manufacturers' Association is in favor of any movement which will mean better business conditions. We opposed former efforts on the part of railroads to obtain higher rates, because we did not believe that conditions in the country warranted the changes and because we would be the ones to suffer.

"We still want to ship our goods just as cheaply as possible, but we want them shipped. Conditions are now such that they cannot always be shipped, partly because there is no market and partly because the railroads cannot afford to supply the needed equipment.

"The railroads are in trouble, and because they are in trouble we are in trouble also. The railroads are the agencies for delivering our goods. There is no sentimental desire on our part to aid the 'poor railroads' for themselves alone, nor are we taking this attitude out of sympathy to the widows and orphans who own the securities. It is simply a business proposition."

American Association of Traveling Passenger Agents

The forty-second annual convention of the American Association of Traveling Passenger Agents is to be held in San Francisco on October 12 and 13. It is expected that this convention will have the largest attendance in the history of the association, as acceptances have already been received from 350 members. Special trains will be run from Chicago over the Chicago & Northwestern, Chicago, Milwaukee & St. Paul, and possibly the Chicago, Rock Island & Pacific, and it is expected that there will be two specials out of St. Louis over the Missouri Pacific. The members will be entertained by the officials of the Panama-Pacific International Exposition and will be afforded an opportunity to inspect the fair grounds and buildings. Following the convention a tour of California will be made. Among the subjects to be discussed at the convention are the following: "Of what value will the Panama-Pacific International Exposition and the opening of the Panama Canal be to the World?" and "Why is the Traveling Passenger Agent of more importance today than he was during the old days of rate cutting?" A special train will be provided by the Atchison, Topeka & Santa Fe for the return trip from San Diego to Chicago.

The Towing Locomotives on the Panama Canal.—Forty three-phase towing locomotives have been built for the Panama Canal, having tractive effort up to 47,500 lb. Four of these, two on each side, will propel steamships through the locks. No vessel is allowed to go through the locks under her own power. Each locomotive is propelled by a rack rail while towing at a speed of two miles per hour; when running idle the rack pinion is released and the speed increased to five miles per hour. The locomotive is driven by two 75 h. p. motors; in the center there is a vertical windlass with drum, the capacity of which is 800 ft. of one-inch steel hawser cable.

Commission and Court News

INTERSTATE COMMERCE COMMISSION

The commission has announced that it will begin hearings on October 19 in relation to the petition of 112 carriers in official classification territory, asking a modification of the recent findings in the Five Per Cent Case.

The New Orleans Cotton Exchange has filed a complaint with the Interstate Commerce Commission against 30 railroads, charging discrimination against New Orleans in favor of other southern and eastern ports in the failure to publish through rates to New Orleans from local cotton-producing points.

The railroads that were defendants in the San Francisco and Los Angeles switching cases, in which the Interstate Commerce Commission issued an order requiring them to cease making and collecting charges for switching cars placed on industrial spur tracks when incidental to the line haul of the delivering carrier, have filed a petition for a rehearing before the Interstate Commerce Commission announcing that they propose to demonstrate that the switching charges imposed by the carriers for transporting freight to and from industries are lawful and reasonable, and that the carriers are entitled to collect charges for performing these services in addition to the rates collected for the main line service. Particular stress is laid upon the decisions in the industrial railways case and on the statement made by the commission in its opinion in the 5 per cent rate advance case. The petition includes the following: "It is therefore respectfully submitted that these defendants should be permitted to introduce evidence in support of their contentions that this industrial switching service is separate and distinct from the main line service; that this service is in the nature of a special and ancillary service for which reasonable charges should properly be made, so that these defendants may conform their practice to the policy approved by the commission, thereby removing the discrimination which will be engendered against the team track shippers and the unjust preference and advantage which will be given industrial shippers if the charges are not imposed; and that, to this end, the cases should be reopened and a rehearing granted."

STATE COMMISSIONS

The New Hampshire Public Service Commission has refused permission to the Boston & Maine and Grand Trunk to increase mileage book rates from 2 to 2¼ cents per mile.

The California Railroad Commission has rendered a decision authorizing the Southern Pacific, Western Pacific and Atchison, Topeka & Santa Fe to make certain increases in their freight rates between San Francisco and Stockton. At the same time, the commission denied the railroads authority to increase their rates between San Francisco, San Jose, Niles, Oakland, Berkeley, San Leandro, Crockett, Benicia, Bay Point, South Vallejo and numerous other points west of Stockton.

The New York State Public Service Commission, Second district, has decided to suspend for another six months, to March 20, 1915, the tariffs filed by the railroads making a charge of $2 a car for "spotting" cars on private sidings and industrial railroads. Protest was immediately made by large numbers of shippers, and as a result the commission suspended the proposed rates pending a hearing and decision of their necessity. The commission is expected to delay action until the federal commission decides the cases, embodying the same question, which affect New York shippers.

As briefly noted in last week's issue the Missouri railways on September 15, filed with the state public service commission a petition for an increase of passenger fares from two to three cents per mile, and four cents on branch lines. At the same time they asked for a general advance in freight rates, for which they submitted tariffs, and a restoration of the old excess baggage rate, which the commission had reduced from 16⅔ to 12½ per cent of the passenger fare for each 100 lb. The petition was filed in accordance with the recent decision of the Missouri Supreme Court in the Missouri Southern case, holding that the provision in the public service commission law authorizing the commission to prescribe reasonable rates in effect repealed the maximum rate laws passed by the legislature.

The Maine Public Utilities Commission

The voters of Maine in the referendum held with the recent September election have approved the act of the legislature creating the public utilities commission and the provisions of the act are now effective. Governor William T. Haines is expected to appoint Samuel W. Gould, a former congressman, as the democratic member of the board, succeeding the late Joseph Williamson; and he will name a chairman in the place of Luere B. Deasey, of Bar Harbor, who declined to serve. William B. Skelton, of Lewiston, is the other member of the commission. Mr. Gould's appointment will carry with it a salary of $4,000 a year. He is one of the leading lawyers of the state and a graduate of the University of Maine, holding the position of president of the board of trustees of that institution at the present time. He has been prominent in democratic politics, having been candidate for governor on that ticket and elected to Congress in 1910. It is understood that George F. Giddings, of Augusta, the present clerk of the state board of railroad commissioners, which is abolished under the new act, is to be appointed clerk of the commission at a salary of $2,500 a year. This law was passed in 1913 and would have gone into effect on July 12 of that year but for the fact that a petition was presented calling for a referendum. The Statute is Chapter 129 of 1913. The law contains in general all of the stringent and sweeping provisions which have been embodied in recent state statutes of this kind such as Massachusetts and West Virginia. An abstract of it was printed in the *Railway Age Gazette*, July 11, 1913. The salary of the chairman is to be $5,000 a year and of the other commissioners $4,500 each. The objectors said that the new law would cost the state $100,000 a year and that this would be an unnecessary expense, the present state of affairs being satisfactory.

PERSONNEL OF COMMISSIONS

M. E. Wells, who is now engaged on the appraisal of the Pere Marquette for the Michigan Railroad Commission, has been appointed senior inspector of motive power, division of valuation, Interstate Commerce Commission, for the Southern district, with headquarters at Chattanooga, Tenn., effective on October 1.

K. E. Kellenberger, whose appointment as senior signal engineer, central district, division of valuation, Interstate Commerce Commission, was reported in the *Railway Age Gazette* of September 11, was superintendent of signals of the Chicago & North Western, not the Chicago Great Western, as stated.

Frank M. Patterson has been appointed field engineer of the central district, division of valuation, Interstate Commerce Commission, with headquarters at Chicago. Mr. Patterson was educated at the University of Iowa, and has been connected with the Chicago, Burlington & Quincy in various capacities, from 1887 until his recent appointment, having been assistant engineer on construction of the St. Louis terminal; resident engineer in Chicago; resident engineer at Hannibal, Mo.; roadmaster on the Missouri lines; engineer in charge of construction on the Chicago & Alton and Burlington joint line from Mexico to Old Monroe, Mo.; assistant to the engineer of the Illinois district, and later engineer of the Missouri district.

COURT NEWS

Judge John G. Slate, of Jefferson City, Mo., last week overruled the demurrer of the Missouri Pacific to the suit brought by the attorney general of Missouri for the recovery of overcharges in passenger rates while the state two-cent fare law was under injunction, and appointed W. S. Hoke as master in chancery to receive and pass upon all claims for overcharges which may be filed. The ruling sustained the right of the attorney general to sue for the shippers and passengers collectively.

Railway Officers

Executive, Financial, Legal and Accounting

Edward D. Robbins, general counsel to the board of directors of the New York, New Haven & Hartford, with headquarters at New Haven, Conn., has resigned.

C. L. Sivley has resigned as general attorney of the Illinois Central and the Yazoo & Mississippi Valley, at Chicago, Ill., to engage in the general practice of law at Memphis, Tenn.

Farrar L. McCain has resigned as judge of the Superior Court of Muskogee county, Oklahoma, to become general counsel of the Midland Valley Railroad for Oklahoma and Arkansas, with headquarters at Muskogee, Okla.

Frank Scott, vice-president and treasurer of the Grand Trunk and the Grand Trunk Pacific, with headquarters at Montreal, Que., has been appointed vice-president, in charge of finances, also of the Central Vermont, succeeding M. M. Reynolds, deceased.

David Van Alstyne has been appointed assistant to the vice-president in charge of operation of the New York, New Haven & Hartford and the Central New England, with headquarters at New York. Mr. Van Alstyne will have charge of the test and store departments, and of handling scrap; he will also have supervisory authority over the mechanical department in regard to organization, shop practice, approval of design, standards and requisitions.

Operating

W. F. Martin has been appointed inspector of operation of the Erie at Cleveland, O.

John B. Glasgow, night chief despatcher on the Northern Pacific, has been appointed trainmaster at Jamestown, N. D.

M. A. Mulligan, trainmaster of the Lehigh Valley at Jersey City, N. J., has been appointed general yard inspector with office at South Bethlehem, Pa.

C. H. Hinton, formerly agent of the Frisco lines at Newton, Tex., has been appointed superintendent of the Orange & Northwestern, with headquarters at Orange, Tex.

John L. Terry, general manager of the Denver, Laramie & Northwestern at Denver, Colo., has resigned to go to the Rail Joint Company, New York, effective October 1.

Traffic

W. B. Wells has been appointed general agent of the Frisco Lines at Dallas, Tex.

F. P. Jeffries has resigned as general agent of the Chicago & Eastern Illinois at Evansville, Ind.

B. L. Abberger has been appointed soliciting freight agent of the Atlanta, Birmingham & Atlantic, with office at Tampa, Fla.

H. A. Willie has been appointed traveling freight and passenger agent of the Wabash, with headquarters at Salt Lake City, Utah.

H. F. Garrett has been appointed soliciting freight agent of the Queen & Crescent Route, with headquarters at Jacksonville, Fla., succeeding L. F. Malum, resigned.

W. H. Kinard, traveling freight agent of the Georgia Railroad at Macon, Ga., has been promoted to commercial agent, with headquarters at Spartanburg, S. C., and H. A. Ansaldo, soliciting freight agent at Charleston, S. C., succeeds Mr. Kinard.

E. J. Naylor, general agent traffic department of the Chicago & Alton at San Francisco, Cal., has been transferred to Peoria, Ill., in a similar capacity, succeeding E. C. Coffee, deceased, whose title was assistant general freight agent. The latter position has been abolished. Frank Carnahan has been appointed commercial agent at Peoria.

J. R. Shannon, commercial agent of the Minneapolis & St. Louis at Cincinnati, Ohio, has been appointed general agent at Chicago, succeeding E. L. Dalton, resigned to take service with the Chicago & Alton, and R. N. Golden has been appointed general agent of the traffic department of the Minneapolis & St. Louis, with office at Cincinnati, Ohio.

Samuel Wilson, assistant general freight agent of the Chicago, Milwaukee & St. Paul at Seattle, Wash., has been transferred to Tacoma, Wash., in a similar capacity. R. J. Daniels, commercial agent at Tacoma, has been appointed division freight and passenger agent at Butte, Mont., and the former position has been abolished. A. J. Hillman, whom Mr. Daniels succeeds, has been appointed general agent freight department at Seattle.

George M. Henry, whose appointment as general passenger agent of the Detroit, Toledo & Ironton, with headquarters at Detroit, Mich., has already been announced in these columns, was born September 3, 1876, at Toledo, Ohio. He began railway work in May, 1893, with the Wheeling & Lake Erie at Toledo, and was successively clerk and chief clerk in the passenger department until 1898, when he went to the Detroit & Lima Northern at Detroit, Mich., as chief clerk in the passenger department. From 1900 to 1902 he was general freight and passenger agent of the Rapid Railway, an electric line, and the following two years was general passenger agent of the Detroit Southern. He was then engaged in the coal business at Detroit for one year, returning to railway service in 1905 as general freight and passenger agent of the Detroit, Monroe & Toledo. For three years from 1906 he was in the advertising business, taking up railway work again in 1909 as chief clerk in the passenger department of the Ohio Electric Railway at Springfield, Ohio. Mr. Henry became connected with the Detroit, Toledo & Ironton in 1910 as assistant general passenger agent, and was appointed general passenger agent on August 1.

Engineering and Rolling Stock

William V. Wicks has been appointed road foreman of engines of the Northern Pacific, at Jamestown, N. D.

W. H. Seward has been appointed assistant engineer of the Chicago, Burlington & Quincy, with headquarters at St. Joseph, Mo., succeeding E. H. Peck.

William Schmalzried, foreman of car shops of the Texas & Pacific at Ft. Worth, Tex., has been appointed master car builder, with office at Marshall, Tex., succeeding W. D. Minton, resigned.

Frank L. Fox has been appointed general foreman, car department, of the Pere Marquette, with headquarters at Detroit, Mich. Mr. Fox will have jurisdiction over all matters pertaining to the car department.

George Searle, formerly for seven years general roundhouse foreman of the Atchison, Topeka & Santa Fe, at San Bernardino, Cal., has been appointed master mechanic of the Los Angeles division of the San Pedro, Los Angeles & Salt Lake, with headquarters at Las Vegas, Nev., succeeding W. A. Rogers, resigned.

J. Q. Anderson, roadmaster of the Atlantic Coast Line at Florence, S. C., has been transferred to Petersburg, Va., in a similar capacity. W. M. Funk, roadmaster at Darlington, S. C., has been transferred to Florence, succeeding Mr. Anderson, and B. E. Haley, roadmaster at Kissimmee, Fla., has been transferred to Darlington, succeeding Mr. Funk.

A. G. Trumbull, mechanical superintendent of the Erie at New York, has been appointed assistant to the general mechanical superintendent, with headquarters at New York; E. S. FitzSimmons, mechanical superintendent of the Ohio division, at Cleveland, Ohio, has been appointed mechanical superintendent of the Erie division, with headquarters at New York; Charles James, master mechanic at Jersey City, N. J., succeeds Mr. FitzSimmons; F. H. Murray, master mechanic at Port Jervis, N. Y., succeeds Mr. James; George Thibaut, general foreman at Susquehanna, Pa., succeeds Mr. Murray; T. S. Davey, master mechanic at Stroudsburg, Pa., has been appointed shop superintendent at Buffalo, N. Y., car shop, and W. H. Snyder, general foreman at Stroudsburg, succeeds Mr. Davey.

Purchasing

G. A. Secor, storekeeper of the Minneapolis & St. Louis, at Minneapolis, Minn., has been appointed general storekeeper of the Chicago & Alton, with headquarters at Bloomington, Ill., succeeding Daniel Downing, resigned.

C. M. Wester has been appointed storekeeper of the Baltimore & Ohio, with office at Parkersburg, W. Va., succeeding D. L. Donaldson, transferred, and J. V. Mayhall has been appointed assistant storekeeper, with office at Parkersburg, succeeding W. D. Stone, promoted.

J. H. Sanford, purchasing agent of the New York, New Haven & Hartford, at New Haven, Conn., has been appointed purchasing agent of the Connecticut Company, and will also buy for the Rhode Island Company, the Housatonic Power Company, the Berkshire Street Railway, the New York & Stamford Railway, the Westchester Street Railroad, and the Westport Water Company. Mr. Sanford will have his headquarters at New Haven. In line with the policy the New Haven is now pursuing of curtailing expenses in every way possible, it is thought that H. A. Fabian, director of purchases, can handle the business without Mr. Sanford's assistance. The appointment of an independent purchasing agent for the trolley companies is the last step in giving those companies a complete organization of their own, entirely independent in every way of the New Haven management.

OBITUARY

Charles A. Pettibone, general agent of the Wabash at Portland, Ore., died on September 16, aged 53 years.

William S. Crane, formerly car accountant of the Missouri Pacific at St. Louis, Mo., died on September 20, at his home in that city.

John G. Haun, supervisor of bridges and buildings of the Virginia & Southwestern, with headquarters at Bristol, Tenn., was killed in an accident on that road on September 14. A motor car in which he was traveling was derailed while crossing a trestle near Bluff City, causing his death.

J. D. M. Hamilton, claims attorney of the Atchison, Topeka & Santa Fe, with headquarters at Topeka, Kan., died at a hospital in Kansas City on September 20. He was born on July 18, 1851 at Pittsburgh, Pa., and was educated at Knox College and at the St. Louis law school. From 1879 to 1898 he was local attorney for the Chicago, Burlington & Quincy at Fort Madison, Iowa, and was for a time mayor of the city. From 1881 to 1890 he was also attorney for the Fort Madison & Northwestern. He entered the service of the Santa Fe as assistant attorney and in June 1898 was made claims attorney. He has been a leader in the safety first movement.

Frank W. Chaffee, general car inspector of the New York Central & Hudson River, with headquarters at Albany, N. Y., died on September 15. He was born on December 17, 1850, at Springfield, Mass., and began railway work in 1868, as car repairer on the Connecticut River Railroad, now a part of the Boston & Maine. From September, 1870, to December, 1872, he was with the Wason Car Manufacturing Company, and then to June, 1881, was in the car building department of the Boston & Albany. He was then for three years in the service of the Baltimore & Ohio at Camden station, Baltimore, and on June 1, 1884, left that company to go to the New York Central & Hudson River as general foreman of the West Albany, N. Y., shops. He remained in that position until March, 1895, when he was promoted to master car builder at the same shops, and since February 1, 1901, Mr. Chaffee was general car inspector of the same road.

F. W. Chaffee

Equipment and Supplies

LOCOMOTIVE BUILDING

The Atchison, Topeka & Santa Fe has ordered one locomotive for exhibition purposes from the Baldwin Locomotive Works.

The Southern Pacific has ordered one Mikado type locomotive for exhibition purposes from the Baldwin Locomotive Works.

The Reed Construction Company, Mishawaka, Ind., has ordered one Shay geared locomotive from the Lima Locomotive Corporation.

CAR BUILDING

The Georgia Railroad is in the market for 500 40-ton box cars.

The New York Central & Hudson River has ordered 2,000 underframes from the Merchants Despatch Transportation Company.

The Nashville, Chattanooga & St. Louis is in the market for 500 to 1,000 40-ton single sheathed box cars, or 500 to 1,000 40-ton double sheathed box cars.

The Northwestern Pacific reported in the *Railway Age Gazette* of August 14, as being in the market for 11 coaches, 3 mail and express, 4 baggage, 3 smoking and 4 chair cars has ordered 25 all-steel passenger cars from the Pullman Company.

The Cincinnati, Hamilton & Dayton is in the market for 12-all steel coaches, 8 all-steel passenger and baggage cars, 4 all-steel baggage and mail cars, 5 all-steel baggage cars, one dining car and 2 wrecking cranes. The same company is also planning to build 105 caboose cars in its own shops.

IRON AND STEEL

The Paducah & Illinois has ordered 137 tons of steel in form of I-beams and girders for use at Paducah, Ky., from the American Bridge Company.

The Chicago, Rock Island & Pacific has ordered 600 tons of material for a highway bridge at Des Moines, Iowa, from the American Bridge Company.

The Louisiana Railway & Navigation Company has ordered 215 tons of steel for a bridge over Tunica Bayou, La., from the American Bridge Company.

SIGNALING

The Texas & Pacific is installing automatic block signals on its line between Addis, La., and Donaldsonville, 24 miles.

Fuel Economy on the Egyptian Railways.—When the news was received at Cairo that a general European war had broken out the various railway administrations at once took steps to examine their supplies of coal. The results were satisfactory as far as the amounts on hand were concerned, but in view of the uncertainty of the future all the companies began to cut down their service. The Egyptian State Railways led the way with a diminished time-table which came into effect on August 7. Four of the Cairo-Alexandria expresses—two each way—have been withdrawn, also the night service in each direction between those places, and six of the main line trains on the Upper Egypt section. Thirty trains a day on the Cairo (Port Limoun)-Mataria suburban line have been taken off, thereby reducing that service by one-third. In order further to save the coal bill, all lights at the Cairo main station are being put out at 8 p. m., while many stations are not being lit at all.

Supply Trade News

R. L. Brown was elected a director and vice-president of the M-C-B Company, Chicago, at a special meeting of the board of directors.

John L. Terry, general manager of the Denver, Laramie & Northwestern, has resigned from that position, effective October 1, to become connected with the Denver office of the Rail Joint Company, New York.

The Ogle Construction Company, Chicago, has been awarded a contract for the erection of a 340-ton all-steel balanced bucket type coaling station at Hollow Rock Junction, Tenn., by the Nashville, Chattanooga & St. Louis.

The U. S. Metal & Manufacturing Company, New York, has been appointed resident purchasing agent in America for the following companies: Underground Electric Railways of London, Ltd., the London General Omnibus Company, Ltd., the Metropolitan District Railway, the London Electric Railway, the Central London Railway and the City & South London Railway.

TRADE PUBLICATIONS

Southern Pacific.—The passenger department has issued a folder on San Francisco, describing the principal points of interest of the city and of the Panama-Pacific exposition to be held next year.

Sectional Buildings.—The Chicago Pneumatic Tool Company, Chicago, general sales agents for the Ruby Manufacturing Company, Jackson, Mich., has recently issued a bulletin descriptive of Ruby all-steel sectional buildings for railroad purposes.

Pacific Type Locomotives.—The Baldwin Locomotive Works, Philadelphia, Pa., has recently published its record No. 79, which describes and gives dimensions of the recent Pacific type locomotives which have been built by this company. The booklet is well illustrated.

Sand Blasting.—The De La Vergne Machine Company, Mott Sand Blasting Department, New York, has issued in pamphlet form a paper read by H. D. Gates, sales manager, at a recent meeting of the Associated Foundry Foremen of New York and vicinity, entitled "The Sand Blast from the Users' Viewpoint."

Pneumatic Tools.—The Independent Pneumatic Tool Company has just issued circular V, descriptive of the lines of Thor roller bearing piston air drills, pneumatic chipping, calking and flue beading hammers, turbine drills, staybolt drivers, air hose and couplings manufactured by that company. This circular will be sent free on request.

Automatic Train Stop.—The Automatic Railroad Appliance Company, Inc., Rochester, N. Y., has issued an 18-page pamphlet descriptive of the Lawn-Ryan automatic train stop for steam and electric roads. Illustrations of the mechanism are shown, and the description, with references to these illustrations, explains the method of operation and installation.

Furnace Heats.—The W. S. Rockwell Company, New York, has issued a card, 9 by 11 inches in size, on which is printed a comparative scale of Fahrenheit and Centigrade degrees and tables of temperature conversion factors, and hardening and tempering heats. The card is meant to be hung in laboratory or furnace rooms and to be used in connection with heating operations.

Appliances for Burning Fuel Oil.—Tate, Jones & Company, Inc., Pittsburgh, Pa., have recently issued a catalogue having this title which aims to show the reasons why oil is the most economical fuel and to name all and illustrate some of the types of furnaces and industries in which oil burners can be used to advantage. The first part of the catalogue in addition, illustrates and describes various types of oil burners produced by the company. The second part likewise describes and illustrates the company's systems for pumping, heating and regulating oil flow to burners.

Railway Construction

Alberta Central.—See Canadian Pacific.

Altus, Lubbock & Roswell.—Announcement has been made that work on the section from Memphis, Tex., southwest to Lubbock, 86 miles, will be pushed to completion and will probably be put in operation this year. This work was started in 1911. The plans call for building an extension from Lubbock west to Roswell, N. M. An extension is also projected east to Altus, Okla. E. Kennedy, president, Houston, Tex.

Canadian Pacific.—The Alberta Central is now open for traffic from Red Deer, Alta., west to Rocky Mountain house, 64.8 miles. The new route from Montreal, Que., via Glen Tay, Trenton and Agincourt, to Toronto, 182.6 miles, is now known as the Lake Ontario Shore Line. This new line has ruling gradients of only 0.4 per cent each way and the maximum curvature is 4 deg.

Florence & Huntsville Interurban.—An officer writes that the plans call for building from Florence, Ala., east to Huntsville, about 75 miles, and about 12 miles of spur lines. A branch is also projected from Killen, northeast via Lexington to Pulaski, Tenn. Surveys are to be started at once on the line. The same interests have organized the Allentown Power Company to develop the water power on Cypress creek and to build two hydro-electric power plants. Surveys have already been made of the various water powers, and the plans for dams and power stations are now being prepared. T. H. Allen, president, and M. S. Bingham, chief engineer, Florence, of the railway company.

Marble Creek Valley (Electric).—Incorporated in Idaho with $100,000 to build an electric line from Clarkia, Idaho, northeast to Pocono, about 20 miles, also to build a line south to a point in Clearwater county. F. Herrick, Lac du Flambeau, Wis., may be addressed.

New York Subways.—The New York Public Service Commission, First district, opened bids on September 15 for the construction of Section No. 2 of Route No. 48, the William street part of the Park place, William and Clark street subway. This section begins at a point under Beekman street, in the borough of Manhattan, about 62 ft. west of William street, curves thence southerly under private property into William street and runs southerly under William street and easterly under Hanover Square to a point about opposite the easterly building line of Pearl street. The contract has been let to Smith, Hauser & McIsaac, Inc., the lowest bidder, who offered to do the work for $2,254,670. (August 28, p. 408.)

The New York Public Service Commission, First district, has approved a contract made by the New York Municipal Railway Corporation with the Empire Construction Company, the lowest bidder, at $115,987, for the installation of tracks and line equipment on the Liberty avenue extension of the elevated railroad in the borough of Brooklyn and on the elevated connection between the Lutheran Cemetery line and the Myrtle avenue elevated railroad.

North Georgia Mineral.—Application has been made for a charter in Georgia by this company with $1,250,000 capital, and office at Atlanta. The plans call for building from Atlanta, Ga., northwest through Fulton, Cobb, Cherokee and Bartow counties, about 50 miles. The incorporators include J. Spalding, J. Morris, D. Macdougald, A. E. Thornton, H. Spalding, W. J. Morrison and J. S. Floyd.

Rocky Ford & Southwestern.—Plans have been made, it is said, to build a line from Rocky Ford, Ga., which is on the Central of Georgia and the Sylvania & Girard southwest to Portal about 12 miles. Henry B. Griffin, formerly of Hamlet, N. C., is said to be interested.

Rosston, Grand Rapids & Protection.—We are told that this company, which was recently organized in Oklahoma, has a survey finished on ten miles. It is thought that money can be raised locally to build the line from a point on the Wichita

Falls & Northwestern at or near Rosston, Okla., east to Doby Springs. The line may eventually be extended further east. L. A. Walton, president, Alva, Okla. (September 11, p. 494.)

Tampa & Gulf Coast.—This company has completed work, it is said, on the extension from Clearwater south along the west coast of Florida to Davista, thence east to St. Petersburg, 22 miles. (July 24, p. 190.)

Verde Tunnel & Smelter Railroad.—An officer writes that this company has finished work on a line from Clarksdale, Ariz., on the Atchison, Topeka & Santa Fe, to Hopewell tunnel of the Verde Copper Company's mine, 14 miles. T. C. Snider was the contractor. The ruling grade on the line is 4 per cent, and the maximum curvature 24 deg. The line was built to carry ore from the mines of the Verde Copper Company to the new smelter just erected at Clarksdale. W. L. Clark, president, Jerome, Ariz., N. E. Bailey, general superintendent, and R. D. Perkins, consulting engineer, Los Angeles, Cal.

RAILWAY STRUCTURES

Greenville, Ala.—Plans for a viaduct to be built on Commerce street in Greenville have been submitted by the Louisville & Nashville to the city officers of Greenville. The proposed structure is to be of steel, concrete and stone construction.

Lebanon, Tenn.—An officer of the Nashville, Chattanooga & St. Louis writes that work is now under way by the company's forces putting up a passenger station 116 ft. long, to cost $14,412, also a freight house 125 ft. long to cost $17,896, on Gay street in Lebanon. The structures are to have wood frames with stuccoed walls.

Philadelphia, Pa.—Plans are being made for a steel and concrete bridge to be built on the line of Glenwood avenue, near Seventh street, Philadelphia, over the tracks of the Richmond branch of the Philadelphia & Reading. It is understood that contracts will soon be let for the work which is to be carried out to eliminate a dangerous grade crossing. The cost of the improvements will be about $40,000.

Richmond, Va.—The Southern Railway has given a contract to P. J. White & Son, Richmond, Va., for the construction of a yard office at South Richmond, and a contract to J. H. Campbell & Brother, Richmond, for the installation of a steam heating system in the new freight house at Richmond.

The Nigerian Railways in 1913.—The report for the year 1913 of the Nigerian Railways shows that, while the receipts increased from $2,440,530 in 1912 to $3,461,096 in 1913, the expenses only rose from $1,717,056 to $1,867,780, so that the ratio of expenses to receipts was but 53.97 per cent in 1913, as against 75.52 per cent in 1912. The growth of traffic has been so great that additional rolling stock has had to be obtained from English equipment companies. Tenders were also asked for locomotives, but the orders for these had to be sent to this country because British makers were unable to promise early delivery.

Diesel Electric Motor Coaches Introduced in German State.—The Saxon State Railways have had constructed two Diesel electric motor coaches, which they propose to try on the line between Dresden, Coswig, and Meissen, for passenger traffic. The Diesel motor is of the six-cylinder type and develops 200 to 250 horsepower at 400 to 450 revolutions per minute. Coupled direct with the motor is a direct current dynamo of about 190 horsepower, which supplies energy to the motors, of which there are two, each wound for 300 volts. The car is on two trucks, one of which has three axles and the other two axles. The Diesel motor and the dynamo are carried on the three-axle truck and the working motors on the two-axle one. At each end of the car are third class compartments with accommodation for ninety passengers, as well as cabs for the driver. The car weighs about 70 tons. It is able to run at a speed of 43.4 miles per hour on the level, or to haul a trailer at a lower speed. The car is fitted with the Westinghouse two-cylinder air brake. For electric lighting a battery is provided, charged from the dynamo. The Diesel motor cylinders are water-cooled, the heated water being discharged in summer, but in winter passed through tubes to heat the car.

Railway Financial News

Baltimore & Ohio.—Felix M. Warburg has been elected a director, succeeding Paul M. Warburg, resigned to become a member of the federal reserve board.

Chicago, Rock Island & Pacific.—The joint committee, of which James N. Wallace is chairman and the members are James Brown, Bernard M. Baruch, Henry Evans and Frederick Strauss, announces that about $18,000,000 of the Railroad collateral trust bonds have been deposited in this country and $7,000,000 in Holland, with a committee which is co-operating with the Wallace committee, and that the trustee for the bonds has brought proceedings for the foreclosure and sale of the collateral. The committee says that no distribution of the pledged stock to bondholders is possible except through purchase under foreclosure. The committee is engaged in the preparation of a plan to buy at foreclosure sale this Railway company stock. The committee says in conclusion:

"The committee desires to make it perfectly plain to the bondholders that such a plan will require for its successful carrying out the concurrence of practically all the bondholders, who on the acquisition and distribution pursuant to the plan, of the pledged stock, will, as stockholders, be entitled to full voting rights and to take action as they may deem best, for future financing. The plan above referred to is under preparation and its formal announcement may be expected next week."

Erie.—J. P. Morgan & Co., New York, are offering to exchange one-year 5 per cent notes at 97½ for the $4,550,000 notes maturing October 1. The new notes will be secured by $7,000,000 first mortgage bonds and will be ready for delivery October 1.

International & Great Northern.—The committee which asked for the deposit of the $11,000,000 3-year 5 per cent notes which fell due on August 1 announces that a large majority of the notes have been deposited and that further deposits will be accepted to October 22.

Kansas City, Mexico & Orient.—Application has been made to the Texas railroad commission for authority to issue $1,458,000 bonds on the new completed line between Alpine and Girvin. This is at the rate of $16,000 per mile.

San Antonio, Uvalde & Gulf.—The receiver has asked permission from the court to issue $145,000 receiver's certificates for improvements.

Taxi-cabs Popular in India.—It is said that taxi-cabs have proven so popular in Colombo and Calcutta that in the latter city every man and woman who manages to save enough to buy a second-hand motor "that has some pretensions to style" will hire it out; and times are indeed dull when a car fails to bring the owner a clear profit of 300 rupees ($100) a month.

Swedish-Danish Power Cable.—An interesting project is at present under execution by which Sweden will be able to sell to Denmark a considerable part of the electric energy obtainable from her numerous waterfalls. The Sound, which divides the two countries, is only 3½ miles in width at its narrowest point, and the electric power cable crossing it at this point has just been completed and will shortly come into use. According to the project, current produced at the Swedish power stations will be transmitted by overhead cable at a pressure of 50,000 volts, to Helsingborg, where it will be transformed to 25,000 volts and transmitted by an underground cable three miles long to the Swedish coast. The submarine cable above mentioned will convey the current across to the Danish coast and this current will then be transmitted by an underground cable one mile long to Helsingör (Elsinore), where it will again be transformed to 50,000 volts. From Helsingör the current will be carried to Copenhagen by overhead connections. For the most part the cable rests on the bottom of the sea, except at the coast at each end, where it is embedded in the earth.

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Contents

*Illustrated.

Mr. Acworth on the Rate Advance Decision

One of the most interesting of the discussions which have appeared regarding the Interstate Commerce Commission's decision in the Eastern rate advance case is that by W. M. Acworth, which is published elsewhere in this issue of the *Railway Age Gazette*. Mr. Acworth is well known to American readers as the highest foreign authority on railway affairs in the United States, and, therefore, his criticism of the decision will carry much weight and should be given the most serious consideration by the commission. In our issue of last week we published an editorial expressing the view that the commission should not deal with railway rates as if it were a court, but should deal with them as an administrative body charged with the duty of solving a great problem of public policy. Mr. Acworth's article was not received until after that editorial was published, and in view of the position he occupies in the railway world, it is highly gratifying to us, and probably is not without significance, that his criticism of the commission's attitude is based on exactly the same ground as ours. We pointed out, and Mr. Acworth now points out in his article, that commissions were created to deal with the problem of railway regulation because the legislatures, and especially the courts, had demonstrated their unfitness to solve it. Mr. Acworth, as he recalls in his article, had accepted the commission scheme of regulation as adopted in the United States with hope and recommended it for imitation in Great Britain, but the attitude assumed by the Interstate Commerce Commission in its opinion in the five per cent case was so different from that which he thinks such a commission should assume to cause him to express apprehension lest regulation by commission may prove a failure because of a disposition on the part of the commissioners to forget that they are not courts.

Activity in Automatic Stops

The propaganda of the automatic train stop makes very slow and halting progress—if, indeed, it is not, a part of the time, moving backwards. Still, "the world do move." The American Railway Association, in its last deliverance, served notice that it would have perfection or nothing. On the other hand, the railroads of France, prodded by the government, showed, by the papers read at Paris three months ago, that they have pretty definitely committed themselves to the doctrine that the engineman's lookout is not an all-sufficient safeguard against collisions. The Railway Signal Association has dutifully adopted as its own the view of the American Railway Association. But individual roads continue to encourage experimenters here and there. The Horne & Crane speed-control stop (described in *The Signal Engineer* last January) is being exhibited this week on the Central of New Jersey. A prominent western road is going to have installed on its lines one of Dr. Wooding's devices which has been exhibited in Denver, Colo., and in New York City, and also the stop patented by Gollos and tried in October, 1912, on the Chicago Great Western. Some inventors go into eclipse; but others rise; and all seem to have persistent vitality. And, lastly, we have the conservative British Board of Trade coming out on the side of the stop. With its last annual review of train accidents the Board of Trade issues a memorandum, signed by the three inspectors, Colonel von Donop, Major Pringle and Colonel Druitt, in which those collisions of the year which were due to overrunning signals are reviewed, with special reference to their causes; and after some general observations on cab signals and automatic stops, the inspectors say that they "hold that some system of this description should be generally adopted in the future." And they call on the railways to go forward with the experiments necessary to clear up doubtful points. Incidentally, American railway officers will be interested in the Board of Trade's statement, in this review, that track circuits, for locking levers at interlockings, are now in use at 1,500 places in Great Britain.

Frisco Reclamation Plant

A little more than a year ago, August 15, 1913, we described the extensive plant for reclaiming scrap which had been established at Corwith, Ill., on the Atchison, Topeka & Santa Fe. It was estimated at that time that half a million dollars' worth of material had been reclaimed for the year ending June 30, 1913. At the time that the article was written it was the most extensive plant of its kind in the country, and possibly still is. Within the last year, however, the Frisco has established a similar plant at Spring-

field, Mo., which is giving an excellent account of itself, as described in another part of this issue. It is somewhat more compact in arrangement than the plant at Corwith and the buildings are of a more substantial nature, as it was found possible to make use of the shops which were formerly operated by the Kansas City, Fort Scott & Memphis, and which had been practically abandoned by the Frisco. A very noticeable feature about the installation is the neat and orderly way in which the plant is maintained. Of even more importance than this is the thorough check which is being kept on each class of material which is reclaimed, to make sure that the work is being done at a profit and that time and effort are not wasted on useless material. Thus far these two plants have attracted so much attention from other railroads that the practice of installing central reclamation plants may possibly be extended more or less generally to other large roads throughout the country.

Protest Against Advance in Mileage Rates

The secretary of the Illinois Commercial Men's Association has sent a circular letter to 100,000 traveling salesmen, bitterly criticizing the steps being taken by the railways to increase the rates on mileage books, and urging the traveling men to protest against the action to the Interstate Commerce Commission. The circular says: "We want you to sign this letter and mail it immediately to the Interstate Commerce Commission, Washington, D. C. We want all the letters to reach them, if possible, at about the same time, so as to make as good an impression as possible (it would be best to write your own letter, wording it as you like, and sending it instead of the copy I am enclosing, but be sure and send in something and do it at once)." Those to whom the letter is addressed are also advised to write letters of protest to their representatives and senators. No exception whatever could be taken if the association should duly appear by proper representatives before the commission and present valid arguments, if there be any, against the proposed advance in rates on mileage books. But can the members of the Illinois Commercial Men's Association themselves indorse the very raw method of agitation suggested by their secretary? The Interstate Commerce Commission, in its opinion in the Eastern rate advance case, protested against the use of alleged improper methods to influence it to decide in favor of higher freight rates. Certainly, neither the railways nor anybody else ever tried to influence it in any coarser, balder or more disreputable way than that outlined by the secretary of this commercial men's organization. If the commercial men carry out their secretary's plan consistency will demand that the commission make a few well-chosen remarks regarding their conduct which will prevent a repetition of it.

THE FREIGHT CAR SURPLUS

THE latest statistical bulletin issued by the Committee on Relations Between Railroads of the American Railway Association, giving the figures for car surpluses and shortages for September 15, affords grounds both for pessimism and for optimism. The business situation, of which it is one of the most valuable indexes, is shown as deplorable, but it is gradually improving. The total surplus on September 15 was 138,108 cars, which is greater than for the corresponding period of any year since 1908, when the total on September 16 reached 175,000. For the corresponding date in recent years it has been as follows: 1907, 17,251; 1908, 173,587; 1909, 78,798; 1910, 54,890; 1911, 70,722; 1912, 27,380, and 1913, 61,753.

The size of the surplus for this year cannot be explained by the fact that there are more freight cars this year than in the past. The car location bulletin of the American Railway Association for September 1, showed a total of 2,408,466 cars owned, as compared with 2,343,091 on September 1, 1913, an increase of 65,375. But cars in shop, while included in figures for cars owned, are not included in statistics of car surpluses; and in taking the car surplus as an index of business conditions, it must be noted that the number of cars in shop on September 1 was 222,868, or 9.25 per cent of the total, an increase of 42,586 over September 1, 1913, and of these 197,538 were home cars in home shops. As the surplus this year is about 75,000 greater than it was a year ago the number of cars actually in service for which there was no demand was about 117,000 more this year than last year.

The total shortage on September 15 was 2,059 cars, practically negligible, whereas on September 15, 1913, it was 21,594. Although the peak of the demand for cars, according to precedent, will hardly be reached for about a month yet, a study of the current figures gives little indication that the annual predictions of a car shortage, made only a few weeks ago, will be borne out. These predictions, made at a time when the surplus stood at a higher figure than at any time since 1909 (240,000 on July 1) were, of course, based on the unprecedented figures of the government crop reports. Since that time the European war and the failure of the railways to receive a general advance in freight rates has kept general business at a minimum, and cars which otherwise would have been used for merchandise traffic have become available for grain loading, while the grain movement has been delayed by the fact that farmers have been holding their shipments for higher prices.

However, this grain is yet to be moved, and that the situation is improving is shown by the fact that the surplus on September 15 represents a reduction of 27,136 cars since September 1, the largest decrease reported since that for the last two weeks in July. The box car surplus decreased approximately 19,000, practically all in the states west of the Mississippi river and in Canada. This is attributable, of course, to the increase in the grain movement since the lifting of the embargoes on export shipments at the Gulf ports, where thousands of loaded cars stood on the tracks for the last two or three weeks in August. There was also a heavy reduction in the surplus of coal cars in the eastern states, where the total number of surplus cars was reduced one-half, or from 17,262 to 9,522, and the number of surplus coal cars from 11,343 to 5,232.

From March 15 to July 15 there was little change in the total surplus, which varied from 213,324 to 228,384. Since July 15, however, there has been a steady decline, averaging about 10,000 cars a week, or slightly greater than that usually shown for this season of the year.

NEW CLEARING YARD

THE completion of the new transfer yard of the Belt Railway at Chicago marks a significant step in the solution of the problem of handling interchange traffic. The three belt lines around Chicago are well adapted to handle transfer freight between the trunk lines entering the city, and it is probable that if they were used to the best advantage in connection with break-up and classification yards on all the roads well outside the built-up portions of the city, the through freight could be entirely removed from the congested area. This ideal has never been even approximated, partly because many of the roads do not have outer yards and especially because of the lack of co-operation between the roads.

The failure of the first Clearing project, which was promoted by a private company, demonstrated that the provision of ample yard facilities without the co-operative support of the trunk lines will not solve the problem. In the new project greatly improved facilities are provided by a company which is assured the support of the twelve owning roads and which will probably also have the co-operation of a number of non-owning roads having large amounts of transfer business to handle. The result will be closely watched, for if a joint yard on so large a scale can be operated with satisfaction, the plan would have much to recommend it at numerous other transfer points.

The new Clearing yard is conspicuous for its magnitude. It represents an investment of about $10,000,000. It has the great-

est car standing capacity, the largest number of tracks over a single hump, the largest number of classification tracks leading from a single hump, and therefore the greatest hourly capacity over the hump of any yard in the country. It contains one of the largest push-button electro-pneumatic interlocking installations in the country for operating the switches along the ladders at the receiving ends of the classification yards. It will require an unusual organization for the maintenance of track and for the repairs to cars in the four light repair yards, as well as the heavy repair yard at the adjoining shop.

Aside from the size of the yard, its design has many interesting features. The use of a single hump for classification in both directions has here the advantages of facility of operation due to the ease with which car riders and hump engines can be interchanged, of economy of operation in combining the plant for the mechanical operation of switches at one point, and of relatively low first cost, since the site of the yard is flat and all filling material had to be brought in from a distance. The yard is compact in its arrangement and the layout is such that all cars, except possibly bad order equipment, move through without reversing direction.

The care with which the design was worked out is evidenced by the compensation in the eastbound hump grade for the prevailing winds, which are from the west. As the general direction of the wind is parallel to the axis of the yard, the eastbound hump was made one foot lower than the westbound, and the four per cent accelerating grade in the former case was made eight feet shorter than the other. The car velocity at the foot of the four per cent grade is estimated to be between 12 and 13 miles per hour, which is somewhat higher than usual for similar conditions, but this is offset by the lower rate of grade through the ladders and body tracks of the classification yard. It is expected that changes in the elevation of the hump tracks will be made on account of variations in conditions throughout the year, if necessary. The entire elimination of slip switches in the track layout, the general use of No. 9 turnouts, manganese steel frogs and guard rails and of stone ballast on all important tracks are noteworthy details, all of which will have an important bearing on the maintenance of the yard.

Operating officers recognize that ample standing capacity and proper construction details will not make a yard successful without a well thought out plan of operation and an arrangement of facilities that fits in with this operating plan. So far as it is possible to foresee before the yard is actually operated, the plan proposed for handling cars to and from and through the Clearing yard seems well adapted to conditions. The road engines of owning roads can bring solid trains of transfer cars to the receiving yard and take back solid trains to their lines from the adjacent departure yards, operating over the Belt Railway tracks. This will eliminate entirely the switching charges, and allow these trains to be handled directly from the road's break-up yards to one central classification yard instead of being transferred to the Belt at the junction point for movement by its power to a number of small classification yards, as is done now. By this method a reduction will be effected both in the delay to cars in moving through Chicago and in the cost of transferring such cars between trunk lines. Non-owning roads which so desire can turn over trains of transfer cars to the Belt as at present, paying the standard charge for such transfers, and will gain the advantage of decreased delay which will naturally result from such an improvement in the Belt facilities.

The operation of the yard will be paid for by the owning roads on a car basis, and it is expected that some plan of charging for the use of the portions of the Belt Line over which these roads operate in moving trains to and from the yard will also be worked out on a similar basis. The provision of engine facilities at convenient points to eliminate the delay to road engines, the two approach tracks for each hump track to secure the maximum capacity over the hump, and other features of the yard contributing to the efficiency of its operation are covered in the description published elsewhere in this issue.

THE SIGNAL ENGINEERS' STANDARDS

THE Railway Signal Association deals with vital questions affecting large expenditures. The results of the work of the association have in some cases been realized rather slowly because of ineffective committee work (due largely to the long distances to be traveled and the difficult nature of the problems encountered) and by lack of money; but still, important progress is recorded every year.

These things are called to mind by President Patenall's statement, at the recent annual meeting, that the association's manual of standards now contains drawings dealing with 150 subjects. Every year committees, reporting on their work in connection with standard drawings and uniform specifications, find it necessary to emphasize the need of prompt action, by making the statement that railroad companies are deferring purchases of material or the adoption of improved practice, pending the action of the association in establishing standards. The signal departments of the railways now expend many millions of dollars yearly, and their work deals directly with two vital questions—safety of passengers (and property) and economical use of tracks—and the importance of the points set forth in Mr. Patenall's address cannot be overestimated. These standards affect practice on many thousands of miles of railway.

To the signal engineer, studying the details of his problems, the question of standards presents two difficulties. First, there is the case of materials embodying qualities which are the exclusive property of a single manufacturer by reason of his patent right or secret process. As was pointed out at the meeting last week, there is little of value to the railroads and nothing of credit to the association in making an association standard out of a design or a process which already has a name and a settled reputation. The committees can be employed more usefully in other directions.

Secondly, there is a demand, and perhaps a need, for standards where, possibly, by reason of the complicated nature of the work, the formulation of standards must cost more than the result will be worth. Needs, in such cases, must be forcibly modified to suit conditions. The report of the committee on automatic block signaling brought out this question. In plans for single track operation, the arrangement of the apparatus, and the decision as to how far it is practicable to go in furnishing the refinements which are demanded for theoretically perfect service, involve questions at once so numerous, so perplexing and so costly that the committee found itself unable to make any progress. In this dilemma the sub-committee having the matter in charge took the wise course of laying its case before the association in a minority report. This report commanded the closest attention of every signal engineer in the room. The question whether automatic block signals, with all conceivable refinements, are demanded on single-track railroads is one on which there is still such a variety of sentiment that the throwing of the subject open to general discussion was not only wise but necessary. Not only all signal engineers but all operating officers should take an interest in this broad question. There was a general feeling at Bluff Point that at the next meeting of the association (in Chicago next March) there should be allotted to this subject a whole day.

The minority report presents a circuit plan designed to produce a series of automatic block signals embodying as many electric and mechanical safeguards as are to be found in the controlled manual system when arranged for single track operation.* The authors of the report desire to have all critics make frank comparisons between the merits of this plan and those of the controlled manual system. And as was pointed out at the meeting, there is the further question, constantly before the eyes of the practical railway manager, whether any automatic or unattended block signal apparatus or system whatever, is to be accepted as fully equivalent to a system which, like the controlled

*A single-track controlled manual system was described in the *Railway Age Gazette*, September 11, page 475.

manual, has always on duty the signalman to check possible defects or failures. The theory of the controlled manual system is that both a man and a machine must go wrong before anything can happen with the signals which will endanger a train.

CHICAGO, MILWAUKEE & ST. PAUL

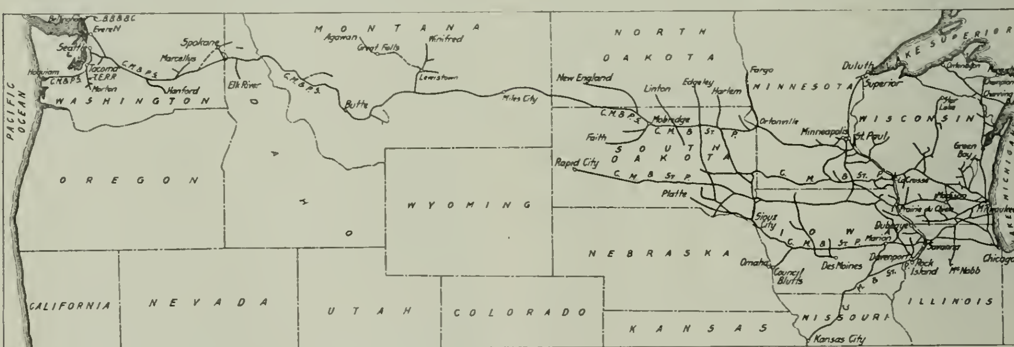
The St. Paul, in 1914, largely through increasing its freight trainloading, was able in part to offset a loss of $2,300,000 in operating revenue by a saving in transportation expenses of $1,100,000. While maintenance of way expenses increased in 1914 over 1913, and may be expected to further increase from year to year for some years as the materials used in the Pacific coast extension require renewal there was a considerably smaller expenditure for maintenance of equipment. The final result was that the company has operating income of $26,607,000 in 1914 as against $27,551,000 in 1913.

The Chicago, Milwaukee & St. Paul operates 9,613 miles of road, 73 miles having been added to the average in the fiscal year ended June 30, 1914. This system includes the old Chicago, Milwaukee & St. Paul east of Mobridge, with its mass of branch lines, operating in well-settled territory and with a large passenger business, and the Pacific coast extension, which is largely main line, running from Mobridge, S. D., west through Montana and Washington to Seattle and Tacoma. The first year in which the operations of the Pacific coast extension were combined with those of the old St. Paul, was 1913, and in 1914 the details of the consolidation were further carried through, the Chicago, Milwaukee & St. Paul now owning and operating the entire system. The Pacific coast extension has been in operation for about four years. For the first three years of its operation each year, of course, showed very large gains in traffic. In 1914, however, the entire road carried less traffic than in 1913. The St. Paul has a very diversified traffic, 10 per cent of the total tonnage being furnished by bituminous coal, 11 per cent by products of forests other than lumber, 7 per cent by lumber, 5 per cent by wheat, 4 per cent by corn and 17 per cent by manufactures. The total tonnage of products of forests in 1914 was 6,038,000 tons, and in 1913, 6,186,000 tons. The annual report shows a considerably smaller tonnage of lumber, laths and shingles, and a considerably larger tonnage of other forest products. This may, however, be simply a change in classification. There is a falling off in the tonnage of most other commodities with the exception of a considerable gain in the tonnage of stone, sand, etc., which tonnage in 1914 amounted to 2,319,000, and in 1913 to 1,961,000. The gain in this low grade traffic would in some measure help to explain the increase in trainload, but this traffic must, of course, be short-haul business, and therefore although the tonnage is over 7 per cent of the total tonnage, the ton mileage is undoubtedly a very much smaller percentage of the total ton mileage, so that the effect on the average trainload is probably but slight.

The average revenue trainload in 1914 was 380 tons, as against 357 tons in 1913, and the total tonnage, including company freight, was 454 tons in 1914 as against 415 tons in 1913. This gain in trainloading was made despite a smaller carload of revenue tonnage which was barely offset by a larger tonnage of company freight per loaded car, the total tons of freight per loaded car being 19.72 in 1914 and 19.52 in 1913. On the other hand, there were on an average 23 loaded cars per train in 1914 as against 21 in 1913, and 9 empty cars as against 7 in the year before. This made the average freight train nearly four cars, or about 14 per cent longer. The increase in trainload and the decrease in traffic resulted, of course, in a materially smaller mileage run by freight trains. This mileage in 1914 amounted to 19,700,000, and in 1913 to 22,280,000.

Detailed operating expenses reflect quite strikingly this change. Fuel for road locomotives cost $7,752,000 in 1914 as against $8,119,000 in 1913, a saving of $368,000 in this item alone. The saving in wages of road enginemen and road trainmen amounted to more than $500,000. There was also either a very considerable gain made in the efficiency of yard operation, or else a change in traffic conditions which necessitated less switching, since the wages of yard conductors and brakemen amounted to $2,075,000 in 1914 as against $2,177,000 in 1913, and the wages of yard enginemen to $1,197,000 in 1914 and $1,288,000 in 1913.

Besides the saving in transportation expenses there was less spent for repairs of locomotives and repairs of freight cars. In 1914 repairs of locomotives cost $5,492,000, or $218,000 less than in 1913, and repairs of freight cars, $4,929,000, or $555,000 less than in 1913.



The Chicago, Milwaukee & St. Paul

Apparently, insofar as possible the St. Paul undertook no new work during 1914 and carried on only such work as had already been begun and was uneconomical to discontinue. In 1913 the company spent about $40,655,000 on new equipment and additions and betterments; in 1914 the company spent $34,435,000. The principal part of this difference is accounted for by a smaller expenditure for new equipment. In 1913 $12,415,000 was spent on this account, and in 1914, $2,979,000, and at the end of the year authority had been given for the purchase of five locomotives and 39 passenger-train cars, while at the end of the previous year authority had been given for the purchase of 41 locomotives, 4,062 box cars and a small number of passenger-train cars. Apparently some of the authorities for new purchases given at the beginning of the year had been withdrawn, since but 33 locomotives were bought during 1914. In 1914 as in 1913 the largest expenditure for additions and betterments, exclusive of equipment, was for second main track, on account of which $10,573,000 was spent in 1914 and $12,558,000 in 1913. Construction work planned or under way is mentioned in the construction news columns of this issue.

During the year the St. Paul sold $17,500,000 general and refunding mortgage 4½ per cent bonds, $9,741,000 general

mortgage 4½ per cent bonds and $1,193,900 convertible 4½ per cent bonds. The total amount of bonds outstanding in the hands of the public increased during the year by $33,753,000. With operating income, therefore, of $26,607,000 in 1914 as compared with $27,551,000 in 1913, net corporate income, after the payment of rentals and interest charges, amounted to $15,476,000 in 1914 as against $18,141,000 in 1913. At the beginning of the year the company had on hand $17,361,000 cash, and at the end of the year $16,746,000. At the beginning of the year there were no loans and bills payable, and total working liabilities amounted to $10,299,000, while at the end of the year there was $5,030,000 bills payable, and total working liabilities amounted to $14,221,000.

As was previously mentioned, the purchase and consolidation of the Pacific coast extension, which had been built by separate companies and consolidated into the Chicago, Milwaukee & Puget Sound, were carried out and $154,489,500 Puget Sound 4 per cent bonds which were in the St. Paul's treasury were exchanged for a like amount of general and refunding 4's of the St. Paul. The profit and loss account of 1913 shows a charge of $1,816,000 as adjustment by reason of the acquisition of the property and accounts of the Chicago, Milwaukee & Puget Sound. The 1914 profit and loss account shows a further charge of $1,144,000. There was nothing on the 1913 balance sheet to show that there would be a still further profit and loss adjustment required, nor is there anything on the 1914 balance sheet to show that any further sums will have to be charged to profit and loss.

In 1914 as in 1913 the St. Paul paid 7 per cent on its $115,846,000 and 5 per cent on its $115,941,000 common stock. After the payment of the preferred dividend the company earned in 1914 6.2 per cent on its common stock.

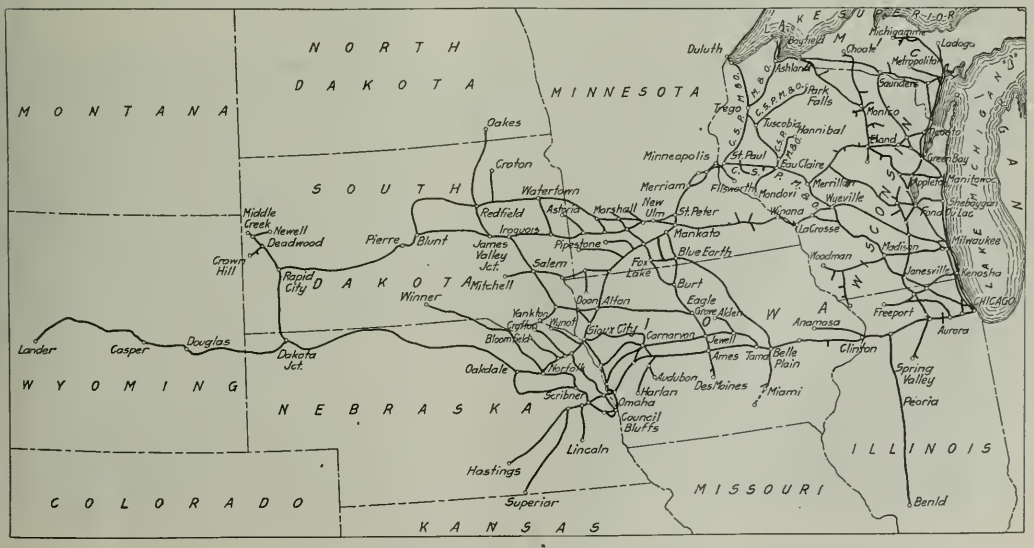
The following table shows the principal figures for operation in 1914 compared with 1913:

	1914	1913
Average mileage operated	9,684	9,613
Freight revenue	$65,266,420	$67,964,161
Passenger revenue	18,961,225	18,457,136
Total operating revenue	91,782,691	94,084,055
Maint. of way and structures	10,704,519	10,648,785
Maint. of equipment	13,112,978	13,871,985
Traffic expenses	1,799,610	1,894,343
Transportation expenses	33,960,582	35,065,842
General expenses	1,752,573	1,403,012
Total operating expenses	61,330,061	62,883,968
Taxes	4,106,557	3,823,833
Operating income	26,606,555	27,551,003
Gross corporate income	30,081,656	31,523,542
Net corporate income	15,476,286	18,140,745
Dividends	13,928,977	13,912,534
Surplus	1,547,309	4,228,211

CHICAGO & NORTH WESTERN

PASSENGER business is a far more important source of revenue on the Chicago & North Western than on the majority of western railroads. In the fiscal year ended June 30, 1914, although there was a decrease of a little more than 1 per cent in freight revenue as compared with the year before, there was an increase of 4.78 per cent in passenger revenue, with some increase in other transportation revenue, so that total operating revenues amounted to $83,677,000 as compared with $83,036,000 in 1913. There was an increase in operating expenses of $1,152,000, the total in 1914 being $59,405,000. But the remarkable thing about the North Western's operations in 1914 was that with the substantial increase in passenger business on a road where nearly a third of the revenue is derived from the operation of passenger trains, there was a decrease in transportation expenses. In recent years it has been the almost universal rule for any increase in passenger revenue to be accompanied by a disproportionately large increase in passenger train mileage, with, of course, a corresponding increase in transportation expenses. On the North Western in 1914 the passenger mileage increased 5.35 per cent, and the mileage of revenue passenger and mixed trains but 0.74 per cent; in other words, the average number of passengers per train-mile increased from 52 to 54.5. With a decrease of 0.84 per cent in ton mileage there was a decrease of 0.74 per cent in freight and mixed train mileage. It will be seen, therefore, that the total train mileage was less in 1914 than in 1913 by only a small fraction of 1 per cent.

The total wages paid by the North Western amounted to $33,871,000. This is an increase over 1913 of $959,000, of which little more than half was due to higher rates paid, and a little less than half to increased time worked. With almost no reduction in train mileage and with some increases in wage scales it is evident that the decrease in transportation expenses must have come about from economy in the use of fuel or other materials. As a matter of fact, the economy was in the expenses for fuel. Fuel for yard locomotives cost $1,126,000 in 1914, a decrease of $267,000, and fuel for road locomotives cost $6,047,000, a decrease of almost $800,000, so that the reduction in transportation expenses would have been even greater than it was if it had not been for increases in wages of station employees, the total increase being $152,000, and increases in amounts paid for loss and damage to freight and injuries to persons, the increases being $222,000 and $223,000 respectively.



The Chicago & North Western and the Chicago, St. Paul, Minneapolis & Omaha

An increase in the wages of station employees is one of the few increased expenses which railroad security holders ought to be willing to cheerfully meet. Station employees are one of the very few classes of railway labor which are now underpaid.

A part of the saving in fuel is probably due to the use of heavier engines; but there is another factor which is very important in this fuel saving, that is, the opening of the St. Louis, Peoria & North Western, which was built for the Chicago & North Western from Peoria into the Illinois coal fields where the North Western owns mines. Previous to the fall of 1913 fuel coal from these mines was carried by foreign roads and the cost of fuel included, of course, the foreign roads' freight charges. Since the company has its own line the cost to the North Western of the transportation of the coal from the mines to the point of delivery has undoubtedly been very much cut down. If a considerable part of this fuel is hauled in regular revenue trains it may be that the company is charging against the cost of fuel a very small part of the train expenses; but if this is the case there have been economies in other ways in transportation expenses to offset it, since the final point is that the North Western is getting its fuel delivered with a much smaller charge against the fuel and no increase in other transportation expenses which would be caused by the North Western's doing the hauling of the coal instead of some foreign line.

In 1914 the North Western spent substantially larger sums for maintenance of both roadway and equipment than in 1913, the principal increases in roadway being for ties, rails, and roadway and track labor. In respect to ties especially considerably more replacement work was done in 1914 than in 1913. The total spent on this account last year was $1,762,000, or $364,000 more than in the previous year, and 3,042,000 new ties were put in track as against 2,718,000 in 1913. In maintenance of equipment the principal increases were due to a considerably larger amount being spent for repairs of freight cars—$4,271,000 in 1914 as against $3,956,000 in 1913—and apparently a more liberal policy in charges for depreciation, although the increased depreciation charges may be entirely accounted for by the larger amount of equipment in service at the end of the year than at the beginning—1,830 locomotives as against 1,722, 1,918 passenger cars as against 1,796, and 65,950 freight cars as against 61,263.

Besides making larger expenditures for maintenance the North Western spent $12,912,000 for additions and betterments and additional new equipment in 1914, which compares with $7,832,000 spent on property account in 1913. The company also took over the St. Louis, Peoria & North Western, as mentioned above, a 115-mile road from near Peoria to the coal fields in Macoupin county, Ill. The cost of this road to the North Western in 1914 was $9,897,000, and in addition the North Western guaranteed $10,000,000 first mortgage 5 per cent bonds of this company, which bonds were issued to the North Western by the construction company to reimburse the North Western for its advances. These bonds were, of course, sold by the North Western.

At the end of the year the Chicago & North Western had $19,459,000 cash as against $9,647,000 at the beginning of the year, and total working liabilities amounted to $9,079,000 at the end of the year, as against $10,420,000 at the beginning of the year The principal reduction in working liabilities was in audited vouchers and wages unpaid, which amounted at the beginning of the year to $5,245,000, and at the end of the year to $3,924,000. This decrease is presumably indicative of greater efficiency and economy in the accounting department, in fact the whole report reflects remarkable gains in good railroading on a road that was already one of the best run in the country.

The table shows the principal figureys for 1914 and 1913.

	1914	1913
Average mileage operated	8,071	7,974
Freight revenue	$53,989,475	$54,661,588
Passenger revenue	21,540,543	20,557,623
Total operating revenues	83,677,051	83,035,921
Maint. of way and structures	12,179,690	11,501,186
Maint. of equipment	12,187,123	11,568,496
Traffic expenses	1,357,643	1,348,982
Transportation expenses	31,941,194	32,241,258
General expenses	1,739,491	1,592,858
Total operating expenses	59,405,142	58,252,780
Taxes	4,252,790	3,597,160
Operating income	20,004,969	21,197,277
Gross income	22,925,730	24,660,796
Net income	12,306,142	14,875,013
Dividends*	11,099,606	11,100,088
Surplus	3,775,408	1,206,055

*Includes $200,473 in 1914 and $199,991 in 1913 appropriated to sinking funds.

CHICAGO, ST. PAUL, MINNEAPOLIS & OMAHA

THE Chicago, St. Paul, Minneapolis & Omaha is a subsidiary of the Chicago & North Western. It operates 1,748 miles of road, much of which might be called branch line mileage in an agricultural territory. In the fiscal year ended June 30, 1914, the road carried 2.47 per cent more ton mileage and 13.70 per cent more passenger mileage—the freight revenue being greater by 5.25 per cent and the passenger revenue by 8.65 per cent than in 1913—but after the payment of dividends, showed a slight deficit, $65,000, as against a small surplus, $192,000, the year before. The principal factors in this showing of a deficit as against a surplus with considerably larger business were the expenditure of $404,000 more on maintenance of way and structures, the total in 1914 being $2,613,000, and an increase in taxes of $141,000. The increase in taxes was out of all proportion to the increase in business and the amount of earnings that are required for taxes on the Omaha is out of all proportion to its earnings or its mileage. In 1914 5.41 per cent of total operating revenue was consumed by taxes, the total amount paid being $973,000. The increase in maintenance of way expenditures was the result of extraordinarily large appropriations for ties and a considerably larger amount spent for bridges, trestles and culverts and for track labor. The table at the end of these remarks shows the comparison between the income accounts for 1914 and 1913.

Transportation expenses in 1914 amounted to $6,940,000, an increase of but $193,000 over 1913, the largest single item of increase being that for injuries to persons, on which there was spent $312,000 in 1914 as against $180,000 the year before. The fact that this subsidiary of the North Western as well as the North Western itself showed very considerably heavier charges for injuries to persons in 1914 suggests that probably the company is settling new claims more promptly and is cleaning up old claims. Eliminating this increase of $132,000 for injuries to persons, transportation expenses increased but $63,000, or less than 1 per cent. The total number of tons carried amounted to 8,467,000, an increase of 3.18 per cent over the previous year, and the passengers carried 4,882,000, or 8.47 per cent over the previous year. This is a good showing.

The average revenue trainload increased by 11 per cent, being 307 tons, and the lading per loaded car, 1.26 per cent, the total being 19.23 tons in 1914. The gross earnings per ton-mile were 8.8 mills in 1914, a decrease of 2.33 per cent. The average haul for freight was 153 miles in 1914 and 154 miles in 1913. On the other hand, the average passenger journey was 54.63 miles in 1914 and 52.11 miles in 1913, an increase of 4.84 per cent.

In 1914 a total of $2,097,000 was spent for property account, of which $939,000 was for extensions or additions and betterments, and the remainder, $589,000 net, for new equipment. The company sold $1,700,000 debenture bonds of 1930, and at the end of the year had on hand $1,016,000 cash, as compared with $2,413,000 at the beginning of the year. Total working liabilities amounted to $1,939,000 as against $2,771,000 at the beginning of the year.

The following table shows the principal figures for operation in 1914 as compared with 1913:

	1914	1913
Average mileage operated	1,748	1,747
Freight revenue	$11,427,563	$10,857,207
Passenger revenue	5,415,710	4,984,595
Total operating revenue	17,992,371	16,993,005
Maint. of way and structures	2,612,610	2,208,294
Maint. of equipment	2,283,926	2,188,946
Traffic expenses	353,956	348,515
Transportation expenses	6,939,604	6,746,792
General expenses	442,474	394,915
Total operating expenses	12,632,571	11,887,461
Taxes	973,283	832,263
Operating income	4,402,684	4,268,469
Gross income	4,636,089	4,504,272
Net income	2,021,615	2,278,933
Dividends	2,086,910	2,086,910
Surplus	65,295*	192,023

*Deficit.

Reclaiming Material on the St. Louis & San Francisco

The Extensive Plant Established at Springfield (Mo.) for This Purpose Is Developing Surprising Results

The reclamation plant of the St. Louis & San Francisco, established at Springfield (Mo.) a little less than a year ago, has many features of special interest. In the first place, it is housed in what might be termed "scrap buildings on scrap property." This, however, is not nearly as bad as it sounds for the buildings, at least the two main ones, are of substantial construction and were originally built as the main shops of the Kansas City, Fort Scott & Memphis, but were practically abandoned when the new Frisco shops were built on the other side of the town several years ago. The plant is ticularly in a plant of this kind, cannot but be felt in the results which are obtained from its operation as a whole.

The scrap which is collected from the various divisions and shops is delivered to the reclamation plant at the rate of about 4,000 tons a month. The force required for handling and sorting it and carrying on the work of reclamation consists of about 255 employees. These are in direct charge of a superintendent, who reports direct to the chief purchasing officer, and include a general foreman, a dock foreman, an office staff of six men, a machine shop and air room force of

A General View of the Reclamation Plant of the St. Louis & San Francisco at Springfield (Mo.)

located about one-quarter mile south of the passenger station at Springfield. That part of the yard which is used for the unloading and storage of scrap formerly consisted in large part of the low, uneven and eroded slope of a creek. This has been leveled and filled except for the channel bed and serves its purpose admirably, as indicated in the general views of the plant.

The buildings are kept well painted and a more or less successful attempt has been made to keep the plant in a neat and orderly condition. From the very nature of things this is a difficult task, but the moral effect upon the force, par-

15 men; 14 men in the bolt shop, 37 in the blacksmith shop, five in the track material and frog shop, 14 in the carpenter shop, eight in the Oxweld department and about 150 in the miscellaneous force.

As the cars containing scrap arrive they are unloaded by a Brown hoist equipped with an electric magnet. The sorting is done by small gangs of men under the supervision of a foreman who thoroughly understands material. A large part of the scrap is of no use as far as re-application to cars and locomotives or roadway is concerned and this is merely sorted into piles according to the class and grade and is

General View of Scrap Yard and Reclamation Plant

again loaded on cars by the hoist and shipped and sold to scrap dealers. The remainder, possibly from 20 to 25 per cent of the total, furnishes the basis of the reclamation plant's profitable operation.

In developing this work of reclamation, it was recognized that it might easily be overdone and thus neutralize all of the gain which could be made if the efforts were concentrated on that part which might be reclaimed with profit. To guard against mistakes of this kind each item is carefully studied and analyzed and where there is any question as to the strength or durability of the part for the purpose for which it is intended, efforts are made to follow it into service. As all of the reclaimed metal parts are dipped in an asphaltum mixture before they are sent to the shops and storehouses, it is easy to spot them in the storehouse stock and to recognize them when they are replaced on cars and locomotives. It is thus possible to more or less readily locate any breakage or failure on a large scale of parts which have passed through the reclamation plant. The mechanical department officers are constantly on the lookout for possible cases of this kind.

As may be seen from the photographs, the main buildings which house the machinery are located at one end of the scrap yard. The other smaller buildings, which have been constructed at a comparatively small cost from scrap lumber and old metal car roofs, are so located as to facilitate the movement of the various classes of material which they handle, cutting down lost motion and wasteful moves to a minimum.

BOLT AND NUTS

All the bolts which are sorted from the scrap are sent to one of the smaller buildings, which is equipped with a shear and three small air operated hammers. The damaged ends are cut off and the bolts are straightened under the hammers. They are then sorted by diameters and lengths and are sent to the machine shop, where they are re-threaded. There is provided for this purpose one single-head bolt cutter, three double-head machines and one triple-head machine. The scrap nuts are first annealed and are then placed in a rattler and cleaned; they are then sorted in sizes and retapped on four tapping machines, each of which is equipped with seven spindles. In all cases nuts are screwed on the newly threaded

Unloading Scrap With a Three-Ton Hoist Equipped With an Electric Magnet

A Group of Bolt Cutters in the Machine Shop

Two of the Multiple-Spindle Nut Tappers Which Were Reclaimed from Scrap

bolts before they are sent to the storehouse. It is true that before the establishment of the reclamation plant, many of these bolts and nuts were reclaimed. It was a more expensive process, however, because the machines were scattered at the different shops and were not worked as efficiently as is possible where they are grouped together in one department and have a sufficient amount of work to keep them working to capacity at all times. In all cases it has been found possible to speed up the machines and thus increase the output. Practically all of the work in the reclamation plant is done on a piece work basis.

Good Material Which Has Been Picked from Scrap for Future Use

A large number of new bolts and pins are also made from round iron which is taken from the scrap, straightened and cut to proper lengths. For the heading of these bolts two machines are used which were reclaimed from scrap. Practically all of the bolts which are required on the railroad are now being reclaimed or made at the reclamation plant. During one month 157,082 machine bolts were reclaimed or made from scrap or new material at an estimated saving of $1,953.50 as compared to the value of new bolts. This is on the basis of direct labor and material cost, plus a proper allowance for supervision and overhead expense.

AIR BRAKES AND AIR HOSE

The main building, which contains the machine shop and the bolt and nut machinery, also has a section for repairing and cleaning air brake apparatus and for working over air and steam hose. The hose and fittings are first stripped with home-made devices; about 90 per cent of the fittings are practically as good as new when they have been cleaned and new gaskets have been applied. The greater part of the hose is useless, although a certain proportion of it is fit for splicing and using on work equipment or for working over for dummy hose. In one month, for instance, 230 steam heat hose were overhauled, the old fittings being applied to new hose in most cases. In the same way 2,505 air hose were overhauled, 706 air hose were spliced and 53 dummy hose were fitted up.

A Pile of Shovels with Broken Handles and Bent Blades is Shown at the Right and a Number of Repaired Shovels at the Left

In this department triple valves, angle cocks, relief valves and various other pipe and air fittings are overhauled and placed in a serviceable condition, often at a comparatively small expense. A typical month shows the overhauling and reclaiming of 247 angle cocks, 29 cut-out cocks, and 283 globe valves.

A large portion of this same building is used for the repairing of damaged lanterns, markers, gage lamps, classification lamps, switch lamps, oil cans and other locomotive supplies. The item of locomotive supplies will probably not

Reclamation Plant Machine Shop

amount to a very large factor, however, because of the steps which are being taken by the mechanical department to standardize and give special attention to the proper use and maintenance of this material, as will be described in a later article of this series.

ROADWAY MATERIAL

A large part of the main shop is used for the rebuilding of damaged hand and push cars which are picked up and sent

Pneumatic Spike Straightening Machine

to the reclamation plant as scrap. In some cases where the cars are badly damaged it may require the good parts from two or three cars to make a new car. When this has been done and the car has been properly painted it is usually difficult to tell it from a new car. This is also true of baggage

Part of Carload of Reclaimed Material Ready for Shipment to the Store Department

trucks, track drills, jacks, track levels and station skids. As an example, one month showed the reclaiming of 23 track jacks, 45 hand cars, 6 baggage wagons, 48 warehouse trucks, 8 push cars, and 5 station settees, with an estimated saving of approximately $1,000.

Another part of the shop, which is of more than ordinary interest, is that in which the shovels, scoops and scythes are re-handled and straightened up. This portion of the shop

Crane and Vat for Immersing Reclaimed Material in Mixture of Asphaltum

is shown in one of the photographs. The 12 in. shovels are cut back a maximum of 2 in. About 90 per cent of the shovels which come to the reclamation plant in the scrap may be reclaimed in this way. A typical month shows the reclaiming of 418 track shovels with a saving of between $90 and $100.

Another special feature is that of cable repairs. A large

The Oxweld Station at the Reclamation Plant

amount of valuable material of this sort is lost on many roads because of the lack of an expert in splicing and repairing the cables. Realizing this, the superintendent of the reclamation plant deliberately set out to locate a competent man to

do this sort of work, preferably with experience in the navy. The result has been most gratifying.

BLACKSMITH SHOP

The blacksmith shop works over a large number of parts which come to it more or less damaged, and manufactures a considerable amount of material from scrap. It is showing a profit of from $1 500 to $1,800 a week. Track tools of all

Welding Car Bolsters with the Oxy-Acetylene Process

kinds, including adzes, spike mauls, clay picks, claw bars, lining bars and tamping bars are straightened and re-dressed. Broken coil springs are heated and drawn out with an air machine and are then made into jack bars, lining bars, drift pins and similar parts. A large shear is provided for shearing the coupler yoke rivets and the good parts are reclaimed. A shear is provided for cutting bars and rods to length. A

Repairing Car Bolsters, a Journal Box and a Coupler with Oxy-Acetylene

considerable number of brake rods are straightened and in many cases new ends are welded on.

The manufacture of material from scrap relieves the blacksmith shops at the different shop plants of much of this work. For instance, round iron is cut into suitable sizes and headed for bolts and made into pins; bar iron which comes to the plant as scrap is worked up into drawbar shims, carrier irons and other locomotive and car parts. One end of the smith shop is used for relining journal brasses. Exceptional results have been obtained by welding carbon steel points on picks. These have given excellent service and are said to be even better than the new tools.

TRACK SPIKES

Hundreds of track spikes are annealed and reclaimed each day. As these are sorted out from the scrap pile they are transferred to a small building which is fitted with a pneumatic hammer and is used only for the straightening of spikes. Such spikes as do not come up to a certain standard are, of course, scrapped, but the large number that can be reclaimed is surprising. Scrap washers after being rattled with the spikes, nuts, air hose couplings, etc., are treated in the same way.

CEMENT SACKS

Cement sacks used in connection with construction work are carefully gathered and forwarded to the reclamation plant.

A Broken Coupler and a Similar One Which Has Been Repaired by the Oxy-Acetylene Process

Usually these are torn and damaged from rough handling in opening; an old box car has been fitted up for handling these, and one of the older employees gives all his time to sorting and repairing them. As many as 1 365 sacks were reclaimed in one month, resulting in a net saving of about $84.

OIL AND WASTE

One of the smaller buildings is equipped with electrically driven centrifugal separators which thoroughly clean the

Broken Signal Post and Relay Box Awaiting Repairs

soiled and oil soaked waste which has been taken from journal boxes, and also reclaims the oil. The net return from this department runs from $200 to $300 a month.

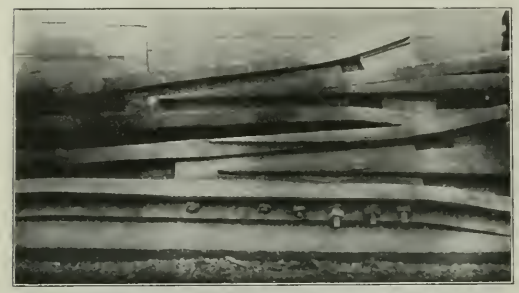
BRASS SCRAP

Special attention is given to the brass scrap because of its value, even as scrap. A small house has been built from old car timbers and metal car roofs which has a number of bins

for the different classes of brass, a scale being placed at the entrance to the building in order to accurately keep a check on all of this material.

BRAKE BEAMS

The reclaiming of brake beams is segregated in a small building because of the danger of flying rivet heads in stripping. All brake beams which are not too badly twisted or damaged are straightened in a bulldozer and are refitted with new heads and fulcrum castings if necessary. Truss rods for these beams are made in the blacksmith shop from scrap material. Brake hangers which have been damaged or distorted are straightened and fitted for further use. In one month 1,692 brake beams were reclaimed with a saving of almost a dollar a beam, and 456 brake hangers were reclaimed.



A Worn Crossing Frog and a Similar One Repaired by the Oxy-Acetylene Process

OXWELD PLANT

Probably the most interesting part of the plant and that in which the most spectacular savings are made is that in which the oxy-acetylene process is used, either for welding or for cutting. The generating apparatus and the oxygen tanks, as well as the supply of carbide, are housed in a small building centrally located. In all essentials the plant is similar to that which was described in the article on oxy-acetylene welding and cutting on the Frisco, September 11, page 467. The piping at the reclamation plant is entirely underground and consists of about 1,000 ft. each of pipe for oxygen and for the acetylene gas. There are 12 outlets or stations on this line and at present a force of eight welding operators is kept steadily at work.

Cutting a Scrap Underframe, Thus Saving the Usable Parts and Securing a Higher Price for the Scrap

The Shop in Which Frogs and Switches Are Repaired and Reassembled

CASTINGS

One of the most interesting classes of work reclaimed by the oxy-acetylene process is that of castings, whether of cast iron, cast steel, brass or other alloy. Many brake cylinders

or air reservoirs with broken lugs are repaired at a very small expense where otherwise it would be necessary to scrap the entire casting; even if the part which was broken off is not available it is possible in many cases to build up the casting with new material or to break a similar piece off of another scrap casting and weld it in place. An important development which has been made necessary is a campaign of education among shop and engine house employees to emphasize the necessity of tying broken pieces of castings, which may be reclaimed, together so that time may be saved at the reclamation plant in supplying the missing parts.

Old Boilers and Fireboxes are Cut with the Oxy-Acetylene Burners Into Pieces Convenient for Handling

The illustrations show typical jobs in the reclaiming of castings. As may be understood, the possibilities in this line are practically unlimited. Many cracked or broken car bolsters are welded and reinforced so that they are as good as new, and in some cases, even better. In possibly as many as 25 per cent of these cases the good ends of two badly damaged bolsters have been cut off and combined into one perfect bolster. Many couplers have been reclaimed which were cracked on the face or in the neck of the shank, or which have had broken knuckle pin bosses or lugs; in some cases repairs have been successfully made by filling in worn contours. One of the illustrations shows repairs being made to two bolsters, a journal box, a coupler and a center plate casting.

Locomotive buffer castings which have been broken or in which the holes have been worn out of round are reclaimed at a comparatively small cost. Many cast iron signal posts and relay boxes used in connection with the block signal system are repaired, the cost of welding usually varying between $2 and $3 per casting as compared to from $16 to $24 for a new part. A broken signal post and relay box which may easily be repaired is shown in one of the illustrations.

SWITCH AND CROSSING FROGS

A separate building, the interior of which is shown in one of the illustrations, is used for the repairing and reassembling of switch and crossing frogs. Ordinarily when these become worn they are rebuilt at a high cost. With the oxy-acetylene process the broken points and worn rails are built up to the original standard at a very small expenditure. As a typical

Old Locomotive Tanks Which Have Been Cut to Sizes Convenient for Handling

case, a frog which costs $45.25 new was reclaimed with an expenditure of $7.50, making a net gain of $37.75. One of the illustrations shows a frog which had become badly worn and a similar frog which had been just as badly worn, but which had been repaired with the oxy-acetylene process. In building up the rails and points the metal is applied over a small area at a time and is hammered down while hot, thus avoiding the necessity of subsequent machining.

REDUCING SCRAP

Several of the illustrations show large parts, such as old boilers, fireboxes, tender tanks and car frames, being cut up with the oxy-acetylene cutting burner. This class of scrap commands a very low price, not more than $2.50 a ton. When it is cut into sizes for convenient handling it will bring at least double that amount; the cost of cutting is comparatively slight, so that there is a net gain of several hundred per cent.

THE SAVING

That the best results may be obtained at the reclamation plant it is necessary for the mechanical department officers over the entire system to understand the work which is being carried on there and to realize the possibilities of co-operation. It is proposed to have all of the master mechanics, road-masters, general foremen and others who handle material, pay periodical visits to the plant to study its workings and its possibilities. By seeing that parts broken from expensive castings are wired to them when they are forwarded to the reclamation plant they can help to increase the saving; in many cases they will send parts for repair direct to the plant rather than to let them take the roundabout method of going forward mixed up with a miscellaneous lot of scrap.

A careful record is being kept of all the work which is done at the plant with the idea of determining as accurately as possible the saving which results. Of course, these savings are not in all cases net, for much of the material, if it were not forwarded to the reclamation plant, would be reclaimed at the other shops on the system. There is little question, however, but that with the special organization at the reclamation plant the work can be carried on more economically and more thoroughly than it can at the other plants, allowing for the cost of transporting the material to and from the plant.

Statements are issued monthly showing the number of different parts reclaimed, the value of the new material used, the value of the scrap material used, the total labor cost, a charge for supervision and overhead expense, and miscellaneous shop expense. This in each case is compared with the cost of similar material purchased new and a column is added showing the total saving for each item and the saving per unit. The officers of the road have given the matter careful attention and thorough study, and are emphatically in favor of the plant. Started as an experiment, it was watched more or less critically with the idea that after all most of the saving might prove to be on paper; that this has not proved true is indicated by the fact that the work is gradually and steadily being extended and enlarged, although in many cases practices have been discontinued because it was found that it did not pay to try to reclaim certain parts. In making out the monthly performance sheet those items which do not show a saving indicate the loss in red and thus attention is focused on them. Needless to say an item showing up on the wrong side more than once or twice means either that prompt attention will be given in the attempt to reduce the cost of reclamation, or no further work will be done on such parts. The plant is in charge of Superintendent R. F. Whalen.

English Railway Employees Enlist.—Up to the present over 9,000 men have either left or are about to leave the London & North-Western for active service. The figures are as follows: Army Reservists, 2,328; Naval Reservists, 398; Territorials, 2,532, and Volunteers, 4,097; total, 9,265.

AMERICAN ASSOCIATION OF PASSENGER TRAFFIC OFFICIALS

The annual convention of the American Association of General Passenger and Ticket Agents was held in Boston on September 15 and 16. It was decided to change the name of the association to the American Association of Passenger Traffic Officials.

A complete report was presented by the committee on Economies in the Distribution of Folders, and the committee, with H. J. Phelps, general passenger agent of the Illinois Central, as chairman, was continued with instruction to carry on its investigation. The committee recommended a continuance of the present method of distributing folders by distributing agencies in a modified form, recommended the discontinuance of placing folder boxes in hotels in cities of less than 50,000 inhabitants, closer co-operation between the Official Railway Guide and the railways in disseminating information of this character, and the discontinuance of the distribution of folders on trans-Atlantic steamships for the reason that the Official Guide will answer the requirements.

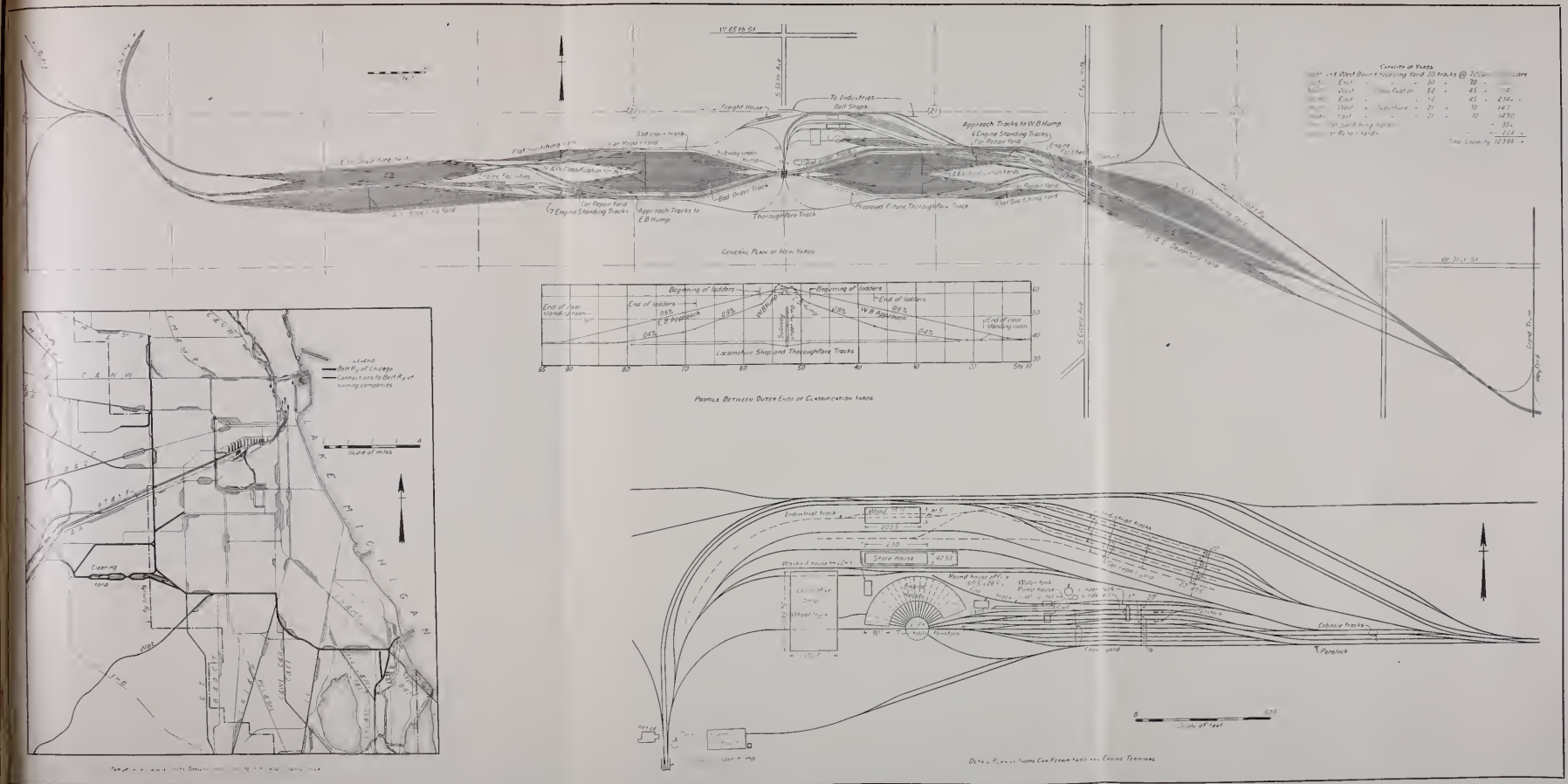
The committee on Digest of Fares and Divisions was continued, and this publication has now become a permanent feature of the association work. It was decided to discourage the practice of furnishing business colleges and commercial schools with samples of tickets.

The question of curtailment of expenses in maintaining city ticket offices in foreign territory where the lines do not have initial rails was the subject of a thorough discussion, and a committee was appointed to continue further investigation of this subject. It was believed that a great saving could be made in this direction.

The committee on Limitations of Local Tickets made a complete report, which was endorsed and referred to the different territorial associations for action. The new multi-route tickets of horizontal and vertical forms have now received the endorsement of the association and a number of lines are experimenting with these forms with a view of determining which of the two forms will be most convenient and effective. It is hoped by the use of these forms to reduce coupon ticket form representation by 33⅓ per cent. The committee on Telegraph Code for the Handling of Association Matters reported progress and is expected shortly to be able to complete its work.

Addresses were presented by the representatives of other associations, as follows: A. J. Gillingham, auditor of passenger traffic, Pennsylvania Railroad, representing the American Association of Accounting Officers; George A. Morton, general baggage agent, New York, New Haven & Hartford, representing the American Association of General Baggage Agents; George J. Alexander, president of the Canadian Ticket Agents' Association; Frank J. Burke, ticket agent at the Union Station, Chicago, representing the International Association of Ticket Agents, and H. M. Fletcher, passenger agent, Atchison, Topeka & Santa Fe, representing the American Association of Traveling Passenger Agents. An address was also presented by E. E. Clark of the Interstate Commerce Commission on "American Passenger Service," which was published in last week's issue. Howard Elliott, chairman of the New York, New Haven & Hartford, also presented an address on the Natural Advantages and Summer Traffic of New England. Those in attendance at the convention were taken on an inspection trip over the electrified zone of the New York, New Haven & Hartford, between New York and New Haven, accompanied by General Manager Bardo and Consulting Engineer Murray, who explained the principal features of the work.

Officers were elected as follows: President, Gerrit Fort, passenger traffic manager, Union Pacific, Omaha, Neb.; vice-president, Alexander Hilton, passenger traffic manager, St. Louis & San Francisco, St. Louis; secretary, W. C. Hope, general passenger agent, Central Railroad of New Jersey, New York. The next convention will be held at San Francisco in 1915.



MAP, PROFILE AND PLAN OF NEW INTERCHANGE YARD BUILT BY BELT RAILWAY OF CHICAGO AT CLEARING

Clearing Interchange Yard for Chicago District

Reconstruction of Big Hump Yard by Belt Railway to Relieve Downtown Terminals of Transfer Freight

[With an Inset]

The operation of a large yard in the vicinity of Chicago to handle all or a large part of the interchange of through carload freight in order to decrease the switching within the city and reduce the congestion in the downtown district has been more or less seriously considered since 1899 when the Chicago Transfer & Clearing Company was organized to build such a yard at Clearing, about 10 miles southwest of the center of the city. The yard built by that company and rebuilt in 1898 by the Chicago Union Transfer Company has remained practically unused, but early in 1912 an agreement was reached by 12 railways entering the city, under which they became joint owners of the Belt Railway with the understanding that the Chicago & Western Indiana would buy the old yard, rebuild and enlarge it, and lease its Belt divisions, including the yard, to the Belt Railway as formerly. This reconstruction work has now been practically completed, and it is expected that the yard will be put in operation in the near future.

General View of West Half of Clearing Yard from the Hump, with the Four Eastbound Approach Tracks on Left, and Two Hump Tracks Leading to Classification Yards on Right

The Problem and the Proposed Solution

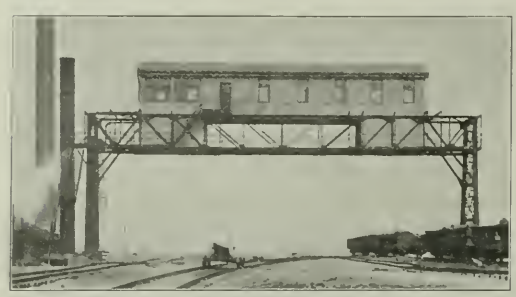
Since more freight is interchanged between roads at Chicago than at any other point in the country, the need for a comprehensive plan of handling such transfers promptly and economically is felt most keenly there. This heavy interchange of business is caused by the fact that 24 trunk line railways enter the city, practically all of which terminate there. In addition there are 14 terminal, switching and industrial roads in and around the city, originating and delivering large amounts of freight which is received from or transferred to the trunk lines. The total freight car movement into the city excluding empties, is approximately 260,000 cars per month and about the same number of loaded cars are taken out of the city. On the assumption that the number of empty cars bears the same relation to the number of loaded ones as the average for roads in this district, the total car movement is approximately 390,000 in and the same number out. Practically half of the loaded cars are for Chicago delivery, and half for points beyond, so that applying this ratio to the total car movement, about 195,000 cars must be transferred from one road to another at Chicago every month, or 6,500 cars every day. At present about 30 per cent of these cars are handled by belt lines and the remaining 70 per cent, or about 4,500 cars a day, are hauled into the congested district of the city to be delivered by direct switching to the connecting roads.

The clearing yard in its reconstructed form is adapted by location and design to become a central "clearing house" for all railways entering the city and will thus solve this most difficult interchange problem, if satisfactory operating agreements can be made to enable its advantages to be realized to the fullest extent. It is owned by the Atchison, Topeka & Santa Fe, the Chesapeake & Ohio, the Chicago & Eastern Illinois, the Chicago, Burlington & Quincy, the Chicago, Rock Island & Pacific, the Chicago, Indianapolis & Louisville, the Erie, the Grand Trunk, the Illinois Central, the Minneapolis, St. Paul & Sault Ste. Marie, the Pennsylvania and the Wabash. The line of the Belt Railway makes direct connections with every trunk line entering the city and extensive improvements now under way will give it ample capacity to handle the interchange business of the other roads as well as the owning companies. The fact that some roads not interested in the control of the Belt have been giving it large amounts of transfer freight indicates that even more will be received from such roads after the new yard is put in operation.

The yard lies between the Belt and the Indiana Harbor Belt, making it possible for the roads interested in the latter line to send their transfer business to Clearing by that route if they

prefer. This line is owned by the Lake Shore & Michigan Southern, the Michigan Central, the Chicago, Milwaukee & St. Paul, and the Chicago & North Western, so that with the exception of the Baltimore & Ohio, the Chicago & Alton, the Chicago Great Western, and the Pere Marquette, every trunk line entering the city is interested either through ownership or affiliation in one or the other of the belt lines and three of these exceptions, the Baltimore & Ohio, the Chicago & Alton, and the Pere Marquette, have direct connections of their own to the new yard.

The design of the yard provides a standing capacity of about 12,400 cars and makes it possible to handle 400 cars an hour over



Interlocking Tower on Bridge Spanning the Hump Tracks

the hump. This would mean a daily capacity of 8,000 to 10,000 cars which is in excess of present demands and ample property is available for the addition of similar units if the capacity of the present yard should ever become insufficient. The yard is centrally located with respect to the breakup yards of the various through lines, resulting in a minimum average haul on transfer business. The distance from Clearing to the farthest break-up yard is approximately 20 miles.

REVISED DESIGN OF YARD

The old facilities consisted of a single hump between two classification yards with two tracks over the hump, one leading in each direction. The receiving yards were located alongside the hump requiring reverse movements. No departure yards were provided, although two five-track overflow yards at the outer end of each classification yard were intended to serve the same purpose. This old layout was inadequate for the proposed method of operation, requiring the enlargement and rearrangement of the facilities.

The new design retained the old hump between the two classification yards, its width being increased to allow four tracks to be operated simultaneously, two in each direction. The classification yards are each divided into two units of 26 tracks, each unit being served normally by one of the hump tracks, although provision is made for either of the tracks in one direction to serve either of the corresponding yard units. The classification tracks have a capacity of 45 cars each, making the total capacity in the classification yards 4,685.

The receiving and departure yards are designed for 70-car trains. The former will ultimately contain 30 tracks each and the latter 21, although only 16 and 12 tracks, respectively, are being laid at present, with a view to adding the others as the capacity is needed. The present capacity of these yards will be 2,240 cars for the receiving and 1,680 for the departure and the ultimate capacity will be 4,200 cars and 2,940, respectively. The receiving and departure yards for opposite directions are located side by side at the extreme ends of the layout, eliminating reverse movements. Thoroughfare tracks are provided along both sides of the yard with Y-connections under the hump, allowing movements to be made easily between any portions of the yard.

Two flat switching yards of 176 cars capacity each are provided near the end of each classification yard with direct leads into the departure yards. These are designed primarily to handle the business originating in the industrial district around Clearing, which will be brought in in small lots by switch engines. The Corn Products Refining Company's plant is the largest single industry in this district at present, although numerous smaller plants are grouped near the yard and further development in this territory is probable. The four car repair yards adjacent to the classification yards have a total capacity of 224 cars and are equipped to make light repairs only. Cars requiring heavy repairs will be switched to the heavy repair yard at the shops north of the hump. A bad order track leads from the hump to each repair yard and tracks for bringing back car riders to the hump will be located just outside these bad order tracks.

As the main line of the belt crossed the site of the proposed receiving and departure yards at the east end, a new double track line was built along the north side of the yard location extending from the Grand Trunk crossing at Hayford to a connection with the old location at about Sixty-seventh street. In order to provide a direct connection to the west end of the yard, a new double track line 4½ miles long was built west from the old line on Fifty-ninth street and south to the yard.

The yard facilities are duplicated on the two sides of the hump. It is expected that in general trains from southern and eastern roads will be brought into the yard from the east end and depart for northern and western connections at the west end and that cars from the latter roads will move through the yard in the opposite direction. The trains will be brought to the yard by road engines of the respective companies running over the Belt tracks. The road engines will pull into one of the receiving yards, cut off, and go to the corresponding engine facility layout to coal, clean fires, and take water and sand. The engine can there be turned and the same crew can pick up a train destined for its road from the adjacent departure yard. Engine facilities are provided at both ends of the yard and the proximity of these facilities to the receiving and departure yards will reduce the delay to road crews to the minimum.

The operation of classifying the incoming trains and making up outgoing trains will be performed by the Belt Railway. A four-track lead is provided from each receiving yard to a point about 200 ft. from the hump where the four tracks merge into the two leading over the hump. This arrangement allows two trains to be pushed up almost to the hump, while two other trains are being classified on the other tracks so that they are in position to begin classification immediately when the others have finished. This will effect an important saving in time

Panorama of the Belt Railway Shops Located Just North of the Hump

over the usual system under which the hump engine has to run back to the receiving yard for another train before work can proceed.

The grade on the approach tracks to the hump is 0.6 per cent. The profile on the other side of the hump includes a short accelerating grade of 4 per cent, 0.9 per cent through the ladders, and 0.4 per cent through the body of the classification yard. The westbound hump is 1 ft. higher than the eastbound to compensate for the force of the prevailing winds. The switches along the ladder track leading into the classification yard will be operated by an electro-pneumatic interlocking system from a tower on the hump.

RECONSTRUCTION OF THE YARD

The design of the new yard made it possible to utilize the sand fill in the old hump, a portion of the old track material, the power house, freight house and office building, the sewer system, and a portion of the water system. The first work undertaken was the raising of the outer ends of the classification tracks on a sand fill to bring them up to the new level. The old hump fill was then widened for the additional classification and approach tracks, the old tracks being shifted to the new sired height above the yard track and a locomotive crane was then used to shift the dumping track to make room for the next plowing. In addition to the sand fill, 177,000 cu. yd. of earth removed from miscellaneous excavations was placed in the fill.

A steam shovel was used in making the cut for a single track connection to Argo, passing under four tracks near the west entrance to the yard, and a team outfit graded part of the new connecting line. These portions of the work were contracted to Andrew Ward & Sons, Chicago. The grading on the change in the old line and the new connection totaled 117,300 cu. yd.

In making the cut through the hump for the new subway, a 25-ton locomotive crane rigged with a clam shell bucket was used, operating on a track laid from the face of the excavation back parallel to the hump to a point where the fill was needed. This crane handled 9,000 yd. at a price less than the contractors' estimate.

The new yard contains 134 miles of track, of which 22 miles is old track shifted into the proper position and the remainder is new track, or old track relaid. The old yard was laid with soft wood ties and 75-lb. rail, and was well ballasted with cin-

Locomotive Shop, Roundhouse and Storehouse Nearing Completion

ders, gravel and slag. It contained 11 miles of lateral drain pipes, so that no additional provision for sub-drainage was required. The old ties that were suitable were used in the new yard in less important tracks with tie plates. All new ties are hard wood, those on curves being tie-plated. The old ballast was reclaimed whenever possible. Stone ballast was used for all ladder and important running tracks with cinders on the other tracks. A total of 112 miles of cinder ballast and 22 miles of stone was placed. All of the 94 miles of 75-lb. rail in the old yard was used in the reconstruction and 80-lb. new or relaying rail was laid on ladders and running tracks. There were 353 turnouts and 58 double slip switches in the old yards, and there are 845 turnouts in the new yard, all double slips having been eliminated. No. 9 turnouts are standard throughout. The frogs from the old yard have been placed in the caboose yards, shop tracks, repair yards and the less important tracks. The new frogs are of solid manganese of a special design by the Chicago & Western Indiana. The guard rails are Ajax one-piece manganese; the switch points are 15 ft. long and the switch stands are Economy for yard tracks and Mansfield for main lines.

locations and new ones laid as the filling progressed. The construction of the new departure yard of 12 tracks at the west end was pushed in order to provide a place for receiving large quantities of sand for filling which was brought in over the Indiana Harbor Belt from Dune Park.

As soon as switch material could be secured, two switch laying gangs were started on the ladder tracks, the classification yard switches at the hump being laid first in order to give the interlocking contractor an opportunity to start his work. The thoroughfare tracks were then laid to provide connections between the ends of the yard without going over the hump, making it possible to rebuild the hump subway, which had been designed only for foot and team traffic and was enlarged to carry two tracks.

A total of 1,051,500 cu. yd. of sand was placed in the yard fill. This material was handled in Haskell & Barker cars using a plow and spreader to unload and place it. In making the fill for the approach tracks to the hump which have a maximum difference in elevation of 8 ft. above the body of the yard, the wing of the spreader was elevated to build up the fill to the de-

South Cicero avenue is carried over the yard on a ten-span viaduct of concrete piers and through steel girders encased in concrete. The spans vary from 38 ft. 2 in. to 69 ft. 8½ in. The approaches are made of sand fill with a street grade of 3.5 per cent. The sand fill at each end of the viaduct will be restrained from overflowing the tracks by crib walls built up of concrete moulded in pieces about the size and shape of cross ties and laid in the same manner as ordinary tie cribs. A similar viaduct will probably be built next year to carry Crawford avenue over the east approach.

The subway under the hump is a double-track structure with a clear opening 30 ft. wide and 17 ft. high from top of rail to clearance line. It consists of re-enforced concrete abutments and transverse girders encased in concrete. The total yardage of concrete placed in the yard work was about 2,250.

The two-story interlocking tower which houses the yard plant is set up on a structural steel bridge spanning the hump. The walls of the tower are of metal lath and cement mortar, and the roof is of asbestos shingles. Two machines of 72 levers, each operating 65 switches and two signals, control the two classification yards. The machines are located on the upper floor of the tower in operating rooms at the ends of the building, facing the yards they control. The space between the operating rooms is occupied by a clerical office and the lower floor of the tower contains the relay rooms.

The machines are of the Union Switch & Signal Company standard push button electro-pneumatic type and the switches are operated by motion plate type switch and lock movements. The track circuits controlling the indicators in the machines use 220-volt, 60-cycle a. c. power. The signals controlling movements over the hump tracks are mounted on the lower chord of the bridge.

The low voltage control current for the machines, switches and signals is furnished by a 400 a. h. storage battery at the power house which is charged by two motor-generator sets. The a. c. power for the track circuits is fed from a separate transformer at the power house. The compressed air is supplied by the same compressor that serves the shops.

NEW LOCOMOTIVE AND CAR SHOPS

As the track elevation work now under way will make necessary the abandonment of the Belt shops at Eighty-third street, and the completion of the yard will effect important changes in operating methods on the Belt it seemed best to provide adequate shop facilities at the new yard. These shops were located just north of the hump and not far from the existing power house. The principal new buildings include a locomotive shop, roundhouse, storehouse and wood-mill.

The locomotive shop is of the transverse lift-over type with six pits; the blacksmith and boiler shops being included in the same building. It is a steel frame structure, 172 ft. 8 in. by 293 ft. 9 in., with brick walls and a composition roof on wood sheathing. It is unusually well lighted by side and monitor windows, which are equipped with David Lupton steel sash and the Pond operating device. The building is divided into three bays, the heavy machine, 60 ft. wide, the light machine, 40 ft. wide, and the erecting, 70 ft. wide. A 150-ton crane is provided in the heavy machine bay and 10-ton cranes in the light machine and the erecting bays. The building is heated by warm air, the circulation being secured by Sirocco blowers through ducts, part of which are overhead and part under the floor. A track connection is provided through the locomotive shop which passes directly over the turntable at the roundhouse and connects to the wye tracks under the hump allowing an engine to be brought in from either side. A track also leads into the shop from the center drop-pit in the roundhouse for bringing wheels to the shop.

The engine house has 20 stalls, with three drop-pits. It is of timber frame construction, 90 ft. deep, with brick walls, concrete footings, tar and gravel roof, cast iron jacks and balanced sash, those on the inner circle being equipped with the Pond operating device. The National boiler washout system was installed, and a 90-ft. turntable is provided, operated by a Nichols electric tractor. The capacity of the roundhouse is not as large as would ordinarily be necessary for the number of locomotives used by the Belt, but in the majority of cases, the engines will not go into the house, when out of service temporarily. A four-track storage yard is provided for such engines, only those requiring work to be done on them going into the house.

The storehouse is a brick building, 230 ft. long by 42 ft. 10 in. wide, with a material platform surrounding it. A second story is provided across one end of this building for the master mechanic's office, and the oil storage room is located in the basement. The Bowser system of oil handling is used, with square tanks instead of round ones in order to economize space.

The wood mill is 203 ft. 6 in. long by 61 ft. 6 in. wide, having brick walls, steel roof trusses, a Brooks roof and wood block floor. The rough lumber will be stored west of the wood mill and after finishing will be run out into the car repair yard east of the building on industrial tracks.

The engine facilities east of the roundhouse include a 400-ton Roberts & Schaefer concrete coaling station with provision for locomotives to take coal and sand on four tracks; three 100,000-gal. conical bottom steel tanks of the Chicago Bridge & Iron Works design, supplying penstocks and service lines; and cinder pits of the receiving-hopper type under three tracks.

The improvements to the old powerhouse and its equipment include a new 450-h. p. Babcock & Wilcox boiler, Green automatic stokers, the reconstruction of the headers and breeching and the construction of a new Wiederholdt tile and reinforced concrete chimney, 200 ft. high and 8 ft. in diameter.

ORGANIZATION

Practically all of the work on the yards except the interlocking installation was handled by company forces in charge of the engineering department of the Belt Railway, of which E. H. Lee is vice-president and chief engineer. The construction of the shop was handled under contract by George B. Swift & Company, Chicago. The interlocking system was installed by the Union Switch & Signal Company, Swissvale, Pa., under the supervision of F. E. Jacob, signal engineer of the Belt. F. E. Morrow, principal assistant engineer, was in charge of the preparation of plans and the office work connected with construction operations. V. R. Walling, first assistant engineer, was in direct charge of the work in the field and was assisted by an engineer for the yard work, and one for the shops. The track work was directed by a supervisor of track and the concrete work by a supervisor of bridges. Excellent co-operation between the assistant engineers, the supervisors, the chief clerk and material agent and the car-tracer, was secured by holding daily meetings at 1 o'clock, at which all of these men suggested plans for improving methods and discussed their various requirements for the following day's work. The cost of supervision was reduced by the free use of motor cars, as the work extended over a distance of five miles, exclusive of the Fifty-ninth street line. Four cars were used, one for the first assistant engineer, one for the supervisor of track, and the other two running on a regular schedule each way from the hump.

A maximum force of about 1,200 men was required in 1913, and about 800 in 1914. Labor was very scarce in 1913, but by authorizing the work early, enough men were secured before they shipped out in large numbers. The supply was irregular throughout the season, however, as many as 900 time checks being issued in one month for men leaving. Conditions were much better in 1914 and no difficulty was experienced in getting enough good men. A camp was maintained for the laborers at the yard, the contract for boarding being let to the Consolidated Boarding & Supply Company, Chicago. This camp was described in the *Railway Age Gazette* of May 16, 1913. In addition, a daily work train was run from the Dearborn street station.

What the Press Thinks About the Rate Case

Welcome Prospect of Advance in Charges; Recognize Carriers' Needs and Demand Prompt Action

The announcement that the Interstate Commerce Commission has granted the petition of the railways in Official Classification Territory for a reopening of the advanced freight rate case, decided on August 1, and the setting of the date for a rehearing on October 19, have aroused widespread editorial comment in the press of the country. With a remarkable approach to unanimity the daily newspapers are supporting the position of the railways in the emergency which has come upon them, and are demanding not only that the commission accede to their request for higher rates, but that it act promptly in reaching its decision. Following are some extracts from the editorial utterances on the case which have come to our exchange desk in the last few days from all parts of the country. No attempt has been made to select those favorable to the railways. It is significant that but one paper comes out squarely in opposition to higher rates. Several are non-committal and two or three express regret that rates apparently are to be increased, but the great majority demand immediate relief for the railways in the form of higher revenues in the interest of the commerce of the country.

AS EARLY AS COMPATIBLE WITH JUSTICE

[From the Cleveland Plain Dealer]

It will be agreed that to give the roads another chance to present their case was just, though friends of the roads' demands are likely to complain because the matter is not to be attended to more promptly. Though the date of the opening hearing has been set later than one might believe wise, under the emergency condition, the commerce commission ought to be able to proceed with its full inquiry with reasonable speed. The delay in rendering the other decision was widely criticized. But in this new investigation the commission will necessarily go over much of the same ground covered before. It will be to the interest of all to have a decision reached as early as compatible with justice, which presupposes thoroughness.

IF THEY NEED IT, THEY NEED IT NOW

[From the Chicago Herald]

The hearings should be speedy. No nine months, nor six months, nor even one month, should be consumed in reaching a decision. Especially there should be no time wasted in reviewing ancient history, nor in considering theories about how railroads might be run, under government ownership, or any other plan different from that under which the railroads have been created. In the well-known words of a late president of the United States, "a condition, not a theory," confronts the railroads, and with them the whole country. It is a plain business proposition that the country cannot prosper if the railroads are squeezed into bankruptcy. The railroads say they are being suffocated by iron rings around their throats—by governmental power limiting the price of the only thing they have to sell. They should be able to prove it easily, or it should be easily disproved if they are not telling the truth. It's all a matter of plain figures, already collected or easily obtained. If the railroads need a pulmotor, and they are visibly gasping for breath, they need it now, not in nine months, or six months, or even one month hence, but NOW!

COMMISSION SHOULD GRANT RELIEF

[From the Daily Oklahoman, Oklahoma City, Okla.]

The consensus of intelligent opinion throughout the country is that the roads are entitled, in common fairness to the greatest single line of business, to an increase in rates; perhaps not to five per cent, as demanded, but to some per cent which will represent the difference between prosperity and bankruptcy. We have seen drastic economies practiced on the part of the roads in the past year or so in order to make both ends meet; trains have been discontinued, employees reduced in number, and betterments postponed. But notwithstanding these economies, the roads generally claim that they are still unable to keep their heads above water owing to the increasing cost of everything they have to buy, the advancing wage scale, and the reduced passenger rate. No fair-minded citizen desires to see the roads hampered by regulation in such degree as to destroy their prosperity. We must display the live-and-let-live spirit toward them, the same as toward the humblest citizen of the land. If it can be disclosed that their rates, both freight and passenger, have been regulated to the degree that they are no longer capable of yielding a fair return upon the money invested in them, then it is obvious that the Interstate Commerce Commission should grant some measure of relief and the public accept the same uncomplainingly.

WIDESPREAD HOPEFULNESS

[From the Milwaukee Evening Wisconsin]

There is widespread hopefulness over the announcement from Washington that the Interstate Commerce Commission has decided to reopen the freight rate case and will begin hearings October 19.

MORE SUBSTANTIAL JUSTICE

[From the Kansas City Journal]

The reopening of the eastern railroad rate cases by the Interstate Commerce Commission holds out the hope that more substantial justice will be rendered than was accorded in the recent decision. The increase granted in the previous decision was proved to be nominal rather than helpful or fair. The more the experts studied the so-called "assistance" doled out by the commission, the more hollow and unsatisfying it appeared. The net result was a pittance, when there should have been generous concessions if very serious consequences were to be averted. It is nonsense to regard justice to the railroads or the big business interests of the country as injustice to the people generally or to so-called "small business." "Big business" cannot be cudgeled into financial insensibility without destroying general prosperity, and it is earnestly hoped that the new conditions which have arisen will bring about a new fairness that will ameliorate the situation all along the line. The Interstate Commerce Commission has the opportunity to do on a comparatively small but helpful scale what ought to be done by the legislative authority of the government and of the several states on a much larger scale.

ENTITLED TO A FAIR HEARING

[From the Chicago Tribune.]

It really should be a work of supererogation to urge a fair and unbiased consideration of the carriers' application on its merits. The sentiments expressed by the President in his letter to Chairman Trumbull are the sentiments which every unprejudiced and enlightened man of business must share fully. The railroads are not asking for special or preferential treatment; they are not resisting or belittling the reforms which the commerce commission advised in its decision of July last. The recommendations that were then made with regard to retrenchment, abolition of favors, and correction of abuses are being carried into effect. But the direct claim made is that a more material increase in revenue is needed than all the reforms pointed to by the commission are capable of yielding. The railroads have assumed the burden of proof, and they are asking merely for a sympathetic and fair hearing. To this they are entitled. To this the great body of investors in railroad securities is entitled. To this the interests and welfare of the na-

tion are entitled. Private industry is free to advance rates or charges; the railroads are not free. However adversely affected by the war and loss of freight, they cannot take a single step in the direction of revenue increase without the consent and sanction of the commission. The commission is independent and in a position to take a large, judicial, fair view of the question.

PROBLEMS CALL FOR IMMEDIATE SOLUTION

[From the New York Evening Post]

Two of the seven commissioners dissented on grounds which were carefully and vigorously set forth, from the decision of the majority of their colleagues. At best, the decision rested on certain presumptions whose correctness could be established only by experiments, and on certain suggestions of economies whose effectiveness could be tested only by time. But months of time and experiment, in doubtful and disputed questions, where the facts may eventually not bear out the commissioners' contention, are precisely what cannot be awaited, in the present extraordinary juncture. And if they could, there would still remain the immense dislocation which has been brought upon the financial world by the European war—some of the urgent problems arising from which call for immediate solution.

MOVING TOWARD HIGHER RATES

[From the Lincoln, Neb., Daily Star]

When the Interstate Commerce Commission recently ordered a reopening of the rate case involving the application of more than 50 eastern railways seeking a five per cent increase of freight rates, its action was some evidence that forces are at work for more liberal treatment of railways that are hard to overcome. Notice is given that the associations of shippers who have contested the application of the eastern railways for higher freight rates will continue their protest at the new hearing, which means that it will not be an ex parte affair, but all the circumstances indicate that we are moving toward a period of higher railroad rates, excuse for which is to be found in conditions created by the war abroad. These conditions will be urged as justification for an increase that could not be justified to the satisfaction of the Interstate Commerce Commission before the war began. Thus there will accrue to the American people another war tax arising from the bloodthirstiness of other countries.

GIVE THE COMMISSION TIME

[From the Manufacturers' News, Chicago]

It is perhaps unfair to jump upon the Interstate Commerce Commission because that body did not render a satisfactory decision—to anybody—regarding freight rates. Conditions have been altered materially in this country, as in other countries, by the European war. The "near decision" made by the commerce commission was based upon conditions as they existed a year or two ago, about the time the commission, as a body, went into hibernation. Now that the commission has been advised that there is a war in Europe and the railroads are unable to obtain any money for improvements the commission, no doubt, will be glad to bring its decision up to date. The commission undoubtedly means well. Give it a chance. It has at least two members, those in the confidence of President Wilson, who know what is going on. Commissioners McChord and Daniels might with perfect propriety tell the other commissioners that conditions alter decisions. The freight decision of the Interstate Commerce Commission needs revision. The commissioners should not let pride, or ethics, or even politics, stand in the way of the welfare of this country.

NO EXCUSE FOR DELAY

[From the Brooklyn Eagle]

There will be hearings, of course. As usual, volumes of testimony will be taken, but little or nothing not already known will be developed. What is already known to a certainty is that the railroads are carrying burdens which constantly increase, thanks to such legislation as the full-crew law and to higher taxes. Equally certain is it that it is useless for them to try to raise money by any means other than through an increase of rates, but the commission will want to be told things of that sort over again. Fortunately, however, the President is taking a hand in the performance. He has a habit of inducing results.

A CONDITION, NOT A THEORY

[From the St. Louis Globe-Democrat]

The discussion of the needs of American railroads has passed the stage of the question of fairness. The interest of the public is now vitally involved. Past sins and the responsibility therefore can no longer be regarded as the issue. In the language of Grover Cleveland, a condition and not a theory confronts us. The railroads are not making money and have not been for some time. The public is vitally concerned in more ways than one. Nothing would be more immediately disastrous than such a paralysis of our transportation system as would seriously impair the service to which American business has been accustomed. We have grown so used to excellent service that it is almost impossible to conceive how business was done in ox-team days. Should our transportation system break down it would spell ruin for general business. Putting our railways on a paying basis is not simply an act of justice. It is a consummation that is vital to the entire public. It should be with a full realization of this fact that the applications for increased rates are considered.

CRISIS IS OBVIOUS

[From the New York Tribune]

The Interstate Commerce Commission should approve without delay the railroads' renewed request for a five per cent increase in freight rates. There is fortunately no occasion for the long investigation which preceded the commission's denial of the request when it was first presented. The commission went into the matter exhaustively at that time. It has all the facts, except the new facts which the railroads offer in their latest letter, and these recent developments are patent. They need no study or long consideration. The crisis is obvious. If the Interstate Commerce Commission is not utterly blinded by pride of opinion it will enable the railroads to face it at once.

STILL AFTER FREIGHT RATE INCREASE

[From the Omaha Bee]

Not content with the substantial victory won in the ruling of the Interstate Commerce Commission on their petition for five per cent freight rate increase, 112 railroad companies, comprising 35 railway systems operating in the territory affected, have come back for a further modification to accord with their original demands. There is no doubt the railroads have been encouraged in this procedure by the knowledge that the commission was divided over the merits of their showing, and that its decision was rendered by a majority with a vigorous dissent from the minority. Taken altogether, it seems to us that in asking a reopening of their case thus early the railroads are, to use a colloquial phrase, trying to rush things, as if fearing a more deliberate experiment might lose to them the force of the argument.

NO ROOM FOR DOUBT

[From the Salt Lake Tribune]

If there was room for doubt as to the necessity of an increase three months ago, there can be little doubt on that point now. The war has supervened to still further reduce railroad revenues. If the Interstate Commerce Commission had acted generously in the first instance the railroads would not be reduced to their present plight. Jugglers of statistics were able to demonstrate with astounding facility that the railroads should be in a prosperous condition, but, strange to say, the actual condition confounded the theorists. Now that the petition of the railroads has been renewed they may look forward with more

confidence to a favorable issue, inasmuch as their financial reports absolutely demonstrate that while their operating revenues have been constantly decreasing for months, their operating expenses have just as constantly increased.

VERDICT MUST BE EXPEDITIOUS

[From the Philadelphia Press]

The Interstate Commerce Commission has again before it the case of the railroads. It has the solving of the problem of whether it will do real and substantial justice, or whether it will again be led astray by theory and chimerical schemes of economy. It has the opportunity to act promptly and well, and so save financial conditions in the United States. It will not be sufficient to decide right after a long interval of time; the verdict must be expeditious if a disastrous situation is to be avoided. This is not a time for the commission to go into the history of railroad financiering and to dig up and exploit any errors of the past. There is far too much at stake in the present. It is time to realize to the full how many different elements are involved in the case of the railroads, and that the question of doing justice to them extends even to the protection of the small depositors in the savings banks of the country. It is to be hoped that in this new case before them the commission will not sit at the feet of Mr. Brandeis, of Boston, and seek from him the path to take. It is a crisis that needs no oracular advice from any apostle of a theoretical economy. The commission has a duty to perform. That duty it should meet in square man fashion, fearless alike of the clamor of the mob and the pleading of the advocate. And first of all it should recognize the extent of the question that is before it.

SHOULD BE EX-BRANDEIS

[From the Albany Journal]

More light has come to the Interstate Commerce Commission. It has granted, with unusual promptness, the appeal of the eastern railroads for a reopening of the rate case which was decided mostly against them shortly before the war began. There is a report that the organizations of shippers which opposed the original application will again make opposition. If they do, they will show themselves even more unreasonable than before, since now there is constant effort to advance the prices of most things that are shipped. The rehearing should be before the commission minus Brandeis, and the decision should be such as will meet the requirements of a condition embarrassing to the railroads, which is now more or less aggravated by the indirect effects of the war.

THE COMMISSION ON TRIAL

[From the New York World]

The president's letter on the railroad situation showed that he was personally convinced of the need of higher rates. . . . But what then? Another year or more of figuring and argument and fiddling around to no certain consequence this way or that? Another year of uncertainty among shippers and in the markets for railroad securities? Another year of that colossal exhibition of administrative vacillation which month after month preceded the inane decision rendered a few weeks ago?

One thing is evident. The railroads are entitled to greater elasticity in the control of their income. They are subjected to quick changes in traffic and credit conditions, as from this unforeseeable war. They should be enabled to adjust themselves to these changes with equal rapidity.

If through the Interstate Commission the roads are not so enabled readily to readjust themselves, it is no body to exercise the rate-fixing power. It should know from month to month what are the just needs of the roads or their unjust charges. If it does not know, or if it is not able to decide promptly on what it does know, it is out of place where it is. The present commission is on trial before the country as a body competent to perform the duties imposed upon it.

COMMISSION SHOULD FACE ABOUT

[From the Philadelphia Public Ledger]

Europe's war has driven European investors to the necessity of selling billions of American railroad securities provided our exchanges open and give them the opportunity to do so. This means that for years to come it will be impossible for American railroads to procure one dollar of capital anywhere in Europe. . . . The hour has come in this war-troubled day when the Interstate Commerce Commission should face about and advance freight rates without argument. Nothing that the president could do, nothing that congress could do, nothing that all our bankers and trades bodies combined could do, would so instantly lift every business to a higher plane of prosperity as a quick rise in rates. It would be notice to the whole world that the United States means in this crisis to preserve its institutions intact and to permit them to live in prosperity. Such notice would do what nothing else will be able to do toward persuading Europe to keep our securities. The Interstate Commerce Commission can now deliver a fatal blow to American trade, or it can by an act of patriotic duty in one day start a thousand industries to humming and send back to work many thousand idle men.

COMMISSION SHOULD ACT AT ONCE

[From The Economist, Chicago]

Thirty-five railroad systems have asked the Interstate Commerce Commission for a rehearing on the application for a five per cent increase in rates. What they want is not the half-loaf that the commission gave them in its recent decision, but the whole thing. They are entitled to it, and failure to give it to them is likely to entail on the whole country a great deal of trouble. There was reason enough for the increase before the European war came on, and that reason has been doubled, or more likely multiplied by 10, for one cannot measure the possible difficulties that the roads will have in their finances. As to the operation of the properties the roads say that for the year ending June 30, 1914, as compared with the year ending June 30, 1913, there was a decrease in total operating revenues of $44,700,000, while operating expenses increased $23,300,000, and a decrease in operating income of approximately $73,700,000, notwithstanding an increased property investment. In addition to these facts is the certainty that high rates for money will have to be paid for a long time yet, and the roads have obligations of over $500,000,000 maturing in the next 15 months. The president has spoken for the roads, the public is beginning to see the merits of the case, and the Interstate Commerce Commission should act at once.

INCREASE SHOULD GO TO RAILWAYS

[From the Houston Post]

The possibility that an advance in rates may have to be made is reason enough why the added burden of a tax on freights should not be laid upon railroads and shippers. One of the immediate causes of business depression throughout the country is the plight of the transportation lines. They have abandoned hundreds of trains and otherwise reduced their service. They have curtailed operations in their shops and offices, halted betterments and laid off tens of thousands of employees. It is a condition confronting them, not a theory. Their credit is badly impaired because of the lack of earnings to meet their financial engagements. Their tonnage has decreased. If there must be any increase of freight rates, it should by all means go to the companies so that they may resume as far as possible the operation of their properties to the limit of efficiency and re-employ as many of their idle men as possible.

NECESSITY FOR RELIEF EXISTS

[From the Iron Age, New York]

The necessity exists, as admitted by President Wilson on September 9 to a committee of railroad executives, of some measure affording relief to the railroads of the country at this time of contraction in railroad revenues. The proper way in

which to afford such relief would be by giving them permission to advance their freight rates. It is to be hoped that the hearing will be granted and that an early and favorable decision will be rendered. The railroads are in practically as serious a condition as the government so far as revenues are concerned and imperatively need to have their interests considered. It would have been most unfortunate indeed if such a complication had been injected into the situation as the imposition of a tax on freights.

THE COMMON LOT

[From the San Antonio Express]

It is the common lot of all enterprise at present in this country to have to contend with the question of capital, credits and commercial interruption. We take it that the eastern roads will have to produce overwhelmingly powerful proof that their credit largely depends on the grant of the desired increase before they can persuade the commission to alter its ruling, which—it is remembered—called the roads' attention to the remedy that lies in cutting out useless extravagances of operation and in increasing passenger rates. For it is not unreasonable to remind that the tightness is but temporary, that it is agreed on all hands that the current stringency will be succeeded by a record era of trade prosperity—an era in which, of necessity, the roads would have a tremendous share. Thus if there is any possible way out of this tight situation for the roads, if there is any way to tide over the straitness until the wheels of commerce shall turn in this country more freely than ever before, without asking the people to supply the funds at this time, certainly the roads should adopt that more just and patriotic expedient.

A NEW CASE

[From the Dallas News]

While the press despatches use the word "rehearing" in speaking of the decision of the Interstate Commerce Commission to grant the latest request of the eastern railroads, the proceeding intended is not, strictly speaking, a rehearing. It does not intend, evidently, to reopen the case adjudicated. What it does intend is to determine whether conditions coming on since that decision was made render it necessary to afford these railroads further relief. The chief and most immediate problem confronting the railroads is that of refunding bonds about to mature. In the present state of the money market, as well as in the state that is to be expected for some time to come, they will have to pay a higher price for financial accommodation than it would have been necessary to pay a few months ago. This will add to their annual expenses just as certainly as an increase of wages would. But what probably chiefly gives rise to the anxieties of the railroads is the greater reluctance to lend to them. Lenders knowing, as of course they do, the increasing predicament of the railroads, feel less certain of the security which their bonds offer. It is the fear of receiverships, and it will undoubtedly be the object of the railroads to show that a further advance in rates is necessary to remove this fear. The commission will hear a new case, and not rehear an old one.

BRANDEIS SHOULD BE ELIMINATED

[From the Salt Lake Tribune]

The Interstate Commerce Commission has decided to reopen the eastern advance rate case. The shippers' organizations, which have previously fought the increases, will be represented by counsel, and the question of right or wrong will be thoroughly ventilated. Both sides are entitled to a hearing before the commission finally makes up its mind as to the necessity of granting the increases asked. This time, however, Lawyer Brandeis should be eliminated and the controversy settled upon its merits, without taking into consideration the fads, fancies and foibles of the Boston reformer. The railroads have been hard hit by the depression of the past year or two and the European war has put the finishing touches upon an already deplorable condition in the business of the carriers. The shelving of the railroad securities bill was an indication that the administration feared disaster would follow, placing the railroads at a still further disadvantage. The fact that the rate cases are to be reopened may be taken as proof that President Wilson believes that the railroads are justified in making their request and that he will not be disappointed if the request is granted.

A LOOK INWARD

[From the Cleveland Leader]

Important representations must have been made to the Interstate Commerce Commission to induce it to consent to a rehearing of the plea of the railroads for permission to increase their freight rates by five per cent. That the ultimate consumer would in the end be compelled to pay the increase is well understood by the commissioners. The railroads will not be permitted, nor do they expect, to go again over the ground covered in the last hearing, despite the fast-growing impression that the commission has borne down upon them with undue severity. They will be limited to the presentation of facts and circumstances which have arisen since the last proceedings—since the democratic tariff law went into effect and before the war in Europe had begun to produce much effect upon this country. One of the facts newly ascertained is an immense falling off in railroad net earnings. In spite of an increase in property investment it amounted to $73,700,000 for the eastern railroads alone. It would have been much greater if drastic economies had not been enforced. And the stockholders have not suffered alone. Purchases of supplies have been cut down, affecting the concerns producing them even to the extent of suspending dividends and confessing bankruptcy. Trains have been withdrawn and men have been laid off work because they could not be employed without loss. All this affects the general public. If the railroads are suffering other branches of industry must be suffering also. What is the cause? The chances are that the forthcoming rate hearing before the Interstate Commerce Commission will have a strong and peculiar political interest for every citizen of the United States.

ADVICE REPUDIATED

[From the Albany Journal]

When the Interstate Commerce Commission some weeks ago handed down its long delayed decision on the application of the eastern railroads for permission to increase freight rates, it granted little of what was asked but gave a great deal of advice as to how by other means revenue could be increased. Among other things, it suggested that charges should be made for "spotting" cars; that is, for placing cars on tracks maintained by shippers.

Having received this advice, the railroads had reason to believe that if they acted upon it, their action would be forthwith sanctioned by the commission. Accordingly, they promptly filed a schedule of charges for "spotting" of cars, expecting that the commission would approve it. Instead, the commission received protests from shippers and then suspended the operation of the schedules filed upon its advice, until next March. In the meantime the protesting shippers are to be heard. Eventually, the schedules may be approved, or not. In view of this development, one is more than ever before at a loss to understand the mental processes of the commission. When advice is given in definite form, it is to be believed that the adviser is convinced that action upon it is in order; that there remains no doubt in his mind as to the merit of his suggestion. Yet the commission, having told the railroads what they ought to do, does not permit them to do it, but decides that the proposed action shall be debated during a long time between those who have accepted the commission's advice and those who are moved by self-interest to offer opposition. Such methods of the commission enable it to keep the railroads indefinitely on the anxious seat, while their financial condition is steadily deteriorating. At the same time, when the administration sees that it needs additional revenue because its "tariff for revenue only" is proving to be a tariff for deficit, a bill is promptly prepared which imposes a tax upon everything in sight. No opportunity is given for protest. "The government needs the money," is offered as

a sufficient reason for the imposition of extraordinary taxes aggregating $105,000,000. That the railroads, too, need more money to give the service that is expected and demanded from them, and to keep their credit sound, is not regarded as an impressive argument.

GOVERNMENT SHOULD UNDO THE WRONG

[From the Buffalo Courier]

The roads east of the Mississippi last year petitioned for authority to raise their freight rates. These had remained stationary while literally everything related to operation and maintenance had largely increased in cost. For an inexcusably long time the Interstate Commerce Commission dwelt with this application, extending investigation in uncalled-for directions, then finally giving a decision disappointing to the transportation companies and condemned by such of the people as have an intelligent understanding of the conditions. . . . Instead of impartially judging the merits of the request and its bearing on public welfare, the majority of the commissioners, no one of them a practical railroad man, assumed to lecture the managers on how the roads should be run with impracticable and illogical suggestions. The transportation interests and the interests of business at large are so interdependent that unless the railroads prosper no general prosperity can exist. The government should consider this incontestible proposition at once. It should undo the wrong committed by its blundering agent, the Interstate Commerce Commission. . . .

TONIC SHOULD BE ADMINISTERED AT ONCE

[From the St. Joseph, Mo., Gazette]

The Gazette is in hearty sympathy with the effort being made by American railway men to have justice done the transportation lines of the country. For years now we have been fighting the railroads. Their every act has been closely scrutinized by government agents, and no forward step has been made by any one of them without having first gained the consent of the government to the proposed action. This period of investigation was, perhaps, necessary in order to place the roads in a proper light before the public, but in our enthusiasm to see that justice was done there is grave question whether we have gone too far. This newspaper does not believe that any country can be prosperous for long while its transportation lines are in the condition now occupied by American railways. Permit them to charge rates sufficiently high to make them prosperous, to enable them to meet their just obligations, and to go on with their improvement plans, and every line of business in the country will immediately feel the impulse of their good fortune. If, however, the request of the roads is not granted we shall see conditions go from bad to worse until business becomes paralyzed, the trust funds of the people invested in railroad securities greatly depreciate in value, and millions of men be thrown out of employment. The tonic needed by the roads should be administered at once.

CRISIS OF THE RAILWAYS

[From the Independent[

The railways of the United States are facing a crisis. It is a crisis not brought on by the great war, but rendered immeasurably more acute by it. It is more than a crisis for the railways, it is a crisis for the American people as a whole. In the words of President Wilson, "the interest of the producer, the shipper, the merchant, the investor, the financier and the whole public in the proper maintenance and complete efficiency of the railways is . . . manifest. They are indispensable to our whole economic life." In the prosperity of the railways we all share. In their ill fortune we all suffer. It is a time for the Interstate Commerce Commission to consider gravely whether it shall not reopen the just-decided rate case and, in its reconsideration, give the railways the benefit of every doubt on behalf of their plea for increased revenue. It is a time when, in the words of President Wilson, "we must all stand as one to see justice done and all fair assistance rendered and rendered ungrudgingly."

COMMISSION CONTROL ON ITS TRIAL

By W. M. Acworth

I am invited to say what I think of the recent 5 Per Cent Rate Advance Case. Let me begin by making my own personal attitude clear. Three or four years ago I started to write a continuation of my little book, "Elements of Railway Economics." Several of its chapters as they were written appeared in the *Railway Age Gazette*. One chapter concluded in these words: "A law court is not the proper body to decide questions of railway rates. On the other side of the Atlantic they seem to be gradually working out a system of regulation much more logical in theory, and likely in the long run to be much more satisfactory in practice." I then held the belief—justified I think by the then evidence—that commission control was going to afford a satisfactory solution of the problem. And I accordingly went on to sketch its gradual development in the United States, showing how commissions and legislators had sown their wild oats, and how the railroads had come, first reluctantly to submit to, and then almost to welcome, reasonable regulation.

And then two years ago my writing abruptly stopped; for the facts unfortunately ceased to fit the theory on which I was proceeding. Legislators refused to be guided by experts, and passed two cent fare laws, full crew laws, and the like, by scores, for reasons quite other than those of general public interest. Commissions failed to become more expert. They still regarded it as their duty to establish, not just and reasonable rates, but low rates. Some of them even, in defiance of the spirit of the Constitution, which forbids any state to lay any imposts or duties on imports, manipulated local rates so as to prejudice the freighters outside their own state. There remained still the Interstate Commerce Commission. And to that commission, strengthened in authority, in numbers, and in personnel, one could surely look to uphold the credit of commission control. And now comes the decision of that commission in a case, not only the most important that has ever been submitted to it, but surely the most important in the magnitude of the interests involved that ever has been submitted in the world's history to any tribunal. That the decision will be a landmark in the story of the relations between railways and governments, I have no doubt. That it will inspire confidence in commission control as a system—can anyone hope?

I am not going to attempt to criticize the decision in detail; as it seems to me details are out of place in a case going down to the whole financial basis of the railroads of America. Three years before the commission inquired into the same question, whether an advance of rates was required. Though they came, as I believe, to a wrong conclusion, they dealt with the matter in a broad and statesmanlike manner. They based their judgment that an increase was not required on the view that new net revenue was not then needed, and on the expectation that neither wages nor cost of supplies would much advance; and added that, if they were proved wrong, they would not hesitate to give their sanction to increases that would be reasonable. In 1914 the commission finds that the expectations of its predecessors of 1911 were wrong Wages and fuel costs have largely increased, and "the net operating income of the railroads in official classification territory, taken as a whole, is smaller than is demanded in the interests of both the general public and the railroads." But thereupon the commission decide that the railroads in official classification territory, taken as a whole, shall not receive at their hands any increase of income whatever.

The commissioners of 1911 were bad prophets. But fate was at least kinder to them than to the prophets of 1914, who—on the very day on which the stock exchanges in New York and London closed their doors, and two days before Germany declared war on France and Russia—put out the opinion, "Shortly after the commencement of this proceeding there began another period of depression from which we

appear now to be recovering." . . . "Subsequent developments have shown that there was little foundation for any such view" as that "carriers would encounter great difficulty in renewing their maturing short term notes and other obligations. With the growing ease in the money markets this difficulty has largely disappeared."

But in truth this was not a case either for detail or for prophecy. In England our courts take judicial cognizance, as it is called, of certain facts that do not need to be proved. They take it for granted, for instance, that the sun goes around the world; that New York time is always five hours behind London; that the United States since 1776 has been an independent nation, and other similar facts that are part of our common consciousness. And so, it seems to me, the commission might have taken judicial cognizance of the elemental facts of the railway situation. We all know, for example, that American railways have been built and operated hitherto with an economy unknown in older countries; but that of recent years the standard of construction, and the standard of operation have been rapidly raised, implying the expenditure of vast additional capital and a much larger proportion of income. We know that freight rates the lowest in the world have gone down rather than up of recent years. We know that operating costs have increased faster owing to increased prices than could possibly be offset by increased economies. We know, to put it in the broadest possible way, that it cannot in the long run be possible, in a country where $1 purchases less than almost anywhere else in the world, to give the European standard of service at the old American standard of price. We—including the commission—cannot help having all these things at the back of our heads, and 1,000 pages of statistical tables do nothing more than confirm—though they do abundantly confirm—our pre-existing impressions. And yet the answer of the commission is a refusal, and ten items of paternal advice.

One would have thought the natural course of the commission, having found the net revenue inadequate, would have been to go on to say: "Take then, as an interim measure, this 5 per cent increase for which you ask, for you have abundantly discharged the burden of proof laid upon you that your rates as a whole are too low. But the general increase must of course be subject to the right of any individual complainant to show that his case is an exception; and, if that is proved, the money must of course be refunded. But we do not think that a general 5 per cent increase is the best thing that can be done. Let us all get together, commission, railroads and freighters, and see if we cannot work out a better scheme, it being understood that the commission has made up its mind, on the one hand, that the railroads must have increased revenues, and therefore increased rates; and, on the other hand, that no trade and no locality must be unjustly discriminated against."

But, far from taking this course, the commission have intrenched themselves in a semi-judicial dignity against "the general impropriety" of what they call "the campaign of publicity." Why there was any impropriety in the action of the Traffic Association which "offered to deluge the commission's offices with thousands of telegrams"—presumably to declare that, in the opinion of the members of the association, the proposed increases were just and reasonable—it is difficult to understand. I had always hitherto believed that the great advantage of a commission of the American type over our purely judicial commission in England was precisely that with you the commission was responsive to public opinion, both guiding it and being guided by it in turn; and was not confined to the consideration of sworn evidence produced in court. In our procedure there is no method by which the interests of the public at large can be brought before the court. But, if with you the public at large, who are expressing their opinion through hundreds of leading articles or through thousands of telegrams, are to be refused a hearing, what is the advantage in the commission being only "semi-judicial"?

I have long thought that the proper method of control over railway rates is that a body of experts, such as the commission, should consider the question, and, instead of deciding it, should publicly give their advice to a cabinet minister, and that he should then act on his own responsibility, being himself in turn responsible to Parliament. Under our form of government in England there is no difficulty in establishing machinery of this kind. But it would, I imagine, be impossible under your constitution with its rigid limitations of the spheres of legislative, executive and judicial action. But you will, I think, have to face the question, how the statesmanship of the country can be brought to bear on the railway problem; for this question the Interstate Commerce Commission by their latest decision has raised in so acute a form that it cannot now be evaded.

RAILWAY SIGNAL ASSOCIATION

The annual meeting of this Association was held at Bluff Point, N. Y., on Lake Champlain, last week, and the proceedings of the first day were reported in the *Railway Age Gazette*, September 25, page 564. On the second day, Wednesday, the first business was the report of Committee No. 3, on power interlocking, F. B. Wiegand, chairman. This committee presented a code of specifications for incandescent electric lamps, which, after brief discussion, was accepted as in the nature of a progress report. A code of specifications for vitrified clay conduit, presented by the committee, was approved and ordered submitted to letter ballot. A standard cartridge enclosed fuse was ordered to letter ballot.

The report of Committee No. 4, on automatic block signalling, was presented by A. R. Fugina, vice-chairman. A code of specifications for caustic soda primary battery, after a very brief discussion, was accepted for reference to letter ballot.

Committee No. 4 presented revisions of a number of paragraphs of the Association's standard specifications for highway crossing bells. The views of the committee expressed in this report were criticised and were discussed at some length; but the specifications were finally accepted as presented.

On the subject of typical circuit plans for automatic block signalling, this committee was unable to agree upon a recommendation, wide differences of opinion developing among the members. A sub-committee, of which G. H. Dryden is chairman, made a thorough study of the subject and prepared typical circuit plans for single track automatic signalling. These were not acted on by the whole committee, but Mr. Dryden presented to the meeting a minority report, accompanied by a plan for single-track signalling, which differs materially from that of any system now in service. There was no discussion of this report, members generally expressing the desire to read it again before expressing themselves on the views of the sub-committee. The subject will be discussed at the March meeting (in Chicago).

Committee No. 6, on standard designs and nomenclature, J. C. Mock, chairman, presented standard drawings for mounting mechanism cases on bracket posts; mechanical dwarf signals; switch rod insulation; a double lever stand to be used on table or wall in offices, and other details; also a number of designs which had been presented at the March and the May meetings. All of these were accepted and ordered to letter ballot, except that the spectacle of the dwarf signal was referred back to the committee for certain alterations, and except also that the handles of the lever stand (drawing No. 1197) were ordered to be made two inches longer than shown in the plan presented by the committee. Eight existing standard designs which had been

slightly modified by the committee were accepted and ordered to letter ballot.

On a number of other designs this committee proposes to send out letter ballots for information before making final recommendations.

This committee again presented its report, embodying an elaborate system of symbols and nomenclature for use in the preparation of working drawings, which was very briefly discussed at the meeting last May. This code of symbols introduces a radical change in the general practice on all railroads; but, evidently, it had been carefully examined by the members, and after very brief discussion it was adopted unanimously, to be sent to letter ballot.

Committee No. 8, C. H. Morrison, chairman, presented descriptive accounts of installations of automatic block signals on railroads where trains are propelled by electric power, these descriptions filling about 40 pages. These were accepted by the association as historical data to be embodied in the proceedings; and also perhaps, to be printed, with similar matter presented before now, in a separate volume.

Specifications for transformer oil, for petrolatum for use in impedance bonds and for alternating current electric generator, after slight corrections, were accepted and ordered to letter ballot. The association endorsed the view of the committee that oil should not be used in impedance bonds.

In connection with the specifications for a generator the committee was authorized to make additions, before publication, to make the specifications correspond with those adopted, or to be adopted, by the American Institute of Electrical Engineers.

The meeting approved certain slight changes which are to be made in the specifications for overhead crossings of electric wires. Changes in the specifications for track relays, after correction of typographical errors, were adopted and ordered sent to letter ballot.

THIRD DAY

On Thursday the meeting took up the report of Committee No. 2, on mechanical interlocking, C. J. Kelloway, chairman. Standard Drawing No. 1207, for leadouts from towers, with low bearings, was adopted and ordered to letter ballot. The same action was taken on six proposed standards for derails, which had been presented at the May meeting. These, however, are treated as examples of good practice, not standards to be printed in the manual.

The changes which had been made in the specifications for mechanical interlocking construction were approved, after a large number of errors in details had been corrected.

This report presented a list of requirements for the proper installation of interlocking at drawbridges, embodying a number of additions to what had been presented on this subject at former meetings. After a long discussion these requirements were accepted as a progress report.

A special committee, J. B. Latimer, chairman, which had been directed to prepare a form of contract to be used in establishing signals at junctions, crossings or other places where two roads are interested, reported that, before anything useful could be done, it would be necessary to adopt a better standard table of operated units and the values to be assigned to each, than is now available; and a list prescribing such values was presented. Objection was made to the list presented on the ground that it went too much into detail. In the great majority of cases where there is a joint interlocking the division of the cost on the basis of one-half to each company would not be far out of the way, and this simple plan has a great advantage over the complications of a set of values based on distinctions carried out to the last small detail. After a long discussion, however, the report was accepted, the word "points" being substituted for "units" as the name to be used in assigning the values as prescribed by the committee. The table will be referred to letter ballot.

Committee No. 3, on manual block signalling, Geo. S. Pflasterer, chairman, presented revisions of the rules governing maintenance of block signals, which were adopted and ordered to letter ballot.

It was voted to recommend to the American Railway Association certain rules, discussed at a previous meeting, relative to the use of caution cards for moving trains past interlocked signals when apparatus is out of order.

The report of the committee on signalling requirements for electric railways was accepted as a progress report. Further conferences with Committee No. 1, on signalling practice, will be necessary before decisive action can be taken by this committee.

The committee on selection of place for the next meeting, R. E. Trout, chairman, named Salt Lake City as the place, and the date September 21, 1915; and this report was unanimously adopted by the meeting.

The election of officers for the ensuing year, which was by letter ballot, resulted as follows: For president, Thomas S. Stevens, Atchison, Topeka & Santa Fe; for second vice-president (the present second vice-president, W. J. Eck, becomes first vice-president), C. A. Dunham, Great Northern; for secretary (eighth year), C. C. Rosenberg, Bethlehem, Pa.

REPORT ON DERAILMENT AT ATTICA, IND.

The Interstate Commerce Commission has issued a pamphlet, not dated, giving the conclusions of Chief Inspector H. W. Belnap on the derailment of eastbound passenger train No. 4, of the Wabash Railroad, at Attica, Ind., April 5, last, when three persons were killed. As reported at the time, this derailment was caused by running the train on to a bridge which had been weakened by a previous derailment. This first derailment occurred at a frog, and the present report gives a view of the track, in which this frog is seen, but there is no study or explanation of the cause. The train, a freight train, was moving west. The car derailed in this train, the twelfth car, ran against the left or south batter post of the bridge and weakened it seriously. Subsequently the freight engine had been backed over the bridge; and as this engine went over safely, and as the passenger engine was lighter than the freight, the passenger train was allowed to move over the bridge at about four miles an hour; but it broke through when on the span of which the weakened end post was a part.

James E. Howard, engineer of the commission, examined the bridge, and he says that, while the passenger engine was lighter than the freight, it, with its adjacent car, caused a greater stress on the weakened post than did the freight engine and one car, because it was headed eastward. He calculates that when the passenger engine was on the weakened span the load on the end post was 186,800 lb. and that when the freight engine was on the same span, this stress was 147,800 lb.

It was reported at the time that the responsibility for allowing the passenger train to enter upon the weakened bridge was chargeable to the track supervisor, but Mr. Belnap says that, "while this man was apparently in charge, he did not personally notify the despatcher that it was safe for the passenger train to proceed over the bridge." After reviewing the testimony, Mr. Belnap says that, owing to the conflict in the evidence, responsibility for permitting the bridge to be used in its weakened condition cannot be definitely placed. The conductor of the freight, the station telegrapher and others testified at the inquiry, but the discrepancies in their testimony are not cleared up in the report.

Engineer Howard says that the weakened condition of the bridge was clearly manifest and of a nature so serious that its dangerous condition should have been realized and traffic

immediately suspended. This opinion appears to be based on the evidence of a photograph showing ruptures and distortion of the batter post, but this photograph is not reproduced. There is a halftone reproduction of a view of the bridge, but the details are not sufficiently distinct to enable the observer to form an intelligent opinion.

The abstract of the testimony of the track supervisor indicates that he looked at the batter post and saw that it was "bent about 6 in. to the south," and yet he seems to have been so much influenced by the fact that the freight engine had passed over the bridge in safety that he took no measures to forbid the passage of the passenger train.

ENGINEMEN'S EXPERIENCES—MAN FAILURES*

By Joseph D. Clyde

I learned a lesson when I had been running about two and a half years that has made me watch my hand ever since. I was running a little ten-wheeler on the Parral branch of the old Mexican Central, and was called one afternoon for an extra south. When we left Parral I had thirty minutes to go to Aristole for No.. 412, the northbound passenger train, and as we had about seven kilometers (4½ miles) of pretty good grade right out of Parral, our thirty minutes allowed just about time to go to Aristole (which is fourteen kilometers from Parral) without exceeding speed restrictions.

We had made about ten kilometers when I sighted a bunch of horses on a road crossing. When I blew for the crossing the horses started to run; but one of them jumped into a cattle guard and got fast between the slats. I stopped all right, before striking him; and it took the whole crew to pry him out. We used 12 minutes doing this and getting under way again.

All of us forgot No. 412 in the meanwhile; and we proceeded on down the hill. Just about a mile from Aristole I came to my senses and saw I was on 412's time. I set the air in emergency and blew for brakes; and just at that moment 412 shot out of a cut and into us. The outcome was about $20,000 damage to the engines and equipment, and the loss of three lives, a man, a woman and a little girl, all of them passengers on No. 412.

It also made both myself and the conductor fugitives from the rather questionable justice that was dealt out in Mexico at that time. I don't think that either one of us—the conductor or myself—has ever overlooked his hand since.

To show that I profited by the foregoing incident I will relate another. I was working for the old National out of Mexico City about ten months after my trouble on the Parral branch, and was on a passenger run that left the main line at Tolucca Junction and went to Acambaro. We made each way a day. I was coming south one night and was running about fifty minutes late. About one mile out of Tolucca the track swung around a curve on to about half a mile of straight line. As I came around this curve I reached up to blow for the town and just glanced at the track as the engine took the straight line, and saw an object lying on the right hand rail. I shot the works into her and got stopped with the pilot just touching an old style coupler knuckle (the kind that has the slot cut in the middle) which had been driven down over the rail, forming a derailer. The track at this point was on a fill about 75 ft. high; so you can see what would have taken place if I had been thinking about my past life, or something besides the job I was on. I can't take all the credit, though, because I had an electric headlight.

This was found to be a deliberate attempt to ditch the train, and the perpetrators were caught and dealt with according to the quickest method; that was, letting the rurales in for a little cheap target practice.

So just make a resolve, brothers, when you register out, that "Safety First" is all you are going to think about till your trip is completed.

*This is the second of a series of articles, made up of useful hints to locomotive runners, which were written in connection with the prize competition of several months ago. The first of this series was printed in the issue of September 25, 1914, page 571.—Editor.

RAILWAY AFFAIRS IN OTHER COUNTRIES

The annual Corean consular report states that during 1913 133.2 miles of railway were opened in Corea, making the total length of line now open to traffic about 970 miles. A new line is to be opened in October or November, and some extension work is now being planned. During 1913 the Corean railways carried 4,143,803 passengers and 1,425,246 tons of freight, an increase of 1,695,075 passengers and 293,474 tons over 1912. A large railway hotel is being erected at Seoul.

* * *

The Journal des Transports, in making a study of the effects of syndicalism on French railway labor problems, has compiled the following table, giving the total number of employees on the various railways of France, with the number and percentage of those who are members of the National Railway Syndicate:

Railway	Number of syndicalists	Total number of employees	Percentage of syndicalists
State	8,783	73,127	9 per cent
Est	1,139	51,471	2.2 per cent
Midi	802	26,268	3.1 per cent
Nord	2,347	56,546	4 per cent
Orléans	1,083	49,600	2.2 per cent
Paris-Lyons-Mediterranean	2,349	86,124	2.7 per cent

It will be noted that both the number and the proportion of syndicalists are considerably greater on the State railway than on the lines of private ownership, but that even in this instance the proportion of syndicalists is far too small to exercise a controlling influence. It is stated, moreover, that the majority of the syndicalists are shop employees or newcomers to the service.

* * *

The first electrification of a steam railway within the polar zone has been practically completed by the Swedish government on the Kiruna-Riksgraensen section of the line from Lulea, Sweden, on the Gulf of Bothnia, across the Scandinavian peninsula, to Narvik, Norway, on the Atlantic ocean, 293 miles. Electrification was determined upon for the section from Kiruna, which is about 87 miles north of the Arctic circle, to Riksgraensen, on the border line between Sweden and Norway, a distance of 80 miles, for the purpose of increasing the capacity of the line in preference to double-tracking. Practically the only freight business is the transportation of iron ore, of which 3,000,000 tons was hauled in 1913 by steam. It was desired to increase the capacity to 5,000,000 tons a year and electricity was adopted to permit heavier trains and an average increase of about 25 per cent in speed. The large amount of available water power and the scarcity of coal were also important factors. The electrified line is through an uninhabited country where temperatures of from 25 to 35 deg. below zero are common in January and February. Although two years was allowed in the contract for completing the work the actual time available for work, on account of weather conditions, was only seven months. The power station is located at Porjus Falls, 74 miles south of Kiruna, and power is transmitted at 80,000 volts by a tower transmission line to four substations where the potential is stepped down to 15,000 volts for the contact trolley line. Electric locomotives hauling passenger trains of 200 metric tons and ore trains of 1,855 tons will be used, and the contract specifies speeds of 31 miles an hour over level track and 18.6 miles an hour on 1 per cent grades. The equipment will include 2 passenger and 13 freight locomotives.

* * *

It will be remembered that the railways of Great Britain are now being operated by the government under a board of control consisting of several general managers, headed by H. A. Walker of the London & South-Western, the latter being responsible to the government rather than to the directors and stockholders. The method of compensation for operation under this plan is shown by the following announcement issued by the Board of Trade:

"The Regulation of the Forces Act, 1871, under which His Majesty's Government have taken possession of most of the railroads of Great Britain, provides that full compensation shall be

paid to the owners of the railroads for any loss or injury they may have sustained thereby, the amount of such compensation to be settled by agreement, or, if necessary, by arbitration.

"His Majesty's Government have agreed with the railway companies concerned that, subject to the undermentioned condition, the compensation to be paid them shall be the sum by which the aggregate net receipts of their railways for the period during which the government are in possession of them fall short of the aggregate net receipts for the corresponding period of 1913. If, however, the net receipts of the companies for the first half of 1914 were less than the net receipts for the first half of 1913, the sum payable is to be reduced in the same proportion. This sum, together with the net receipts of the railway companies taken over, is to be distributed among those companies in proportion to the net receipts of each company during the period with which comparison is made.

"The compensation to be paid under this arrangement will cover all special services, such as those in connection with military and naval transport, rendered to the government by the railway companies concerned, and it will therefore be unnecessary to make any payments in respect of such transport on the railways taken over."

The Statist, of London, a leading authority, is under the impression "that the net earnings guaranteed to the railways by the government during the time the railways are worked by the state will not be much less than were the net earnings in 1913, and that, consequently, railway shareholders will not suffer any serious loss of dividend."

HOW CAN ENGINEERS BEST UTILIZE THE TECHNICAL JOURNALS?*

By John W. Alvord
Consulting Engineer, Chicago

That we cannot keep abreast of the times without reading the engineering journals is obvious. That if we carefully read all the engineering journals in our chosen specialty we shall have no time left to earn a living is easily capable of demonstration. What, then, is the proper attitude to adopt toward this ever increasing flood of information that pours in upon us so relentlessly? It we look about to see how our fellow engineers solve this matter we shall find a great variety of attitudes toward the problem. Some engineers simply do not take engineering journals, reading one occasionally here and there as opportunity offers. Others take all they can afford and let them pile up around the office, often unopened, and unused. Others still limit themselves to a select few, which they carefully bind and shelve. Still others read journals when they can, and throw them away when they move on.

The problem of the engineer with his technical paper is much affected by his age, station, and aim in life. To the man who is engineering only to get money and more money, the engineering journal is a newspaper, in which he may notice mainly where there are better jobs than his own that may be sought after and perhaps obtained. To the man who is anxious to fit himself for something better, it is an opportunity for a great variety of study. To the young engineer the engineering journal, properly read and noted, is a part of a post-graduate course in engineering. To the middle-aged man, it is a mine of data, bearing in all sorts of ways on his work. To the mature specialist only does it begin to become burdensome by its repetition of experience and its volume of matter on subjects which have already, to him at least, been well digested.

The young engineer and the college graduate need, most of all, practical experience. It is safe to say that engineering literature will never have any proper perspective for him until he has been connected in some capacity with engineering work himself, be it in ever so modest a capacity. With the actual doing of engineering work, however, should come contemporaneously the reading of technical journals, particularly along the lines in which he is working. Nothing can be more instructive, broadening and enlightening to a man doing a particular kind of work than reading about similar work at the same time. It follows, therefore, that the young engineer should, as early as possible, take at least one good, first-class engineering journal, and own it himself; bind it, if he can afford to, but lay it away in an orderly manner, in any event. If he can afford two journals so much the better, especially if they are selected so as to widen his outlook.

In the matter of indexing for the young engineer, much must be left to the judgment and taste of the individual. The engineering indexes are very complete and useful in these modern days. The mind itself is a wonderful indexer. It is safe to say that the average intelligent man reading an article which impresses him as useful and valuable can, without effort, remember for many years after the name of the journal and the approximate year in which the article appeared.

It is probably not wise for the young engineer to indulge extensively in card indexes and filing systems for topically arranging his available engineering journal articles. Few men know very early in life where fate and interest will land their future attention. Filing systems and special indexes are expensive and time consuming, and when indulged in without definite aim nearly always quickly become too voluminous and thereby useless.

If any suggestions are made along this line, it would be to start a loose leaf letter size (8½ in. x 11 in. page) notebook, and note in it, with separate pages for separate subjects, only what appears to be extremely useful, either in exceedingly brief abstracts from engineering articles or diagrams, costs, etc. These notes will be most useful if they are confined to that kind of work in which the compiler is immediately engaged, and has on his mind at the time, or at the most, work very similar to his own, which has perhaps had his personal inspection.

To the man in early middle life, actively engaged in his profession, the problem with the technical journal is the lack of time. Absorbed in a multitude of responsibilities, how shall he derive any useful good from the multitude of journals which his more ample income can readily afford, but which pile high on his table after every brief absence from the office. The average editor can judge of a technical article with only a brief inspection. The working engineer who has had some experience with technical literature can form the same habit, and save much time.

Much light is thrown on engineering literature by personal or general acquaintance with the author. One can more fully appreciate what an author says when he knows fairly well what the author's experience has been. All men have their high strong ground, their less trodden side slopes, and their twilight zone of knowledge, and they should not be blindly accepted as authority in all of the fields in which they sometimes venture an opinion.

What shall the engineer do with his special selection of material when once he thinks he has separated it from the flood of raw material? Several courses are open to him: He may rely on his memory and the published index to his bound volumes. It is safe to say, however, that few engineers really make much practical use of this method. He may keep a special card index of important data and reference to valuable articles. This at once involves labor and attention, which few busy men can give, and which, if done by assistants or librarians, largely loses its personal value to the one who needs it. He may abstract important data in a limited way on loose leaf transparent paper, standard letter size, and he may remove or detach articles of special value from his journals, to be filed in regular office file system, like correspondence.

The writer has tried all of the above methods at considerable cost in time and patience, and has, for many years, settled upon the third method outlined. With all its admitted limitations it seems to be the best for an office which is expected to find out information on a great variety of subjects in a limited time and with the least amount of effort.

*Abstract of a paper presented before the ninth annual convention of the Federation of Trade Press Associations, Chicago, September 25, 1914.

General News Department

The Canadian Pacific announces that within the next two months 6,000 extra men will be employed by the company, the object being to relieve distress brought about by the war in Europe.

The White Audit System of checking passenger fares was adopted on October 1 by the Florida East Coast, the Louisville & Nashville, the Nashville, Chattanooga & St. Louis and the Mississippi Central.

On account of decreased passenger revenues due apparently to uncertainties occasioned by the European war, the Southern Railway has temporarily reduced the number of ticket collectors employed on its passenger trains.

It is reported from Mexico that the constitutional government, now in control of most of the railways of the country, has announced that none of the official positions are to be filled by Americans. Most of the American employees and officers have already been replaced by Mexicans.

In the federal court at Birmingham, Ala., September 22, the Alabama Great Southern was fined $300 for violation of the Safety Appliance law, and the Central of Georgia $100 for a similar offense. At Louisville, Ky., on the 25th, the Illinois Central pleaded guilty in three cases of the same kind and was fined $300. Both of these courts also imposed heavy prison sentences, under the federal law, for stealing from freight cars.

Vice-President W. R. Scott of the Southern Pacific has issued, through the division superintendents, an appeal to all employees of the company, especially train and yard crews, for the benefit of passengers in sleeping cars. He asks them to increase their efforts to eliminate all unnecessary nocturnal noises, and furthermore, calls for suggestions for improvement of the service in this regard. He wants renewed attention given to the problem of doing away with the clanging of bells, tooting of whistles, hissing and sputtering of locomotives and shouting of trainmen in the vicinity of sleeping cars.

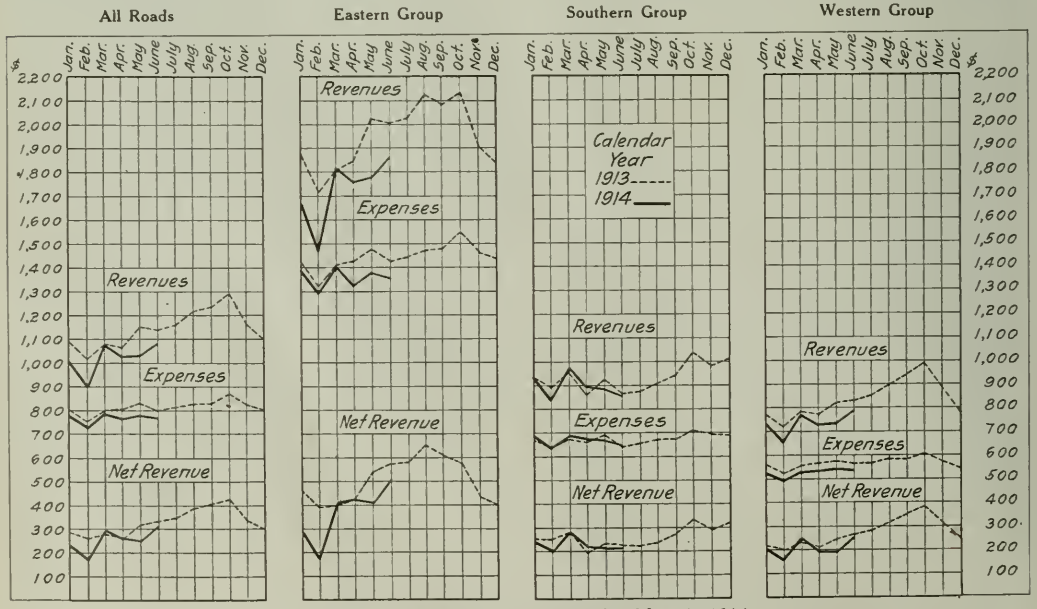
A recent statement issued by the New York Public Service Commission, First district, reports that the total number of tickets sold for passage in the Broadway and Lenox avenue subways operated by the Interborough Rapid Transit Company during the year ended June 30, 1914, was 340,413,103, an increase for the year of 12,941,593. As the commission treats Sundays as half days, the daily average for the first time in the history of the subway exceeds 1,000,000 passengers, the average having been 1,001,215. The daily average for the previous year was 963,152.

Representative Rupley, of Pennsylvania, introduced on Wednesday a bill to amend the interstate commerce law, providing that after the physical valuation of the railroads has been completed by the Interstate Commerce Commission the government may buy such lines at the price set as the actual value of the roads as may in the opinion of the commission be desirable, and that if at the expiration of 90 days from the offer to the railways the companies decline to sell, the government may enter the open market to buy such securities as may be necessary to obtain control. The price to be paid, however, must not exceed that set by the physical valuation. An initial appropriation of $250,000,000 is to be provided by a bond issue.

Summary of Revenue and Expenses of Steam Roads

The Bureau of Railway Economics' summary of revenues and expenses and comments thereon for June, 1914, are as follows:

Railways operating 226,224 miles of line are covered by this summary, or about ninety per cent. of all steam railway mileage in the United States. Their operating revenues for the month of June, 1914, amounted to $244,123,428. This amount includes revenues from freight and passenger traffic, from carrying mail and express, and from miscellaneous sources connected with rail operation. Compared with June, 1913, total operating revenues show a decrease of $10,309,159. Total operating revenues per mile averaged $1,079 in June, 1914, and $1,135 in June, 1913, a



Monthly Revenues and Expenses per Mile of Line in 1914

decrease of $56, or 5.0 per cent. There was a decrease of 5.7 per cent in freight revenue per mile, and a decrease of 4.7 per cent in passenger revenue per mile.

Operating expenses, which include all the costs of maintaining track and equipment, operating trains, securing traffic, and of administration, amounted to $173,747,857. This was $5,728,228 less than for June, 1913. These operating expenses per mile of line averaged $768 in June, 1914, and $801 in June, 1913, a decrease of $33 per mile, or 4.1 per cent.

Net operating revenue, that is, total operating revenues less operating expenses, amounted to $70,375,571, which was $4,580,931 less than for June, 1913. Net operating revenue per mile of line averaged $311 in June, 1914, and $334 in June, 1913, a decrease of $23 per mile, or 7.0 per cent.

Taxes for the month of June amounted to $12,333,210, or $55 per mile, an increase of 9.3 per cent. over June, 1913.

Operating income, which is net revenue from rail and auxiliary operations, less taxes, averaged $256 per mile of line, and in June, 1913, $284, tbus decreasing $28, or 9.8 per cent. Operating income for each mile of line for each day in June averaged $8.54, and for June, 1913, $9.47. Operating income is that proportion of their operating receipts which remains available to the railways for rentals, interest on bonds, appropriations for betterments, improvements, new construction, and for dividends.

The operating ratio for June, that is, the per cent of total operating revenues absorbed in operating expenses, was 71.2 per cent, which is comparable with 70.5 per cent in June, 1913, and 68.5 per cent in June, 1912.

The railways of the eastern district show a decrease in total operating revenues per mile of line as compared with June, 1913, of 6.9 per cent, the railways of the southern district a decrease of 0.2 per cent, and the railways of the western district a decrease of 3.9 per cent. Operating expenses per mile decreased 5.1 per cent in the East, increased 1.3 per cent in the South, and decreased 4.4 per cent in the West. Net operating revenue per mile decreased 11.5 per cent in the East, decreased 4.5 per cent in the South, and decreased 2.7 per cent in the West. Taxes per mile show a decrease of 4.6 per cent in the East, an increase of 41.6 per cent in the South, and an increase of 13.4 per cent in the West. Operating income per mile decreased 12.0 per cent in the East, decreased 14.1 per cent in the South, and decreased 5.9 per cent in the West.

When the returns for the six months of the calendar year 1914 are compared with those of the corresponding months of 1913 they show a decrease in total operating revenues per mile of 6.4 per cent, a decrease in operating expenses per mile of 4.0 per cent, and a decrease in net operating revenue per mile of 13.1 per cent. This net operating revenue per mile decreased 21.1 per cent. in the East, as compared with the corresponding period of the previous year, decreased 4.2 per cent in the South, and decreased 8.3 per cent in the West.

The following table shows the per cent of operating revenues consumed by each class of expenses:

Per Cent of Total Operating Revenues

	June		Fiscal year ending June 30		
	1914	1913	1914	1913	1912
Freight revenue	67.2	67.7	68.9	69.8	68.7
Passenger revenue	23.9	23.8	22.8	22.2	23.2
Other transportation	7.5	7.3	7.1	6.9	7.1
Non-transportation	1.4	1.2	1.2	1.1	1.0
Maintenance of way and structures	15.6	14.9	13.6	13.3	12.7
Maintenance of equipment	16 6	16.2	17.5	16.4	15.9
Traffic expenses	2.2	2.2	2.1	2.0	2.1
Transportation expenses	33.9	34.4	36.2	35.2	35.9
General expenses	2.9	2.8	2.6	2.4	2.5
Total operating expenses (excluding outside operations and taxes)	71.2	70.5	72.0	69.3	69.1

Fire Prevention on the Mobile & Ohio

General Manager R. V. Taylor of the Mobile & Ohio has set aside Friday, October 9, as "Fire Prevention Day" on that road. The purpose of this day is to make a fall clean-up of premises before the setting in of winter. All concerned are instructed to observe the day in the following manner:

Remove rubbish, grass and all other inflammable material from under and around buildings, platforms and bad order cars.

Give the interior of all buildings a thorough house cleaning.

Examine carefully fire apparatus, hydrants, hose, couplings, water barrels, buckets, etc., to insure efficient service in case of emergency.

Inspect stoves, stove pipes and flues and remedy all defects.

Remove birds' nests from eaves of buildings to prevent engine spark fires.

Remove accumulation of old straw, hay, etc., from stock yards and pens.

Provide metal boxes for storage of matches.

Post "No Smoking" signs, as called for in Insurance Rule No. 5.

Thoroughly clean out all bunk cars.

MEETINGS AND CONVENTIONS

The following list gives names of secretaries, dates of next or regular meetings, and places of meeting.

Air Brake Association.—F. M. Nellis, 53 State St., Boston, Mass. Next convention, May 4-7, 1915, Hotel Sherman, Chicago.

American Association of Demurrage Officers.—A. G. Thomason, Demurrage Commissioner, Boston, Mass. Annual convention in April.

American Association of Dining Car Superintendents.—H. C. Boardman, D. L. & W., Hoboken, N. J. Next convention, October 22-24, Washington, D. C.

American Association of Freight Agents.—R. O. Wells, Illinois Central, East St. Louis, Ill. Annual meeting, May 21-24, 1915, Richmond, Va.

American Association of General Passenger and Ticket Agents.—W. C. Hope, C. R. R. of N. J., 143 Liberty St., New York.

American Association of Railroad Superintendents.—E. H. Harman, Room 101, Union Station, St. Louis, Mo. Next meeting, May 20-21, 1915, San Francisco, Cal.

American Electric Railway Association.—E. B. Burritt, 29 W. 39th St., New York. Annual convention, October 12-16, Atlantic City, N. J.

American Electric Railway Manufacturers' Association.—H. G. McConnaughy, 165 Broadway, New York. Meetings with American Electric Railway Association.

American Railway Association.—W. F. Allen, 75 Church St., New York. Semi-annual meeting, November 18, Chicago.

American Railway Bridge and Building Association.—C. A. Lichty, C. & N. W., Chicago. Next convention, October 20-22, 1914, Los Angeles, Cal.

American Railway Engineering Association.—E. H. Fritch, 900 S. Michigan Ave., Chicago. Next convention, March 16-18, 1915, Chicago.

American Railway Master Mechanics' Association.—J. W. Taylor, 1112 Karpen Bldg., Chicago. Annual meeting, June, 1915.

American Railway Safety Association.—L. F. Shedd, C. R. I. & P., Chicago. Next meeting, November, Chicago.

American Railway Tool Foremen's Association.—A. R. Davis, Central of Georgia, Macon, Ga. Annual meeting, July, 1915.

American Society for Testing Materials.—Prof. E. Marburg, University of Pennsylvania, Philadelphia, Pa.

American Society of Civil Engineers.—Chas. W. Hunt, 220 W. 57th St., New York. Regular meetings, 1st and 3d Wednesday in month, except, June, July and August, 220 W. 57th St., New York.

American Society of Engineering Contractors.—J. R. Wemlinger, 11 Broadway, New York. Regular meetings, 2d Thursday in month, at 2 P. M., 11 Broadway, New York.

American Society of Mechanical Engineers.—Calvin W. Rice, 29 W. 39th St., New York. Annual meeting, December 1-4, 1914, New York.

American Wood Preservers' Association.—F. J. Angier, B. & O., Mt. Royal Sta., Baltimore, Md. Next convention, January 19-21, 1915, Chicago.

Association of American Railway Accounting Officers.—E. R. Woodson, 1300 Pennsylvania Ave., N. W., Washington, D. C. Annual convention, April 28, 1915, Atlanta, Ga.

Association of Manufacturers of Chilled Car Wheels.—George W. Lyndon, 1214 McCormick Bldg., Chicago. Annual meeting, second Tuesday in October, New York.

Association of Railway Claim Agents.—C. W. Egan, B. & O., Baltimore, Md. Annual meeting, 3d week in May, 1915, Galveston, Tex.

Association of Railway Electrical Engineers.—Jos. A. Andreucetti, C. & N. W., Room 411, C. & N. W. Sta., Chicago. Annual convention, October 26-30, 1914, Chicago.

Association of Railway Telegraph Superintendents.—P. W. Drew, Soo Line, 112 West Adams St., Chicago. Annual meeting, June 22-25, 1915, Rochester, N. Y.

Association of Transportation and Car Accounting Officers.—G. P. Conard, 75 Church St., New York. Next meeting, December 8-9, 1914, Richmond, Va.

Bridge and Building Supply Men's Association.—L. D. Mitchell, Detroit Graphite Co., Chicago, Ill. Meetings with American Railway Bridge and Building Association.

Canadian Railway Club.—James Powell, Grand Trunk, P. O. Box 7, St. Lambert (near Montreal), Que. Regular meetings, 2d Tuesday in month, except June, July and August, Windsor Hotel, Montreal, Que.

Canadian Society of Civil Engineers.—Clement H. McLeod, 176 Mansfield St., Montreal, Que. Regular meetings, 1st Thursday in October, November, December, February, March and April. Annual meeting, January, Montreal.

Car Foremen's Association of Chicago.—Aaron Kline, 841 Lawler Ave., Chicago. Regular meetings, 2d Monday in month, except July and August, Lytton Bldg., Chicago.

Central Railway Club.—H D. Vought, 95 Liberty St., New York. Regular meetings, 2d Friday in January, May, September and November. Annual meeting, 2d Thursday in March, Hotel Statler, Buffalo, N. Y.

Engineers' Society of Western Pennsylvania.—Elmer K. Hiles, 2511 Oliver Bldg., Pittsburgh, Pa. Regular meetings, 1st and 3d Tuesday, Pittsburgh.

Freight Claim Association.—Warren P. Taylor, R. F. & P., Richmond, Va. Annual meeting, June 16, 1915, Chicago.

General Superintendents' Association of Chicago.—A. M. Hunter, 321 Grand Central Station, Chicago. Regular meetings, Wednesday preceding 3d Thursday in month, Room 1856, Transportation Bldg., Chicago.

International Railway Congress.—Executive Committee, 11, Rue de Louvain, Brussels, Belgium. Next convention, June 23 to July 6, 1915, Berlin.

International Railway Fuel Association.—C. G. Hall, C. & E. I., 922 McCormick Bldg., Chicago. Annual meeting, May 17-20, 1915, Chicago.

International Railway General Foremen's Association.—Wm. Hall, 829 W. Broadway, Winona, Minn. Next convention, July 14-17, 1915, Sherman House, Chicago.

International Railroad Master Blacksmiths' Association.—A. L. Woodworth, C. H. & D., Lima, Ohio.

Maintenance of Way and Master Painters' Association of the United States and Canada.—T. I. Goodwin, C. R. I. & P., Eldon, Mo. Next convention, November 17-19, 1914, Detroit, Mich.

Master Boiler Makers' Association.—Harry D. Vought, 95 Liberty St., New York. Annual convention, May, 1915.

Master Car and Locomotive Painters' Association of the United States and Canada.—A. P. Dane, B. & M., Reading, Mass.

Master Car Builders' Association.—J. W. Taylor, 1112 Karpen Bldg., Chicago. Annual meeting, June, 1915.

National Railway Appliances Association.—Bruce V. Crandall, 537 So. Dearborn St., Chicago. Next convention, March 15-19, 1915, Chicago.

New England Railroad Club.—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass. Regular meetings, 2d Tuesday in month, except June, July, August and September, Boston.

New York Railroad Club.—Harry D. Vought, 95 Liberty St., New York. Regular meetings, 3d Friday in month, except June, July and August, 29 W. 39th St., New York.

Niagara Frontier Car Men's Association.—E. Frankenberger, 623 Brisbane Bldg., Buffalo, N. Y. Meetings monthly.

Peoria Association of Railroad Officers.—M. W. Rotchford, Union Station, Peoria, Ill. Regular meetings, 2d Thursday in month, Jefferson Hotel, Peoria.

Railroad Club of Kansas City.—C. Manlove, 1008 Walnut St., Kansas City, Mo. Regular meetings, 3d Friday in month, Kansas City.

Railroad Master Tinners, Coppersmiths and Pipefitters' Association.—U. G. Thompson, C. & E. I., Danville, Ill. Annual meeting, May, 1915.

Railway Business Association.—Frank W. Noxon, 30 Church St., New York. Annual meeting, December 10, 1914, Waldorf-Astoria Hotel, New York.

Railway Club of Pittsburgh.—J. B. Anderson, Room 207, P. R. R. Sta., Pittsburgh, Pa. Regular meetings, 4th Friday in month, except June, July and August, Monongahela House, Pittsburgh.

Railway Electrical Supply Manufacturers' Association.—J. Scribner, 1021 Monadnock Block, Chicago. Meetings with Association of Railway Electrical Engineers.

Railway Fire Protection Association.—C. B. Edwards, Fire Ins. Agt., Mobile & Ohio, Mobile, Ala. Annual meeting, October 6-7, 1914, Hotel Raleigh, Washington, D. C.

Railway Signal Association.—C. C. Rosenberg, Times Bldg., Bethlehem, Pa.

Railway Storekeepers' Association.—J. P. Murphy, L. S. & M. S., Box C, Collinwood, Ohio. Annual meeting, May, 1915.

Railway Supply Manufacturers' Association.—J. D. Conway, 2136 Oliver Bldg., Pittsburgh, Pa. Meetings with Master Car Builders and Master Mechanics Associations.

Railway Telegraph and Telephone Appliance Association.—G. A. Nelson, 50 Church St., New York. Meetings with Association of Railway Telegraph Superintendents.

Richmond Railroad Club.—F. O. Robinson, C. & O., Richmond, Va. Regular meetings, 2d Monday in month, except June, July and August.

Roadmasters' and Maintenance of Way Association.—L. C. Ryan, C. & N. W., Sterling, Ill.

St. Louis Railway Club.—B. W. Frauenthal, Union Station, St. Louis, Mo. Regular meetings, 2d Friday in month, except June, July and August, St. Louis.

Salt Lake City Transportation Club.—R. E. Rowland, Hotel Utah Bldg., Salt Lake City, Utah. Regular meetings, 1st Saturday of each month, Salt Lake City.

Signal Appliance Association.—F. W. Edmunds, 3868 Park Ave., New York. Meeting with annual convention Railway Signal Association.

Society of Railway Financial Officers.—Carl Nyquist, C. R. I. & P., La Salle St. Sta., Chicago.

Southern Association of Car Service Officers.—E. W. Sandwich, A. & W. P. Ry., Atlanta Ga.

Southern and Southwestern Railway Club.—A. J. Merrill, Grant Bldg., Atlanta, Ga. Regular meetings, 3d Thursday, January, March, May, July, September, November, 10 A. M., Candler Bldg., Atlanta.

Toledo Transportation Club.—Harry S. Fox, Toledo, Ohio. Regular meetings, 1st Saturday in month, Boody House, Toledo.

Track Supply Association.—W. C. Kidd, Ramapo Iron Works, Hillburn, N. Y. Meetings with Roadmasters' and Maintenance of Way Association.

Traffic Club of Chicago.—W. H. Wharton, La Salle Hotel, Chicago.

Traffic Club of New York.—C. A. Swope, 291 Broadway, New York. Regular meetings, last Tuesday in month, except June, July and August, Waldorf-Astoria, New York.

Traffic Club of Pittsburgh.—D. L. Wells, Erie R. R., Pittsburgh, Pa. Meetings bimonthly, Pittsburgh. Annual meeting, 2d Monday in June.

Traffic Club of St. Louis.—A. F. Versen, Mercantile Library Bldg., St. Louis, Mo. Annual meeting in November. Noonday meetings October to May.

Train Despatchers' Association of America.—J. F. Mackie, 7122 Stewart Ave., Chicago. Annual meeting June 15, 1915, Minneapolis, Minn.

Transportation Club of Detroit.—W. R. Hurley, Superintendent's office, L. S. & M. S., Detroit, Mich. Meetings monthly, Normandie Hotel, Detroit.

Traveling Engineers' Association.—W. O. Thompson, N. Y. C. & H. R., East Buffalo, N. Y.

Western Canada Railway Club.—W. H. Rosevear, P. O. Box 1707, Winnipeg, Man. Regular meetings, 2d Monday, except June, July and August, Winnipeg.

Western Railway Club.—J. W. Taylor, 1112 Karpen Bldg., Chicago. Regular meetings, 3d Tuesday in month, except June, July and August, Karpen Bldg., Chicago.

Western Society of Engineers.—J. H. Warder, 1735 Monadnock Block, Chicago. Regular meetings, 1st Monday in month, except January, July and August, Chicago. Extra meetings, except in July and August, generally on other Monday evenings.

REVENUES AND EXPENSES OF RAILWAYS

Month of July, 1914

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses					Net operating revenue (or deficit).	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
		Freight.	Passenger.	Total inc. misc.	Maintenance Way and structures.	Maintenance Of equipment.	Traffic.	Transportation.	Miscellaneous.	General.	Total.				
Baltimore & Ohio—System	4,516	6,086,321	1,462,338	8,146,688	815,396	1,591,317	162,690	3,075,935	56,139	173,189	5,874,667	2,272,021	271,271	2,000,750	—381,649
Central of New Jersey	678	1,655,366	719,966	2,512,928	245,644	438,907	29,804	835,126	10,358	50,834	1,600,673	912,294	112,376	799,853	—156,986
Delaware & Hudson Co.—R. R. Dept.	881	1,563,007	331,827	1,997,294	160,617	297,668	28,172	716,034	12,886	61,076	1,271,360	725,934	56,250	669,649	84,967
Galveston, Harrisburg & San Antonio	1,338	624,257	280,298	961,685	144,917	164,744	27,485	401,944	9,565	33,556	780,451	184,234	39,425	141,665	86,510
Houston, East & West Texas	191	77,124	36,670	119,570	23,249	13,621	1,983	40,011	.....	2,831	81,518	38,053	4,249	33,803	17,123
Houston & Texas Central	849	365,005	164,615	565,866	93,083	81,038	15,303	221,951	1,500	16,877	429,385	136,481	24,051	112,229	43,796
Kansas City Southern	827	714,528	150,123	945,266	99,771	114,290	26,481	288,000	.....	40,833	569,375	375,891	44,751	331,029	89,696
Louisiana Western	208	117,151	60,240	188,393	22,508	40,869	6,895	56,226	3,176	6,436	136,103	52,291	8,735	43,555	8,701
Louisville, Henderson & St. Louis	200	81,028	36,593	124,709	28,881	16,983	5,340	37,900	.....	3,164	92,268	32,441	3,800	28,641	6,332
Morgan's La. & Tex. R. R. & S. S. Co.	405	225,703	91,510	340,852	49,917	61,834	10,992	133,817	2,747	11,990	271,297	69,555	20,392	48,543	34,434
Texas & New Orleans	469	729,229	105,956	378,187	62,083	77,220	7,171	176,096	11,971	10,214	344,552	33,635	15,794	17,576	25,781
Ulster & Delaware	129	52,037	72,709	142,111	14,705	13,085	3,081	53,557	44	3,110	87,582	54,529	3,300	51,229	—3,863
Union Pacific	3,615	2,962,221	966,737	4,374,544	644,012	613,109	92,318	1,062,242	76,399	112,424	2,600,007	1,774,537	182,118	1,592,313	—92,885

Traffic News

The Western Classification Committee has announced hearings at its office in Chicago on October 8, 9 and 13.

Illinois roads have announced the cancellation of tariffs filed last year with the Illinois railroad commission providing for an advance of 1 cent per 100 lb. in grain rates. The advance was suspended by the old commission and again by the new Illinois Public Utilities Commission.

According to advices received by the Canadian Pacific, 21,195,857 bushels of wheat had been marketed on all lines west of Winnipeg to September 16, as against 9,445,400 bushels on the same date last year, showing an increase of 11,750,457 bushels. Western Canadian farmers have already received approximately $20,000,000 for this, or about $14,000,000 more than the amount realized last year at the same date.

The Southern Pacific has issued a new lumber tariff naming through rates by way of the Northern Pacific and Southern Pacific from points in Washington on the Portland-Tacoma line and the Gray's Harbor and Willapa Harbor lines to points in California, Nevada and New Mexico. This places the Northern Pacific points on the same basis as those on the Oregon-Washington Railroad & Navigation Company and makes an important reduction below the former combination of local rates.

Car Surpluses and Shortages

Arthur Hale, chairman of the committee on relations between railroads of the American Railway Association, in presenting statistical bulletin No. 175-A, giving a summary of car surpluses and shortages by groups from May 15, 1913, to September 15, 1914, says:

The total surplus on September 15, 1914, was 138,108 cars; on September 1, 1914, 165,244 cars, and on September 15, 1913, 61,753 cars.

The surplus reported for this period totals 138,108 cars, a decrease of 27,136 cars since September 1.

Box car surplus decreased approximately 19,000; this decrease is practically all in states west of the Mississippi river and in Canada.

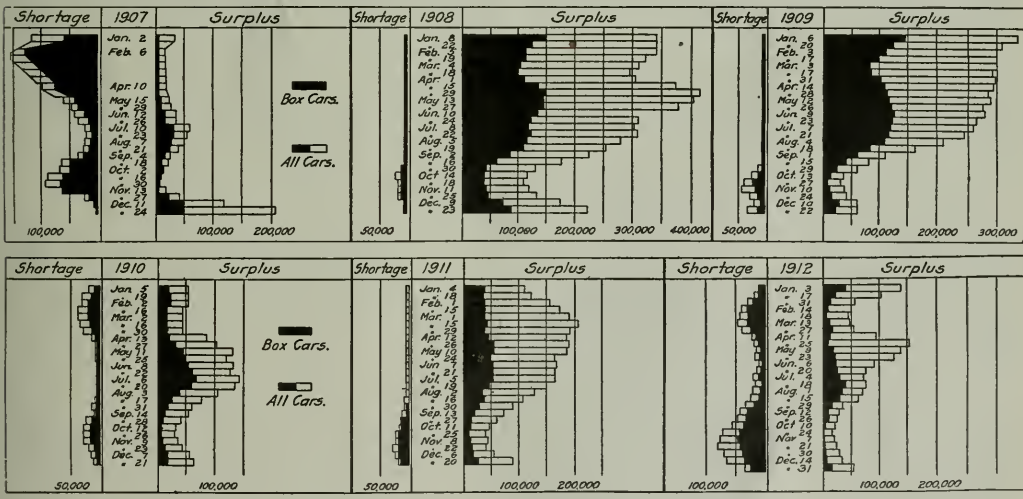
There is also a heavy reduction in coal cars in the eastern states (group 2), where the surplus is reduced more than one-half.

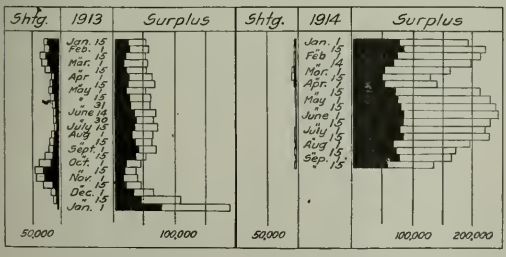
The total shortage on September 15, 1914, was 2,059 cars; on

Car Surpluses and Shortages

Date	No. of roads.	Surpluses Box.	Flat.	Coal, gondola and hopper.	Other kinds.	Total.	Shortages Box.	Flat.	Coal, gondola and hopper.	Other kinds.	Total.
Group *1.—September 15, 1914	9	822	276	1,326	629	3,053	298	0	0	19	317
" 2.— " 15, 1914	34	572	185	5,232	3,533	9,522	47	0	0	0	47
" 3.— " 15, 1914	31	2,150	1,141	16,957	3,755	24,003	112	0	0	205	317
" 4.— " 15, 1914	11	6,588	1,637	3,194	1,322	12,741	75	60	9	0	144
" 5.— " 15, 1914	25	2,416	594	4,096	2,492	9,598	0	2	0	0	2
" 6.— " 15, 1914	29	15,166	1,629	2,823	4,979	24,597	0	21	0	0	21
" 7.— " 15, 1914	4	1,575	25	963	815	3,378	0	0	0	0	0
" 8.— " 15, 1914	15	4,151	322	1,968	3,163	9,604	388	30	89	2	509
" 9.— " 15, 1914	14	1,569	216	258	814	2,857	6	0	6	4	16
" 10.— " 15, 1914	23	5,379	1,160	2,741	8,439	17,719	68	1	87	10	166
" 11.— " 15, 1914	5	17,111	1,316	0	2,609	21,036	520	0	0	0	520
Total	200	57,499	8,501	39,558	32,550	138,108	1,514	114	191	240	2,059

*Group 1 is composed of New England lines; Group 2—New York, New Jersey, Delaware, Maryland and Eastern Pennsylvania lines; Group 3—Ohio, Indiana, Michigan and Western Pennsylvania lines; Group 4—West Virginia, Virginia, North and South Carolina lines; Group 5—Kentucky, Tennessee, Mississippi, Alabama, Georgia and Florida lines; Group 6—Iowa, Illinois, Wisconsin and Minnesota lines; Group 7—Montana, Wyoming, Nebraska, North Dakota and South Dakota lines; Group 8—Kansas, Colorado, Missouri, Arkansas and Oklahoma lines; Group 9—Texas, Louisiana and New Mexico lines; Group 10—Washington, Oregon, Idaho, California, Nevada and Arizona lines; Group 11—Canadian lines.





Car Surpluses and Shortages, 1907 to 1914

September 1, 1914, 1,918 cars, and on September 15, 1913, 21,594 cars. A very slight increase is noticeable in the shortage.

The table on the previous page gives car surplus and shortage figures by groups for the last period covered in the report, and the diagram shows total bi-weekly surpluses and shortages from 1907 to 1914.

Commercial Travelers Protest Increased Mileage Rate

The Illinois Commercial Men's Association is sending out a letter to 100,000 commercial travelers protesting against the action of the eastern railways in advancing the rates for mileage books to 2¼ cents a mile. The letter says: "This is a direct slap at the commercial traveler and should not be submitted to without a good, hard fight. They are striking at your bread and butter, at your very existence, and it is time we rose en masse and showed them what it means to get 500,000 live wires after them." With the letter is enclosed a form of a protest to the Interstate Commerce Commission, which the recipients are asked to fill out and mail immediately so that all the letters will reach the commission about the same time. It is suggested, however, that it would be best to write individual letters, and also to write to United States senators and representatives. The form letter to the commission says: "If this increase is permitted the burden will fall almost entirely upon the shoulders of the commercial traveler, because it is only the commercial traveler who uses the mileage book, and I do not believe that your honorable body will sanction the railroads doing an act which will place this unjustifiable burden upon it. It may be true that the railroads would be justified in increasing the rate on single trip tickets or round trip tickets in certain localities, but mileage books containing 1,000, 2,000 or more miles, should be sold at the price they are now selling at, and have sold at for more than 35 years. The commercial traveler is entitled to be designated the advance agent of business, and just now what this country needs more than anything else is more business." The letter states also that if such an increase is granted it is not the manufacturer or jobber who will pay it, but the commercial traveler.

Car Location

The accompanying table, which was taken from bulletin No. 22 of the American Railway Association, gives a summary of freight car location by groups on September 1, 1914:

Car Location on September 1, 1914

	New England.	N.Y., N.J., Del., Md., Eastern Pa.	Ohio, Ind., Mich., Western Pa.	Va., W. Va., No. & So. Carolina.	Ky., Tenn., Miss., Ala., Ga., Fla.	Iowa, Ill., Wis., Minn.	Mont., Wyo., Neb., Dakotas.	Kans., Colo., Okla., Mo., Ark.	Texas, La., New Mexico.	Oregon, Idaho, Nev., Cal., Ariz.	Canadian Lines.	Grand Total.
Total Cars Owned	87,557	683,063	263,555	215,763	175,279	495,435	25,165	154,812	33,874	119,342	154,621	2,408,466
Home Cars on Home Roads	54,345	450,262	109,985	141,563	109,546	359,174	13,227	105,399	20,872	77,933	108,498	1,550,804
Home Cars on Foreign Roads	33,212	232,801	153,570	74,200	65,733	136,261	11,938	49,413	13,002	41,409	46,123	857,662
Foreign Cars on Home Roads	35,833	225,978	177,331	59,903	51,675	159,834	10,689	51,364	23,407	44,431	26,425	866,870
Total Cars on Line	90,178	676,249	287,316	201,466	161,221	519,008	23,916	156,763	44,279	122,364	134,923	2,417,674
Excess or Deficiency	2,621	*6,823	23,761	*14,297	*14,058	23,573	*1,249	1,951	10,405	3,022	*19,698	9,208
Surplus	3,153	17,262	24,030	13,678	8,125	29,472	6,285	13,460	3,418	20,690	25,671	165,244
Shortage	429	206	846	0	32	176	0	47	53	129	0	1,918
Shop Cars—												
Home Cars in Home Shops	8,458	61,274	25,881	20,341	17,092	32,634	951	15,350	3,733	5,283	6,541	197,538
Foreign Cars in Home Shops	556	5,563	7,319	1,002	1,302	4,592	541	1,507	823	1,968	157	25,330
Total Cars in Shops	9,014	66,837	33,200	21,343	18,394	37,226	1,492	16,857	4,556	7,251	6,698	222,868
Per Cent to Total Cars Owned—												
Home Cars on Home Roads	49.69	65.92	41.73	65.61	62.50	72.50	52.56	68.08	61.62	65.30	70.17	64.39
Total Cars on Line	105.44	99.00	108.90	93.37	91.98	104.76	95.04	100.22	130.72	102.53	87.26	100.30
Home Cars in Home Shops	7.58	8.97	9.82	9.43	9.75	6.59	3.78	9.91	11.02	4.43	4.23	8.20
Foreign Cars in Home Shops	.98	.81	2.78	.46	.74	.92	2.15	.90	2.43	1.65	.10	1.05
Total Cars in Shops	8.56	9.78	12.60	9.89	10.49	7.51	5.93	10.81	13.45	6.08	4.33	9.25

*Denotes deficiency.

The San Francisco Fair.—The traffic department of the Panama-Pacific International Exposition has received word from eastern freight forwarding agents that the interruption of transatlantic travel caused by the European war will not interfere with the shipment from Holland of the hundreds of thousands of bulbs for the exposition gardens. Orders for the bulbs in great quantities were placed with Dutch nurserymen by the landscape department of the exposition. As the tulips, iris and other flowers included in the order will form an essential part of the landscape decoration considerable apprehension was felt over the possibility that Holland growers would be unable to export the bulbs. The shipment will be the largest of the kind ever received in this country.

Commission and Court News

INTERSTATE COMMERCE COMMISSION

The Omaha Grain Exchange has filed a complaint with the commission asking a reduction in the rates on wheat and corn to Omaha, South Omaha and Council Bluffs.

The National Industrial Traffic League has protested to the Interstate Commerce Commission against reopening the California switching cases, as asked recently by the California roads.

The commission has suspended from October 1 to January 1 tariffs of the Atchison, Topeka & Santa Fe and other western railroads proposing to withdraw the concentration rates on eggs, butter and poultry at Omaha, Neb., and other western points.

The Nebraska Railroad Commission has filed a complaint with the Interstate Commerce Commission asking a readjustment and reduction of rates on wheat and corn from Nebraska and other middle western points to St. Joseph and Kansas City, Mo., and Atchison and Topeka, Kan.

The commission has announced that a hearing will be held in Chicago on January 20, 1915, for the purpose of inquiring into the question of embargoes, the conditions under which they are established and the manner in which notice is given, it having been alleged that certain coal roads have established embargoes which resulted in discrimination against certain shippers.

Western railways are filing with the commission supplements to their demurrage tariffs imposing higher rates on refrigerator cars, when used for perishable freight shipments, effective on October 15. The proposed charge is $2 per car for each of the first two days after free time and $3 per day for each succeeding day. It was recommended by the American Railway Association.

The commission has entered a long and short haul order affecting the class and commodity rates of New York, Philadelphia, Baltimore and related points to Norfolk, Port Norfolk, Pinners Point, Portsmouth and Old Point, Va., granting the carriers authority to continue charging lower rates to the Virginia cities named than to intermediate points; but it is directed that on and after December 1, the rates to the Virginia cities shall not be any lower than the rates from the northern points north of Cape Charles, Va.

A hearing will be held at Reno, Nev., on October 23, on the complaint of the Nevada Railroad Commission against tariffs filed some time ago by the western railways requiring the payment of two full fares for passengers having the exclusive use of a drawing room and one and one-half fares for a compartment. The Canadian railway commission has recently sustained a complaint against a similar tariff filed by the Canadian roads, sug-

gesting as a compromise that drawing rooms and compartments may be reserved for two or more persons, but that no extra charge be made for one person if the compartment or drawing room would otherwise be vacant.

STATE COMMISSIONS

The California Railroad Commission has ordered a hearing on November 30 in its investigation of the rates, practices and regulations of the Pullman Company.

The Idaho Public Utilities Commission has granted the application of the Pacific Northwest Demurrage Bureau for permission to increase demurrage charges on refrigerator cars.

The Tennessee Railroad Commission is taking measures to compel the Illinois Central to reduce all passenger fares in that state to the basis of 2½ cents a mile. All of the other principal roads in the state have complied with the wishes of the authorities by making reductions to this basis. The Illinois Central is expected to contest in the courts the order issued, or to be issued, by the commission.

The New Hampshire Public Service Commission, in refusing the request of the Boston & Maine and the Grand Trunk for approval of a proposed increase in mileage ticket rates in that state from 2 to 2¼ cents a mile, quotes the statute which requires the issuance of 500-mile tickets at a rate of two cents a mile, and holds that "we should not enter upon a long and expensive hearing to determine whether the rate fixed is compensatory until it has been determined by the Supreme Court that it is our duty to do so."

The Railroad Commission of Louisiana has issued an order that no regular freight or passenger station, or flag station, shall be closed or discontinued by any railroad operating in the state without the consent of the railroad commission, except for causes beyond control of the railroad. No railroad telegraph office shall be closed, abandoned or discontinued without the consent of the commission, except for causes beyond control. In case any station or telegraph office is closed for causes beyond the control of the railroad, a full report of the causes shall be made to the commission immediately and arrangement to reopen it must be made within 15 days. The commission has also ordered that wherever through trains are operated in the state through tickets shall be sold from any agency station to any agency station at which the train stops. When passenger trains are scheduled to make connections at junction points with trains of other railroads through tickets shall be sold between points on the different railroads.

PERSONNEL OF COMMISSIONS

R. F. Peters, mechanical engineer of the San Antonio & Aransas Pass, has been appointed senior mechanical engineer, division of valuation, of the Interstate Commerce Commission, with headquarters at Kansas City, Mo.

COURT NEWS

The Southern Pacific was fined $100,000 in the United States District Court at Los Angeles on September 21, on a charge of rebating in offering a Redlands, Cal., orange growers' association preferential rates from St. Louis to Chicago.

The attorney general of Missouri has filed a suit in the state court at Jefferson City to enforce a statute requiring the railroads to transport the Missouri National Guards at a flat rate of one cent a mile. The railroads are contending that the statute in question was repealed by implication by the act creating the commission and empowering the state railroad commission to fix just reasonable rates.

French Train Services Resumed.—It is reported from Paris that the Northern railways are about to resume their train services to places previously occupied by Germans. On the Northern line trains which already travel to Plerrifitte, Pontoise, Argenteuil, and Sevran-Livry will soon be run as far as Chantilly, Crecy in Valois, and Dammartin. On the Eastern line trains go to Lagny. On the Belfort line the service is normal.

Railway Officers

Executive, Financial, Legal and Accounting

L. A. Farquhar has been appointed auditor of the Norfolk Southern, with office at Norfolk, Va., succeeding W. L. Bird, resigned.

J. R. McCoy has been appointed assistant auditor for the receivers of the Denver, Laramie & Northwestern, with office at Denver, Colo.

W. C. Bowhay has been appointed freight claim agent of the Cincinnati, Hamilton & Dayton, with office at Cincinnati, Ohio, succeeding B. M. Waldron, resigned to accept service with the Baltimore & Ohio.

H. L. Utter, assistant secretary and assistant treasurer of the Missouri Pacific at New York, has been elected secretary and treasurer, with headquarters at New York, and S. N. Rice, assistant to Mr. Utter, has been appointed assistant secretary and assistant treasurer, with headquarters in New York, succeeding Mr. Utter.

J. A. D. Vickers, who has recently been acting vice-president and general manager of the American Express Company, at Chicago, has been elected vice-president and general manager, succeeding George C. Taylor, who recently was elected president. Mr. Vickers was until recently general manager of the National Express Company.

Thomas Hackney, of the firm of Thomas & Hackney, of Carthage, Mo., has been appointed general attorney for the Missouri Pacific and the St. Louis, Iron Mountain & Southern for Jackson County, Mo., with headquarters at Kansas City, Mo. The firm has represented the system at Carthage since 1903. Thomas L. Phillips, assistant to the general solicitor, has been appointed valuation attorney, with headquarters at St. Louis.

Operating

F. J. McKee has been appointed superintendent of the Port Huron, Mich., terminals of the Grand Trunk, succeeding J. F. Jones, resigned, on account of ill-health.

George A. Hoag, whose appointment as superintendent of car service of the Canadian Northern, Eastern lines, with headquarters at Toronto, Ont., has already been announced in these columns, was born on May 31, 1866. He was educated in the Kingston public schools and at the Kingston Business College. On June 8, 1884, he began railway work as a switchman on the Grand Trunk, serving in the same capacity at various places until May 3, 1886, when he was appointed night operator. He remained in that position until January, 1888, and then was promoted to day operator and relief agent. In 1899 he was appointed agent at Trenton, Ont., and from 1901 to 1905 he was yardmaster at Belleville. He then entered the service of the Central Ontario, a Canadian Northern line, and from October, 1905, to March, 1908, was trainmaster on that road. He was promoted to superintendent on March 1, 1908, and in July, 1914, was appointed superintendent of car service of the Canadian Northern, Eastern lines, as above noted.

G. A. Hoag

T. F. McCarthy, general yardmaster of the Lehigh Valley at Jersey City, N. J., has been appointed trainmaster, with office at Jersey City, succeeding M. A. Mulligan, promoted.

George P. Johnson, general manager of the Chesapeake & Ohio, at Richmond, Va., has resigned, and at present no successor will be appointed, the work being divided among other officers.

H. C. Grout, assistant general superintendent of the Canadian Pacific at St. John, N. B., has been appointed general superintendent of the Atlantic division, with headquarters at St. John, succeeding William Downie, retired.

Traffic

W. S. Smith, traveling freight agent of the Frisco Lines at Houston, Tex., has been appointed assistant general freight agent of the St. Louis, Brownsville & Mexico, at Kingsville, Tex.

Claude P. Wilson, commercial agent of the Missouri, Oklahoma & Gulf at Houston, Tex., has been appointed general agent at Dallas, Tex., succeeding F. S. Sleight, resigned on account of ill health.

W. T. Webster, division freight agent of the Chicago, Indianapolis & Louisville at Bedford, Ind., has been appointed general freight agent, with office at Chicago, succeeding O. C. Carter, resigned.

F. R. Darby, traveling passenger agent of the Western Maryland, at Cumberland, Md., has been promoted to the new position of district passenger agent, with headquarters at Pittsburgh, Pa., and William E. Zirckel has been appointed traveling freight agent, with headquarters at Cleveland, Ohio.

Engineering and Rolling Stock

George Strasding has been appointed roadmaster of the Pasco division of the Northern Pacific, at North Yakima, Wash.

O. E. Shaw has been appointed general car foreman of the Chicago & Eastern Illinois at Danville, Ill., succeeding Harry G. Love, resigned.

W. H. Snyder, whose appointment as master mechanic of the Erie, with headquarters at Stroudsburg, Pa., has been announced in these columns, was born on July 14, 1874, at Ashley, Luzerne county, Pa. He began railway work on March 18, 1894, as machinist apprentice in the Central of New Jersey shops at Ashley, remaining with that road until July, 1901, when he went to Stroudsburg as a machinist in the Erie shops. In October, 1903, he was promoted to tool room foreman, and in November, 1905, was appointed assistant to general foreman. He remained in that position until January, 1912, when he was promoted to general foreman, which position he held at the time of his appointment on September 1, as master mechanic of the same road, as above noted.

OBITUARY

George L. Rhodes, formerly assistant general passenger agent of the Chicago, Rock Island & Pacific, died on September 23 at his residence in Chicago, aged 65 years.

E. B. Gilbert, formerly superintendent of motive power of the Bessemer & Lake Erie, died at his home in Greenville, Pa., on September 7. Mr. Gilbert was born at Windsor, N. Y., on December 13, 1843. He took up the trade of machinist, and later was employed on the Erie Railroad, both at Youngstown, Ohio, and at Galion, in the latter place holding the position of foreman. He went to Greenville about 28 years ago, and entered the service of the Pittsburg, Shenango & Lake Erie, now the Bessemer & Lake Erie. He was promoted from machinist foreman to master mechanic, and later to superintendent of motive power, which position he held until his resignation in 1909.

An English Employee's Revenge.—On September 10 in a London court a foreman on the London, Brighton & South Coast was sentenced to 12 months' imprisonment for having cut electric wires connected with signaling apparatus on his railroad. The prisoner declared that his motive was revenge on the company for not allowing him to work overtime.

Equipment and Supplies

LOCOMOTIVE BUILDING

The Nashville, Chattanooga & St. Louis is considering the purchase of 10 Mikado and 7 Pacific type locomotives.

CAR BUILDING

The hearing on the application of the receivers of the Cincinnati, Hamilton & Dayton, for authority to issue certificates for purchase of additional equipment as mentioned recently in the *Railway Age Gazette* has been indefinitely postponed. This action was taken in view of the financial situation, the receivers believing that too high a rate of interest would have to be paid at this time.

IRON AND STEEL

The Denver Union Terminal has ordered 703 tons of steel for a new Union station at Denver, Colo., from the American Bridge Company.

The Chicago & Western Indiana has ordered 465 tons of material for a bridge over Little Calumet river, near Dalton, Ill., from the American Bridge Company.

Pass Privileges for Wives of Enlisted English Railwaymen.—The various railway companies of England have announced that they will continue to grant passes and privilege tickets to the wives and families of Reservists or Territorials who have been called out from the service to join the colors, exactly as though the men were still in railway employ.

British Locomotive Exports Decline Because of War.—The value of locomotives exported from the United Kingdom in August decreased sharply as compared with like business for previous months. The value of the engines shipped was $1,019,760, as compared with $1,460,335 in August, 1913, and $559,568 for August, 1912. Depression in Argentina has greatly reduced the demand for British locomotives in that quarter and engines to the value of only $44,100 were shipped in August as compared with $436,650 and $106,456. There was a good demand for British locomotives in Australia in August, but the value of the engines despatched to India during the month declined to $241,360 as compared with $483,089 in August, 1913. The aggregate value of the locomotives exported during the first eight months of the present year, on the other hand, was $12,811,702 as compared with $8,672,823 in the first eight months of 1913 and $6,427,750 in the first eight months of 1912.

Trespassing Reduced to a Science.—When a locomotive makes its first trip along the rails in an out-of-the-way place the natives look upon it with awe. The Chinese, for example, would not allow the "fire devil" to move until Li Hung Chang mounted beside the driver. After a while, on the other hand, this feeling of dread is changed to one of overwhelming confidence, especially on the part of men employed on the line and of people living close to it. The familiarity thus engendered leads to most of the fatalities among maintenance of way employees, trespassers, people at grade crossings and others walking along the line. It is said that in India the right of way is a favorite resting place of cowherds in particular and that the space between the rails has been proved many times to be quite safe to lie down in. When women and children are employed to unload ballast from a train they are fond of sleeping with their heads on the rails during the dinner hour, and it is necessary to walk along the train and awake them before it is moved in order to avoid wholesale decapitation. A recent incident occurred on the Eastern Bengal State Railway in which three natives engaged in maintenance of way work who had been set to watch the line by which the governor was to travel laid their ears on the rails, the better to hear the approaching train, went to sleep and were run over.

Supply Trade News

F. J. O'Brien has been appointed general sales agent of the Globe Seamless Steel Tubes Company, Chicago, effective October 1.

The Chicago & Alton has contracted with the Hupp Automatic Exchange system for the installation of its mail exchange system on mail cars, and at 33 stations between Chicago and St. Louis.

The Central Trust Company of Illinois has been appointed receiver of the Crawford Locomotive & Car Company at Streator, Ill. An involuntary petition in bankruptcy was filed against the company last week.

The Monarch Steel Castings Company, Detroit, Mich., announces the opening of an exhibit of Lion and Monarch couplers, Lion coupler pockets for locomotives and Lion cast steel yokes in the office of H. F. Wardwell, their Chicago representative at 548 Railway Exchange, Chicago.

Wellington B. Lee will henceforth handle the Superior rail anchor for the Track Specialties Company, New York, in eastern territory. It is also announced that the Sargent Company, 1418 Fisher building, Chicago, will represent the Track Specialties Company in the Chicago district.

Al H. Hoffman, president of the Wimo Supply Company, 304 Oriental building, Seattle, Wash., the representative of the Indianapolis Switch & Frog Company, Springfield, Ohio, in Seattle and vicinity, has also been appointed to cover the territory formerly handled through representatives at Spokane and Portland.

The general sales offices of the Cambria Steel Company, now located at Johnstown, Pa., are to be removed within a few weeks to Philadelphia, it being the desire of the company to have the general sales offices and the executive offices in the same place. It is expected that not later than November 1 the entire sales offices will be located on the seventeenth floor of the Morris building in Philadelphia. It is also the intention of the company to establish sales offices in the near future in Rio de Janeiro, Brazil; Mexico City, Mexico; Buenos Aires, Argentina, and London, England. The company proposes to seek foreign trade vigorously, and in this the location of the sales offices in Philadelphia is expected to prove advantageous.

Ellis F. Muther, eastern sales manager of the Gisholt Machine Company, Madison, Wis., with headquarters in New York, has been appointed general sales manager of the company, with office at Madison. It is also announced that J. E. Brandt, hitherto representative in Philadelphia and vicinity, has become associated with the Swind Machinery Company, which has been appointed a Gisholt agency in that city. J. L. Osgood has been appointed exclusive agent in Buffalo and Rochester, N. Y. R. D. Heflin, formerly representative of the company in New England, has been placed in charge of the New York office, and will henceforth attend to the interests of Gisholt customers and users in the entire eastern territory.

TRADE PUBLICATIONS

Highway Crossing Signals.—The Hall Switch & Signal Company, New York, has issued a 16-page pamphlet, 6 in. x 9 in., describing, with illustrations, its "audible-visible" highway crossing signal. This signal is an enclosed disk, like the well known Hall block signal, with a bell added. By day a red disk, and by night a red light furnishes a warning for the automobilist, even if he be deaf. An interesting installation of this type of signal at a crossing on the Lehigh Valley was described in the *Railway Age Gazette*, June 19, last, page 1522. The Lehigh Valley has 47 crossings protected by these signals. The pamphlet calls attention to the fact that this signal is time-tested, the design of the apparatus being substantially the same as that which has proved eminently successful in block signals in all parts of the country for forty years.

Railway Construction

Alabama Great Southern.—A contract is reported let to H. C. Elkins, Baltimore, Md., for 11 miles of double-track work between Birmingham, Ala., and Mobile Junction. (August 14, p. 310.)

Bellingham & Northern.—A contract is reported let to Henry & McFee, Seattle, Wash., to build a three-mile extension from Bellingham, Wash., to Whatcome lake. This company is a subsidiary of the Chicago, Milwaukee & St. Paul, and operates 44 miles of railway from Bellingham, Wash., north to Sumas, thence southeast to Glacier.

Canadian Pacific.—The Railway Commission of Canada has authorized the Canadian Pacific to open for traffic a single track diversion of the Moose Jaw subdivision, from Indian Head, Sask., mileage 50 to Qu'Appelle, mileage 59.8; and new second track from mileage 59.8 to 67.7 near McLean, Sask.

Chicago, Milwaukee & St. Paul.—The report of this company for the year ended June 30, 1914, shows that construction work has been in active progress during the year on the second main track and grade reduction work on the Chicago and Council Bluffs division in Iowa, also on the Hastings and Dakota division, and it is expected to have the improvements finished and the new tracks open for operation before the coming winter between Green Island, Iowa, and Manilla, 270 miles. Work is now under way depressing the tracks on about three miles along the Hastings and Dakota division, in the city of Minneapolis, Minn., which will eliminate 37 grade crossings. About 35 per cent of the work has been completed, and it is expected that all the work will be finished early in 1916. The elevation of the tracks along the Bloomingdale road in the city of Chicago on 2.4 miles is under way, and when completed will eliminate 35 grade crossings. Elevation of tracks in the city of Milwaukee, Wis., is now under way on 1.4 miles, and is about 15 per cent completed; the work will be continued over a period of two years, and when finished this improvement will eliminate 14 grade crossings. Work was begun in February of this year on the elevation of tracks on the Chicago and Evanston division, from Montrose avenue to Howard avenue, Chicago, on 4.4 miles, and this work is now about 15 per cent completed. The work will extend over a period of three years, and will eliminate 36 grade crossings. Work on the extension from Crystal Falls, Mich., to Iron River is about finished, and the main line and connections with the various iron mines have been completed and are in operation. The line from Lewistown, Mont., to Great Falls, 137 miles, is also finished, and will be opened for operation in September. Construction of the Choteau line from Great Falls, Mont., to Agawam, 70 miles, has been temporarily suspended, and will not be completed before next season. The lines from Hilger, Mont., to Roy; from Roy Junction to Winifred; from Lewistown to Grass Range, and from Colorado Junction to Cliff Junction have been completed and are in operation. The line into Spokane, Wash., has been completed and is in operation, the C. M. & S. P. having entire ownership of the line from Plummer, Idaho, to Bell, Wash., 21 miles, and joint use with the Oregon-Washington Railroad & Navigation Company of that company's line from Bell to Spokane. In the city of Spokane the terminal tracks and buildings and freight house have been completed and are in operation. Work on the Newwood River line, a logging road extending 17 miles northwesterly from Merrill, Wis., was started in October, 1913, and up to June of this year the grading was completed on about 8 miles, and the track was laid on about 4 miles. The construction of the Snoqualmie tunnel, at the summit of the Cascade mountains, is nearing completion, the work being carried on from both portals, and it is expected that the tunnel will be open for traffic early in 1915. This improvement will provide a route 3.6 miles shorter than the existing line; it will also avoid all trouble caused by snow slides on the Coast division, and the heavy grades will be eliminated.

Chicago & North Western.—The report of this company for the year ending June 30, 1914, shows that work on the elevation

of the six main tracks on the Galena division in the village of River Forest, Ill., 0.6 miles and the construction of an elevated yard with a capacity for 300 cars is now under way, and it is expected that the improvements will be completed during 1914. At Milwaukee, Wis., the company has undertaken the elevation of the main tracks and certain yard tracks on the Wisconsin division on 1.04 miles and on the Madison division on 0.77 miles. In connection with the elevation of the existing tracks, provision has been made for the construction of two additional tracks on the Wisconsin division. These improvements include the construction of two subways on the Wisconsin division and two on the Madison division. The total miles of main, yard and side tracks to be elevated are equivalent to 14.81 miles of single track railway. Work is now under way on important revisions of grade between Nelson, Ill., and Peoria. During the year substantial progress has been made in the filling, and a protection crib has been completed in connection with the filling in and occupying with additional tracks, about ten acres of submerged lands east of the company's present holdings on the shore of Lake Michigan in Milwaukee, Wis. The Macoupin County Extension Railway, organized to build from a connection with the Macoupin County Railway near Benld, south about nine miles to coal fields under development in Macoupin and Madison counties, Illinois, was finished during the year from Benld to Staunton, 4.36 miles, and the Iowa Southern, organized to build from a connection with the C. & N. W., in Monroe county, Iowa, southwest for about 25 miles, was completed during the year from a connection with the C. & N. W., at Miami, Iowa, to the company's coal fields in Monroe county, 12.25 miles.

Chicago, St. Paul, Minneapolis & Omaha.—The report of this company for the year ended June 30, 1914, shows that during the year work was finished on the extension from Kaiser, Wis., to Park Falls, 5.99 miles, and the line is now in operation. Work on second track was also completed and is now in operation between Truax, Wis., and Northline, and on additional yards at Hazel Park and at Minneapolis, Minn. Filling for a new coach yard at Minneapolis, Minn., has been finished, and a new yard for the interchange of traffic between the Eastern and Northern divisions was constructed at Northline, Wis., containing 2.98 miles of track. The net increase in sidetracks and in yard tracks during the year was 12.01 miles.

Georgia Roads.—Plans are being made to build a line from Homer, Ga., northwest to Lula on the Southern Railway about 15 miles. In addition about 3 miles of sidings are to be constructed also a 40-ft. span bridge. Prices are now wanted by D. G. Zeigler & Sons, Lula, for supplying rails, switches, frogs, spikes, etc.

Kentucky Roads (Electric).—A franchise has been granted by the city of Middlesboro, Ky., to Godfrey Hunter to build about 5.5 miles of electric lines to connect Middlesboro with adjoining towns.

Lorain, Ashland & Southern.—An officer writes that in addition to the line in operation from Custaloga, Ohio, northwest to Ashland, 23 miles, a section of 24 miles on the extension building from Ashland north via Wellington to Lorain has been completed and was opened for business on September 5. A total of 67 miles of track has been laid, and it is expected that the remaining section to Lorain will be opened for business at an early date.

Louisville & Nashville.—This company is securing rights of way, it is said, for building an extension from the line now ending at Cartersville, Ga., southeast to a connection with the line ending at Marietta, thence to Atlanta. It is thought that the Louisville & Nashville is back of the North Georgia Mineral, recently incorporated to build from Atlanta northwest about 50 miles.

Minneapolis, St. Paul & Sault Ste. Marie.—An officer writes that track will be laid in October on an extension from a point four miles west of Makoti, N. D., on the Plaza line, west to Van Hook in Mountrail county, 23 miles. The line is eventually to be extended further west to Fairview, Mont. Foley Brothers, Welch & Stewart, St. Paul, Minn., had the contract for the grading work, which involved handling about 37,000 cu. yd. to the mile.

Murphysboro & Southern Illinois (Electric).—This company has prepared plans for an 8-mile electric railway to be built between Murphysboro, Ill., and Carbondale. Edward Flad & Co., De Menil building, St. Louis, Mo., engineers.

North Georgia Mineral.—See Louisville & Nashville.

South Florida & Gulf.—Work is now under way, it is said, on a line from Kenansville, Fla., to a point on the Kissimmee river, about 37 miles. The construction work is being carried out by the company with day labor, and about 6 miles of track has been laid. C. H. Armstrong, president, Kenansville, Fla.

RAILWAY STRUCTURES

Albert Lea, Minn.—The Minneapolis & St. Louis has awarded a contract for the erection of a passenger station at Albert Lea, Minn., to C. F. Mayer & Co., Humboldt, Ia. The structure is to be of brick with a red tile roof. The cost is estimated at $30,000.

Elkins, W. Va.—The Western Maryland has given a contract to the Enterprising Construction Company, Elkins, it is said, to rebuild the freight house at Elkins recently damaged by fire.

Hawkinsville, Ga.—The Southern Railway has given a contract to R. V. LaBarre, Birmingham, Ala., for building a new frame passenger station 31 ft. by 88 ft., with tile roof, at Hawkinsville. The present combined passenger station and freight house will be remodeled and used exclusively as a freight house. Some track changes and paving are also included in the work to be carried out.

Huron, S. D.—The report of the Chicago & North Western for the year ended June 30, 1914, shows that the more important additions and betterments carried out during the year include the following: A brick passenger station, also a two-story brick freight house and six additional parallel yard tracks were constructed at Huron, S. Dak. Modern brick passenger stations were completed or are nearing completion at Rochelle, Barrington, Woodstock, Des Plaines and Crystal Lake, Ill.; De Pere and Jefferson, Wis.; Iron River, Mich.; and at Rapid City, Sturgis and Redfield, S. Dak. Combined freight houses and office buildings of brick construction are nearing completion at Green Bay, at Manitowoc, Wis., and at Ironwood, Mich. Other improvements were completed at Green Bay, Wis., consisting of a 40-stall brick engine house, power house, machine shop, store and oil house, and other structures, also additional trackage. Work is now under way at South Pekin, Ill., and at Norfolk, Neb., putting up two-story brick office buildings. Additions were also made during the year at the Chicago shops. The machine shops, power house and store and office buildings at Clinton, Iowa, under construction last year have also been completed, and at Escanaba, Mich., the company's coal dock has been extended 300 ft., and two bridges, each consisting of one truss span 163 ft. long, and connected with present towers, have been installed.

Lexington, Ky.—A building permit has been issued to the Louisville & Nashville for the construction of a 12-stall roundhouse and repair shops in the yard at Lexington, and work on these improvements is now under way.

North Toronto, Ont.—The Railway Commission of Canada has approved the plans submitted by the Canadian Pacific and the Canadian Northern for a proposed subway to be built at Dovercourt road, North Toronto.

Wayne, Neb.—The report of the Chicago, St. Paul, Minneapolis & Omaha for the year ended June 30, 1914, shows that a brick passenger station was built at Wayne, Neb.; new frame passenger stations were constructed at Woodville and Solon Springs, Wis., and combined passenger and freight stations were built at Nicols, Minn., and at Wilder. A number of new structures were also put up at Park Falls, Wis. Improvements to the enginehouse facilities at Altoona, Wis., were completed, and a 4-stall brick enginehouse was built at Duluth, Minn. Work is now under way on an 8-stall brick enginehouse, also on a water tank, sand house, cinder pit and turntable at Sioux Falls, S. D. During the year work was finished on the viaduct at Earl street, St. Paul, Minn., and work has been started on a viaduct at Nicholas street, Omaha, Neb., jointly with the Missouri Pacific and the Omaha Bridge & Terminal Railway companies. This work is expected to be finished in the fall of 1914.

Railway Financial News

Central of New Jersey.—Frederick G. Bourne, of the Singer Sewing Machine Manufacturing Company, has been elected a director of the Central of New Jersey, succeeding H. C. Fahnestock, deceased.

Chicago, Rock Island & Pacific.—N. L. Amster, holding $350,000 of the railroad collateral 4's, has asked by advertisement that bondholders send him their names and that a meeting of the bondholders be called to select a committee other than the Wallace committee, the new committee to be empowered to co-operate in securing the deposit of bonds as promptly as possible for the purpose of procuring the sale of the stock and its acquisition by the present bondholders; to enforce and receive the distribution of the railway stock represented by their bonds and its deposit with the new committee; to adjust the charges properly payable as their share of the expenses incurred by the trustee in securing the return of their stock; to procure the election of a new board of directors of the railway company that will represent exclusively their interests; to enforce the recovery for their benefit of $7,500,000 which is claimed to have been improperly paid from the funds of the railway company to the holding company, and which is largely responsible for the present plight of the railway company; to inaugurate a drastic investigation of the accounts and transactions of the past management with a view of further recoveries wherever warranted by the facts; and to provide a plan for financing the future money requirements of the railway company.

Erie.—Holders of a substantial part of the $4,550,000 notes matured October 1 accepted 3-year 5 per cent notes in exchange, and the remainder of the new 3-year notes, it is understood, have been sold.

The Erie has asked the New York Public Service Commission, Second district, for permission to issue $900,000 4½ per cent car trust certificates, series BB. Arrangements have been made for the sale of the notes to Drexel & Company, Philadelphia, at 97.

Maine Central.—As shown by the annual report this company, operating 1,207 miles, in the fiscal year ended June 30, 1914, had net income after the payment of expenses, rentals, taxes and interest of $1,348,061 as compared with $1,118,544 in 1913. There was a slight increase of 1.43 miles in mileage operated. The road operates a main line from Portland, Maine, to Vanceboro, which is part of the route from Boston to the provinces via the Boston & Maine, the Maine Central and the Canadian Pacific. There are also lines to St. Johnsbury, Vt., Lime Ridge, Que., and Kineo, Rockland, Belfast, Calais and other points in Maine. For some time this road has been controlled by the Boston & Maine, but in April an arrangement was made as noted below whereby the Boston & Maine stock was purchased by Maine Central interests. During the fiscal year just closed the road earned a freight and passenger revenue per mile of $6,166 and $3,374 respectively, comparing with $5,912 and $3,361 for the previous year. The freight revenue, constituting 63.66 per cent of the total, increased from $7,126,071 to $7,440,035. The ton mile rate in 1914 was 1.050 cents, as against 1.086 in 1913, but the ton mileage increased from 656,351,489 to 708,894,306. The tonnage was made up principally of potatoes, coal, lumber, pulp wood, pulp and paper. The passenger receipts showed little change, there having been a slight increase from $3,511,171 to $3,517,583. The passenger mileage decreased, but there was an increase in the revenue per passenger mile from 2.083 to 2.184 cents to compensate. The average trainload of revenue freight in 1914 was 271 tons, and in 1913 259. The company in 1914 paid dividends of 6 per cent, which called for $1,491,797. The net income, however, was but $1,348,061, so that $143,736 had to be carried to the contingent fund. The funded debt on June 30, 1914, was $4,000,000 greater than in 1913, $6,000,000 of 5-year 5 per cent coupon bonds having been issued on May 1, 1914, to provide funds for the payment of the 5-year coupon notes amounting to $2,000,000 maturing April 1, 1914; to provide funds for various corporate purposes, and to pay a note of $3,000,000 issued to permit the company to pay for the entire $3,000,000 capital stock at par of the Maine Railway Companies formed to purchase from the Boston & Maine its entire holdings of 159,601 Maine Central shares. At the end of the year the Maine Central had on hand $704,778 cash, a considerable decrease from the $1,929,902 of the year before.

Muscatine North & South.—Charles N. Voss and E. H. Ryan have been appointed receivers of this road. The road runs from Muscatine, Iowa, to Burlington, 53 miles.

New York Central & Hudson River.—This company has asked J. P. Morgan & Co., New York, to manage a syndicate to take $40,000,000 notes, of which half are to be 5 per cent six-months notes and the other half one-year coupon notes. The Wall Street Journal says that the railroad company will secure its money probably, at approximately 7 per cent.

New York, New Haven & Hartford.—William Rockefeller, George F. Baker, Charles F. Brooker and James S. Elton have resigned as directors of the New York, New Haven & Hartford, and J. Horace Harding, of C. D. Barney & Co., New York, has been elected a director.

New York, Ontario & Western.—This company, operating 568 miles in the fiscal year ended June 30, 1914, had net income, after the payment of expenses, rentals, taxes and interest, of $663,692, as against $1,211,633 in the previous year. There was no change in the mileage operated, and the decreased net was due to a loss of 4.37 per cent in gross, an increase of 2.98 per cent in expenses, and a slight loss in other income offset by slightly lower interest charges due to the payment of maturing equipment trust notes. The New York, Ontario & Western is controlled by the New York, New Haven & Hartford. Its main line runs from Weehawken, N. J., opposite New York city, to Oswego, N. Y., with two important branches, one to Scranton, Pa., and the other to Utica, N. Y. In 1914 the road earned $12,109 from freight and $3,480 from passenger per mile, comparing with $12,926 and $3,470 per mile in 1913. Of the total earnings from freight—$6,893,176—in 1914, $4,334,679 was from coal traffic and $787,339 from milk, with $1,013,462 from local freight. The falling off in freight revenue was due to a falling off in all classes of freight tonnage, and the slight gain in passenger revenue was due to a higher average passenger-mile rate because of a larger proportion of local passenger business. The ton-mile rate in 1914 was 7.84 mills, as against 7.83 mills in the previous year, the total ton mileage carried being 878,519,133 in 1914, as against 933,144,824 in 1913. The average passenger receipts per passenger-mile in 1914 amounted to 1.970 cents, and in 1913 to 1.934 cents. The average trainload of revenue freight in 1914 was 301, and in 1913 308. The company had been paying two per cent dividends, which called for $1,162,130. No dividend, however, was declared in 1914, so that the $663,482 net income was available as working capital, no new securities being sold during the year. At the end of the year the company had on hand $513,204 cash, with loans and bills payable of $149,855. The expenditures for additions and betterments in 1914 totaled $264,179, and for necessary addition to equipment, $1,016,977.

Old Colony Railroad.—James Hustis, president of the Boston & Maine, has resigned as a director of the Old Colony, and has been succeeded by Frank A. Farnham.

Pere Marquette.—The first mortgage bondholders have withdrawn their appeal against Judge Tuttle's order in the United States district court permitting the issue of $4,000,000 receiver's certificates, of the proceeds of which $2,000,000 was to be used to pay taxes in Michigan and thus avoid a tax penalty of $5,000 a month. Arrangements for the sale of the certificates have not as yet been made.

The Railway Mileage of Great Britain.—The preliminary returns of the British railways for the year 1913 show that in that year there were 40,689 miles of line open for operation. Of this but 23,718 miles, or 59 per cent, was single track. The prelimary return does not divide this into English and Welsh, Scottish and Irish, but taking the returns for 1912, where it is divided as a basis, it is found that 33 per cent of the English and Welsh, 58 per cent of the Scottish and 80 per cent of the Irish are single-track lines.

ANNUAL REPORTS

CHICAGO AND NORTH WESTERN RAILWAY COMPANY

REPORT OF THE BOARD OF DIRECTORS

To the Stockholders of the Chicago and North Western Railway Company:

The Board of Directors submit herewith their report of the operations and affairs of the Chicago and North Western Railway Company for the fiscal year ending June 30, 1914.

Average number of miles operated, 8,070.61.

OPERATING REVENUES:		
Freight Revenue	$53,989,475.43	
Passenger Revenue	21,540,542.79	
Other Transportation Revenue	7,028,438.19	
Non-transportation Revenue	1,118,594.38	
Total Operating Revenues		$83,677,050.79
OPERATING EXPENSES (70.99 per cent. of Operating Revenues)		59,405,141.53
Net Revenue—Rail Operations		$24,271,909.26
OUTSIDE OPERATIONS—Net Deficit		14,149.85
Net Railway Operating Revenue		$24,257,759.41
RAILWAY TAX ACCRUALS (5.08 per cent. of Operating Revenues)		4,252,790.29
Railway Operating Income		$20,004,969.12
OTHER INCOME:		
Rental Income	$198,540.63	
Dividend Income	1,579,236.39	
Income from Funded Securities	5,650.00	
Income from Unfunded Securities and Accounts, and Other Items	1,137,333.77	
Total Other Income		2,920,760.79
Gross Income, carried forward		$22,925,729.91
DEDUCTIONS FROM GROSS INCOME:		
Rental Payments	$1,265,866.98	
Interest Deductions for Funded Debt	9,239,007.59	
Other Deductions	114,713.13	
Total Deductions		10,619,587.70
Net Income		$12,306,142.21
DISPOSITION OF NET INCOME:		
Sinking Funds	$200,472.61	
Dividends—		
8% on Preferred Stock	1,791,600.00	
7% on Common Stock	9,108,015.00	
Total		11,100,087.61
Balance Income for the year		$1,206,054.60

The results as compared with the preceding fiscal year were as follows:

Passenger Revenue increased		$982,919.54
Non-transportation Revenue increased		394,196.19
		$1,377,115.73
Freight Revenue decreased	$672,112.80	
Other Transportation Revenue decreased	63,873.22	
		735,986.02
Total Operating Revenues increased		$641,129.71
Operating Expenses increased	$1,152,361.31	
Railway Tax Accruals increased	655,630.49	
Operating Expenses and Railway Tax Accruals increased	$1,807,991.80	
Net Deficit from Outside Operations increased	25,446.20	
		1,833,438.00
Railway Operating Income decreased		$1,192,308.29

Of the Operating Expenses for the current fiscal year $33,871,483.08, or 57.02 per cent., was paid employes for Labor, as compared with $32,911,995.31, or 56.50 per cent., paid during the preceding fiscal year. The increase of $959,487.77 in the amount paid is accounted for as follows:

Increase account higher rates of compensation	$534,506.41
Increase account more time worked	424,981.36
	$959,487.77

MILES OF RAILROAD

The total number of miles of railroad owned June 30, 1914, was 7,945.50 miles

In addition to which the company operated:

THROUGH OWNERSHIP OF ENTIRE CAPITAL STOCK—		
Wolf River Valley Railway (Junction east of Elton to Van Ostrand, Wis.)	1.98	"
UNDER LEASE—		
De Pue, Ladd & Eastern Railroad (Ladd to Seatonville, Ill.)	3.25	miles
Belle Fourche Valley Railway (Belle Fourche to Newell, S. D.)	23.52	"
James River Valley and North Western Railway (Blunt to Gettysburg, S. D...)	39.55	"
Macoupin County Extension Railway (Benld to Staunton, Ill.)	4.36	"
	70.68	"
UNDER TRACKAGE RIGHTS—		
Peoria & Pekin Union Railway (in the city of Peoria, Ill.)	2.02	"
Chicago, Indiana & Southern Railroad (Churchill to Ladd, Ill.)	2.80	"
Union Pacific Railroad (Broadway Station, Council Bluffs, Iowa, to South Omaha, Neb.	8.73	"
Missouri Valley and Blair Railway and Bridge Company's track	3.36	"
Chicago, St. Paul, Minneapolis & Omaha Railway:		
Blair to Omaha, Neb.	24.70	"
Elroy to Wyeville, Wis.	22.79	"
In Sioux City, Iowa	2.28	"
Illinois Central Railroad (Sioux City to Wren, Iowa)	10.10	"
	76.78	"
Total miles of railroad operated June 30, 1914	8,094.94	"

The above milcage is located as follows:

In Illinois	824.53	miles
In Wisconsin	2,170.03	"
In Michigan	519.88	"
In Minnesota	650.30	"
In Iowa	1,620.26	"
In North Dakota	14.28	"
In South Dakota	1,063.15	"
In Nebraska	1,102.05	"
In Wyoming	130.46	"
Total	8,094.94	"

FREIGHT TRAFFIC

The details of Freight Traffic for the year ending June 20, 1914, compared with the preceding year, were as follows:

	1913	1914	Decrease—Amount	Decrease—Per Cent.
FREIGHT REVENUE	$54,661,588.23	$53,989,475.43	$672,112.80	1.23

	1913	1914	Percentage of Increase or Decrease
TONS OF FREIGHT CARRIED	44,839,071	43,309,643	3.41 Decrease
TONS OF FREIGHT CARRIED ONE MILE	6,282,916,222	6,229,944,171	.84 Decrease
AVERAGE REVENUE RECEIVED PER TON	$1.22	$1.25	2.46 Increase
AVERAGE REVENUE RECEIVED PER TON PER MILE	.87 of a cent	.87 of a cent	....
AVERAGE DISTANCE EACH TON WAS HAULED	140.12 miles	143.85 miles	2.66 Increase
MILEAGE OF REVENUE FREIGHT AND MIXED TRAINS	18,055,815	17,932 137	.74 Decrease
AVERAGE NUMBER OF TONS OF REVENUE FREIGHT CARRIED PER TRAIN MILE:			
East of Missouri River	375.38	377.64	.60 Increase
West of Missouri River	148.68	152.26	2.41 Increase
Whole Road	347.97	347.61	.10 Decrease
AVERAGE NUMBER OF TONS OF REVENUE FREIGHT CARRIED PER LOADED CAR MILE	18.38	18.44	.33 Increase
AVERAGE FREIGHT REVENUE PER TRAIN MILE	$3.03	$3.01	.66 Decrease

PASSENGER TRAFFIC

The details of Passenger Traffic for the year ending June 30, 1914, compared with the preceding year, were as follows:

	1913	1914	Increase—Amount	Increase—Per Cent.
PASSENGER REVENUE	$20,557,623.25	$21,540.542.79	$982,919.54	4.78

	1913	1914	Percentage of Increase or Decrease
PASSENGERS CARRIED	32,441,450	33,389,428	2.92 Increase
PASSENGERS CARRIED ONE MILE	1,113,831,352	1,173,435,140	5.35 Increase
AVERAGE FARE PAID PER PASSENGER	63 cents	65 cents	3.17 Increase
AVERAGE RATE PAID PER PASSENGER PER MILE	1.85 cents	1.84 cents	.54 Decrease
AVERAGE DISTANCE TRAVELED PER PASSENGER	34.33 miles	35.14 miles	2.36 Increase
MILEAGE OF REVENUE PASSENGER AND MIXED TRAINS	21,378.704	21,537.781	.74 Increase
AVERAGE PASSENGER-TRAIN REVENUE PER TRAIN MILE	$1.23	$1.26	2.44 Increase

MAINTENANCE OF WAY AND STRUCTURES

The total Operating Expenses of the Companyy for the year ending June 30, 1914, were $59,405,141.53; of this amount $12,179,689.85 was for charges pertaining to the Maintenance of Way and Structures. Included in these charges is a large part of the cost of 82,741 tons of steel rails, the greater portion of which was laid in replacement of rails of lighter weight in 600.62 miles of track; also the cost of 3,041,197 new ties.

The charges for Maintenance of Way and Structures also include a portion of the cost of ballasting 89.51 miles of track with crushed stone,

343.75 miles with gravel, and 16.92 miles with cinders; the erection, in place of wooden structures, of 42 new steel bridges on masonry aggregating 3,846 feet in length and containing 3,858 tons of bridge metal; and the replacement of other wooden structures with masonry arch and box culverts and cast-iron pipes, the openings being filled with earth. The wooden structures replaced by permanent work aggregate 11,396 feet in length.

The charges on account of Maintenance of Way and Structures for the year ending June 30, 1914, compared with the preceding year, were as follows:

	1913	1914	Increase or Decrease
Cost of Rails:			
New steel rails	$1,608,212.85	$1,212,258.90	$395,953.95 Dec.
Usable and re-rolled rails	589,407.15	996,460.61	407,053.46 Inc.
	$2,197,620.00	$2,208,719.51	$11,099.51 Inc.
Less value of old rails and other items	1,582,238.40	1,484,363.53	97,874.87 Dec.
Net charge for rails	$615,381.60	$724,355.98	$108,974.38 Inc.
Cost of Ties	1,398,359.45	1,762,313.18	363,953.73 Inc.
Cost of Ballast	193,644.46	227,056.25	33,411.79 Inc.
Cost of Other Track Material	525,805.53	539,118.33	13,312.80 Inc.
Roadway and Track Labor and Other Expenses	4,949,338.52	5,073,539.12	124,200.60 Inc.
Total Charges for Roadway and Track	$7,682,529.56	$8,326,382.86	$643,853.30 Inc.
Other Charges Account Maintenance of Way and Structures were as follows:			
Bridges, Trestles and Culverts	854,794.52	945,128.70	90,334.18 Inc.
Road Crossings, Fences, etc.	325,226.84	331,200.62	5,973.78 Inc.
Signals and Interlocking Plants	444,175.32	451,960.43	7,785.11 Inc.
Buildings, Fixtures and Grounds	1,175,886.10	1,229,244.45	53,358.35 Inc.
Docks and Wharves	214,950.50	53,975.41	160,975.09 Dec.
Superintendence	483,468.65	489,352.50	5,883.85 Inc.
Roadway Tools and Supplies	139,863.67	150,540.57	10,676.90 Inc.
Sundry Miscellaneous Charges	180,291.27	201,904.31	21,613.04 Inc.
Total Charges Account Maintenance of Way and Structures	$11,501,186.43	$12,179,689.85	$678,593.42 Inc.

The above charges for Maintenance of Way and Structures for the current year amount to 20.50 per cent. of the total Operating Expenses, as compared with 19.74 per cent. for the preceding fiscal year.

MAINTENANCE OF EQUIPMENT

The charges on account of Maintenance of Equipment for the year ending June 30, 1914, compared with the preceding year, were as follows:

	1913	1914	Increase or Decrease
Locomotives	$4,688,207.05	$4,831,466.36	$143,259.31 Inc.
Passenger-Train Cars	1,088,442.30	1,070,046.73	9,395.47 Dec.
Freight-Train Cars	5,016,122.00	5,445,489.09	429,367.09 Inc.
Work Equipment	132,975.41	143,446.64	10,471.23 Inc.
Shop Machinery and Tools	229,505.27	229,921.15	415.88 Inc.
Superintendence	335,106.49	358,660.57	23,554.08 Inc.
Sundry Miscellaneous Charges	78,137.67	99,092.63	20,954.96 Inc.
Total Charges Account Maintenance of Equipment	$11,568,496.09	$12,187,123.17	$618,627.08 Inc.

The above charges for Maintenance of Equipment for the current year amount to 20.52 per cent. of the total Operating Expenses, as compared with 19.86 per cent. for the preceding fiscal year.

RESERVE FOR ACCRUED DEPRECIATION ON EQUIPMENT

At the close of the preceding fiscal year there was a balance to the credit of the Equipment Reserve Accounts of		$4,665,712.28
During the year ending June 30, 1914, there was credited to the Equipment Reserve Accounts on account of charges to Operating Expenses and Profit and Loss, and for salvage		3,336,032.63
		$8,001,744.91
And there were charged during the year against the above amount the original cost of Equipment retired and other items, as follows:		
17 Locomotives	$148,486.01	
7 Passenger-Train Cars	28,610.67	
2,467 Freight-Train Cars	1,360,288.60	
172 Work Equipment Cars	31,141.18	
Other Items	343,979.08	
		1,912,505.54
Leaving a balance to the credit of the Equipment Reserve Accounts on June 30, 1914, of		$6,089,239.37

TRANSPORTATION EXPENSES

The Transportation Expenses of the Company for the year ending June 30, 1914, were $31,941,194.36, or 53.77 per cent. of the total Operating Expenses. Of this amount $19,862,352.33, or 62.18 per cent., was charged for labor; $6,905,727.12, or 21.62 per cent., was charged for fuel for locomotives; and $5,173,114.91, or 16.20 per cent., was charged for supplies and miscellaneous items. The decrease in the Transportation Expenses for the year ending June 30, 1914, as compared with the preceding fiscal year, was $300,063.32 or .93 per cent., distributed as follows:

Increase in amount charged for labor	$236,274.32	
Decrease in amount charged for fuel for locomotives	1,020,161.01	
Increase in amount charged for supplies and miscellaneous items	483,823.37	
		$300,063.32

CAPITAL STOCK

There was no change during the year in the Capital Stock and Scrip of the Company.

The Company's authorized Capital Stock is Two Hundred Million Dollars ($200,000,000.00), of which the following has been issued to June 30, 1914:

Common Stock and Scrip held by the Public		$130,117,028.82
Common Stock and Scrip owned by the Company	2,338,502.15	
Total Common Stock and Scrip		$132,455,530.97
Preferred Stock and Scrip held by the Public	$22,395,120.00	
Preferred Stock and Scrip owned by the Company	3,834.56	
Total Preferred Stock and Scrip		22,398,954.56
Total Capital Stock and Scrip, June 30, 1914		$154,854,485.53

FUNDED DEBT

At the close of the preceding fiscal year the amount of Bonds held by the Public and in Sinking Funds was		$193,259,000.00
The above amount has been decreased during the year ending June 30, 1914, as follows:		
Bonds Purchased:		
C. & N. W. Ry. 5% Sinking Fund Debentures of 1933	$4,000.00	
Equipment Taust Certificates Redemed:		
C. & N. W. Ry. 4½% Equipment Trust Certificates of 1912, Series B	300,000.00	
Bonds Redeemed with Sinking Fund Payments:		
C. & N. W. Ry. Sinking Fund of 1879, 6%	$37,000.00	
C. & N. W. Ry. Sinking Fund of 1879, 5%	93,000.00	
	130,000.00	
Total Bonds Purchased or Redeemed		434,000.00
		$192,825,000.00
And the above amount has been increased by Bonds and Equipment Trust Certificates sold and assumed during the year, as follows:		
C. & N. W. Ry. General Mortgage Gold Bonds of 1987, 4%, sold to reimburse the Company for past expenditures made for construction and in redeeming matured bonds	$8,054,000.00	
C. & N. W. Ry. 4½% Equipment Trust Certificates of 1912, Series C, sold	4,000,000.00	
St. Louis, Peoria and North Western Ry. 5% First Mortgage Bonds assumed	10,000,000.00	
		22,054,000.00
Total Bonds held by the Public and in Sinking Funds, June 30, 1914		$214,879,000.00
Net Increase during the year in Bonds held by the Public and in Sinking Funds		$21,620,000.00

BONDS IN THE TREASURY AND DUE FROM TRUSTEE

At the close of the preceding fiscal year the amount of the Company's Bonds in its Treasury and due from Trustee was		$7,519,000.00
The above amount has been increased during the year ending June 30, 1914, as follows:		
C. & N. W. Ry. 5% Sinking Fund Debentures of 1933, Purchased	$4,000.00	
C. & N. W. Ry. 4½% Equipment Trust Certificates of 1913, Series D, Issued	4,000,000.00	
C. & N. W. Ry. General Mortgage Gold Bonds of 1987, Due from Trustee in Exchange for Bonds Retired, viz:		
C. & N. W. Ry. Sinking Fund of 1879, 6%	$41,000.00	
C. & N. W. Ry. Sinking Fund of 1879, 5%	94,000.00	
M. L. S. & W. Ry. Extension and Improvement Sinking Fund Mortgage, 5%	11,000.00	
	146,000.00	
C. & N. W. Ry. General Mortgage Gold Bonds of 1987, Due from Trustee on Account of Construction Expenditures Made During the Year	1,000,000.00	
		5,150,000.00
		$12,669,000.00
The Bonds on hand and due from Trustee have been decreased during the year, as follows:		
C. & N. W. Ry. General Mortgage Gold Bonds of 1987, 4%, sold to Reimburse the Company for Past Expenditures Made for Construction and in Redeeming Matured Bonds	$8,054,000.00	
Southern Iowa Ry. First Mortgage, 3½% Bonds, Canceled	431,000.00	
M. L. S. & W. Ry. Extension and Improvement Sinking Fund Mortgage 5% Bonds Retired	11,000.00	
		8,496,000.00
Total Bonds in the Treasury and due from Trustee, June 30, 1914		$4,173,000.00
Net Decrease during the year in Bonds in the Treasury and due from Trustee		$3,346,000.00

CONSTRUCTION

The construction charges for the year ending June 30, 1914, were as follows:

ON ACCOUNT OF ELEVATING TRACKS, VIZ.:		
In River Forest, Illinois	$124,384.93	
Greenfield Avenue north, Milwaukee, Wis.	61,161.83	
		$185,546.76
SUNDRY CONSTRUCTION:		
Right of Way and Additional Depot and Yard Grounds	$184,532.21	
Buildings and Fixtures	1,069,551.05	
Shop Machinery and Tools	137,992.00	
ridges, Trestles and Culverts	823,210.81	
Interlocking, Block and Other Signal Apparatus	481,452.24	
Improvement of Grade Crossings	102,321.98	
Reduction of Grade between Nelson and Peoria, Ill.	69,629.21	
Betterment of Roadway and Track	1,073,570.59	
Miscellaneous Construction, including Terminal Yards, Docks and other items	196,281.44	
		4,138,541.53
EQUIPMENT:		
30 Locomotives, 66 Steel, Passenger-Train Cars, 1,000 Freight-Train Cars and 4 Work Equipment Cars	$2,088,737.07	
Improvement of Equipment	397,860.75	
Trust Equipment of 1912 added—4 Locomotives and 4,005 Freight-Train Cars	4,005,925.04	
Trust Equipment of 1913 added—71 Locomotives, 67 Steel, Passenger-Train Cars and 2,035 Freight-Train Cars	4,007,414.31	
	$10,499,937.17	
Less Equipment retired	1,912,505.54	
		8,587,431.63
		$12,911,519.92
Account Cost of Milwaukee, Sparta and North Western Railway		60,604.91
Account Cost of Des Plaines Valley Railway		4,483.50
Account Cost of St. Louis, Peoria and North Western Railway		9,896,745.59
		$22,873,353.92

TRACK ELEVATION

The elevation of the Company's six main tracks on the Galena Division in the Village of River Forest, Illinois, from the overhead crossing of the Minneapolis, St. Paul & Sault Ste. Marie Railway to the Des Plaines River, a distance of 0.6 miles, and the construction of an elevated yard with a capacity for 300 cars, are in progress and it is expected will be completed during the present calendar year.

At Milwaukee, Wisconsin, the Company has undertaken the elevation of the main tracks and certain yard tracks of its Wisconsin Division, from the Kinnickinnic River to the Milwaukee River, a distance of 1.04 miles, and also the elevation of the main tracks and certain yard tracks of its Madison Division from Kinnickinnic Avenue north to a connection with the Wisconsin Division, near Mineral Street, a distance of 0.77 miles. In connection with the elevation of the existing tracks, provision has been made for the construction of two additional tracks on the Wisconsin Division. This work includes the construction of subways on the Wisconsin Division at Washington Street and National Avenue, and on the Madison Division at Greenfield Avenue and Washington Street. The total miles of main, yard and side tracks to be elevated are equivalent to 14.81 miles of single track railway.

SUNDRY ADDITIONS AND BETTERMENTS

Among the more important sundry additions and betterments to the property of the Company during the fiscal year are the following:

Modern brick passenger stations have been completed, or are nearing completion, at Rochelle, Barrington, Woodstock, Des Plains, and Crystal Lake, Illinois; De Pere and Jefferson, Wisconsin; Iron River, Michigan; and at Rapid City, Sturgis, and Redfield, South Dakota.

At Huron, South Dakota, a commodious brick passenger station, two-story brick freight house 40 feet x 212 feet, and six additional parallel yard tracks have been constructed.

At Green Bay, Wisconsin, a brick freight house 40 feet x 250 feet with two-story office portion 40 feet x 50 feet; at Manitowoc, Wisconsin, a brick freight house with two-story office portion 40 feet x 180 feet; and at Ironwood, Michigan, a brick freight house 41 feet x 131 feet with office portion at one end, are nearing completion.

At South Pekin, Illinois, and at Norfolk, Nebraska, two story brick office buildings are being constructed.

At Chicago Shops the following additions to the plant have been completed:

Enlargement of Wisconsin Division engine house.
Brick extension to locomotive tank shop 30 feet x 324 feet.
Enclosing of space 66 feet x 300 feet between Car Shops 1 and 2.
Brick extension to coach paint shop 14 feet x 300 feet.
Installation of two 70-foot electric transfer tables for coaches, and one 38-foot electric transfer table for locomotives.

Also at Chicago shops, a considerable expenditure has been made for the installation of a sprinkler system, the erection of fire walls and the rearrangement and enlargement of the facilities for supplying water, in order to provide for additional fire protection and thereby reduce the cost of insurance.

At Green Bay, Wisconsin, the improvements consisting of a 40-stall brick engine house, power house, machine shop, store and oil house, ice house, coal and water facilities, and additional trackage, to which reference was made in the last annual report, have been completed.

At Clinton, Iowa, the machine shops, power house and store and office buildings under construction at the close of the previous fiscal year, have been completed. The installation at this station of a car repair yard with suitable shop and other buildings is in progress.

At Escanaba, Michigan, the Company's coal dock has been extended 300 feet and two bridges, each consisting of one truss span 163 feet lang, and connected with present towers, have been installed.

Between Nelson and Peoria, Illinois, important revisions of grade, to permit a material increase in the train tonnage on this line, are in progress.

Reference was made in the last annual report to the stockholders, to an agreement with the City of Milwaukee, Wisconsin, by which this Company acquired the right to fill in and occupy with additional tracks, approximately ten acres of submerged lands east of its present holdings on the shore of Lake Michigan in that city. During the year covered by this report substantial progress has been made in the filling, and a protection crib has been completed.

The installation of automatic block signals has been completed during the year, or is nearing completion, as follows:

Evansville to Madison, Wisconsin	22.5 miles
Baraboo to Elroy, Wisconsin	37.3 "
Fond du Lac to Duck Creek, Wisconsin	69.0 "
Missouri Valley to Sioux City, Iowa	74.7 "
Ames to Des Moines, Iowa	34.0 "

Between Clybourn and Mayfair, Illinois, and between Elmhurst and West Chicago, Illinois, new upper quadrant semaphore signals are being installed in place of disc signals. Upon completion of the work now in progress, 1,135 miles of the Company's railway will be protected by automatic signals.

NEW RAILWAYS

The ST. LOUIS, PEORIA AND NORTH WESTERN RAILWAY COMPANY, organized in the interest of this Company and owning a railroad from near Peoria to the Company's coal fields in Macoupin County, Illinois, a distance of 114.64 miles, conveyed its entire property to the Chicago and North Western Railway Company on December 15, 1913, subject to an indebtedness consisting of $10,000,000 First Mortgage 5% Gold Bonds, payable July 1, 1948, which were assumed by the Chicago and North Western Railway Company.

THE MACOUPIN COUNTY EXTENSION RAILWAY COMPANY, organized in the interest of this Company to construct a railway from a connection with the Macoupin County Railway near Benld, in a general southerly direction for a distance of about 9 miles, to reach certain coal fields under development in Macoupin and Madison counties, Illinois, has been completed during the year from Benld to Staunton, a distance of 4.36 miles. This railway was leased to the Chicago and North Western Railway Company for a term of twenty-five years beginning January 1, 1914.

The IOWA SOUTHERN RAILWAY COMPANY, organized in the interest of this Company, to construct a railway from a connection with this Company's railway in Monroe County, Iowa, in a general southwesterly direction in that county, for a distance of about 25 miles, has been practically completed during the year from a connection with the Chicago and North Western Railway at Miami, Iowa, to the Company's coal fields in Monroe County, a distance of 12.25 miles. This railway was leased to the Chicago and North Western Railway Company for a term of twenty-five years beginning July 1, 1914.

LANDS

During the year ending June 30, 1914, 8,809.93 acres and 8 town lots of the Company's Land Grant lands were sold for the total consideration of $245,862.52. The number of acres remaining in the several Grants June 30, 1914, amounted to 330,434.65 acres, of which 18,030.19 acres were under contract for sale, leaving unsold 312,404.46 acres.

Appended hereto may be found statements, accounts and statistics relating to the business of the fiscal year, and the condition of the Company's affairs on June 30, 1914.

By order of the Board of Directors.

WILLIAM A. GARDNER,
President.

PROFIT AND LOSS ACCOUNT, JUNE 30, 1914

DR.		CR.	
Depreciation accrued prior to July 1, 1907, on equipment retired or changed from one class to another during the current fiscal year	$1,013,396.85	Balance, June 30, 1913	$36,438,744.36
Net loss on property sold or abandoned and not replaced	62,288.48	Balance Income for year ending June 30, 1914, brought forward from Income Account	1,206,054.60
Debt discount extinguished through surplus	844,497.20	Amount transferred from "Appropriated Surplus" on account of the retirement of Madison Extension and Menominee Extension First Mortgage Sinking Fund Bonds	180,678.20
Balance Credit, June 30, 1914, carried to Balance Sheet	35,998,882.89	Adjustments in sundry accounts, etc.	93,588.26
	$37,919,065.42		$37,919,065.42

GENERAL BALANCE SHEET, JUNE 30, 1914

(7,945:50 Miles)

ASSETS			LIABILITIES	
PROPERTY INVESTMENT:			**CAPITAL STOCK:**	
Road and Equipment—			Common Stock and Scrip, C. & N. W. Ry. Co., held by the Public	$130,117,028.82
Balance to Debit of this Account, June 30, 1913	$336,655,248.30		Preferred Stock and Scrip, C. & N. W. Ry. Co., held by the Public	22,395,120.00
Add Sundry Construction and Equipment Expenditures for the year ending June 30, 1914 (including trust equipment), as see statement elsewhere herein	12,911,519.92			$152,512,148 82
" Account Cost of Milwaukee, Sparta, and North Western Railway	60,604.91		Common Stock and Scrip, C. & N. W. Ry. Co., owned by the Company	$2,338,502.15
" " Cost of Des Plaines Valley Railway	4,483.50		Preferred Stock and Scrip, C. & N. W. Ry. Co., owned by the Company	3,834.56
" " Cost of St. Louis, Peoria and North Western Railway	9,896,745.59			2,342,336.71
		$359 528,602.22	Premium Realized on Capital Stock	-9,657.75
				$154,884,143.28
Securities—			**MORTGAGE, BONDED AND SECURED DEBT:**	
Securities of Proprietary, Affiliated and Controlled Companies—Unpledged		1,451,013.15	Bonds held by the Public	$192,709,500.00
Other Investments—			Equipment Trust Certificates held by the Public	9,400,000.00
Advances to Proprietary, Affiliated and Controlled Companies for Construction, Equipment and Betterments	$11,667,030.69		C. & N. W. Ry. Sinking Fund Debentures of 1933, held by the Public, issued for purchase of Stock of C. St. P. M. & O. Ry. Co.	9,691,000.00
Miscellaneous Investments	1,468,336.88			$211,800,500.00
		13,135,367.57	Bonds held by Trustee account Sinking Funds	3,078,500.00
		$374,114,982 94	Bonds owned by the Company and due from Trustee	173,000 00
WORKING ASSETS:			Equipment Trust Certificates of 1913 owned by the Company	4,000,000.00
Cash	$19,458,669.84			219,052,000.00
Common Stock and Scrip, C. & N. W. Ry. Co., held in Treasury	2 338,502.15		**WORKING LIABILITIES:**	
Preferred Stock and Scrip, C. & N. W. Ry. Co., held in Treasury	3,834.56		Traffic and Car-Service Balances Due to Other Companies	$1,424,635.10
$29,000 M. L. S. & W. Ry. Ext. & Imp. Sinking Fund Bonds held in Treasury	29,000.00		Audited Vouchers and Wages Unpaid	3,924,446.10
140,000 C. & N. W. Ry. General Mortgage Gold Bonds of 1987, due from Trustee	140,000.00		Miscellaneous Accounts Payable	200,953.07
4,000 C. & N. W. Ry. Sinking Fund Debentures of 1933 held in Treasury	4,000.00		Matured Interest, Dividends and Rents Unpaid	3,372,802.29
4,000,000 C. & N. W. Ry. Equipment Trust Certificates of 1913, Series D, held in Treasury	4,000,000.00		Other Working Liabilities	156,233.79
149,200 Shares of Capital Stock of the Chicago, St. Paul, Minneapolis & Omaha Ry. Co	10,337,152.29			9,079,070.35
41,715 Shares of Preferred Stock of the Union Pacific Railroad Co	3,910,575.93		**ACCRUED LIABILITIES NOT DUE:**	
Bills Receivable	769,251.00		Unmatured Interest Payable	$1,979,350.83
Traffic and Car-Service Balances Due from Other Companies	83,855.10		Taxes Accrued	60,000.00
Net Balance Due from Agents and Conductors	2,747,719.58			2,039,350.83
Miscellaneous Accounts Receivable	2,209.238.17		**DEFERRED CREDIT ITEMS:**	
Materials and Supplies	5,463,707.81		Reserve for Accrued Depreciation on Equipment	$6,089,239.37
Other Working Assets	171,218.67		Other Deferred Credit Items	258,202.65
		51,666,725 10		6,347,442.02
DEFERRED DEBIT ITEMS:			**APPROPRIATED SURPLUS:**	
Advances	$299,011.34		Sinking Fund on North Western Union Ry. Gold Bonds	$1,599,408.97
Insurance Paid in Advance	62,592.66		" " " W. & St. P. R. R. Extension Gold Bonds	2,393,636.47
Cash and Securities in Sinking and Redemption Funds	3,994,062.99			3,993,045.44
Other Deferred Debit Items	1,256,559.78		**PROFIT AND LOSS**	35,998,882.89
		5,612,226.77		
		$431,393,934.81		$431,393,934.81

COMPARATIVE STATEMENT OF INCOME ACCOUNT

	Year Ending June 30, 1913	Year Ending June 30, 1914	Increase or Decrease
Average Mileage Operated	7,974.24	8,070.61	96.37
OPERATING REVENUES:			
Freight Revenue	$54,661,588.23	$53,989,475.43	—$672,112.80
Passenger Revenue	20,557,623.25	21,540,542.79	982,919.54
Other Transportation Revenue	7,092,311.41	7,028,438.19	—63,873.22
Non-transportation Revenue	724,398 19	1,118,594.38	394,196.19
Total Operating Revenues	$83,035,921.08	$83,677,050.79	$641,129.71
OPERATING EXPENSES	58.252,780.22	59,405,141.53	1,152,361.31
Net Revenue—Rail Operations	$24,783,140.86	$24,271,909.26	—$511,231.60
OUTSIDE OPERATIONS—Net Deficit	Cr. 11,286.35	Dr. 14,149 85	25,446.20
Net Railway Operating Revenue	$24,794,437 21	$24,257,759.41	—$536,677.80
RAILWAY TAX ACCRUALS	3,597,159.80	4,252,790.29	655,630.49
Railway Operating Income	$21,197,277.41	$20,004,969.12	—$1,192,308.29
OTHER INCOME:			
Rental Income	191,209.04	198,540.63	7,331.59
Dividend Income	1,836,922.00	1,579,236.39	—257,685.61
Income from Funded Securities	53,433.33	5,650.00	47,783.33
Income from Unfunded Securities and Accounts, and Other Items	1,381,927.54	1,137,333.77	—244,593.77
Total Other Income	$3,463,491.91	$2 920,760.79	—$542,731.12
Gross Income	$24,660,769.32	$22,925,729.91	—$1,735,039.41
DEDUCTIONS FROM GROSS INCOME:			
Rental Payments	1,194,268.52	1,265,866.98	71,598.46
Interest Deductions for Funded Debt	8,529,266.49	9,239,007.59	709,741.10
Other Deductions	62,220.84	114,713.13	52,492.29
Total Deductions	$9,785,755.85	$10,619,587.70	—$833,831.85
Net Income	$14,875,013.47	$12,306,142.21	—$2,568,871.26
DISPOSITION OF NET INCOME:			
Sinking Funds	199,990.75	200,472.61	481.86
Dividends—			
8% on Preferred Stock	1,791,600.00	1,791,600.00	.....
7% on Common Stock	9,108,015.00	9,108,015.00	.....
Total	$11,099,605.75	$11,100,087.61	$481.86
Balance Income for the year, carried to Profit and Loss	$3,775,407.72	$1,206,054.60	—$2,569,353.12

CHICAGO, SAINT PAUL, MINNEAPOLIS AND OMAHA RAILWAY COMPANY

REPORT OF THE BOARD OF DIRECTORS

To the Stockholders of the Chicago, Saint Paul, Minneapolis and Omaha Railway Company:

The Board of Directors submit herewith their report of the operations and affairs of the Chicago, Saint Paul, Minneapolis and Omaha Railway Company for the fiscal year ending June 30, 1914.

Average number of miles operated, 1,748.39.

OPERATING REVENUES.		
Freight revenue		$11,427,563.24
Passenger revenue		5,415,710.19
Other transportation revenue		1,036,609.69
Non-transportation revenue		112,487.47
Total operating revenue		$17,992,370.59

Operating Expenses (70.21 per cent of operating revenues)		12,632,570.52
Net revenue—Rail Operations		$5,359,800.07
Outside Operations (net revenue)		16,166.40
Net Railway operating revenue		$5,375,966.47
Railway Tax Accruals (5.41 per cent of operating revenue)		973,282.83
Railway operating income		$4,402,683.64
Other Income.		
Rental income	$134,921.94	
Dividend income	46,351.00	
Income from funded securities	12,060.00	
Income from unfunded securities and accounts, and other items	40,072.08	
Total other income		233,405.02
Gross income		$4,636,088.66
Deductions from Gross Income.		
Rental payments	$515,184.10	
Interest deductions for funded debt	2,052,901.43	
Interest deductions for unfunded debt	32,735.53	
Other deductions	13,652.25	
Total deductions		2,614,473.31
Net income		$2,021,615.35
Disposition of Net Income.		
Dividends:		
7% on preferred stock	$787,976.00	
7% on common stock	1,298,934.00	
Total dividends		2,086,910.00
Net deficit for the year		$65,294.65

As compared with the previous year, the results were as follows:

Freight revenue increased	$570,356.31	
Passenger revenue increased	431,114.88	
Non-transportation revenue increased	18,149.03	
		$1,019,620.22
Other transportation revenue decreased		20,254.31
Total operating revenue increased		$999,365.91
Operating expenses increased	$745,109.24	
Railway tax accruals increased	141,019.56	
Operating expenses and railway tax accruals increased	$886,128.80	
Net revenue from outside operations increased	20,978.02	
		865,150.78
Railway operating income increased		$134,215.13

The operating expenses for the current fiscal year include $6,895,806.12 paid employes for labor, as compared with $6,720,074.48 paid during the preceding fiscal year, being an increase of $175,731.64, accounted for as follows:

Increase account higher rates of compensation	$51,924.14
Increase account more time worked	123,807.50
Total increase	$175,731.64

MILES OF RAILROAD

The total number of miles of railroad owned June 30, 1914, was 1,683.22 miles

In addition to which the company operated:

Under Trackage Rights—		
Northern Pacific Railway (Superior, Wis., to Rices Point, Minn.)	1.59	miles
Great Northern Railway (St. Paul to Minneapolis, Minn.)	11.40	"
Minneapolis & St. Louis Railroad (Minneapolis to Merriam, Minn.)	27.00	"
Illinois Central Railroad (LeMars to Sioux City, Iowa)	25.20	"
Sioux City Bridge Company (bridge across Missouri River and tracks at Sioux City, Iowa)	3.90	"
Chicago and Northwestern Railway (Sioux City to Sioux City Bridge Company's track)	.50	"
	69.59	"
Total miles of railroad operated June 30, 1914	1,752.81	"

The above mileage is located as follows:

In Wisconsin	781.14	miles
In Minnesota	473.04	"
In Iowa	102.04	"
In South Dakota	88.20	"
In Nebraska	308.39	"
Total	1,752.81	"

In addition to the foregoing, the company owned and operated 183.03 miles of second track, located as follows:

In Wisconsin	157.09	miles
In Minnesota	24.23	"
In Nebraska	1.71	"
Total	183.03	"

FREIGHT TRAFFIC

The details of freight traffic for the year ending June 30, 1914, compared with the preceding year, were as follows:

	1913	1914	Increase Amount	Increase Per Cent
Freight revenue	$10,857,206.93	$11,427,563.24	$570,356.31	5.25

	1913	1914	Percentage of Increase or Decrease
Tons of freight carried	8,205,947	8,466,632	3.18 Increase
Tons of freight carried one mile	1,262,998,028	1,294,143,291	2.47 Increase
Average revenue received per ton	$1.32	$1.35	2.27 Increase
Average revenue received per ton per mile	.86 of a cent	.88 of a cent	2.33 Increase
Average distance each ton was hauled	153.91 miles	152.85 miles	.69 Decrease
Mileage of revenue freight and mixed trains	4,575,954	4,212,289	7.95 Decrease
Average number of tons of revenue freight carried per train mile	276.01	307.23	11.31 Increase
Average number of tons of revenue freight carried per loaded car mile	18.99	19.23	1.26 Increase
Average freight revenue per train mile	$2.37	$2.71	14.35 Increase

PASSENGER TRAFFIC

The details of passenger traffic for the year ending June 30, 1914, compared with the preceding year, were as follows:

	1913	1914	Increase Amount	Increase Per Cent
Passenger revenue	$4,984,595.31	$5,415,710.19	$431,114.88	8.65

	1913	1914	Percentage of Increase or Decrease
Passengers carried	4,500,947	4,881,961	8.47 Increase
Passengers carried one mile	234,545,623	266,685,999	13.70 Increase
Average fair paid per passenger	110.75 cents	110.93 cents	.16 Increase
Average rate paid per passenger per mile	2.125 cents	2.031 cents	4.42 Dec ease
Average distance traveled per passenger	52.11 miles	54.63 miles	4.84 Increase
Mileage of revenue passenger and mixed trains	4,489,183	4,510,639	.48 Increase
Average passenger train revenue per train mile	$1.31	$1.39	6.11 Increase

MAINTENANCE OF WAY AND STRUCTURES

The total operating expenses of the company for the year ending June 30, 1914, were $12,632,570.52; of this amount $2,612,609.99 was for charges pertaining to maintenance of way and structures. Included in these charges are $168,965.84 for rails, $525,024.76 for ties, and the cost of re-ballasting 70 miles with gravel and cinders, also part cost of replacing 1,514 feet of wooden bridging with permanent work.

During the year 12,393 tons of new steel rails and 6,188 tons of usable and re-rolled steel rails were laid in track, a greater portion of which replaced rails of lighter weight; 843,544 ties of all descriptions were laid in renewals.

The details of the charges to maintenance of way and structures for the year, compared with the previous year, were as follows:

Cost of Rails.			
New steel rail	$398,243.49	$392,057.11	*$6,186.38
Usable and re-rolled rail	279,678.91	143,572.52	*136,106.39
	$677,922.40	$535,629.63	*$142,292.77
Less value of old rails and other items	474,185.06	366,663.79	*107,521.27
Net charge for rails	$203,737.34	$168,965.84	*$34,771.50
Cost of Ties	326,294.47	525,024.76	198,730.29
Cost of Ballast	34,448.52	51,996.80	17,548.28
Cost of Other Track Material	99,577.84	89,442.67	*10,135.17
Roadway and Track Labor and Other Expenses	788,989.71	860,749.04	71,759.33
Total charges for Roadway and Track	$1,453,047.88	$1,696,179.11	$243,131.23
Other Expenses Account of Maintenance of Way and Structures were as follows:			
Superintendence	89,095.57	108,713.97	19,618.40
Bridges, Trestles and Culverts	228,478.02	295,994.49	67,516.47
Road Crossings, Fences, Etc.	54,627.14	70,010.91	15,383.77
Signals and Interlocking Plants	20,629.17	30,288.21	9,659.04
Buildings, Fixtures and Grounds	239,467.58	243,322.66	3,855.08
Docks and Wharves	1,043.85	2,636.23	1,592.38
Roadway Tools and Supplies	23,742.77	23,742.73	*.04
Sundry Miscellaneous Charges	98,161.62	141,721.68	43,560.06
Total charges account of Maintenance of Way and Structures	$2,208,293.60	$2,612,609.99	$404,316.39

*Decrease.

The foregoing expenditures for maintenance of way and structures for the current year amount to 20.68 per cent of the total operating expenses, as compared with 18.58 per cent for the preceding fiscal year.

MAINTENANCE OF EQUIPMENT

The charges on account of maintenance of equipment for the year ending June 30, 1914, compared with the preceding year, were as follows:

	1913	1914	Inc. or Dec.
Locomotives	$897,790.57	$920,442.73	$22,652.16
Passenger-train cars	263,636.58	273,896.38	10,259.80
Freight-train cars	870,962.72	924,113.26	53,150.54
Work equipment	33,649.40	33,067.42	*581.98
Shop machinery and tools	29,937.33	33,788.02	3,850.69
Superintendence	59,815.81	62,988.77	3,172.96
Sundry miscellaneous charges	33,153.65	35,629.63	2,475.98
Total charges account of Maintenance of Equipment	$2,188,946.06	$2,283,926.21	$94,980.15

*Decrease.

The above charges for maintenance of equipment for the current year amount to 18.08 per cent of the total operating expenses, as compared with 18.41 per cent for the preceding fiscal year

RESERVE FOR ACCRUED DEPRECIATION ON EQUIPMENT

At the close of the preceding fiscal year there was a balance to the credit of the equipment reserve accounts of $1,321,312.99

During the year ending June 30, 1914, there was credited to the equipment reserve accounts on account of charges to Operating Expenses and Profit and Loss, and for Salvage..		757,580.72
		$2,078,893.71
There was charged during the year against the above amount the original cost of equipment retired as follows:		
9 Locomotives	$85,500.00	
7 Passenger-train cars	39,792.00	
661 Freight-train cars	379,428.89	
		504,720.89
Leaving a balance to the credit of the equipment reserve accounts on June 30, 1914, of		$1,574,172.82

TRANSPORTATION EXPENSES

The transportation expenses for the year were $6,939,604.01, or 54.93 per cent of the total operating expenses. Of this amount $3,825,879.76, or $5.13 per cent, was for labor; $2,044,091.93, or 29.46 per cent. was for fuel for locomotives; and $1,069,632.22, or 15.41 per cent. was for supplies and other items.

The total increase in the charges as compared with the previous year was $192,812.47, distributed as follows:

Increase in amount charged for labor	$31,645.45
Increase in amount charged for fuel for locomotives	17,659.88
Increase in amount charged for supplies and other items	143,507.14
Total increase	$192,812.47

CAPITAL STOCK

No stock was issued or sold during the year. The company's authorized capital stock is fifty million dollars ($50,000,000), of which the following has been issued to June 30, 1914:

Common stock and scrip held by the public	$18,559,086.69	
Common stock and scrip in treasury	2,844,206.64	
		$21,403,293.33
Preferred stock and scrip held by the public	$11,259,911.63	
Preferred stock and scrip in treasury	1,386,921.66	
		12,646,833.29
Total		$34,050,126.62

FUNDED DEBT

At the close of the preceding fiscal year the amount of bonds held by the public was		$37,547,000.00
The above amount has been increased by bonds sold during the year ending June 30, 1914, as follows:		
Chicago, Saint Paul, Minneapolis and Omaha Railway Consolidated Mortgage Bonds of 1880, 6%	$90,000.00	
Debenture Golds Bonds of 1930, 5%	1,700,000.00	
		1,790,000.00
Total bonds held by the Public, June 30, 1914		$39,337,000.00

In addition to the foregoing, Chicago, Saint Paul, Minneapolis and Omaha Railway Consolidated Mortgage 6% Bonds of 1880 were issued for a like amount of the following underlying bonds retired:

Chicago, Saint Paul and Minneapolis Railway First Mortgage of 1878, 6%	$55,000.00	
North Wisconsin Railway First Mortgage of 1880, 6%	9,000.00	
		$64,000.00

BONDS IN THE TREASURY

On June 30, 1913, the amount of the company's bonds and scrip in the treasury was		$51,046.02
The amount of bonds and scrip was increased during the year as follows:		
Chicago, Saint Paul, Minneapolis and Omaha Railway Consolidated Mortgage Bonds of 1880, issued at the rate of $15,000 per mile on the extension of the line from Kaiser to Park Falls, Wis., a distance of 5 5135/5280 miles		89,588.07
Total		$140,634.09
The above amount was decreased by bonds sold during the year, as follows:		
Chicago, Saint Paul, Minneapolis and Omaha Railway Consolidated Mortgage 6% Bonds of 1880		90,000.00
Total bonds and scrip in treasury, June 30, 1914		$50,634.09

CONSTRUCTION

The construction charges for the year ending June 30, 1914, were as follows:

Balance cost of second track Truax to Northline, Wis.		$360,360.80
Account of extension of line Kaiser to Park Falls, Wis.		208,903.99
Sundry Construction:		
Account cost of terminal improvements at Minneapolis, Minn.	$178,058.43	
Balance cost of terminal improvements at Altoona, Wis.	98,434.10	
Balance cost of Earl St. viaduct, St. Paul, Minn.	34,294.07	
Account Nicholas Street viaduct, Omaha, Neb.	11,913.37	
Automatic block Signals	111,160.72	
Permanent bridges (cost of new over old)	101,758.06	
Betterments of roadway and track	145,132.33	
Sidings and spur tracks	76,019.60	
Terminal yards	29,725.27	
Buildings	41,559.36	
Machinery and tools	75,076.72	
Miscellaneous charges	35,578.14	
		938,710.17
Equipment:		
Equipment acquired (22 locomotives, 1 steel dining, 2 combination mail and baggage, 6 baggage, 14 steel first class, 5 steel second class and 15 caboose cars)	$1,058,108.45	
Improvements to equipment	35,849.16	
	$1,093,957.61	
Less equipment retired	Cr 504,720.89	589,236.72
Total		$2,097,211.68

EXTENSION OF LINE

The line was extended from Kaiser to Park Falls, Wis., a distance of 5.99 miles, and placed in operation April 1, 1914.

SECOND MAIN TRACK

The work on the second track between Truax and Northline, Wis., mentioned in the two previous years' reports, was completed, and the final portion placed in operation on October 30, 1913.

SUNDRY ADDITIONS AND BETTERMENTS

New frame passenger depots were constructed at Woodville and Solon

GENERAL BALANCE SHEET, JUNE 30, 1914

Assets			Liabilities		
		1,683.22		Miles	
Property Investment.			Capital Stock.		
Road and Equipment:			Common stock and scrip outstanding	$18,559,086.69	
Balance to debit of this account, June 30, 1913	$72,085,442.75		Preferred stock and scrip outstanding	11,259,911.63	
Add sundry construction and equipment expenditures for the year ending June 30, 1914	2,097,211.68				$29,818,998.32
		$74,182,654.43	Common stock and scrip owned by the company	$2,844,206.64	
Securities:			Preferred stock and scrip owned by the company	1,386,921.66	
Securities of proprietary, affiliated and controlled companies, unpledged		210,200.00			4,231,128.30
Other Investments:					$34,050,126.62
Advances to proprietary, affiliated and controlled companies for construction, equipment and betterments		97.49	Mortgage, Bonded and Secured Debt.		
Miscellaneous investments		200,465.69	Bonds outstanding	$39,337,000.00	
		$74,593,417.61	Bonds and scrip owned by the company	50,634.09	
Working Assets.					39,387,634.09
Cash	$1,016,097.38		Working Liabilities.		
C., St. P., M. & O. common stock on hand	2,844,206.64		Traffic and car service balances due to other companies	$312,969.53	
C., St. P., M. & O. preferred stock on hand	1,386,921.66		Audited vouchers and wages unpaid	1,388,526.22	
Consolidated mortgage bond scrip due from Central Trust Company	634.09		Miscellaneous accounts payable	130,487.35	
S. S. M. & S-W. Ry. Co. first mortgage bonds on hand	50,000.00		Matured interest, dividends and rents unpaid	102,770.00	
Minneapolis Eastern Ry. First Mortgage bonds on hand	125,000.00		Other working liabilities	3,914.16	
Minnesota Transfer Ry. first mortgage bonds on hand	191,000.00				1,938,667.26
Bills receivable	1,855.83		Accrued Liabilities, not Due.		
Traffic and car service balances due from other companies	184,322.40		Unmatured interest and dividends	$1,420,750.82	
Net balance due from agents and conductors (including working funds)	448,434.39		Taxes accrued	611,056.80	
Miscellaneous accounts receivable	528,368.20				2,031,807.62
Materials and supplies	1,389,931.64		Deferred Credit Items.		
Other working assets	6,223.90		Reserve for accrued depreciation	$1,574,172.82	
		8,172,996.13	Unextinguished premium on funded debt sold	115,474.10	
Deferred Debit Items.			Other deferred credit items	195,902.32	
Advances	$6,008.32				1,885,549.24
Other deferred debit items	618,789.05		Profit and Loss		4,097,426.28
		624,797.37			
		$83,391,211.11			$83,391,211.11

Springs, Wis., and a brick passenger depot at Wayne, Neb., replacing structures now used exclusively as freight houses. Passenger and freight depots were constructed at Nicols and Wilder, Minn., to replace similar structures destroyed by fire.

Wooden water tanks on steel towers were erected at Altoona, Wis., Adrian, Minn., and Craig and Omaha, Neb., those at Adrian and Craig replacing tanks worn out.

The improvements in the enginehouse facilities at Altoona, Wis., mentioned in the previous report were completed. Work is in progress on an 8-stall brick enginehouse, water tank, sand house, cinder pit and turntable at Sioux Falls, S. D. A 4-stall brick enginehouse was built at Duluth, Minn., to replace one destroyed by fire, and the old enginehouse at Minneapolis was abandoned and torn down.

There was constructed at Park Falls, Wis., a frame passenger and freight depot, coal house, water tank, pump house, brick-lined enginehouse, wye and cinder pit.

An electric interlocking plant, joint with the C. & N. W. Ry., was constructed at Wyeville, Wis.

The viaduct at Earl Street, St. Paul, mentioned in the last report, has been completed and work has been started on a viaduct at Nicholas Street, Omaha, Neb., joint with Missouri Pacific and Omaha Bridge and Terminal Railway Companies, which will be completed in the fall of 1914.

The additional yards at Hazel Park and Minneapolis, Minn., mentioned in the previous report, were completed during the year and a 100-ton Howe track scale is now being installed at Hazel Park. The filling has been completed for a new coach yard at Minneapolis. A new yard for the interchange of traffic between the Eastern and Northern divisions was constructed at Northline, Wis., containing 2.98 miles of track.

The net increase in sidetracks and yards was 12.01 miles.

Electric headlights were applied to 184 locomotives to comply with state regulations.

The length of wooden bridging was decreased 1,514 ft. as follows:

By construction of permanent bridges	1,076 feet
By construction of iron pipe culverts	49 feet
By construction of concrete pipe culverts	343 feet
By filling	46 feet
Total	1,514 feet

LAND DEPARTMENT

The net receipts from all grants were $834.03.

3,500.06 acres were disposed of, leaving 75,390.50 acres unsold June 30, 1914.

Appended hereto may be found statements, accounts, and statistics relating to the business of the fiscal year, and the condition of the company's affairs on June 30, 1914.

By order of the Board of Directors.

WILLIAM A. GARDNER,
President.

THE FIFTIETH ANNUAL REPORT OF THE DIRECTORS OF THE CHICAGO, MILWAUKEE & ST. PAUL RAILWAY COMPANY TO THE STOCKHOLDERS

FOR THE FISCAL YEAR ENDING JUNE 30TH, 1914.

The Directors submit to the Stockholders the following report of the operations of the Company for the year ending June 30, 1914, and of the condition of its property and finances at the close of that year.

The operations for the year show the following results:

Operating Revenues		$91,782,690.74
Operating Expenses		61,330,061.17
Net Operating Revenue		$30,452,629.57
Net Revenue—Outside Operations		260,483.24
Total Net Revenue		$30,713,112.81
Taxes Accrued		4,106,557.41
Operating Income		$26,606,555.40
Other Income:		
Interest on Bonds	$234,841.80	
Dividends on Stocks	51,143.00	
Interest on Other Securities, Loans and Accounts	2,065,327.68	
Rents—Received	402,547.04	
Hire of Equipment	272,635.87	
Miscellaneous	448,605.43	3,475,100.82
Gross Corporate Income		$30,081,656.22
Deductions:		
Interest Accrued on Funded Debt	$13,254,822.89	
Rents—Paid	765,362.80	
Miscellaneous	585,184.62	14,605,370.31
Net Corporate Income		$15,476,285.91

MILES OF TRACK, JUNE 30th, 1914.

Owned solely by this Company:		
Main track	9,578.48	
Second main track	924.95	
Third main track	21.72	
Fourth main track	13.11	
Connection tracks	45.13	
Yard tracks, sidings and spur tracks	3,083.07	13,666.46
Owned jointly with other Companies:		
Main track	102.90	
Second main track	5.59	
Third main track	1.94	
Fourth main track	1.93	
Connection tracks	4.98	
Yard tracks, siding and spur tracks	165.67	283.01
Used by this Company under contracts:		
Main track	305.92	
Second main track	64.81	
Third main track	1.14	371.87
Total miles of track		14,321.34

Average miles of main track in operation during the year:		
Owned solely	9,279.24	miles
Owned jointly	102.90	"
Used under contracts	301.81	"
Total average miles operated	9,683.95	miles

The lines of road of this Company are located in the following States:

Wisconsin	1,805.34	miles
Illinois	415.04	"
Iowa	1,867.17	"
Minnesota	1,233.39	"
North Dakota	379.93	"
South Dakota	1,794.87	"
Missouri	140.27	"
Michigan	179.97	"
Montana	1,051.86	"
Idaho	197.59	"
Washington	615.95	"
Total length of main track owned solely and jointly	9,681.38	miles

EQUIPMENT.

During the year thirty-three locomotives and two thousand eight hundred and thirty-one cars of various classes have been purchased or built as follows:

33 Locomotives	2732 Box Cars
3 Dining Cars	69 Cinder Dump Cars
10 Postal Cars	2 Pile Drivers
2 Office Cars	1 Track Scale Test Car
10 Mail and Baggage Cars	2 Bridge Derrick Cars

During the year sixteen locomotives and one thousand six hundred and eighty-three cars of various classes were destroyed by wreck or fire, sold or taken down on account of small capacity, as follows:

16 Locomotives	32 Ore Cars
3 Passenger Cars	32 Refrigerator Cars
1 Dining Car	9 Vegetable Cars
1 Baggage Car	15 Ballast Cars
7 Mail and Express Cars	18 Cahoose Cars
1257 Box Cars	15 Cinder Dump Cars
69 Stock Cars	41 Work Train Cars
183 Flat and Coal Cars	

The original cost of the equipment retired has been credited to Property Investment—Road and Equipment.

PROPERTY INVESTMENT—ROAD AND EQUIPMENT.

Equipment	$2,978,916.21
New Branch Lines adn Extensions	9,228,615.60
Construction of Second Main Track	10,573,229.72
Reducing Grade and Improving Line	1,336,633.08
Yard Improvements	762,778.97
Shop Improvements	544,540.79
Other Additions and Betterments	9,776,549.35
	$35,201,263.72
Credit—Property retired or converted	766,311.90
Total as shown by detailed statement on page 35 of this report	$34,434,951.82

IMPROVEMENTS AUTHORIZED.

EQUIPMENT

Authority has been given for the purchase or building of additional equipment as follows:

5 Locomotives, 10 Passenger Coaches, 16 Sleeping Cars, 1 Dining Car, 4 Parlor Cars, 2 Observation Parlor Cars, 2 Cafe Observation Cars, 2 Passenger and Baggage Cars, and 2 Mail and Baggage Cars.

ADDITIONAL MAIN TRACKS

Construction work has been in active progress during the year on the second main track and grade reduction work on the Chicago and Council Bluffs Division in Iowa, and on the Hastings and Dakota Division. Between October 1st, 1913, and July 1st, 1914, the unfavorable financial conditions caused a suspension of a large part of the work on the Hastings and Dakota Division and a portion of that on the Chicago and Council Bluffs Division in Iowa. Since July 1st, 1914, track laying has been resumed, and it is expected to have the Chicago and Council Bluffs Division in operation before winter between Green Island and Manilla, Iowa, a distance of 270 miles.

On June 30th, 1914, the following new sections of second main track were completed and are now in operation:

CHICAGO AND COUNCIL BLUFFS DIVISION IN IOWA—		
Green Island to one mile east of Delmar Junction	19.42	miles
Lost Nation to Elheron	80.31	"
Capron to Coon Rapids	86.02	"
Total	185.75	miles
HASTINGS AND DAKOTA DIVISION—		
Hennepin Ave., Minneapolis, to Hopkins	6.17	miles
Cologne to Glencoe	18.88	"
Hector to Bird Island	8.79	"
Wegdahl to Montevideo	3.12	"
Milbank to Aberdeen	99.98	"
Total	138.94	miles

AUTOMATIC BLOCK SIGNALS

Authority was given for the installation of automatic block signals on the line between Chicago and Minneapolis, and a portion of the line between

Minneapolis and Aberdeen, also on the line between Chicago and Manilla, Iowa, on the Chicago & Council Bluffs Divisions in Illinois and Iowa. About 60% of this work was completed during the fiscal year. It is expected that the balance will be completed by the close of the calendar year.

The installation of block signals heretofore authorized on the Puget Sound line and as set forth in the annual report of 1913, was completed and placed in operation during the year.

ELIMINATION OF GRADE CROSSINGS

The depression of tracks, for a distance of about three miles along the Hastings and Dakota Division, in the City of Minneapolis, extending from Hiawatha Avenue to Hennepin Avenue, contemplates the elimination of thirty-seven grade crossings. The work is now in progress, and is about 35% completed. It is expected to be entirely completed early in 1916.

The elevation of the tracks along the Bloomingdale Road, in the city of Chicago, a distance of about 2.4 miles, is progressing satisfactorily. When completed it will eliminate thirty-five grade crossings.

Elevation of tracks in the City of Milwaukee is in progress. This work which extends from Kinnickinnick Avenue to Fowler Street, and from Clinton Street to First Avenue, a distance of 1.4 miles, is about 15% completed, and will be continued over a period of two years. When completed, fourteen grade crossings will be eliminated.

The elevation of tracks on the Chicago and Evanston Division, from Montrose Avenue to Howard Avenue, Chicago, the northern city limits, a distance of about 4.4 miles, was begun in February of this year and is now about 15% completed. This work will extend over a period of three years, and will eliminate thirty-six grade crossings.

NEW LINES AND EXTENSIONS

The work on the extension from Crystal Falls to Iron River, Michigan, is practically completed. The main line and connections with the various iron mines have been completed, and are in operation.

The line from Lewistown to Great Falls, Montana, a distance of 137 miles, is practically completed, and will be opened for train service early in September.

Construction of the Choteau Line, extending from Great Falls to Agawam, Montana, a distance of 70 miles, has been temporarily suspended, and will not be completed before next season.

The lines from Hilger to Roy, Montana; from Roy Junction to Winifred, Montana; from Lewistown to Grass Range, Montana, and from Colorado Junction to Cliff Junction, Montana, have been completed and are in operation.

The line into Spokane, Washington, has been completed, and is in operation, this company having entire ownership of the line from Plummer, Idaho, to Bell, Washington, a distance of 21 miles, and joint use with Oregon-Washington Railroad & Navigation Co. of that Company's line from Bell to Spokane, Washington. In the City of Spokane, the terminal tracks and buildings and freight house are completed and in operation.

Work on the Newwood River Line, a logging road extending 17 miles northwesterly from Merrill, Wisconsin, was commenced in October, 1913. On June 30th, 1914, the grading was completed for about 8 miles and the track laid for about 4 miles.

TERMINAL YARDS

All of the improvements on the terminals and yards mentioned in last year's report were completed during the past year, and are now in operation.

TUNNELS

The construction of the Snoqualmie Tunnel, at the summit of the Cascade Mountains, is nearing completion, the work being carried on from both portals. At the present rate of progress the tunnel should be open for traffic shortly after the close of the calendar year. When completed, the line will be shortened 3.6 miles, practically all trouble caused by snow slides on the Coast Division will be avoided, and heavy grades will be eliminated.

ELECTRIFICATION

The work on the electrification of the Puget Sound Line was started in April, 1914, and on June 30th, 1914, thirty miles of poles were set and ready for wiring. It is expected that the work of stringing the wires from Three Forks to Deer Lodge will be completed by July 1st, 1915.

RESERVE FOR ACCRUED DEPRECIATION.

At the close of the fiscal year, ending June 30th, 1913, there was at the credit of Reserve for Accrued Depreciation the sum of $5,649,820.07.

A certain percentage of the total cost of equipment, aggregating $961,233.64, has been credited to this Reserve for accrued depreciation of locomotives, passenger train cars, freight train cars and work train cars.

There has been charged to this Reserve an amount of $212,263.81, representing the accrued depreciation, previously credited, on locomotives and cars destroyed, sold or taken down.

The balance of this Reserve, June 30th, 1914, as shown on page 22, is $6,398,789.90, which represents the estimated depreciation of rolling stock subsequent to June 30th, 1907.

FUNDED DEBT.

At the close of the last fiscal year the Funded Debt of the Company was $455,849,966.30.

It has been increased during this fiscal year by $154,489,500.00 General and Refunding Mortgage Bonds, issued in exchange for a like amount of Chicago, Milwaukee & Puget Sound Railway Company 4% Bonds, and by the issue of the following bonds for the acquisition of additional lines of railway and for additions and improvements to property: $16,424,000.00 General and Refunding Mortgage Bonds; $8,138,988.36 Chicago, Milwaukee & Puget Sound Ry. Co. 4% Bonds; $1,149,200.00 Convertible 4½% Gold Bonds; and $5,319,000.00 Twenty-five Year 4% Gold Bonds.

It has been decreased during this fiscal year by $154,489,500.00 Chicago, Milwaukee & Puget Sound Railway Co. 4% Bonds exchanged for a like amount of General and Refunding Mortgage Bonds.

The amount of bonds at the close of the year is $486,881,154.66, of which $153,572,500.00 are in the Treasury of the Company and $333,308,654.66 are outstanding.

TREASURY BONDS.

At the close of the last fiscal year the amount of the Company's bonds in its treasury was $156,295,211.64.

This has been increased during the year as follows:

General and Refunding Mortgage bonds issued in exchange for a like amount of Chicago, Milwaukee & Puget Sound Ry. Co. 4 per cent bonds	$154,489,500.00
Bonds issued for acquisition of additional lines of railway and for additions and improvements to property as follows:	
General and Refunding Mortgage bonds	$16,424,000.00
Chicago, Milwaukee & Puget Sound Ry. Company 4 per cent bonds	8,138,988.36
Convertible Gold 4½ per cent bonds	1,149,200.00
Total increase	$180,201,688.36

It has been decreased as follows:

Chicago, Milwaukee & Puget Sound Ry. Company 4 per cent bonds exchanged for a like amount of General and Refunding Mortgage Bonds	$154,489,500.00
General and Refunding Mortgage 4½% bonds sold	17,500,000.00
General Mortgage 4½ per cent bonds sold	9,741,000.00
Convertible Gold 4½ per cent bonds sold	1,193,900.00
Total decrease	$182,924,400.00
Net decrease	$2,722,711.64

At the close of this fiscal year, June 30th, 1914, bonds in the treasury amount to $153,572,500.00 as follows:

General and Refunding Mortgage	$153,413,500.00
General Mortgage 4 per cent	159,000.00
	$153,572,500.00

OPERATING REVENUES.

The Operating Revenues for the year were $91,782,690.74—a decrease of $2,301,363.95 compared with the previous year.

The revenue from freight traffic was $65,266,420.18—71.11% of total revenue—a decrease of $2,697,740.92 or 3.97%.

The number of tons of freight carried was 33,007,277—a decrease of 1,798,214 tons, or 5.17%.

The following classes of commodities show a decrease compared with the previous year: Products of Agriculture, 128,881 tons; Products of Animals, 6,940 tons; Products of Mines, 812,650 tons; Products of Forests, 148,321 tons, and Manufactures, 739,048 tons. There was an increase in Commodities Not Specified of 37,626 tons.

The number of tons of all agricultural products carried during the year was 7,162,250 tons—a decrease compared with the previous year of 1.77%. Agricultural products comprised 21.70% of the total tonnage carried, compared with 20.95% of the total tonnage of last year.

The number of tons of commodities other than agricultural products carried during the year was 25,845,027 tons—a decrease compared with the previous year of 1,669,333 tons, or 6.07%—the per cent of the total being 78.30% against 79.05% last year.

The number of tons of revenue freight carried one mile was 8,079,689,505—a decrease of 490,371,906, or 5.72%. The revenue per ton per mile was .8078 cent—an increase of .0148 cent, or 1.87%. The average miles each ton of revenue freight was carried was 244.79 miles—a decrease of 1.44 miles, or .58%.

The number of tons of revenue freight carried per loaded car was 16.498, against 16.776 last year—a decrease of 1.66%. The number of tons of revenue freight per freight and mixed train mile was 379.78, against 356.95 last year—an increase of 6.40%. The revenue from freight per freight and mixed train mile was $3.0678, as against $2.8308 last year—an increase of 8.37%.

The revenue from passenger traffic during the year was $18,961,224.58—20.66% of the total revenue—an increase of $504,089.07 compared with the previous year, or 2.73%.

The number of passengers carried was 16,426,016, an increase of 302,541 or 1.88%. The number of passengers carried one mile was 912,375,815—an increase of 50,146,132, or 5.82%.

The revenue per passenger per mile was 2.078 cents—a decrease of .063 cent, or 2.94%. The average miles each passenger was carried was 55.54 miles—an increase of 2.06 miles, or 3.85%.

OPERATING EXPENSES.

The Operating Expenses for the year were $61,330,061.17, a decrease of $1,553,906.43 compared with the previous year.

The expenses of Maintenance of Way and Structures were $10,704,519.01; Maintenance of Equipment, $13,112,977.98; Traffic Expenses, $1,799,609.65; Transportation Expenses, $33,960,581.52; and General Expenses, $1,752,373.01.

There was an increase in Maintenance of Way and Structures of $55,733.95 and in General Expenses of $349,361.09.

There was a decrease in Maintenance of Equipment of $759,007.49, in Traffic Expenses of $94,733.49 and in Transportation Expenses of $1,105,260.49.

During the year 43 steel bridges, aggregating 4,009 feet in length and 6 masonry bridges, aggregating 676 feet in length, were built—replacing 3,430 feet of wooden bridges, 1,013 feet of iron bridges and 242 feet of embankment; and 13,568 feet of wooden culverts were replaced with iron and concrete pipe. About 3.9 miles of pile bridges were filled with earth 90 bridges having been completely filled and 70 reduced in length by filling.

SUBSIDIARY COMPANIES.

The operations for the fiscal year ending June 30th, 1914, of the Subsidiary Companies named below—all of the Capital Stock of which is owned by this Company—show the following results:

These Companies are operated independently and their Revenues and Expenses are not included in the statement of the Chicago, Milwaukee & St. Paul Railway Company, shown on page 7 of this report.

TACOMA EASTERN RAILROAD COMPANY.

Operating Revenues		$581,265.64
Operating Expenses		442,703.72
Net Operating Revenue		$138,561.92
Taxes Accrued		39,473.10
Operating Income		$99,088.82
Rents Received	$18,174.02	
Hire of Equipment	27,858.13	46,032.15
Gross Corporate Income		$145,120.97
DEDUCTIONS:		
Interest Accrued on Funded Debt	$44,200.00	
Interest paid Chicago, Milwaukee & St. Paul Ry. Company	109,363.48	
Rents Paid	1,218.75	
Miscellaneous	1,717.22	156,499.45
Net Corporate Deficit		$11,378.48

BELLINGHAM & NORTHERN RAILWAY COMPANY.

Operating Revenues		$331,205.22
Operating Expenses		196,009.44
Net Operating Revenue		$135,195.78
Taxes Accrued		25,880.75
Operating Income		$109,315.03
Rents Received		3,297.90
Gross Corporate Income		$112,612.93
Deductions:		
Interest Accrued on Funded Debt	$30,303.87	
Sinking Fund	18,220.00	
Hire of Equipment	32.97	
Rents Paid	565.00	
Miscellaneous	780.00	49,901.84
Net Corporate Surplus		$62,711.09

GALLATIN VALLEY RAILWAY COMPANY.

Operating Revenues		$107,376.64
Operating Expenses		83,795.10
Net Operating Revenue		$23,581.54
Outside Operations—Net		1,812.32
		$25,393.86
Taxes Accrued		9,922.47
Gross Corporate Income		$15,471.39
Deductions:		
Interest paid Chicago, Milwaukee & St. Paul Ry. Company	$54,621.41	
Hire of Equipment	10,439.11	65,060.52
Net Corporate Deficit		$49,589.13

MILWAUKEE TERMINAL RAILWAY COMPANY.

Operating Revenues		$92,733.28
Operating Expenses		86,699.36
Net Operating Revenue		$6,033.92
Taxes Accrued		8,956.22
Operating Deficit		$2,922.30
Rents Received		25.00
Gross Corporate Deficit		$2,897.30
Deductions:		
Interest paid Chicago, Milwaukee & St. Paul Ry. Company	$33,064.36	
Rents Paid	1,040.56	
Hire of Equipment	210.00	34,314.92
Net Corporate Deficit		$37,212.22

BIG BLACKFOOT RAILWAY COMPANY.

Operating Revenues		$63,211.31
Operating Expenses		43,380.85
Net Operating Revenue		$19,830.46
Taxes Accrued		1,525.00
Operating Income		$18,305.46
Income from Non-Operating Property		50.00
Gross Corporate Income		$18,355.46
Deductions:		
Interest paid Chicago, Milwaukee & St. Paul Ry. Company	$20,166.24	
Hire of Equipment	14,867.84	
Rents Paid	5,306.54	40,340.62
Net Corporate Deficit		$21,985.16

IDAHO & WASHINGTON NORTHERN RAILROAD.

During the year, this Company acquired approximately 83% of the capital stock and all of the outstanding bonds and notes of the Idaho & Washington Northern Railroad, with the exception of sixty thousand dollars of first mortgage bonds, in exchange for its four per cent bonds.

The railroad of that company extends from a connection with this Company's Coeur d' Alene branch at McGuire, Idaho, to Metaline Falls, Washington, a distance of 106 miles, with a branch extending from Coleman to Clagstone Junction, a distance of about 7 miles. Its equipment consists of 13 locomotives, 9 passenger cars and 448 freight cars. Its railroad shops and equipment were built during the years 1907, 1908 and 1909, and are all of modern construction.

For details of operation, reference is made to the statements of the General Auditor, appended hereto.

By order of the Board of Directors.

August, 1914.

A. J. Earling, *President.*

GENERAL BALANCE SHEET.

ASSETS—June 30th, 1914.

Property Investment:		
Road and Equipment		$553,243,345.05
Reserve for Accrued Depreciation—Cr.		6,398,789.90
		$546,844,555.15
Securities:		
Securities of Controlled Companies—		
Unpledged:		
Stocks	$9,033,502.34	
Funded Debt	5,480,000.00	14,513,502.34
Other Investments:		
Advances to Controlled Companies for Construction, Equipment and Betterments	$31,971,333.27	
Miscellaneous Investments:		
Physical Property	482,833.18	
Investment Securities—Unpledged	51,082.05	32,505,248.50
Total Capital Assets		$593,863,305.99
Working Assets:		
Cash	$16,745,787.97	
Traffic and Car-Service Balances	456,649.11	
Due from Agents and Conductors	2,036,091.85	
Miscellaneous Accounts Receivable	3,071,118.13	
Materials and Supplies	7,723,038.00	
Other Working Assets	360,098.18	30,392,783.24
Accrued Income not Due:		
Unmatured Interest		282,328.67
Deferred Debit Items:		
Working Funds	$217,844.37	
Special Deposits	55,258.98	
Taxes Paid applicable to period subsequent to June 30th, 1914	857,181.94	
Cash and Securities in Sinking Funds	412,089.02	
Securities in Insurance Fund	2,806,600.00	
Other Deferred Debit Items	1,875,599.92	6,224,574.23
		$630,762,992.13

GENERAL BALANCE SHEET.

Liabilities—June 30th, 1914.

Capital Stock:			
Common Stock—			
In Hands of Public	$116,850,100.00		
Held by Company	5,300.00	$116,855,400.00	
Preferred Stock—			
In Hands of Public	$115,845,800.00		
Held by Company	429,100.00	116,274,900.00	
Premiums Realized on Capital Stock		36,183.87	
Total Capital Stock			$233,166,483.87
Funded Debt:			
Mortgage Bonds—			
In Hands of Public	$199,784,000.00		
Held by Company	155,551,500.00	$355,335,500.00	
Debenture Bonds—			
In Hands of Public	$131,443,454.66		
Held by Company	102,200.00	131,545,654.66	
Total Funded Debt			$486,881,154.66
Total Capital Stock and Funded Debt			$720,047,638.53
Less Stock and Bonds unsold, held in the Treasury of the Company			153,915,500.00
Total Capital Liabilities			$566,132,138.53
Working Liabilities:			
Bills Payable		$5,030,280.20	
Traffic and Car-Service Balances		516,327.13	
Pay Rolls and Vouchers		7,592,102.61	
Miscellaneous Accounts Payable		340,973.72	
Unclaimed Dividends		4,415.50	
Interest Coupons not Presented		115,994.14	
Matured Funded Debt		5,000.00	
Other Working Liabilities		615,955.47	14,221,048.77
Accrued Liabilities not Due:			
Interest Accrued on Funded Debt		$5,001,099.23	
French Government Tax—European Loan of 1910		928,459.10	5,929,558.33
Deferred Credit Items:			
Insurance Department Fund—Reserve		$2,771,116.58	
Other Deferred Credit Items		417,964.72	3,189,081.30
Appropriated Surplus:			
Reserves from Income or Surplus:			
Invested in Sinking Funds			430,269.02
			$589,902,095.95
Profit and Loss—Balance:			
Surplus			40,860,896.18
			$630,762,992.13

Railway Age Gazette

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WE GUARANTEE, that of this issue 8,950 copies were printed; that of these 8,950 copies 7,395 were mailed to regular paid subscribers to the weekly edition, 250 were provided for counter and news companies' sales, 1,101 were mailed to advertisers, exchanges and correspondents, and 204 were provided for samples and office use; that the total copies printed this year to date were 383,900, an average of 9,363 copies a week.

Volume 57 October 9, 1914 Number 15

Contents

*Illustrated.

Trade Opportunities in South America

At the request of the *Railway Age Gazette*, F. Lavis has written an article on Trade Opportunities in South America, which is published elsewhere in this issue. The article is especially intended to show what are the openings for the sale of American railway supplies in the markets of South America, what difficulties must be overcome in winning these markets and how this may be done. Mr. Lavis is well fitted to discuss this subject, for until quite recently he was engaged in railway engineering work in Argentina, and his thorough knowledge of conditions in that country, especially, was shown by his articles on the railways of Argentina, published in the issues of the *Railway Age Gazette* for March 27 and April 3, 1914. Mr. Lavis is not entirely optimistic regarding the opportunities for the early development of a large market for American manufacturers in South America, but with respect to the general subject neither is he at all pessimistic. He believes there is a large potential market to the south of us which our manufacturers of railway supplies and other articles can capture if they will undertake to do so systematically and persistently, and can secure the co-operation and support of the large financial interests of this country. Mr. Lavis' article is one of the best discussions of the subject that have appeared, and will well repay a careful reading by those interested in the matter.

Safety First in Motion Pictures

On the New York Central, the Lackawanna, the Santa Fe and the Burlington "Safety-first" is henceforth to be taught by means of a love story, embellished with a suitable percentage of smiles and kisses to produce the proper effect, according to the latest efficiency tables of Taylor and Emerson. It is to be done by a motion-picture exhibition, which has been prepared by Mr. Dow of the New York Central, and a description of which the reader will find on another page. At first thought this might seem to be a rather light and questionable treatment of a very serious subject; but love and tragedy are skilfully combined, and no one who sees Mr. Dow's pictures will question their effectiveness. Surely, no one who has noticed the romances and the very readable pages of domestic fiction which fill some of the brotherhoods' monthly magazines can doubt that railway employees appreciate matters of "human interest." The safety-first movement is essentially one which depends on exhortation and appeal, rather than on systematic commands and instruction; and arguments addressed to the emotions, rather than to the intellect alone, are wholly legitimate. And the men who can derive the most benefit from this movement are, probably, the freight train men; those from whose everyday life the lessons here shown have been taken. For women and children and for general audiences, some of the scenes are of a pretty startling character, bordering on the class which, in ordinary shows, has been condemned in some quarters as too harrowing; but for men who work about trains and in freight yards the lessons are none too vivid. For, in sober truth, most of these men, for some reason or other, do not fully realize what a considerable percentage of their fellow-workmen are killed or injured by carelessness each year.

Increase in Mileage Book Rates

That the members of the Illinois Commercial Men's Association are not unanimous in opposing the advance in rates for passenger mileage books, and that the secretary of that organization apparently is individually responsible for the circular letter containing blank forms of protest to be filled out and sent to the Interstate Commerce Commission, which was discussed in our last week's issue, is indicated by another letter on the subject by Lorenzo Norvell, of Fairbanks, Morse & Co., which is published elsewhere. In the meantime, moreover, the Interstate Commerce Commission has allowed the increase to go into effect on October 1, without suspension, subject to investigation on any complaint that may be filed. This was no more than fair, since the suggestion for increasing passenger rates came from the commission itself. Mr. Norvell enters a most emphatic protest against the attempt to incite the commercial travelers into a movement against the increase, and proposes to institute a counter-campaign by sending copies of his letter to the press and to other large firms that he feels are in accord with him on this subject. His action suggests

an opportunity for those who believe that the prosperity of the country will be enhanced by improving the condition of the railways. Mr. Norvell cites some very strong reasons why commercial houses and traveling salesmen, instead of considering that they are to be the victims of the increased cost of mileage books, should be among the first to aid in placing the railway passenger service on a paying basis. He says, "Our great need today is service. We want trains in plenty to enable traveling men to get over their territory quickly without loss of time. We also want our freight handled promptly, and when we get service we should be fair enough to pay for it." That sums up the whole argument. He adds that he cannot see why traveling salesmen should get a better rate on transportation than individuals, especially when in nine cases out of ten their firms pay their expenses. It is often said that mileage books should be sold at a lower rate than single tickets, on the principle that wholesale prices should be less than retail, and this idea is still recognized in the new rate. While the mileage book rate has been advanced from 2 to 2¼ cents the roads are preparing to advance their ordinary rates to 2½ cents, so that the mileage book rate will still represent a 10 per cent discount. But the principle of wholesale rates is based on the fact that the cost of wholesale service is less than that of retail service. In the case of mileage books the only reduction in cost to the railways lies in the sale of a book at one time instead of numerous tickets, and in the prepayment. The service rendered to those travelers making use of mileage books is in all other respects a retail one.

THE YARDMASTER AN EXECUTIVE

ONE fact which deserves special emphasis, and which is brought out by several contributors to the discussion of the Operation of Terminal Yards, some of whose papers are published elsewhere in this issue, is that the general yardmaster in charge of an important terminal is an executive officer who should be freed of petty details and clerical duties to a large extent, so that he will be able to spend a large portion of his time out in the yard, where the work is being done and the money spent.

It is only by being free to go from one point of local congestion or difficulty to another that he can direct operations most intelligently, and it is only in this way that he is able to secure a first-hand knowledge of the exact conditions in the yard and is able to improve practices to the end that a high standard of efficiency may be maintained. The yardmaster who permits himself to be tied to his desk continuously by clerical duties reduces himself very largely to the rank of a clerk, while the railroad company which requires him to devote a large portion of his time to such work is paying a yardmaster's salary for no more than a clerk's work.

It is generally observed that the yard is best operated in which the yardmaster appears to have the least to do with the handling of routine business. By this it is not meant to imply that he should have no actual duties, but it is distinctly to his credit if he so organizes his forces that routine work requires only his casual attention. It has been said of the late E. H. Harriman that he considered that a man who would allow his deck to become stacked up with papers was not fit for an important executive position since, in allowing himself to be buried in a mass of details, he overlooked the larger opportunities. The same criterion can be applied to the work of a yardmaster. If he is engrossed in a multitude of routine details, he will not observe a congestion arising in some portion of his yard until it has become so serious as to affect the operation of the entire yard.

The analogy drawn by one contributor between a yard and a stream of water is pertinent. Let any facility of a yard, even one classification track, become congested and the effect is soon felt in all other parts of the yard. The serious blockade of 1907 in the terminal district of Chicago was caused by the inability of two or three roads to accept interchange traffic from connecting lines because of lack of facilities, and the ultimate result was that practically every road in that district was blocked with traffic which it was unable to deliver to other lines.

The larger the yard the greater is the necessity for the general yardmaster to be free to observe conditions. Entirely aside from the advantage discussed above, close supervision is a most potent factor in the elimination of expensive switching practices and the introduction of economical methods.

HANDLING LESS THAN CARLOAD SHIPMENTS THROUGH THE FREIGHT HOUSE

IN a recent issue of the *Railway Age Gazette* a description was published of an investigation of freight house conditions in Boston. Other cities have encountered many problems pertaining to the handling of merchandise shipments through the local freight houses, and our attention has been called to a method of improving conditions in this respect which has proved successful in St. Louis.

A few years ago complaints from shippers concerning the handling of less-than-carload shipments at the local freight houses became so numerous that the Traffic Bureau of the Business Men's League of St. Louis made an investigation. It was found that it was the custom of all the carriers to compel shippers to peddle their outbound shipments from door to door at each freight house so that the freight might be trucked across the platform as directly as possible, to the car into which it should be loaded in station order, and to wait indefinitely for a receipt. In some cases this required resetting of a wagon from eight to ten times in order to dispose of a single wagon load for a single station.

The shippers felt that this was an unreasonable burden and that it would be mutually advantageous if the carriers would provide arrangements for discharging entire wagon loads at some door designated for the purpose. A standing committee was appointed representing all of the local agents of the railways at St. Louis and East St. Louis, to work with a like committee representing the shippers in connection with the bureau.

As a result of the joint work of this joint committee there was established at all freight houses what is termed the "one-dump" system; that is, the shippers are permitted to discharge their entire wagon loads at a door designated by the freight house foreman. The freight is immediately checked and receipt given, thus avoiding delay to the drayage facilities of the shippers. Through the committee from time to time all of the various details with respect to receiving, checking, loading, issuing receipts, and other incidentals to the handling of freight shipments which might cause friction or controversies, have been thrashed out.

As an aid to the committee in determining from day to day the conditions at the freight houses, the Traffic Bureau of the Business Men's League has a station service inspector who reports daily the general conditions so that the standing committee may be called together if necessary.

It is stated that the system is now working so smoothly that the standing committee has had very little to do for the past two years; and the results obtained have been due to the practical and earnest co-operation of the shippers and carriers through representatives having an intimate knowledge of all the details and conditions. This is but another example of the advantages to be derived from such co-operation between the railways and the shippers, which is rapidly taking the place of the old condition of protracted controversy. The results obtained in the city of St. Louis may perhaps prove an object lesson to many other cities that have been struggling with the freight house problem.

DENVER & RIO GRANDE

INSTEAD of the usual rather perfunctory thanks to officers and employees with which so many annual reports close, Mr. Bush concludes his letter of transmittal accompanying the Denver & Rio Grande annual report for the fiscal year ended June 30, 1914, by saying: "The company and its officers have undertaken to warrant the confidence of the peoples served so that the relations between all are established on sound, substantial principles." This was not always the attitude of the management of the Denver & Rio Grande, and it is, therefore, all the more noteworthy. The figures in an annual report cannot, of course, directly reflect progress in the undertaking "to warrant the confidence of the peoples served"; nevertheless, it has been the pretty general rule, especially in recent years, that good operating results have gone hand in hand with better service. There are plenty of theoretical exceptions to this, but in practice the economically managed road gives good service and any number of examples could be cited—the Delaware, Lackawanna & Western, the Chicago & North Western, the Buffalo, Rochester & Pittsburgh, the Union Pacific, the Burlington, etc.

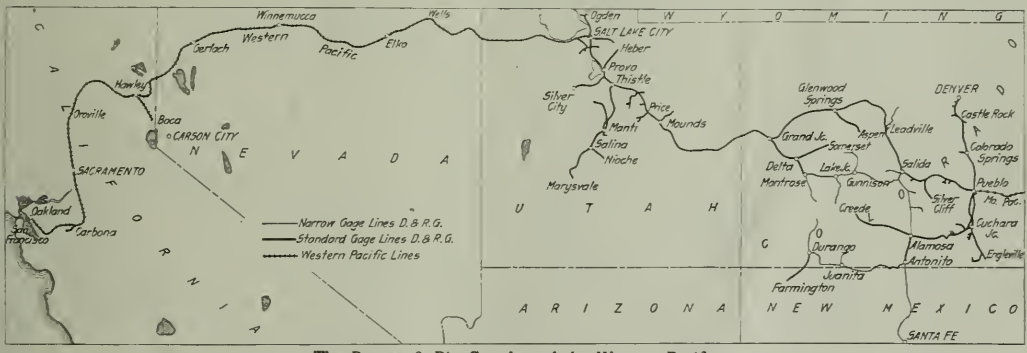
In 1914 the Denver & Rio Grande's earnings amounted to $23,167,000, or 5.26 per cent less than in 1913. This was the result of a reduction of 4.80 per cent in passengers carried one mile and 6.23 per cent in tons carried one mile. The falling off in business, however, was accompanied by a decrease of 8.19 per cent in passenger-train miles and 17.04 per cent in freight-train miles. Notwithstanding, therefore, unusually heavy snow, followed later in the year by unusually heavy rains, transportation expenses amounted to $7,249,000, a decrease of $489,000, or 6.32 per cent, from the corresponding expenses of 1913. The saving in transportation expenses was in greater part directly due to a saving in train mileage. The saving in train mileage, disproportionately larger than the falling off in business, was the result of a larger revenue trainload—337 tons in 1914 as against 305 tons in 1913, a gain of 10.57 per cent—and 66 passengers on an average per train as against 64 in 1913, a gain of 2.50 per cent. In addition to the larger revenue trainload there was also more company freight—52 tons as against 40 tons—carried per train, so that the total trainload was 390 tons in 1914 as against 345 tons in 1913. All of the gain in trainload was made in adding cars, the carloading per loaded car being about the same in each year—23 tons. The average number of loaded cars per train was 17, as against 15, and the empty cars 7.6 as against 6.7. The percentage of loaded car-miles to total car-miles was 66.23 in 1914 and 66.35 in 1913. In view of all the conditions this is certainly a very creditable record.

The Denver & Rio Grande operates a total mileage of 2,585 miles, of which approximately 1,795 miles is standard gage and 769 miles narrow gage. There is in all about 197 miles of second-track and 700 miles of sidings and spur tracks.

The Denver & Rio Grande forms a connecting link in the Gould transcontinental system between the Missouri Pacific, with its western terminus at Pueblo, Col., and the Western Pacific, with its eastern terminus at Salt Lake City, Utah. The part of this route formed by the Denver & Rio Grande and Western Pacific is, however, a very mountainous one. On competitive business, therefore, both passenger and freight, the Denver & Rio Grande is at a disadvantage when compared with the Union Pacific, Northern Pacific and Great Northern on the north, and with the Southern Pacific on the south, although, of course, the Grand gorge scenery is a real asset insofar as passenger business is concerned. On the other hand, the Denver & Rio Grande taps resources of the wonderfully rich state of Colorado, which no other railroad has access to. The local business in precious ores, fruit and vegetables is expensive to handle, but is the real backbone of the Rio Grande's earnings.

Of the total 11,230,397 tons of freight carried in 1914, 38 per cent was precious ore and 29 per cent bituminous coal, 5 per cent was products of agriculture and fruit, and 6 per cent manufactures. Because of the nature of the traffic the ton-mile rate on the Denver & Rio Grande is good—1.201 cents in 1914. The passenger rate, however, is low—2.04 cents in 1914.

The Denver & Rio Grande used its credit in helping to build the Western Pacific. The Western Pacific was opened in July, 1911. It was built avowedly, because in competition with the Union Pacific the Denver & Rio Grande was at a disadvantage for California business. This ambition to share in through transcontinental business was the hope of a traffic man rather than an operating man. It is one thing to be able to solicit through business and quite another to be able to handle it economically and expeditiously. With its grades and location the Denver & Rio Grande is at a disadvantage wholly regardless of its relations with roads to the east and west of it. The following table shows the percentage of each class of traffic in 1911 to 1914:



The Denver & Rio Grande and the Western Pacific

	1914	1913	1912	1911
Products of agriculture	5.3	5.4	4.9	3.9
Products of animals	1.6	1.4	1.2	1.1
Products of mines	80.9	79.9	82.6	84.2
Products of lumber	2.2	2.8	2.3	3.9
Manufactures	5.9	6.3	5.5	5.5
Merchandise	1.7	1.7	1.6	1.3
Miscellaneous	2.4	2.5	1.9	1.6

Neither the percentages of the various classes of traffic nor the actual tonnage figures would indicate that the Western Pacific had brought a great deal of through business to the Denver & Rio Grande. The tonnage of fruit shows a steady increase from 106,000 tons in 1911 to 146,000 in 1913, with a slight falling off in 1914; but no great part of this fruit tonnage is furnished by California, most of it being Colorado fruit shipped east, and the growth in traffic is due to the growth in production in the state of Colorado, the falling off in 1913, when there was a bad fruit year in Colorado, bearing out this assumption.

This brings us back to President Bush's statement about the establishment of confidence between the people served and the railroad. The Denver & Rio Grande is essentially a local and originating and distributing road. It originates traffic for the Missouri Pacific and distributes traffic delivered to it by the Missouri Pacific; but its success depends very largely on the

prosperity of Colorado, and to a less extent on that of Utah. The recognition of this fact by the present management of the road is a significant and hopeful sign.

The Denver & Rio Grande in 1914 spent $1,938,000 for additions and betterments. No bonds were sold and the funded debt was decreased by $321,000 through the redemption of a small block of first and refunding 5's and the payment of $150,000 maturing equipment trust obligations. No dividends were paid on either the preferred or common stock, so that the entire $1,056,000 surplus from income account was credited to profit and loss. The cash on hand at the end of the year amounted to $2,607,000, $258,000 more than at the beginning of the year, and the amount loaned to the Western Pacific by the Rio Grande increased from $593,000 to $2,420,000. In addition there is now $3,125,000 interest due on the Western Pacific's second mortgage bonds, all held by the Rio Grande, which is unpaid. There were no Denver & Rio Grande loans and bills payable at the end of the year, and total working liabilities amounted to but $3,677,000, $240,000 less than at the beginning of the year.

The Western Pacific earned $6,100,000 in 1914, or $74,000 less than the previous year, and had operating expenses of $4,996,000, or $517,000 more than the previous year. After the payment of taxes the company had $322,000 available for interest charges as against $1,040,000 the year before. It will be seen, therefore, that the Denver & Rio Grande had to advance the Western Pacific about $2,200,000 to pay the interest charges on the Western Pacific's $50,000,000 first mortgage 5 per cent bonds.

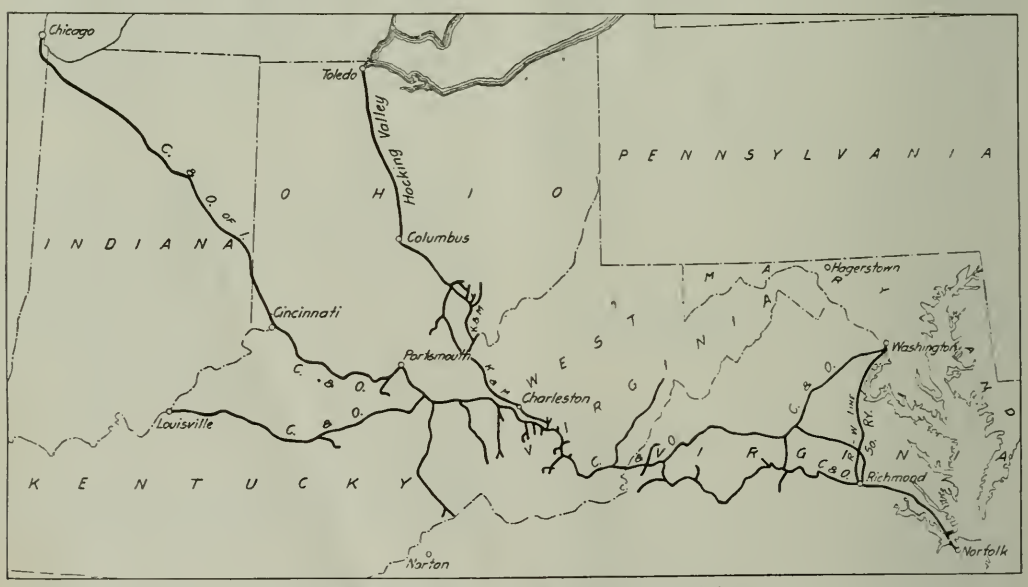
The following table shows the principal figures for operation in 1914 and 1913:

	1914	1913
Average mileage operated	2,583	2,555
Freight revenue	$17,058,080	$18,078,140
Passenger revenue	5,077,408	5,299,081
Total operating revenues	23,167,051	24,452,965
Maint. of way and structures	3,393,968	3,545,938
Maint. of equipment	4,245,325	4,538,231
Traffic expenses	497,431	546,432
Transportation expenses	7,249,240	7,738,496
General expenses	632,231	678,055
Total operating expenses	16,018,196	17,047,172
Taxes	1,009,144	948,739
Operating income	6,123,564	6,450,560
Gross income	7,386,498	7,698,498
Net income	1,400,375	2,094,180
Appropriations to sinking funds	263,889	247,808
Appropriations for additions and betterments	80,928	389,000
Surplus	1,055,559	1,457,372

CHESAPEAKE & OHIO

WHEN control of the Chesapeake & Ohio was bought in 1909 it was figured that the property could earn on an average of about 10 per cent on its stock. Since 1910 unforeseeable increases in wages and taxes accumulated until they now aggregate about 4½ per cent a year on the stock. If, therefore, the estimate of 1909 of the investors in Chesapeake & Ohio stock was correct, the company would have earned approximately 5½ per cent on its stock in the fiscal year ended June 30, 1914, and the fact that it actually earned but 4.73 per cent would indicate either that the original 1909 estimate was a little too high or that there were temporary causes adversely affecting net income which may under ordinary circumstances be expected to be no longer effective.

Operating revenue was greater in 1910 than in 1905 by 50 per cent, or an average increase of a little less than 10 per cent per year. From 1911 to 1914 the average yearly increase in operating revenues was only between 3 and 4 per cent. Total operating revenues in 1914 amounted to $36,690,000, an increase of 4.57 per cent over 1913. The question then is as to whether the 4½ per cent increase in gross in 1914, which is slightly larger than the average since 1911, but only half of the average from 1905 to 1910, may be considered normal in estimating future earning power.*



The Chesapeake & Ohio System and the Kanawha & Michigan

During the years 1911 to 1914, because of particular problems and circumstances, the Chesapeake & Ohio has not shared to the extent that it ought in the increase in general business, especially in coal business. It did not share in the increase in tidewater coal business, which has apparently been so profitable to the Norfolk & Western, because the Virginian's competition cut into this business and because both the Virginian and the Norfolk & Western had far better facilities for dumping coal into vessels at tidewater than had the Chesapeake & Ohio; and, furthermore, the Chesapeake & Ohio could not keep its coal cars on its own lines at the very times that it needed them most when there was the largest amount of coal pressing for shipment to tidewater. The Chesapeake & Ohio could not share in the full increase in the lake coal movement partly because of

*A break is made in this comparison between 1910 and 1911 because 1911 is the first year in which the earnings and expenses of the Chicago line are included. By comparing 1910 with 1905 and 1914 with 1911, like is compared with like.

congestion on western connections, especially the Cincinnati, Hamilton & Dayton at Cincinnati; partly because its own Chicago line, which was bought to develop general business rather than coal business, probably was not in physical shape to economically handle much coal business, and partly because of the uneconomical way in which the Chesapeake & Ohio had to route coal to Toledo. Shortage of cars also prevented the company from fully sharing in the increase in coal business in its territory. With these disabilities removed it appears quite safe to say that 4 per cent increase in operating revenues is very materially less than a normal increase.

The company has been building and put in operation on June 1, 1914, a new all-steel dumping pier at Newport News. This pier cost about $1,630,000, and has a capacity of 5,000 tons per hour. The completion of this pier not only removes the disability under which the Chesapeake & Ohio had been laboring in regard to tidewater coal business, but gives it facilities that are even more modern and of greater capacity than either of its competitors. On the other end of the line a project has just been started which should give the road an economical outlet for lake coal that will both make it independent of the congestion on connections at Cincinnati and give it a far better division of the rates than it is now getting on coal which moves over the Kanawha & Michigan to the Hocking Valley. During the past two years the Chesapeake & Ohio has also added very largely to its equipment.

The new outlet to the lakes is to be furnished by a line which is being built from Portsmouth, Ohio, on the main line of the Chesapeake & Ohio, to Columbus, Ohio, on the main line of the Hocking Valley. This line is being built under the direct supervision of M. J. Caples, who built the Carolina, Clinchfield & Ohio, which argues well, therefore, for its being an economical line to operate.

Total operating expenses on the Chesapeake & Ohio in 1914 amounted to $25,654,000, an increase over 1913 of $1,202,000. This is an increase of 4.92 per cent, with an increase of 9.2 per cent in passenger mileage and 5.5 per cent in revenue ton mileage, with, however, an increase of but 0.2 per cent in passenger-train mileage and 2.3 per cent in freight-train mileage. The greater part of the increase in expenses was in transportation. These expenses in 1914 amounted to $12,168,000, an increase over 1913 of $787,000, the largest increases being $132,000 in payments for loss and damage to freight, $99,000 in fuel for road locomotives, $96,000 in station employees and $74,000 in yard conductors and brakemen. These increases are by no means necessarily permanent; in fact, with the exception of station employees, it would seem as if the company might reasonably expect to increase transportation expenses only slightly more than in proportion to the increase in revenue train-mileage.

Maintenance of way expenses amounted to $4,138,000 in 1914, a reduction of $205,000, largely because of a smaller rail renewal and smaller expenditures on track labor, tie renewals having increased, however. Maintenance of equipment cost $7,693,000, an increase of $417,000. Maintenance of equipment expenses were extraordinarily high because up till about a year ago there was so large and pressing a demand for cars, especially coal cars, and so many cars were off the line, that as soon as the demand became more normal and cars began to return from the west, an extensive repair program was entered on.

If the above conclusions are right, the Chesapeake & Ohio had a smaller gross and larger expenses in 1914, because of particular circumstances and conditions which have been or are being changed. Just how much difference this would make in the net income available for dividends, it is, of course, impossible to say. It ought to be more than one per cent on the stock. The faith of the owners in the property is shown by their willingness to postpone dividends in order that the surplus which belongs to them may be invested in betterment of the property.

Interest charges in 1914 were more by $615,000 than in 1913. Part of this increase was due to the refunding of $28,000,000 notes, of which $25,000,000 were 4½ per cent and the remainder 5 per cent, by the sale of $33,000,000 5 per cent notes and by the interest charges on equipment contracts. The interest on the new $33,000,000 notes began in March, whereas the interest on the notes retired did not cease until June 1. There was, therefore, an overlapping of interest charges, so that in 1915 interest charges ought not to be any higher, if as high, as in 1914, despite the fact that interest for the full year will, of course, be called for on the new notes.

There has been a great deal of money spent on expansion and betterment of the Chesapeake & Ohio since 1909. On the other hand, the financing of this expansion and betterments, that is, the issue and sale of securities against this new investment in property, has been notably conservative. In the five years since 1909 the property has been extended through the purchase of stocks of other companies, principally the Chesapeake & Ohio of Indiana (the Chicago line), the Hocking Valley and a part interest in the Kanawha & Michigan, at a cost of $21,506,000, to which should be added the cost of the bonds of the Chicago line and of the Elkhorn & Beaver Valley, $6,381,000, and other properties bought outright, $4,193,000. In addition, during these five years $15,692,000 has been spent for additions and betterments, including 173 miles of second-track, and $16,875,000 net for new equipment. This is a total of $64,646,000. Against this expenditure there has been issued net, including the new $33,000,000 5 per cent collateral notes, but $54,888,000.

The company had falling due on June 1, 1914, $28,500,000 notes. In March an arrangement was made for refunding these notes through the sale of $33,000,000 5-year 5 per cent notes. The company pledged itself to spend out of net income $17,000,000 during these five years for additions and betterments, this expenditure to be made prior to any dividend payments. In other words, the stockholders agreed to, if necessary, sacrifice a part or all of their 4 per cent dividend (the rate paid in 1914) in order to make a further investment in the property as an added margin of safety behind the first lien and improvement mortgage bonds which are the collateral security for the $33,000,000 notes.

At the time of the purchase of the majority stock of the Hocking Valley the Chesapeake & Ohio also bought a half interest in the majority stock of the Kanawha & Michigan. The Lake Shore & Michigan Southern owned the other half interest. The cost to the Chesapeake & Ohio of its Kanawha & Michigan stock was $2,901,000. This purchase was the subject of litigation, and in March, 1914, the United States district court held the ownership of the Kanawha & Michigan control by the Lake Shore and the Chesapeake & Ohio as a violation of the Sherman anti-trust law. Valuable as is the Kanawha & Michigan, control of the half interest in it, except as an investment, was not particularly advantageous to the Chesapeake & Ohio, and rather than fight the suit through to the Supreme Court, the company agreed to sell its Kanawha & Michigan stock to the Toledo & Ohio Central, which is controlled by the Lake Shore & Michigan Southern. During the time that the Chesapeake & Ohio held this stock it had appreciated materially in value and the company sold it for $4,029,000, realizing a profit of $1,100,000. This stock was pledged under the first lien and improvement mortgage, and the proceeds of the sale will, therefore, be available for additions and betterments or other capital purposes permitted by the mortgage securing these bonds. With the building of the connection between the Chesapeake & Ohio and the Hocking Valley the necessity for a voice in the management of the Kanawha & Michigan will have entirely disappeared.

At the beginning of 1914 the company had on hand $2,928,000 cash, with total working assets, including this cash, of $6,468,000. There were $95,000 loans and bills payable, and a total, including the bills payable, of $5,228,000 working liabilities. On June 30, 1914, the company had $1,793,000 cash, total working assets being $5,979,000, the same $95,000 loans and bills payable, with total working liabilities of $5,774,000. As of June 30, 1914, however, the sale of the Kanawha & Michigan

stock had not been consummated. Payment for this stock is to be made $2,000,000 in cash and the remainder by note maturing September 1, 1915.

The table shows the principal figures for 1914 and 1913:

	1914	1913
Average mileage operated	2,346	2,319
Freight revenue	$28,866,516	$27,549,696
Passenger revenue	6,098,059	5,858,138
Total operating revenues	36,690,021	35,085,278
Maint. of way and structures	4,138,092	4,342,745
Maint. of equipment	7,692,748	7,275,439
Traffic expenses	669,283	669,016
Transportation expenses	12,167,906	11,380,998
General	985,909	783,362
Total operating expenses	25,653,937	24,451,560
Taxes	1,330,935	1,375,863
Operating income	9,705,149	9,257,855
Gross income	11,859,681	11,483,392
Net income	2,971,816	3,298,503
Dividends	2,511,264	3,139,080
Surplus	460,552	159,423

ATCHISON, TOPEKA & SANTA FE

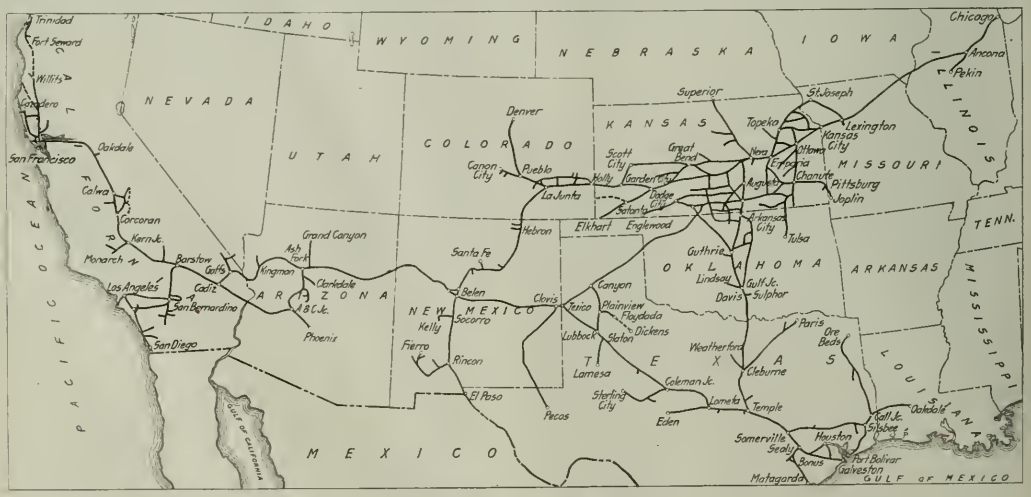
THE Atchison, Topeka & Santa Fe has been one of the few railroad companies which have continued expenditures for extensions in the past few years as well as expenditures for additions and betterments. This was so because the Santa Fe had very extensive work in hand when the present period of depression in the railroad business began and it was of utmost importance that this work should be carried to completion so that a return might be had on investment already made. Even in the fiscal year ended June 30, 1914, $2,673,000 was spent for construction and acquisition of new mileage, in addition to $13,284,000 spent for additions and betterments and additional equipment. The net increase in the property account after making adjustments for reduction in book values was $11,165,000. In President Ripley's opinion it has now become prohibitively difficult to borrow new capital for a railroad company such as the Atchison, Topeka & Santa Fe. President Ripley says in his annual report to stockholders: "Under these conditions it is the intention of your directors to make no additions or betterments, however desirable, which cannot be paid for out of current earnings, and to continue the policy of incurring no floating debt." In 1914 the surplus current earnings available for expenditure on additions and betterments or extensions, after the payment of interest charges and dividends, was $2,719,000. It will be seen, therefore, how radical and drastic would be the change in the course of the Santa Fe if increased earnings do not make available a larger sum than $2,700,000 for additions and betterments, or if there is no change for the better in money conditions which will warrant a change of policy on the part of the management.

The Atchison, Topeka & Santa Fe operates 10,909 miles of road and the increase in mileage from 1913 to 1914 was 190 miles. During the years from 1897 to 1914 the average earnings per mile of road operated have grown from $4,752 in 1897 to $10,186 in 1914.

If one will stop to think what this development of the Santa Fe has meant to the territory which it serves it will be easy to see how vastly important it is to the future development of this country that a continuation of development of this and other great railroad properties may be made possible. As President Ripley says, the development of the Atchison, Topeka & Santa Fe business and of its efficiency has been due principally to the very large expenditures (over $298,000,000) which have been made in the extension and improvement of the property since January 1, 1896.

The 1914 annual report of the Santa Fe contains a very striking table showing the property investment, income applicable to bond interest, dividends, improvement of property and strengthening of credit, and the per cent of this income to property investment. In 1897 the total property investment, excluding working capital, amounted to $387,957,000, and the income for that year amounted to 1.57 per cent on this investment. By 1907 property investment had increased to $519,004,000 and the income to an amount equal to 6.31 per cent on this investment. In 1909 total property investment was $548,251,000 and income $33,535,000, or 6.11 per cent. In 1914 property investment was $651,429,000, an increase of more than $100,000,000 since 1909, while income was but $33,070,000, or slightly less than in 1909 and represented but 5.08 per cent on the investment.

The fiscal year 1914 was not a prosperous one for the Santa Fe. Total operating revenues amounted to $111,110,000, a decrease of $5,786,000 from the revenues of 1913. Operating expenses amounted to $73,469,000, a decrease of $4,173,000. By far the greater part of the decrease in revenues was caused by a falling off in freight business. The total tonnage carried in 1914 was 25,034,000 tons, or only a comparatively small number of tons less than in 1913 (25,062,000 tons). On the other hand, the average length of haul was but 292 miles in 1914 as against 311 miles in 1913. The tonnage of products of mines in 1914 was 10,244,000 tons; in 1913, 9,334,000 tons. This tonnage is comparatively short-haul business. The tonnage of products of agriculture amounted to 5,000,000



The Atchison, Topeka & Santa Fe

tons in 1914, or 19.97 per cent of the total tonnage, and in 1913 to 5,237,000 tons, or 20.90 per cent of the total tonnage. Lumber and forest products furnished 2,164,000 tons in 1914, or 8.64 per cent of the total tonnage, and in 1913, 2,627,000 tons, or 10.48 per cent of the total tonnage. The proportionate amount of l. c. l. tonnage of merchandise on the Santa Fe is large. In 1914 1,499,000 tons, or 5.99 per cent of the total tonnage, was merchandise; in 1913, 1,563,000 tons, or 6.24 per cent of the total tonnage.

It was impossible to reduce operating expenses to an amount that would offset the decrease in business. The reduction in operating expenses of $4,173,000 was effected through a smaller expenditure for maintenance of way by $2,746,000, and a reduction in transportation expenses of $1,317,000. Detailed expense accounts show that the principal reductions in maintenance of way were in the amount spent for track labor, for bridges, trestles and culverts, and for buildings, for fixtures and grounds.

The economies in transportation expenses were due, apparently, to a reduction in freight-train mileage, which reduction, however, was not quite commensurate with the falling off in ton mileage. The decrease in ton mileage was 8.07 per cent; the decrease in freight-train mileage, 6.98 per cent. The average trainload in 1914 was 420 tons and in 1913, 425 tons; the average carload per loaded car, 18.75 tons in 1914 and 19.14 tons in 1913.

No additional securities were sold by the Atchison, Topeka & Santa Fe in 1914 and interest charges were reduced by $939,000 through the conversion of $4,975,000 4 per cent bonds into stock. At the beginning of 1914 there was $30,096,000 cash on hand, with, of course, no loans or bills payable and total working liabilities of $13,024,000. At the end of the year there was $20,063,000 cash, with total working liabilities of $10,413,000. If the income statement of the Santa Fe were as satisfactory as its balance sheet there would be no need for President Ripley's warning to stockholders. The Santa Fe is in a sounder position, insofar as the relation of the amount of its debt to its stock is concerned, than most other roads. At the end of 1914 there was $309,985,000 stock outstanding and $313,194,000 bonds.

The following paragraph in President Ripley's letter of transmittal of the annual report is worthy of most careful consideration:

"Your directors feel that heavy responsibilities devolve on them in the present state of governmental activities directed at the railroad industries. It has been found almost impossible to make even an approximate estimate of the cost of 'regulation' which has been imposed on us by the state and national governments. Without criticizing the policy of proper supervision, it is fair to say that many of the laws are not only expensive, but in the opinion of your officers unnecessary and superfluous. Constant whittling of rates, plus constant legislation which adds to your expenses without adding to revenue, have had their inevitable effect. Your own company has been less crippled by these conditions than some of those less fortunate, but by reference to page 14 [income account] it will be seen on how narrow a margin we have been working. There are some evidences of a disposition on the part of those in authority to realize that great injustice has been done in the guise of regulation and that it is time to call a halt, but the relief which the railroads need cannot come until this disposition shall be transmuted from mere expressions of friendliness into positive remedial measures. General words of sympathy will accomplish nothing if governmental agencies continue in each specific instance to impose additional burdens or to find excuses for not granting specific relief. Hence your directors deem it their duty again to warn stockholders that their interests are more endangered by the various governmental regulations than from any other source."

The following table shows the principal figures for operation in 1914 as compared with 1913:

	1914	1913
Average mileage operated	10,909	10,751
Freight revenue	$73,638,388	$78,190,923
Passenger revenue	28,497,233	29,425,922
Total operating revenues	111,109,770	116,896,252
Maint. of way and structures	15,308,780	18,054,413
Maint. of equipment	19,100,725	19,415,225
Traffic expenses	2,521,453	2,455,785
Transportation expenses	33,818,433	35,135,649
General expenses	2,719,943	2,581,463
Total operating expenses	73,469,334	77,642,535
Taxes	5,525,585	4,662,152
Operating income	32,114,851	34,591,565
Gross income	34,289,204	37,107,189
Net income	20,183,965	22,153,734
Dividends	17,400,440	16,107,470
Appropriations for additions and betterments and sinking fund	2,783,525	6,046,264

HOCKING VALLEY

THE majority stock of the Hocking Valley is owned by the Chesapeake & Ohio, and besides the great importance of the Hocking Valley as an outlet for lake coal for the Chesapeake & Ohio, the investment as an investment is a good one. This fact was as clearly demonstrated in 1914 as in previous years when net earnings of the Hocking Valley were very much larger. In 1914 there was a coal miners' strike in the Hocking district which resulted in the almost entire suspension of coal mining in April, May and June. Since the Hocking depends on coal for about 70 per cent of its tonnage, this caused a material reduction in operating revenues. Total operating revenues in 1914 amounted to $7,021,000, which is less by $796,000, or 10 per cent, than the revenues in 1913. No corresponding increase was made in operating expenses, which in 1914 amounted to $4,804,000, or but $180,000, or 4 per cent, less than in 1913. Nevertheless, after the payment of expenses, interest charges and rentals, there was a net income available for dividends of $956,000, the regular 8 per cent dividends calling for $880,000.

Of the total 10,487,000 tons of coal carried in 1914, 40 per cent originated on the Hocking Valley and 60 per cent was received from connections. Of the total tonnage 78 per cent was products of mines and 11 per cent manufactures. The average haul was 125 miles in 1914 as against 130 miles in 1913. There was, therefore, a decrease in the revenue ton mileage of 9.5 per cent, the total in 1914 being 1,315,000,000. With this falling off of 9.5 per cent in ton mileage there was a decrease of 10.6 per cent in freight-train mileage, the total freight-train mileage in 1914 being 1,316,000, and a reduction in locomotive mileage of 13.3 per cent, the total locomotive mileage in 1914 being 1,513,000. The average revenue trainload in 1914 was exactly 1,000 tons, and including company freight, 1,036 tons. This is an increase of 13 tons, or 1.3 per cent, over the trainload in 1913. The showing per locomotive mile was even better, 901 tons in 1914 as against 862 tons in 1913, an increase of 4.5 per cent. The greater part of the gain was made in length of train, carloading per loaded car being 36.9 tons in 1914 and 36.3 tons in the year 1913.

The Hocking Valley had on hand at the end of the year $973,000 cash, with a total of $1,844,000 working assets, exclusive of materials and supplies. There were loans and bills payable amounting to $1,400,000, which are included in total working liabilities of $3,057,000. In this connection it should be pointed out that the company has just finished building a new dock and terminal at Toledo, which is described elsewhere in this issue, and which cost about $1,450,000. The new dock is across the river from the old dock which the Hocking Valley owned, and this old dock is to be sold to the Pennsylvania, and a very considerable sum will be realized from this sale.

The following table shows the principal figures for operation in 1914 as compared with 1913:

	1914	1913
Average mileage operated	352	352
Freight revenue	$5,601,382	$6,365,735
Passenger revenue	910,311	929,991
Total operating revenues	7,021,145	7,817,644
Maint. of way and structures	668,455	781,109
Maint. of equipment	1,460,653	1,595,266
Traffic expenses	107,576	106,384
Transportation expenses	2,391,640	2,332,475
General	175,422	168,609
Total operating revenues	4,803,747	4,983,843
Taxes	451,136	477,900
Operating income	1,766,262	2,355,901
Gross income	2,215,182	3,128,379
Net income	955,741	1,916,403
Dividends	879,960	1,264,943
Surplus	75,781	651,461

INVESTMENT BANKERS' ASSOCIATION TO TAKE PART IN RATE CASE

In a letter addressed to the members of the Investment Bankers' Association of America George B. Caldwell, president of the association and chairman of the special railroad bond committee, urges an expression of opinion to be submitted by the bond committee to the Interstate Commerce Commission. Mr. Caldwell's letter is as follows:

"President Wilson, in a letter recently published, has called attention to the fact that it is of paramount importance in the present crisis to maintain the credit of the railroad industry in the United States.

"The clientele of the members of the Investment Bankers' Association embraces almost the entire investing public of the country. A very large proportion of this clientele owns railroad securities. It is therefore of particular importance to the membership of the association that the value of railroad securities should remain as far as possible unimpaired.

"For several years a situation has been developing in the United States which vitally affects every owner of a railroad bond or share. We refer to the steadily decreasing margin of net earnings of the railroads, which has already resulted in placing corporations with over $500,000,000 of outstanding securities in the hands of receivers.

"For the purpose of placing before the proper tribunal the broad facts as they have developed, and are developing, your committee has asked that you write them a letter which may be considered a composite representation of the opinions of your own clients to whom you have in times past sold securities (especially railroad securities) and which will state their impressions as to the safety of their investments—say 10 years ago—and at the present time. If such statements show an increasing lack of confidence in the intrinsic safety of these securities, has this lack of confidence been brought about through the various increases in labor cost enforced by arbitrations sanctioned by the government through the reduction in rates enforced by state legislatures and commissions acting independently and by the Interstate Commerce Commission? Are these the principal causes? If not, what others are stated?

"Your committee believes that statements of this character, representing the opinion of hundreds of thousands of individuals in the country who have in times past furnished money for extensions and improvements of the roads and from whom the money must come to provide for future extensions and improvements, will be of great value in considering the merits of the situation.

"The following questions are submitted with a view of outlining some phases of the situation which the committee believes should be covered:

"1. During the last 10 years have you noticed any change in the requirements of your clients in the matter of preferences for municipal, industrial or public utility bonds or stocks where previously they have purchased steam railroad bonds? Give their reasons.

"2. Has there been a growing reluctance on the part of your clients to the purchase of the newer, and therefore junior, securities of steam railroads and a growing preference for underlying issues? Give their reasons.

"3. What expressions of opinion have you had from your clients in regard to the necessity of an increase in the rates of well-managed, conservatively capitalized railroads, as being necessary for the protection of their investments? Give their reasons.

"4. Has there been, to any great extent, a disposition to exchange steam railroad securities for other classes of corporate issues, for any other reason than possibly a larger return on the investment?

"5. What effect do you believe the European war will have on the attitude of your clients toward the purchase of railroad bonds?

"6. Do you anticipate that unless there is an increase of rates, or some other method devised, which will stem the tide of declining earnings of the steam railroads, it will be possible to place with your clients the large amounts of securities which must necessarily be floated to cover maturing obligations, amounting to over $500,000,000 prior to January 1, 1916, and should be floated to provide added facilities for the increased business which will be necessary if this country continues to grow in wealth and population?

"The Investment Bankers' Association of America has been accorded a hearing before the Interstate Commerce Commission at Washington, October 19, 1914.

"The demand for quick action is urgent and your answer, to be of value, must be submitted promptly."

The Special Railroad Committee representing the association is as follows: George B. Caldwell, president Investment Bankers' Association, chairman; John E. Blunt, Jr., Merchants' Loan & Trust Company, Chicago; Frederick Strauss, J. & W. Seligman & Co., New York; Moritz Rosenthal, Ladenburg, Thalmann & Co., New York; S. L. Fuller, Kissel, Kinnicutt & Co., New York; A. G. Hoyt, N. W. Halsey & Co., New York; Lawrence Chamberlain, Kountze Brothers, New York; Warren S. Hayden, Hayden, Miller & Co., Cleveland; Stedman Buttrick, Estabrook & Co., Boston; R. B. Young, E. H. Rollins & Sons, Boston; Howard Graham, Graham & Co., Philadelphia; R. Lancaster, Williams, Middendorf, Williams & Co., Baltimore; J. R. Edwards, Fifth-Third National Bank, Cincinnati; W. R. Compton, Wm. R. Compton Company, St. Louis; R. T. Field, Field, Richards & Co., Cincinnati; B. B. Veech, United States Trust Company, Louisville; Lynn H. Dinkins, Interstate Trust & Banking Company, New Orleans; W. G. Lackey, Mississippi Valley Trust Company, St. Louis; J. Herndon Smith, Smith, Moore & Co., St. Louis; John A. Prescott, John A. Prescott & Co., Kansas City; Gardner P. Stickney, Wisconsin Trust Company, Milwaukee; Eugene M. Stevens, Stevens, Chapman & Co., Minneapolis.

An English Railway's Battalion.—To meet the case of men who would prefer to enlist among those whom they know, the directors of the North-Eastern Railway of England have asked Lord Kitchener's authority to enroll a North-Eastern Railway battalion for his new army. One thousand one hundred men are required, and a sufficient number are willing to join. Already over 4,000 of the company's employees from all departments have enlisted as Regulars and Territorials. The directors have undertaken to make adequate provision for dependents of men who enlist, to keep their positions open, and to make the arrangements for equipping and clothing the battalion

Brake Levers on English Railway Cars.—The English Board of Trade by authority of the act of 1901 ordered on November 7, 1911, that a brake lever be provided on each side of all freight cars, and established time limits varying with the number of cars owned. For those companies or persons owning under 3,000 cars ten years was given; for those with over 3,000 cars and under 20,000, 15 years, and for those over 20,000 cars the limit was 20 years. It will therefore be seen that it is possible that not until the end of the year 1931 will every car be so fitted. The companies to whom the twenty years' limit applies are the Caledonian, Great Central, Great Eastern, Great Northern, Great Western, Lancashire and Yorkshire, London and North-Western, Midland, North British and North-Eastern. The railway companies are, however, making good progress with their equipment, and it is most unlikely that they will take advantage of their powers. It is, generally, the private owner who is hindering progress, and he has until the end of the year 1921—seven years hence—to get his work finished.

Our Trade Opportunities in South America

Extent of Openings There for American Goods, Especially Railway Supplies and How Markets May be Gained

By F. Lavis
Consulting Engineer*

During the past few years there has been an ever increasing interest by the people of the United States in the countries to the south of us, and a great deal has been said and written about South America, which term, for the purpose of the present article may generally be understood to include all the countries to the south of the United States or at any rate south of Mexico. It is probably quite generally understood that there is here a vast area, mostly as yet undeveloped, but still at the same time supporting in the aggregate large numbers of people as highly civilized as ourselves and with needs for manufactured products on the whole very large, and which they are obliged to supply by imports from foreign countries. Heretofore these needs have been met almost wholly by European manufacturers, and it has been assumed that there must have been something radically wrong with the manufacturers of the United States that they have not secured a share of this business, in some degree proportionate to the relative importance of the United States as one of the foremost manufacturing countries of the world.

Speaking generally, it may be said that there are no manufactured articles produced anywhere south of the United States. South America, therefore, needs all kinds of manufactured products of iron and steel, from locomotives and steel bridges to pins and needles; cement for masonry, coal, structural timber, all kinds of wearing apparel, etc., etc.; in short, all kinds of manufactured articles. The classes of goods we have been able to supply so far, in spite of the many disadvantages under which we have labored, as compared with European manufacturers, are principally rolled steel products, such as rails, structural steel for buildings, bridges, etc., which, in spite of our high labor costs, are sold in competition with European manufacturers largely, owing to the aggressive policy of the United States Steel Products Company, and the specialties, such as agricultural machinery, sewing machines, typewriters, phonographs and articles of a similar nature, which the native inventive genius of the American has produced, which are necessary to modern methods of working and doing business, and which could not be obtained elsewhere. All other classes of manufactured products have been most generally bought in Europe.

South America has to offer in exchange the products of the soil, agricultural, pastoral and mineral, the latter, however, not including coal or iron. It will be seen, therefore, that what they have to offer in trade is mostly the things we ourselves have in abundance, but which are required in Europe, especially in England, France, Germany, Belgium, Holland, etc., all of which are importers of food stuffs and have a large and continuous excess of manufactured products to offer in exchange, and for which they have for many years had to find markets outside of their own countries. It may be noted that owing to the almost entire absence of coal and iron, at any rate in sufficiently close relation and proper quality to build up a successful manufacturing industry of steel products, it is entirely probable that South America will always continue to be a market for steel products.

NEED FOR STUDY OF SOUTH AMERICAN CONDITIONS

Many reasons have been advanced to account for the fact that the United States has failed to obtain any large amount of the business of South America. These are usually, that American salesmen are incompetent, that they do not speak the language (all Spanish, except in Brazil, where Portuguese is spoken), that catalogs and circulars are printed in English or translated into poor Spanish, that the needs of the people are not studied, that we will not or cannot adopt the metric dimensions, which are almost universally used throughout South America, that goods are not properly packed to withstand the rough handling of ocean transport and frequent transshipment, or in small packages for pack trains, that we have no banking facilities for exchange except through London, that we have no ships of our own and have to depend on foreign bottoms, and so on.

Now, it is true that all these things and many other minor details have been neglected either wholly or in part, that they must be attended to, and that the lack of attention will prevent the development of business, but all these things have been overcome either wholly or in part by at least some American manufacturers, and on the whole they are really unimportant and may in a sense be said to be almost trivial, compared to the real underlying causes which have compelled the Latin Americans to do their trading in Europe rather than with us. In saying this, the point should be emphasized that these matters are only unimportant *by comparison*. They must on no account be overlooked or neglected, nor must we think that we can force the Latin Americans to do business our way, simply because it is our way, or to buy what we offer, whether it is what they want or not. Our manufacturers must study the needs of the countries and the people, they must employ competent salesmen if they want to do business at all, and deliver the goods in the shape in which they can be handled and in the kind of packages which are required. Perhaps many of these things apply more particularly to ordinary merchandise for what may be called household consumption, than to railway supplies, the matter which the editor has especially asked me to refer to, but the general situation is much the same for any lines of manufactured articles, and of course, in the small space of a single article little more than generalities can be attempted.

American manufacturers, except in the special lines previously referred to, have had no occasion to really attempt to consistently develop foreign markets for their products. When times have been good, as they usually have been with only comparatively infrequent intervals until the last few years, there has been a market here at home for all they could produce. We have been busy developing our own country, we have been opening up new areas and our problem has been, not to find markets for our goods in order to keep a dense population busy and earning, but to find sufficient laborers to do our work. We have had a surplus of food products, and these we have been able to export to pay our debts abroad.

There is no question, however, that we are now about at the turning point. We are finding it necessary to import such food products as corn (maize) and beef—very little, it is true, but little as it is, a beginning, and one which unless we materially change our farming methods, is bound to grow. We have a larger and ever increasing proportion of our population employed in factories and rolling mills and our manufacturers have expanded their plants to such an extent that, with only the requirements of our own domestic needs to supply, they are finding it increasingly difficult to keep them running at full time, and must necessarily look for other markets. The proportion of consumers of food products to producers is, therefore, becoming all the time relatively greater, we are consuming more and more of our own food products, we shall export less and we shall import more; this must, therefore, be offset by the sale of our manufactured products in foreign countries, and the most logical market is naturally the nearest, namely, that of our neighbors in South America. That this expansion of our foreign

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trade is bound to come in the not far distant future, and that we must develop it in South America, is as sure as is the fact that we must continue to progress. But that the present European war is going to help in this matter, is extremely doubtful, and to the writer it seems much more likely that it will tend at least temporarily to retard it rather than help.

WHY OUR SOUTH AMERICAN TRADE IS SMALL

The principal reasons why the manufacturers of the United States have not done more business with South America are:

Because the development and exploitation of the resources of these countries have been carried out almost entirely by European capital.

Because of the extensive system of credits granted by Europeans and the co-operation of the bankers with the merchants.

Because of the higher cost of production in the United States.

Because of the lack of incentive heretofore for American merchants to continuously seek foreign markets—and further—

Because of the direct shipping lines, banking connections, and facilities of intercourse both for passengers and mail.

South America has been and for quite a long time will continue to be almost entirely dependent on foreign capital for the exploitation and development of its resources, and not only this, but it has been necessary to employ foreigners, i. e., Europeans and some Americans to supervise this development, that is to say, as builders and managers of its railways, mines and other commercial enterprises. The capital has been supplied by European bankers, they naturally have a great deal to say as to the selection of both the European and resident managers of the enterprises thus financed, and therefore, not only exercise a strict control over the necessary supplies, but aside from this it is only natural that a British, French or a German manager of a railway, for instance, should prefer materials with which he has been accustomed to work and which he has been trained to believe are best. The railways of the Argentine, for example, the country in which the greatest railway development in South America has taken place, are controlled very largely by British interests, and it is a fact beyond dispute *that as a rule* neither the managers in the Argentine, the directors in London, nor their engineers or purchasing agents care to even hear anything about railway supplies or other materials not made in England. There are exceptions, of course, but they are only frequent enough to cause surprise when they happen. It must be remembered, also, that both the Argentine and Brazil, principally the former, have been built up very largely by the immigration of Europeans, and a large part of their people naturally lean towards and sympathize with their mother countries.

Another phase of the situation is, of course, the extensive system of credits which has been developed by European banks, working with the manufacturers, and which has been largely the cause of the great over-extension in Brazil and the Argentine which has almost brought them to bankruptcy within the last year or so. The Germans especially have been willing to sell to anyone who had any kind of reasonable security, whether convertible into cash or not, they have added anywhere from 20 per cent to 200 per cent to their bills, the notes in payment have been discounted by the banks, and the manufacturers have been free to go ahead and manufacture more goods to be sold on the same terms. It is needless to tell an American manufacturer how fruitless it would be, or at least has been, to get a New York bank to discount any kind of a note on South America, except on the personal security of the firm offering it.

The Germans particularly have also maintained at all important points in South America agents, bright young men working for what we should consider almost meager salaries, who have kept close watch on the financial situation and who have made it their business to make collections at such times as the money has been available. Without a man like that on the ground, thoroughly well posted as to what is going on, and able and ready to take advantage of any turn to get a payment on account, they would have made very few collections, and as a result they have now what must be in the aggregate a very large outstanding account. The British financing has been much more generally of enterprises managed by themselves, and therefore, their goods have been sold under credit conditions more nearly resembling the practice in England, and practically to their own representatives abroad.

Another very important consideration governing the possibility of our being able to sell to South America is, that, speaking generally, the cost of production in the United States, due principally to the very much higher wage scale, makes it difficult and in many cases almost impossible for us to compete with Europe. The writer believes he has no prejudices in regard to either political party and does not pretend to understand the intricacies of the tariff, but it does seem that we must necessarily enter the world's markets with our manufactured products and he does not see how that is going to be possible with the continued artificial maintenance of a very high wage scale as compared with that of the rest of the world.

The question of the effect of the lack of American owned ships on our trade with South America is one which it is difficult to answer. So long as there was general peace, of course, it apparently had little effect on the business and the shippers had little difficulty in finding bottoms. Now, when nearly all the available ships belong to one or other of the belligerents there is a great cry for American owned ships. So far as the writer can see, however, the effect of this on our prospects of future trade with South America cannot be very great one way or the other.

The question of the establishment of branches of American banks in South America is also on a somewhat similar basis to that of shipping. If we are to develop our trade it is undoubtedly to be desired that we should be able to do business through our own banks, but it seems no more reasonable to ask the bankers to be pioneers in the establishment of banks before there is any business for them to do than it is to ask our merchants to tie up their capital in extended credits to compete with Europeans merely as a matter of sentiment, and just so that we as a great nation may do as much business in South America as other great nations do. As a matter of fact, the two must be pushed along together, and one bank at least has already taken steps in the right direction by the establishment of branches in Buenos Aires and Rio. It has been stated within the past few days that the government is seriously considering two-cent postage and direct exchange of postal money orders. This is desirable, but almost everyone who does business would rather pay five cents and have frequent and prompt service, say two direct mails a week to each coast and by reasonably fast boats, than a cheaper rate. The postal money order feature is a desirable step in the right direction, as up to the present, if my memory serves, all this business has been done through Belgium.

THE QUESTION OF RAILWAY SUPPLIES

Turning now to the question of railway supplies, these have been very largely furnished heretofore by England, Germany, Belgium and France, probably about in the order named, and I should think with England very largely in the lead. Germany and Belgium are, of course, practically eliminated by reason of the war. Just how long they will be kept out of the markets of the world depends on the length of the war, and the decimation of the laboring classes due to death, wounds, etc. It seems probable, though, that the decline of their influence will be felt for some time to come, even if the war should stop at once. The same may probably be said of France, to some extent, though there is no embargo on French shipping.

There seems to be no reason, however, to expect that England is not, and will not continue to be, able to supply all or nearly all the demands made on her for practically all lines of manufactured products, and in view of the greatly decreased purchasing power of the South American nations, it would seem that England alone could easily supply all the demands which may be made by South America in the immediate future and for quite some time to come.

It must be borne in mind that not only is the demand for the products of South America by Europe decreased to the lowest

point and is for only the most necessary articles of food supply, but also that the ability and desire of Europe to lend money or extend credit has been practically entirely suspended for at least a year now, and of course will so continue not only until the end of the present war, but until most of its depressing effects on the general financial situation of the world have been overcome.

The purchasing power of South America has, therefore, been decreased, first by reason of the fact that it is largely indebted to Europe and there is, therefore, an actual dearth of real money; second, by the fact that its credit has been strained by over-speculation and too rapid development (too rapid only in relation to the supply of the world's capital); third, entire suspension of European ability to make loans; and fourth, decreased demand for South America's products. This latter, however, is to some extent offset so far as some sections are concerned by an increased demand for food products at higher prices, tempered by some lack of transportation facilities.

In estimating the possibility that American manufacturers may take advantage of the present war situation to introduce their goods into South America, and especially so far as regards railway supplies, the factors which seem to the writer most important are, that Great Britain will not have to materially curtail her production, that while the shipping facilities of the world are considerably decreased by the practical withdrawal of all the German boats, and the use of some commercial vessels for the purposes of war, yet with the largely decreased volume of business of all kinds throughout the world, the available shipping will probably be able to take care of it, that South Americans have been quite generally educated to and have developed the habits of trading with Europe and that so far as regards England and France they have little reason to change now, and most important of all, due to the quite universal financial depression which has existed in southern South America for the past 18 months and which has been greatly accentuated by the present war, the purchasing power of these countries is very largely decreased, or almost entirely destroyed for the moment, unless at extremely long credits.

The writer recently received a letter from a friend in Buenos Aires dated early in August, which contains the following: "All the railways in the Argentine have reduced their train services by about 50 per cent in the last few days, due to lack of traffic and shortage of coal. The Buenos Aires & Pacific has cut out thirty-two daily trains in its local service alone. The banks opened yesterday after being closed for ten days, but all managed to come out well except one which cannot pay its claims and remains shut."

FINANCIAL SITUATION OF SOUTH AMERICAN RAILWAYS

For the last financial year ending June 30, 1914, the gross receipts of the Argentine Railways were somewhere near fifteen million dollars less than for the year previous, only three lines out of fifteen showing any increase. Both the Argentine and Brazil have suffered greatly during the past year, owing to the necessary curtailment of credits by Europe, due first to the Balkan war and also to the fact that previous to that time they were greatly over-extended and there has been considerable over-speculation.

In Brazil the practical failure of the valorization scheme to sustain the price of coffee and the great drop in the price of rubber due to the great competition of plantation rubber, has accentuated the financial difficulties, while the Argentine has greatly suffered from over-speculation in lands. Credits have been strained to nearly the limit everywhere. In regard to Chili, the writer is not very well posted, but that country is at least equally a sufferer from the necessary curtailment of their credit in Europe.

Brazil has about 12,000 miles, of which about half is controlled by a company incorporated in the United States, but of which the capital has been supplied by English, French and Belgium banks. The rest of the mileage is mostly British, with quite a little owned and operated by the government.

The Argentine has some 20,000 miles of railway owned as follows:*

	Length	Capital invested
British	22,908 km.	$875,000,000
French	3,770 km.	112,000,000
Argentine	269 km.	9,000,000
Argentine government	5,907 km.	122,000,000
	32,854 km.	$1,118,000,000

The Argentine government has always bought freely of American railway supplies whenever money has been available, but of course the British and French companies look to their own countries.

In Chili where there are a little over 4,000 miles, the lines are mostly owned and operated by the government or by British interests. In the rest of South America, with a total of about 4,500 miles of railway, the lines are largely British, with some few under local control, though the Guayaquil & Quito in Ecuador is at least partly controlled by American interests.

The 1,500 miles of railway of Central America are controlled quite largely by interests associated with the United Fruit Company, are operated by American methods and their supplies are generally bought here.

Summing up the situation, therefore, it seems to the writer that the time has come when the manufacturers of the United States must find the means of extending their business with foreign countries in spite of, rather than because of the war. This is an economic necessity which is beginning to be realized by all those who are in any degree far-sighted. We must extend our foreign trade in manufactured products because we must progress, because the proportion of consumers to producers of food products within our own borders is continually increasing, because our exports of food products are becoming a less and less proportion of the values of our imports, and there must necessarily be some compensation.

A PLAN OF CAMPAIGN FOR TRADE

The campaign to secure this business, or a greater proportion of the business of South America, will be a long and expensive one and large results will probably only come slowly. It will probably be generally desirable for manufacturers of similar lines of goods to combine together and send down one or two thoroughly well posted and equipped representatives rather than to attempt to each send its own more or less mediocre man, and be prepared to continue the campaign for several years before there can be any hope of very substantial results. It may be desirable to select men of different types, one to first cover the ground carefully and fully to investigate the possibilities of the sale in any particular locality of a particular line or lines, he to be followed later by men more of the salesmen type to prosecute the campaign in certain specified localities.

Dependence can hardly be placed on the ordinary commission houses or export agents to carry on a really aggressive campaign or to make the investment it would require. This can only be accomplished by direct representatives having a definite object in view. Immediate or quick results cannot possibly be hoped for, as only the long continued, persistent campaign will get final results, and the expense will not be small.

During the initial period if orders are obtained, every care must be taken to see that they are filled to meet the requirements of the customers, even at considerable expense to the manufacturers, and possibly, even probably, with little or no margin of profit. Above all there must be some means of determining that the goods (especially any kind of machinery) shipped are reasonably sure to meet the requirements, and even further, that they are properly used. It will be far better to refuse orders than to sell goods that will not be useful to the buyer, and of course, this is one of the phases of the campaign where exceptionally good judgment will be required. There must be absolutely no attempt to foist left-overs and unsuitable goods on the people of South America. The fact must be remembered that these people are generally able and intelligent, and the higher classes almost always highly educated. They have not

*For more particulars see article in *Railway Age Gazette* of March 27 and April 3, 1914.

usually the genius for persistent attention to details, or the business ability which makes the Anglo-Saxon the successful manager of commercial enterprises; but they are by no means foolish or ignorant, as has been too often assumed. Many of them have been educated either in Europe or the United States, and are well posted in regard to the affairs of our times and in modern progress in the arts and sciences.

As already indicated, the writer believes there is very little prospect of the immediate extension of American trade with South America, owing to the generally prevailing financial depression and the great curtailment of the purchasing power of all these countries. Above all, it is no time to send a flock of young salesmen to South America with big trunks of samples, who will return with nothing but expense accounts bigger than their sample cases. It is, however, a time when a properly organized campaign may well be started, as it will be much easier now to obtain a hearing in many places heretofore more or less inaccessible than it was when the South Americans would only listen to those who were lending them money.

Gradually with the extension of our trade, which must and can only be built up hand-in-hand with our bankers and with the assistance and effective co-operation of the government, and with our more intimate knowledge of the people and their countries, it should be possible to build up and establish a reasonable credit system on a satisfactory basis, that is, that payment must be made promptly at the time specified, though not necessarily as now, cash against bill of lading. The long extended credit system now prevalent is probably the result quite as much of too great a desire to sell goods under any conditions, as of desire on the part of the South Americans to buy goods they could not pay for. It is to be remembered also that after this war the European nations will be in no better position than we are to extend credits, and that from now on, or as soon as our banking and financial machinery is adapted to it, we shall be in quite as advantageous a position as they are in this respect.

INVESTMENTS UNDER AMERICAN MANAGERS NEEDED

Any serious campaign for the extension of our trade must eventually contemplate a considerable investment of American capital in South American enterprises, under the direction of American managers, but in view of the fact that we ourselves always have been and still are (or would be) borrowers of European capital for the development of our own resources, it is not easily apparent just now how this is to be accomplished. There have been, however, certain recent indications that it may not be altogether impossible in the not too far distant future in spite of our own great needs. It will, of course, only come with the co-operation of our bankers after they realize from the direct information received through the agency of their own branches, ultimately to be established it is hoped in all the most important centers, what the needs and resources of South America are. Heretofore, of course, European capital which could only count on very low returns at home, has been obliged to seek foreign investments for greater returns. We ourselves could earn as much from investments in our own country as we could obtain abroad and without the additional risk. The war is going to change many of these conditions.

The financial depression now existing in South America is bound to be only more or less temporary, in spite of the war. It is possible that even now the worst of it may nearly be over, especially in those countries which produce the staple foods the world must have and which it must pay for. There may be some little difficulty for a while in regard to transport, but this also will quite likely be only temporary and the chances are that the increased prices which will be received for the cereals and cattle will partially make up for other losses, so that sooner or later the purchasing power will be restored, and if we are to be in a position to take advantage of it, we must begin now to make our preparations and lay our lines.

POSTOFFICE DEPARTMENT ECONOMY

J. E. Sexton, general manager of the Eureka-Nevada Railway, declares that the postoffice department in refusing to send the mails over his road is imposing on the citizens along the line a gross injustice; and he has written a letter of protest to President Wilson. In this letter, dated Palisade, Nev., September 20, he says, in part:

"Dear Sir:—Is the postmaster general of the United States honest? I respectfully submit this question to you, firmly convinced from the facts following that you cannot answer in the affirmative.

"I submit that with the knowledge and through the unfairness of the postoffice department the United States is being robbed; its taxpayers being unreasonably discriminated against as well as having the grossest character of injustice imposed upon its citizens residing at Eureka, Nev.

"I am the general manager of a little narrow gage railroad (that has been twice in the hands of a receiver in the last 15 years) operated semi-weekly between Palisade and Eureka, a distance of 84 miles. Alongside of this railroad is operated a mule-drawn vehicle carrying the United States mail, route No. 75,148, tri-weekly between the points indicated in 33 hours for the sum of $5,970 per annum; while our line makes the run in eight hours, and the postoffice department contend that they cannot under existing statutes, according to their interpretation, pay us more than $1,795.

"We are willing to perform the service tri-weekly in eight hours, or with 300 per cent more efficiency, for $5,300, and in addition perform the service of route No. 175,023, for which the department is paying about $875; or in other words, saving the United States more than $1,500 per year.

"Under date of January 12, 1914, I submitted a bid to perform service on both routes, and to serve two additional postoffices that have since been discontinued, for the sum of $6,269, as against the present combination price of $6,845, in eight hours as compared with 33 hours, but my offer was refused.

"I submit that the difference between what is now being paid for a 33-hour service and what the service could be performed for in eight hours is being taken from the Treasury of the United States wrongfully and amounts to robbery, and when our railroad can and will perform the service for more than $1,500 per annum less and with 300 per cent more efficiency the case presents an instance of unwarranted and offensive discrimination, to say nothing of the injustice imposed on the people whom we could and would serve, and who have petitioned the department and members of congress with sufficient frequency to have impelled the department, if it were honestly conducted, to have found a means to have met the prayer of said petitioners. . . .

"What excuse can a person, having taken an oath to support the constitution and perform the duties of any office, offer to justify sitting in silence and administering a law that robs its treasury? . . .

"Assume that a condition existed where the postoffice department had contracted the two routes referred to herein for $6,800 per annum service to be performed in 33 hours, and for some reason the statute were to forbid any consideration of a bid by a member of a labor organization in excess of $1,795, although the means of conveyance he would employ would perform the service 300 per cent more efficiently. How long do you suppose there would be any tranquillity around the postoffice department or the homes of members of congress? . . .

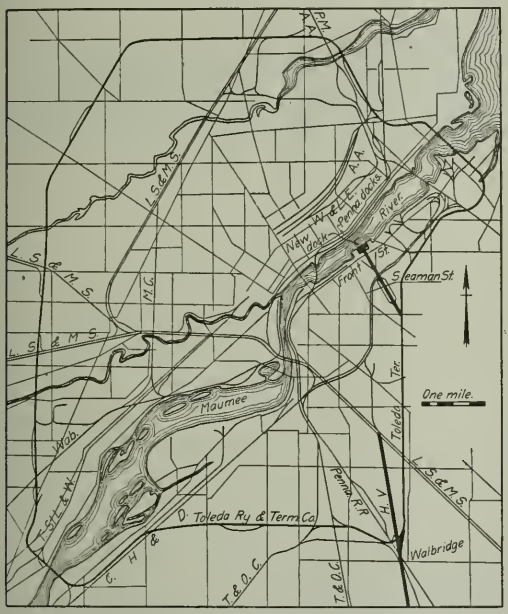
"Can you do anything in this case to see that we are permitted to enjoy the equal protection of the law? . . .

"Those who administer the affairs of the postoffice department are, as you can see, too narrow between the eyes to initiate anything that will free a railroad from abuse."

New Hocking Valley Coal Dock at East Toledo, Ohio

Providing Two Tipples, Each With a Capacity of 40 Cars Per Hour, and a 3,000-Car Yard and Approaches

The Hocking Valley Railway has had under way for some time a comprehensive improvement on the east bank of the Maumee river, at East Toledo, Ohio, to replace the coal and ore handling facilities formerly owned and operated by this company on the west bank of the river and reached over the tracks of the Pennsylvania Lines. The new terminal includes 1½ miles of running track approaching the dock, a 3,000-car storage yard, a coal-loading dock with two tipples, each having a capacity for handling 40 cars per hour, and an ore-loading dock, although the operating machinery for the latter dock has not been placed.



Map of Toledo and Vicinity Showing Hocking Valley Entrance and the Belt Line Used to Reach the New Dock

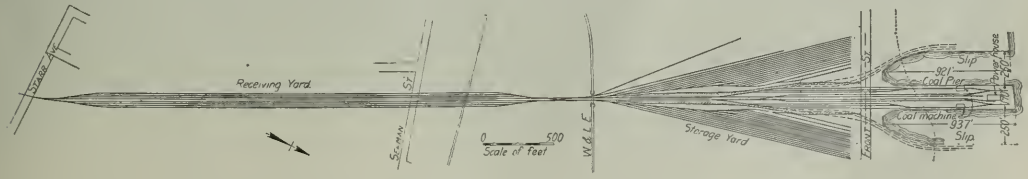
The Hocking Valley has been operating into Toledo over the Pennsylvania tracks since 1877. Until recently all of this company's freight trains crossed the Pennsylvania bridge over the Maumee river and used the Summit street yard and the adjacent dock frontage. Passenger trains entered by the same route until 1896, using a station located near the freight yard. In the last few years the passenger traffic has been diverted to reach the Union station over the Lake Shore & Michigan Southern. All freight, except coal, has also been diverted from the Pennsylvania tracks and is now routed to the Clover Leaf terminals.

The present improvements, comprising new docks with independent approaches, is the last step in the removal of the Hocking Valley trains from the tracks of the Pennsylvania Company in order to reduce the congestion on the latter road. The contract between the two companies, covering the trackage agreement, contemplated the abandonment of the Hocking Valley dock and machinery to the Pennsylvania Company when the trains of the former road should cease to use the line and Summit street yard of the Pennsylvania, and the present dock development is in fulfillment of this agreement.

The coal trade for the Northwest, which is handled over the Hocking Valley to Toledo and loaded on lake boats at that point, is very important and it was essential in the design of the new dock that ample facilities be provided for the economical handling of increasing quantities of this business. The coal originates at about 95 mines along the Hocking Valley, the Kanawha & Michigan and the Norfolk & Western in the southern Ohio and West Virginia fields, requiring a haul of from 200 to 500 miles. The maximum tonnage handled at Toledo by the Hocking Valley during a single navigation season has been 2,700,000 tons, with a daily loaded car movement into the terminal running as high as 458 cars. The new dock facilities will make possible the loading of about 10,000,000 tons in a season, a vessel of 12,500 tons cargo, which is about the largest in use on the lakes, being filled in 6¼ hours by one machine. In addition to more than doubling the rated dock capacity, the improvement provides a much more direct line from the company's northern freight terminal at Walbridge, five miles south of Toledo, and a much improved yard serving the dock. The long, high crossing of the Maumee river is also avoided.

CONNECTING LINE AND YARDS

As shown in the accompanying map, the new dock will be reached from Walbridge by using about 3½ miles of the line of the Toledo Terminal railroad, an interchange belt line encircling the city, and 1½ miles of new line extending from the belt line to the river. This new line passes through a thinly settled section of the suburb of East Toledo, and on account of the commercial advantages of the location of the new dock in this portion of the city, the company was allowed to occupy certain streets with the understanding that other necessary streets be donated to the city. No grade crossings are involved in the new work, one street being carried under the tracks and one street and the tracks of the Wheeling & Lake Erie being carried overhead. In order to handle the additional traffic over the belt line between Walbridge and the dock connection, this portion of the road has been double-tracked.



General Plan of the New Coal Pier, Yards and Approaches

The economical separation of grades at the crossings with the two streets and the Wheeling & Lake Erie was one of the principal problems in the location of the dock. The country adjoining the river near the dock is generally level with an abrupt river bank about 28 ft. high. In order to approach the dock at

the proper grade a cut with a maximum depth of 21 ft. near the river was required, running out to the ground surface about one-half mile from the river. As Front street is parallel to, and only a short distance from the river, it was only required to be elevated about four feet to secure the necessary clearance over the new tracks. At the crossing of the Wheeling & Lake Erie the new cut is only about four feet deep, requiring the elevation of the Wheeling tracks about 16 ft. This fill was made of earth taken from the excavation made for the dock approach tracks, involving, in addition to the structure carrying the old line over the new dock connection, a subway to carry Seaman street under the elevated line.

A short distance beyond the Wheeling crossing the new line crosses a ravine 600 ft. wide and 35 ft. deep. This ravine is skirted on the south by Seaman street. A subway was built to carry this street under the tracks, and a reinforced concrete box culvert was constructed in the bottom of the ravine to the north of the street. This ravine afforded a convenient point to waste the material excavated from the adjacent cut.

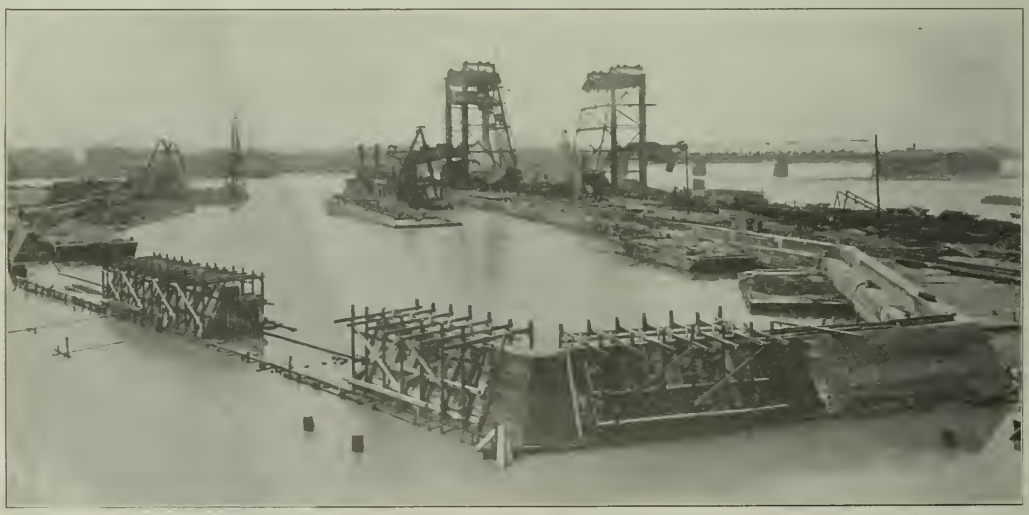
A receiving yard occupies practically the entire distance between the Terminal belt line connection and the crossing of the Wheeling, and a storage yard extends from the latter crossing to Front street. Two running tracks extend through the center of these two yards to the dock. The receiving yard contains 8 tracks and the storage yard will ultimately have 60 stub tracks, although the development of this yard will depend somewhat on the growth of the business. The receiving yard has ladder connections with the running tracks at both ends, but the storage yard is fan-shaped, with ladders only at one end, this layout being necessary in order to lay the yard tracks practically on the original ground surface, while the running tracks are on a lower grade in the cut. The ultimate capacity of the yard will be 3,000 cars. The yard tracks are laid with 67-lb., relay rail, with 80-lb. rail on the running tracks and ladders. No. 8 rigid frogs are used on ladders of No. 7 angle. Manganese guard rails and frogs are used throughout.

NEW DOCKS

The water frontage along the river is 1,600 ft. in length, of which 1,200 ft. will be occupied by the new coal and ore docks. The middle of the frontage is occupied by the coal pier, which is 170 ft. wide and about 900 ft. long. On either side of this coal pier is a slip 250 ft. wide and about 850 ft. long, in each of which four vessels can be docked. These slips are dredged to a depth of 23 ft. The down stream slip is only being finished to a width of 125 ft. at present, the remaining width to be completed when the ore dock on that side is required.

The dock wall surrounding the coal pier is founded on four rows of 45-ft. white oak piling, with a row of 30-ft. Lackawanna steel sheet piling driven just inside the second row of supporting piles, to retain the wet sand fill which forms the body of the dock. The dock wall is of concrete, reinforced in both directions, extending 4 ft. below mean water level and 10 ft. above it. The maximum width of the wall over the heads of the piles is 16 ft. 6 in. The side walls of the coal pier are anchored together by 2¼-in. tie rods, and the end wall is similarly anchored to pile clusters driven in the fill. The face of the concrete along the dock line is protected from damage of boats by the insertion of three 10-in., 25 lb. I-beams, flush with the surface of the concrete. Eye-bolts and rings for attaching guard timbers are located in recesses along the face of the dock. Cast iron mooring posts are spaced 50 ft. center to center along the dock face securely anchored to the concrete wall.

The Front Street Viaduct Before the Tracks Were Laid Under It



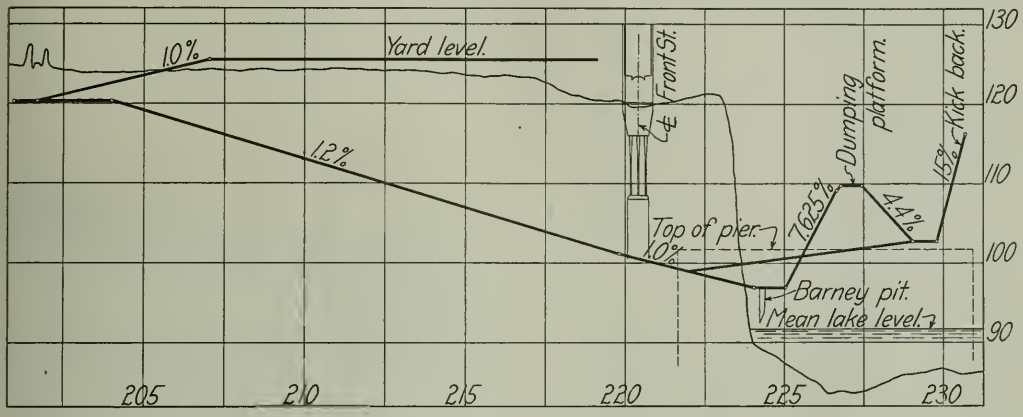
General View of New Dock Showing the Two Dumpers and Slip Wall Under Construction

The wall enclosing the ore dock on the up stream side of the coal pier and across the slip is supported on cribbing. After the dredging had been done, heavy timber cribs built up of 2-in. by 10-in. and 2-in. by 12-in. timbers were floated into position and sunk. They were anchored in position by piling driven in the

inside corners and were subsequently filled with sand. On these cribs as a foundation a reinforced concrete wall, similar in general design to the coal pier wall, was built.

The two tipples located on opposite sides of the pier about midway of its length are of structural steel, occupying a ground area 40 ft. by 60 ft., and having a height of 100 ft. They are designed to handle any type of coal cars up to 52 ft. in length and 270,000 lb. in weight at a rate of 40 cars per hour. The

The power for the operation of the dock is generated in a power house, 42 ft. by 112 ft. in size, located near the end of the pier between the two switchbacks. It is divided by a fire wall into a boiler room and combined engine room and machine shop. The boiler room contains three Scotch marine boilers, 12 ft. 6 in. in diameter by 16 ft. in length, with a rated capacity of 375 h.p. each. Automatic stokers, suspended ferro-inclave coal hopper, feed water heater, pumps, and force draft under automatic control

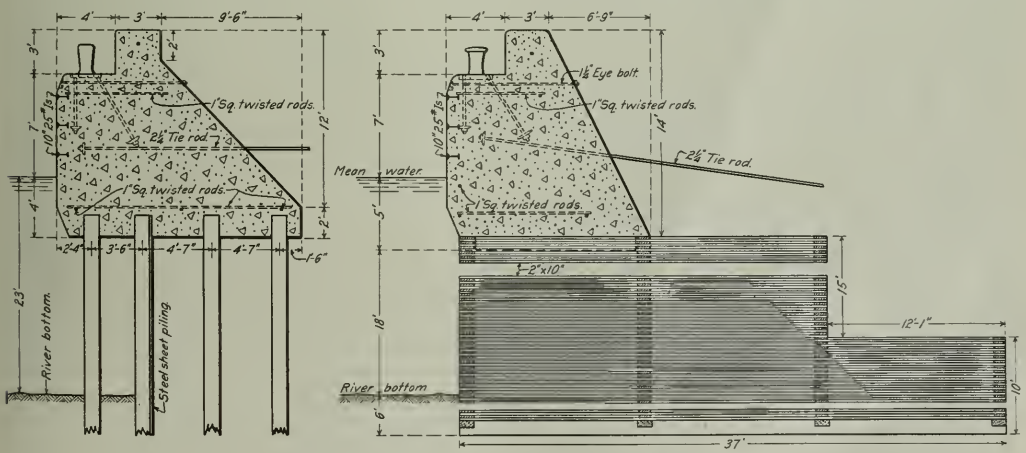


Profile of Tracks on the Dock and its Approaches

loaded cars are set down a grade of 1.2 per cent from the storage yard into three 20-car tracks for each dumper, the cars running singly by gravity from these tracks down to the foot of the tipple track incline. This incline has a grade of 7.625 per cent, reaching an elevation on the cradle 18 ft. above mean water level. The empty car run-off track on the other side of the dumpers has a grade of 4.4 per cent, ending in a switchback from

are provided. A separate spur track connecting with one of the empty tracks is used to deliver coal to a hopper serving these boilers.

The machine shop contains shop tools, lathes, planers, etc., necessary for making quick repairs. The engine room contains two 75-k.w. d.c. generators which supply electric current for lighting the dock and for operating the telescopic spouts on the



Typical Cross Sections of Dock Walls on Piles and Cribbing

which the cars go down an easy grade to two 30-car empty tracks for each dumper located between the tipples. A switch engine is able to place 20 loads and pull out 30 empty cars. The weight of each tipple complete is approximately 1,500,000 lb., the concrete footings being designed to stand this loading under the most severe strain.

dumpers. The steam required for the operation of the large steam engines, located within the framework of the two dumpers, is carried through large steam pipes in a 5-ft. by 6-ft. reinforced concrete tunnel about 260 ft. long. The power house is a brick structure with a 125-ft. concrete stack. The operation of each machine requires five operators, one oiler and 14 laborers. It is

estimated that 25 tons of slack will operate the power plant for a day when both dumpers are in operation.

STRUCTURES

The Seaman street bridge, carrying 12 tracks, is a two-span, trough floor structure, designed to harmonize with a proposed boulevard development contemplated by the city. The floor troughs are 19½ in. wide and 21 in. deep, spanning from the abutments to the center support parallel with the tracks which cross the street at a slight skew. Concrete facia girders are provided along the ends of the structure and the end columns of the center support are also encased in concrete to give the structure the appearance of a concrete bridge. The floor troughs are filled with concrete, with the exception that a line of 12-in. vitrified tile is laid in each trough to effect a saving in the amount of concrete and to reduce the dead load on the structure. The reinforced box culvert at the bottom of the ravine is 300 ft. long and has a 10-ft. by 12-ft. opening.

The bridge carrying the two tracks of the Wheeling & Lake Erie over the Hocking Valley is a through girder structure, a center girder being provided in order to allow the use of a shallow floor of 15-in. I-beams, spaced 16 in. center to center. The rails are fastened directly to these I-beams by Ritter adjustable rail clamps. The Front street viaduct is a steel structure encased in concrete, being 380 ft. long and 66 ft. wide. It is designed to span 16 tracks on the lower level and to carry a double-track street railway in a 40-ft. roadway with 11-ft. sidewalks on each side. Three-column steel bents with collision piers enclosing the bottoms of the columns support transverse steel girders, on which are supported the I-beams encased in concrete which comprise the bridge floor. An ornamental concrete balustrade is provided along the faces of the bridge to prevent pedestrians from falling over and to shut out the view of the yard below.

The grading work for this improvement required the handling of 400,000 yd. of material, most of which was a hard, tenacious, blue clay, which was very difficult to excavate and distribute. Explosives had practically no effect on it and steam shovels were able to make but slow progress. The dredging in the slips and channels out into the river involved the handling of 650,000 cu. yd. of material. The concrete in the bridge abutments, footing and piers amounted to about 7,600 cu. yd., and in the dock walls 25,000 cu. yd. All concrete on the work was mixed in the proportion of 1:3:5.

This improvement work has been carried on under the direction of W. Michel, chief engineer of the Hocking Valley; D. W. Smith, assistant engineer, and W. L. Roller, resident engineer. The Great Lakes Dredge & Dock Company, Cleveland, Ohio, had the contract for the construction of the dock and the power house and for the dredging. The Fritz-Rumer-Cooke-Grant Company, Columbus, Ohio, placed the bridge masonry, and the Toledo Bridge & Crane Company, Toledo, Ohio, and the Mt. Vernon Bridge Company, Mt. Vernon, Ohio, fabricated the bridge superstructures. The erection of the bridge was done by company forces. The grading was done by J. T. Adams, Columbus, Ohio, and the car dumpers were designed and erected by the Brown Hoisting Machinery Company, Cleveland, Ohio. The work was started in December, 1912, and the first dumper was ready for operation at the expiration of the company's contract with the Pennsylvania on July 1, 1914.

Peat as Fuel on the Swedish Railways.—The question of employing pulverized peat as fuel for locomotives has been under consideration by the Swedish railway authorities since 1909, and several experiments have been made with a view to ascertaining the cost of the material as compared with coal, and also its suitability for the various types of engines. One of the State Railway locomotives has been altered so as to employ the new fuel. This engine has now for some time past been used in regular traffic between Stockholm and Upsala with favorable results, both from the technical and economic points of view.

RAILWAY AFFAIRS IN OTHER COUNTRIES

For rather obvious reasons hardly anything has been allowed to leak out thus far regarding the railway activities on the European continent in connection with the present war. It is only possible, therefore, to obtain facts about the part that the railways are playing by correlating various items of information that may have appeared in the daily papers. The reports agree that the various administrations are performing the emergency duties put upon them remarkably well. The German railways, in particular, seem to have done some remarkable work. The railways of Belgium and France have not had similar burdens put upon them, but the engineers of the latter are now engaged in a reconstructive work of great importance. The French possess a very efficient and enthusiastic force whose duty it is to rebuild the damaged railways and bridges as the army moves forward. The organization of the body appears to be excellent. Particulars of all the destroyed structures, for instance, are known and arrangements have been made for the restoration of these structures as soon as the invaders have moved clear of them. The rebuilding of the Belgian railways may very likely also form part of the work to be accomplished by the French military engineers. It will be remembered that the Belgians despatched a considerable number of locomotives and cars for safety into France some weeks ago. The Germans also appear to have brought many of their troops across the frontier in their own cars.

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Railway Bridge Destroyed by Germans at Battle of the Marne

* * *

The Northwestern Railway of India has recently completed a new locomotive repair plant which ranks among the largest of its kind in the world. The Northwestern of India operates about 5,000 miles of 5 ft. 6 in. gage track, and the new shops at Moghalpura near Lahore have been designed to handle the heavy repairs on about 800 engines. The pay-roll numbers 5,000 men. The shops are laid out on either side of a 45 ft. transfer pit 1,160 ft. in length and will accommodate 80 locomotives, the output being 36 repaired engines per month. The principal building of the plant is 537 ft. 4 in. wide by 703 ft. long, parallel to the transfer pit, and is divided into 12 transverse bays. It contains the tender shop, erecting shop, fitting shop, machine shop, wheel shop, millwright shop, tool shop and brass finishers' shop. In a separate building near one end of the main building is located a foundry where both gray iron and brass castings are made. The iron foundry has four cupolas, the aggregate capacity of which is 20 tons of metal. Near the other end of the main building is the locomotive paint shop, a small building which will house six locomotives and tenders. On the opposite side of the transfer pit are located the stripping pit, the boiler

shop, the copper and tin shop, the smith shop and the locomotive material stores.

The arrangement of this shop differs from that followed in this country, where a transfer table is used. Intsead of arranging the erecting shop in a bay parallel to the transfer table, with individual pits each served by the table, the erecting shop occupies three bays extending entirely across the building, the moving of engines within the shop requiring the services of overhead cranes. Locomotives pass over the transfer table only when entering the shop. After the repairs have been completed the engine and tender leave their respective shops from the side opposite to the transfer pit, where the engine is fired up and tested in a shed provided for that purpose. After receiving a trial trip the locomotive is run into the paint shop for finishing.

CORRECT THEORIES OF AUTOMATIC BLOCK SIGNAL CONSTRUCTION*

Sub-committee No. 5 of Committee No. 4, having in hand the work of designing circuits for single track automatic block signaling, has . . . made a careful study of the various schemes in use on the railroads of the United States.

In our study of single track blocking, we find that no automatic system compares favorably with the "Lock and Block" or "Controlled Manual" systems, and in the design of the circuits submitted at this meeting the sub-committee has endeavored as far as possible to embody the same characteristics as those of the latter, omitting, of course, the manual control features.

Controlled manual systems, each differing from others in minor details, have been used on a number of our principal railroads for the past 20 years, and notwithstanding the differences in matters of detail, all are designed to prevent the clearing of opposing signals between passing sidings.

The system that appeals to us as being the safest and best provides:

(a) Continuous track circuit between passing sidings, controlling electrically locked traffic levers and semi-automatic signals.

(b) Traffic levers in adjacent towers, located at passing sidings, each equipped with normal electric locks.

(c) Electric locks controlled (a) by all track circuits between opposing signals governing from passing sidings, (b) by circuit breakers, closed only when the signals between passing siding outlets indicate "stop," and (c) by an operator in the next tower working in conjunction with the operator at the home station.

(d) Traffic levers controlling direction relays, wired in such a manner as to cause the signals in both directions to indicate "stop" if for some unknown reason both traffic levers should be unlocked at the same time.

(e) Semi-automatic signals, controlled by the direction relays, and arranged to permit trains to follow one another as in double track signaling.

This system provides an absolute check on each track circuit section and on each signal mechanism between passing sidings, whenever the direction of traffic is changed; and it is this feature, the equivalent of indication locking, which makes controlled manual systems safer than straight automatic systems. The direction of traffic cannot be changed if the section between passing sidings is occupied by a train, or if one of the signals should be stuck at clear, when the traffic lever which was reversed is put normal. The controlled manual system requires seven line wires between passing sidings, viz.: Lock, traffic in each direction, home in one direction, and distant, serving both directions, combined bell and telephone, and common. This number is increased within the passing siding limits in proportion to the number of units directly controlled from the home station.

In comparing automatic systems now used, with the controlled manual system already explained, we find that equal safety is not provided, and seeing that the average single track railroad has not sufficient business to afford a controlled manual system, the question arises: Is it possible to design circuits for single track automatic blocking, following the general principles of controlled manual, or the equivalent?

In single-track automatic signaling we have electrically controlled apparatus, governed by track circuit relays, and, with signals in both directions usually indicating proceed, block sections are usually from one to three miles in length. Signal motors and slots are in all cases controlled by line relays, the latter being governed by all track relays throughout the block section. Line wire is generally located on telegraph poles and below telegraph wires.

The single control with common return system is in general use; but as we are compelled to depend for our signal indications, both opposing and following, upon the making and breaking of line relays which are susceptible to crosses and grounds, resulting too frequently in the relay coils remaining energized and either following or opposing signals indicating "proceed" when the block is occupied, we believe that it is important that something be done to produce greater safety, even if not the equivalent of that obtained through the use of a controlled manual system. . . .

When the oldest types of signal apparatus now used, such as fuse shunt and open-faced relays, clock-work and disk banner signals, were first introduced, many of us felt that the day of perfection had arrived. This apparatus was good, but not good enough. Progress has been made because there were men who, recognizing the faults, set out to remedy them. If the first trial proved too costly or ineffective, they tried again, and kept on trying until today it can be truly said that the signal system is second to no other branch of transportation service.

Notwithstanding this fact, however, we are doing some things today which must be improved upon. We must have greater protection against opposing trains than our present systems afford. The single control automatic system is identical with that of the interlocked power apparatus, without indication locking; and there is not a signal engineer present who would depend for his signal indications at interlocking plants entirely upon the making and breaking of circuits by the controlling lever. A check or indication lock, checking the position of the signal against that of the controlling lever is demanded, for neither the power apparatus nor the controlling circuits are entirely immune from mechanical or electrical defects. We have recently heard of one road which, at interlocking plants, now requires both the positive and the negative sides of signal circuits to be broken by the controlling lever, in addition to the indication locking, unless cross protection of some description is provided.

As to the patent situation, no one seems to know what is claimed by the different manufacturers. However, the research made by this sub-committee leads us to believe that no individual or company can broadly claim a system wherein the direction of traffic is automatically established by trains.

The nomenclature and method of drawing employed in our plans now presented show present practice, but are subject to change whenever this association adopts a standard system; but we earnestly recommend that no set of plans be accepted as final which does not clearly show the location of each wire terminal, each lightning arrester, each fuse, ground plate, wire location, relay box and junction box; in fact, every part that goes to make up the complete plan. Using a complete plan, we are enabled, first, to reduce the cost of construction, by having the details worked out by competent engineers, and, second, to better maintain the apparatus, and with men of less experience than would be required if the plans were not complete. . . .

Progress in the art of signaling enables us to accomplish today that which was formerly considered unsafe, viz.: to meet and pass trains on a single track railroad without issuing written orders to trainmen. On the Baltimore & Ohio we do this through the use of a controlled manual system. It is the ideal system for handling heavy traffic over a single track railroad, and in the design of circuits for automatic blocking, the question which naturally arises is: How can we, through the use of an automatic system, obtain protection equal to that provided by the controlled

*Report of sub-committee No. 5 of Committee No. 4 of the Railway Signal Association. Presented at Bluff Point meeting, September 23. The proceedings of this meeting were reported September 25, page 564, and October 2, page 612.

manual system? We do not claim to have succeeded in all that we have set out to accomplish, but we do claim to have improved the circuit requisites, and to the best of our ability we have designed plans covering those requisites. . . .

The circuit requisites on which the plans now offered are based are as follows.

(a) Signals so located as to provide adequate spacing and protection against opposing movements. At a meeting of the full committee in Buffalo it was agreed by a majority of the members present that outgoing signals from passing sidings should be located at or near the fouling of the passing siding, rather than beyond the main switch. At interlocking plants, and where controlled manual systems are in service, signals are always located at the foulings. The same location system should be used whether in manual or automatic territory. The location of signals in single-track territory should be so arranged that trains, where meeting, will be separated a sufficient distance apart to allow for a slight over-run without resulting in a collision; the incoming signal at passing sidings 50 ft. from the switch point, and the outgoing signals at the fouling. This affords a safe stagger, and at the point where needed; at the point where it will allow the incoming train to take siding. At intermediate signals between siding outlets, the signaling arrangement should provide that opposing trains be stopped by signals not less than 1,000 ft apart.

(b) The control of signals to be such as to provide (1) positive block indications against opposing trains between passing sidings; (2) whether in terminal territory or on the line-of-road, the giving of a signal at the entrance of a block should depend upon the opposing signal governing into the same block indicating stop; (3) stop, caution, or clear indications for following movements, as on double track; (4) that two trains meeting at a passing siding shall each first receive a caution indication before reaching a stop signal; (5) protection for switches and switching movements as on double track; (6) cross and ground protection, such that neither a single cross nor any combination of grounds will cause the energization of the controlling or signal operating devices.

This requisite is, I believe, principally responsible for the division of opinion in Committee No. 4. However, if requisite "b" is correct, if the control of signals should be such as to afford positive block indications against opposing trains, then it is essential that the control of the opposing signal shall be as positive as can be made.

Under the controlled manual system, we have, through the electric locking, a physical check against the opposing block signal indicating stop, and under the system used on the Baltimore & Ohio we have a further check through the controlling circuits being arranged so as to require joint operation between traffic levers. Without this joint operation the signals in both directions will indicate stop.

This means that in case the electric locking should fail, so as to enable the levermen to each secure traffic combinations at the same time, the signals controlled by the traffic levers, instead of indicating proceed, as is the normal condition in automatic territory, must indicate stop in both directions, because the controlling circuits are open.

In automatic blocking the safest scheme would be to break the control wire through opposing signals, and a tracing of this character was prepared by the sub-committee, of which I am chairman, and presented to the full committee, but as the number of line wires required is excessive, the plans now offered are considered best suited to meet general conditions.

We have shown that under the single control system a cross between the control wire and any other wire carrying battery will result in a false clear indication being displayed, with the block occupied. We have also shown that almost any combination of grounds will cause a false clear indication with the block occupied; and if the false clear signal is one for movements opposite to the direction of traffic, something other than the signal system must be looked to to prevent a butting collision. It is important that we avoid having false clear signals, particularly in single track territory, and if practicable we must design our signal system so that when every other safety factor has failed the signal may be relied upon. Good maintenance is not, of itself, sufficient to obviate false clear indications caused by grounded circuits. How many signal repairmen are there today who possess the knowledge or who have the necessary instruments for measuring the insulation resistance of a circuit? Grounded circuits cannot be foreseen unless the circuits are arranged in such a way that certain combination of grounds will cause a stop signal.

The question may now be asked: Is it possible to design signal circuits so that no combination of grounds will cause the energization of the controlling or signal operating devices? And, if so, is the scheme practicable? And what is the additional cost?

In double-track signaling, the direct control of both sides of the signal motor through the track relay affords reasonable insurance against the effect of crosses, and this practice is followed on the principal railroads.

In semi-automatic territory the indication or back check provides the safety features desired. In single track automatic signaling we must have direct control through a breaker on the opposing signal, closed only when the signal indicates stop; or else double control, as shown in plans now presented, must be provided. This is the only solution known to this sub-committee.

Two other points must be considered. These will be numbered 7 and 8.

(7) That two opposing signals governing into the same block shall not display the proceed indication simultaneously, authorizing trains to move opposing each other.

The sub-committee has recently checked and criticised plans that are so arranged that the overlapping sections are ineffective under certain conditions. This is unsafe. It is desirable to avoid stopping trains unnecessarily; but safety must not be sacrificed.

(8) That two opposing signals governing into the same block shall not display the proceed indication simultaneously, authorizing two trains to move from passing sidings opposing each other.

There are in service several hundred miles of signaling wired under what is known as the A. P. B. system, some with, but mostly without what is known as the "siding overlap in one direction." Under the A. P. B or traffic assigning system we have short blocks for following movements, and long blocks extending from one passing siding to the next for opposing movements.

Paragraph No. 8 refers to the long opposing block. This system of signaling enables us to place signals opposite, under certain conditions, thus cheapening the cost of construction. But requisite No. 8 is not covered except where the siding overlap is used. This serves as an overlap for trains in one direction only and is sometimes referred to as a provisional overlap. The wiring of the traffic-assigning stick relay is more complicated than at points where the signal circuit breaker is used as a timing element. However, on account of trains meeting at the passing siding and the necessity for incoming trains flagging past signals indicating stop, it is essential that the traffic-assigning stick relays at sidings shall operate for incoming trains whether or not the signal indicates proceed.

The improvements added over present methods (in the drawings now presented) are: First, double control as against single control. The latter requires three line wires between passing sidings and the former four line wires and two extra relay contacts. The added cost per signal (spaced one mile apart between passing siding outlets) is $35. Second, the use of a siding overlap. This sub-committee contends that the siding overlap, fulfilling requisite "b" to the letter, is necessary in single track signaling, and, therefore, should not be classed as an addition. Third, the placing of outgoing signals from passing sidings at the fouling point instead of beyond the main switch conforms to general principles in signaling used elsewhere and is therefore a correction, the cost of which should not be considered. . . .

We advocate the use of a separate and distinct signal indication for the government of trains going out of passing sidings. We should forget what is being done on the X Y Z Railroad and confine our thoughts, first, to providing correct single track circuit requisites, and, second, to the design of circuits properly meeting those requisites. . . .

Practical Hints on Operation of Terminal Yards

First Set of Contest Papers in Which Operating Men Discuss All Phases of This Very Important Problem

Twenty-nine papers were received in the contest on the Operation of Terminal Yards, which closed on September 15. These papers were turned over to the following judges: W. J. Jackson, receiver and general manager, Chicago & Eastern Illinois; H. G. Hetzler, president of the Chicago & Western Indiana, and F. C. Batchelder, president, Baltimore & Ohio Chicago Terminal. The judges awarded the first prize to the paper submitted by William L. Burt, assistant freight trainmaster, Pennsylvania Railroad, Jersey City, N. J., and the second prize to that prepared by F. L. Hutchins, Baltimore, Md. The judges were very favorably impressed with a number of other papers and felt that special mention should be given to those submitted by D. S. Farley, division superintendent, Atchison, Topeka & Santa Fe, Kansas City, Mo., and F. H. Garner, transportation inspector, Union Pacific, Omaha, Neb.

Other contributors to this contest were: W. T. Sutphen, general yardmaster, Southern Railway, Macon, Ga.; W. B. Hinrichs, superintendent of terminal, Chicago, Milawukee & St. Paul, Milwaukee, Wis.; Fred P. Grossman, general yardmaster, Chicago, St. Paul, Minneapolis & Omaha, Minneapolis, Minn.; C. A. Pennington, superintendent of terminals, Cleveland, Cincinnati, Chicago & St. Louis, Louisville, Ky.; V. R. C. King, division superintendent, Atlantic Coast Line, Wilmington, N. C.; H. H. Larson, yardmaster, Union Pacific, Council Bluffs, Transfer, Ia.; Richard Brooker, yardmaster, Canadian Pacific, Portage la Prairie, Man.; Z. Middlebrook, trainmaster, Atlantic Coast Line, Florence, S. C.; M. A. Mulligan, trainmaster, Lehigh Valley, Jersey City, N. J.; James M. Fox, yardmaster, Southern Railway, Winston-Salem, N. C.; E. C. Tucker, yardmaster, Norfolk & Western, Portsmouth, Ohio; G. G. Butler, Southern Railway, Washington, D. C.; W. C. Copley, freight trainmaster, Pennsylvania, Altoona, Pa.; I. T. Tyson, assistant trainmaster, Philadelphia & Reading, Port Richmond, Philadelphia, Pa.; R. M. Baker, Pennsylvania Railroad, Bellwood, Pa.; O. C. Hill, assistant superintendent, Chicago, Burlington & Quincy, Kansas City, Mo.; J. E. Campbell, freight agent, Pittsburgh & Lake Erie, Bessemer, Pa.; J. R. Hamilton, terminal trainmaster, Delaware, Lackawanna & Western, Buffalo, N. Y.; G. B. Schrand, trainmaster, Chicago & North Western, Chicago; G. D. Brook, division superintendent, Baltimore & Ohio, Chillicothe, Ohio; W. L. Derr, superintendent, Chicago Great Western, Clarion, Ia.; J. H. Hopkins, Pennsylvania Lines West, Columbus, O.; J. W. Roberts, superintendent of car service, Vandalia, Terre Haute, Ind., and R. R. Farmer, trainmaster, Missouri, Kansas & Texas, Parsons, Kan. The first prize paper is published below and other papers will appear in later issues.

FIRST PRIZE—PRACTICAL CONSIDERATIONS IN THE OPERATION OF A LARGE TERMINAL YARD

By Wm. L. Burt

Assistant Freight Trainmaster, Pennsylvania, Jersey City, N. J.

While there are many things in common in the methods of operation of a purely classification yard and of a terminal yard, the latter presents many complications which do not exist in a classification yard, not the least of which are the receiving and despatching of trains through the same throat of the yard; the placing of loaded cars at various parts of the terminal for unloading and the placing of empty cars for loading; the serving of the station, individual sidings, warehouses and industries, many of which demand the most exacting switching service. At tide water terminals the despatching of cars on floats to various destinations and the assembling of cars from floats for despatching in road trains is also a very important feature.

PERSONNEL

As no system or organization can be more proficient than those responsible for its operation, it necessarily follows that great care should be exercised in selecting employees for the various positions in the organization of a large terminal yard. The selection of a suitable yardmaster is of course of paramount importance. Experience has proven that no established rule of succession can be followed in this respect. It does not necessarily follow that a man who has given satisfaction as an assistant yardmaster possesses the proper qualifications for a yardmaster. Some may be able to execute faithfully and satisfactorily the work allotted to them and manifest a high degree of subordinate efficiency and at the same time be entirely lacking in the administrative ability required of a yardmaster. He should be a man whose predominating characteristic is the obtaining of results with the least amount of friction and confusion. Other than the regular qualifications for the position there should also be taken into consideration, age, physical condition, regularity in attendance to duty, capacity for management and administration, intelligence and judgment in the handling of men, education and moral deportment.

Too much care cannot be exercised in selecting assistant yardmasters as this is the usual line of succession to the position of yardmaster. As in the selecting of a yardmaster, there should be no established grade from which to choose. In some localities it is the practice to use only trainmen for these positions, but this has many decided objections, not the least of which is the element of doubt as to their loyalty to the company's interests. In selecting assistant yardmasters from various positions in the organization it stimulates all to a spirit of emulation which naturally redounds to the benefit of the company in the increased efficiency resulting from this method.

As yardmasters and assistant yardmasters are developed largely from clerks, trainmen, etc., it is important to exercise care in their initial employment. The practice of requiring satisfactory references from former employers has become universal. This should also be augmented by an educational test and physical examination in order to eliminate all those who may not be fitted, either physically or intellectually, for advancement to a higher grade of the service. All applicants for employment in any grade whatever should be interviewed personally by the trainmaster or assistant trainmaster. They should be cautioned to avoid the use of intoxicants, to observe the rules of safety, to avoid the company of those showing a tendency to violate the rules of the company and to report such violations, and to become conversant with the orders and instructions displayed on bulletin boards. At the end of 90 days they should be given an examination as to their knowledge of the book of rules, regulations covering the handling of explosives, rules of safety, special instructions, etc. Failing to pass a satisfactory examination, they should be given 30 days for further preparation for a second examination and an additional 30 days in case they fail to pass the second examination. Failing to pass the third examination, they should be dropped from the service.

RECEIVING, CLASSIFYING AND DESPATCHING

It is necessary for a terminal yardmaster to have a detailed report of every train destined to his yard as it is despatched from the other end of the division and to be advised when it is within a certain distance of the terminal in order that preparations may be made to receive it without delay. Several passing sidings just beyond the limit of the terminal will be found to be of great advantage in permitting trains of live stock and other high class freight to pass around those of less importance when there is

not sufficient room in the receiving yard to accommodate all of the trains without delay. Upon arrival at the terminal the air hose should be uncoupled between each car of all trains of mixed classifications before the train is classified. This can be done quickly with an uncoupling fork without going between the cars —a good position for a crippled trainman.

Upon the arrival of the train in the yard the conductor should send his waybills and mail to the yardmaster's office at once together with a list of the initials and numbers of the cars in the order in which they stand in his train. This list and waybills are then checked for any diversions, hold for orders, changes in destination, etc., after which the train is ready to be marked for classification. Every yardmaster's office should keep a classified car record which provides for the entry of a certain car number in but one place in the book. When orders are received in advance of the arrival of a car for diversion, hold for order, change in destination, etc., the number of the car should be entered in this particular space in red ink in order that the instructions may be brought to the immediate attention of the car record clerk in checking up the train. While this work is in progress the car inspectors should be inspecting the train in order to have the inspection completed by the time the train is marked for classification. The date of arrival should be placed in numerals at the corner of each car. This will be found to be valuable information in avoiding delays to cars, as every car in the yard will then have the date of arrival marked in plain view and save considerable time in checking the yard for delayed cars.

The writer has long been an advocate of equipping large yards with pneumatic tubes, having stations located at each end of the yard connected with the main office. This will permit the immediate despatching of all waybills, mail, etc., to the main office from incoming trains, effect a saving of at least one-half hour in the checking and classifying of every train taken into the yard and avoid the delays incident to the wanderings of messenger boys or some member of the train crew discovering the mail in his pocket several hours after arrival at his home miles away from the terminal. Where this tube system has been installed it has effected a saving estimated at approximately $500 per day in the handling of about 175 trains. In marking cars for classification the following method will be found to be of considerable advantage: If the first draft consists of four cars for "A yard" "A 4" should be written in chalk on the front of the first car where it can be plainly seen by the switchman. The last car in each draft should also show the classification and number of cars in the next draft. For instance: If the second draft consists of three cars for "B yard" the notation "B 3" should be made in chalk on the back of the last car of the first draft and also on the front of the first car in the second draft. This method will enable the switchman or leverman to read on the last car of each draft what the next classification will be before it reaches him. All yards should be well lighted so as to give a good volume of light for all operations.

The clerk at the hump or the car cutter should keep a list of all cuts ridden by each car dropper. This record is beneficial in many ways and serves a threefold purpose. First: It discourages any inclination on the part of car droppers to "soldier" as with proper supervision any tendency in that direction is quickly detected and corrective measures taken. Second: A notice posted on the bulletin board at the end of the month showing the number of cuts ridden by each car dropper will incite rivalry to attain the top of the list, resulting in greater activity on their part. Third: It is of considerable assistance in placing responsibility for cars damaged during classification. It is possible if car droppers are placed on a piece work basis it might result in quicker handling and at the same time in a greater number of damaged cars, although this fact could only be determined by experiments along that line.

A positive rule should be established and observed in all yards requiring trainmen to report immediately all cases of damage to cars and to call at the yardmaster's office at the close of their tour of duty to give a statement in connection with the same. In cases where they attribute the damage to defective equipment such as slack chain or inoperative brake they should call a car inspector and have him determine at once whether or not the alleged defect exists. Failure to call a car inspector should be considered as an acknowledgment of responsibility and proper discipline imposed. If this rule is strictly observed it will result in a decided decrease in the number of cars damaged. Brakes should always be tested before the cars are classified over the hump and where defects are discovered another car should be added to the draft with the defective brake in order to ride it safely to its proper track. Care should be exercised, however, to see that the additional car is returned to its proper classification as soon as the cars in the draft have been classified.

A list of all cars traveling under refrigeration should be sent to the ice house attendant who should make a prompt inspection of all such cars, keeping a detailed record of the amount of ice found in the bunkers upon arrival and the amount of ice added daily until the cars are finally unloaded by consignee. A similar practice should obtain with cars traveling under ventilation. A record should be kept of the position of ventilators, weather conditions, etc., until the final disposition of the car. A full and complete icing and ventilation record is invaluable in contesting or defending claims for alleged damage when it can be shown that such damage was not due to lack of protection given by representatives of the railroad company. A complete seal record should be taken of all inbound loaded cars. In the case of inbound cars it is well to have the conductor accompany the seal clerk around his train in order to check or explain any discrepancy in their respective seal records. This practice has a tendency to create greater watchfulness on the part of conductors while trains are in their possession enroute over the road.

The shifting of cars to and from team tracks, stations, warehouses, piers, docks, etc., should be controlled by the issuance of drill orders prepared by the agent or his representative. All drill orders should be numbered consecutively and a receipt obtained from the assistant yard master or conductor to whom delivered, who places the time he receives it on the back of the order and also the time he completes the work or makes a notation explaining his failure to do so. These drill orders should be sent to the office of the yardmaster or trainmaster at the close of each tour of duty and carefully examined. They will show in detail all the internal shifting performed and call immediate attention to any work left undone.

The interchange of cars with foreign lines should be conducted according to a prescribed schedule. The sending of shifting engines for work on connecting lines should be discouraged or reduced to a minimum. Wherever possible interchange tracks should be placed at junction points and where conditions will permit certain tracks should be assigned for the delivery and other tracks for the receipt of cars. Designate certain hours for interchange with the understanding that stock and perishable shipments may be interchanged at all hours, sufficient notice being given in advance of such deliveries. Where it is necessary for shifting engines to work a portion of the time on connecting lines a spirit of reciprocity on the part of interested operating officials together with special reports of detentions and work performed from conductors of the engines while so engaged will permit of close supervision of their movements.

Arrangements for the interchange of cars by float movement depend entirely upon the number of cars so interchanged. Where one or two floatbeds daily will provide for the interchange an arrangement of the schedule is a simple matter, but where the interchange amounts to 35,000 cars or over monthly the closest supervision is necessary over the yard, transfer bridge and float operations to secure the best results. Modern yard facilities are of course necessary for the satisfactory handling of such a volume of business. The most satisfactory results are obtained by having a system of "gridiron" tracks located immediately in front of each transfer bridge, each track having a holding capacity of one float load. There should be sufficient room for at least five tracks in front of each bridge. With this arrangement of tracks floats

can be handled in about one-half the time required when the float yards are located some distance from the transfer bridges. As in all other operations a closing hour should be established between all lines for the receipt and delivery of cars for certain train connections.

MARKET FREIGHT

The schedules for the movement of market freight consisting of vegetables, peaches, berries, etc., are of course so arranged that trains arrive at the terminal in sufficient time to have the cars placed on team tracks or floated to the market pier stations before the opening or closing of the market hour. The greatest despatch is, therefore, necessary in the handling of these trains both in the road movement and after their arrival at the terminal in order to avoid claims for delays. When cars are shipped from the far south the revenue billing forwarded by United States mail will arrive at destination in sufficient time to have the delivery receipts prepared before the arrival of the cars, but when shipments originate within a radius of about 200 miles the billing must accompany the cars as market trains run at such speed as to arrive at destination ahead of the billing when the latter is forwarded by United States mail.

Some scheme must, therefore, be adopted to avoid the delay incident to the preparation of delivery receipts after the arrival of the cars at destination, as while this work is in progress the time for the market to open has arrived, the truckmen and consignees are clamoring for their freight and confusion and chaos reign until the identity of the various shipments have been established with the result that a number of shipments miss the market, shippers and consignees are disgruntled, claims are presented, and life for all becomes a wearisome burden. The remedy is to send messengers out to meet the incoming trains, preferably at the last yard through which they pass for changing engines and crews. Have them secure the billing, prepare delivery receipts and all terminal papers and hasten to the home station by passenger train if there is one available that will arrive at the terminal in advance of the market train, otherwise continue to destination on the market train with all necessary papers prepared. The result is that when the market opens consignees and truckmen know the exact location of their cars and chaos and confusion are changed to system and order, unloading begins at once, the shipments are placed on the market in satisfactory time, all empty cars are removed from the yard, room is made on the team tracks for the early morning merchandise traffic and everybody is in a happy frame of mind.

The floating of market products to a pier station presents a different proposition from that of delivery on team tracks for the reason that the shipments are unloaded from cars on floats to various assigned locations on the pier by longshoremen wherein enters the labor proposition. For reasons of economy the force engaged in unloading should not be too great and for reasons of efficiency should not be too small. This can be regulated to a nicety by a system of advice quickly and accurately transmitted to the terminal and station organizations of the number of cars en route in each train and the probable time of arrival at destination. This advice not only enables the pier agent to bring his force of longshoremen on duty at the proper time, but also enables the terminal operating department to make proper arrangements for the yarding and floating of cars without delay. Under this system it is not an uncommon practice for market trains to run the last one hundred miles of their journey, be yarded, loaded on floats and placed at the pier for unloading within a period of from three to four hours.

OPERATING DETAILS

Every officer in charge of details of operation should perfect a system of advice whereby he will receive accurate reports at least every six hours showing the cars on hand for various destinations; the amount of traffic en route to the terminal; the cars ready and to be available for movement during the next six-hour period; the power, crews and floating equipment available, and the number of cars on hand and en route to and from connecting lines and private terminals. After a close study of such advice he should map out a campaign of action, having in mind always the requirements of the next six-hour period with all branches of the organization working in harmony for the accomplishment of the campaign outlined. A telephone selector system at the terminal will be found invaluable; in fact, indispensable to accomplish this purpose. A selector system should be located at every vital point in the terminal wherever there is located a yardmaster, assistant yardmaster, freight station, float bridges, etc., or where any certain part of the terminal work is concentrated. Make it imperative that a call on the selector shall be answered at once. Many embarrassing and complicated situations are avoided by this quick means of communication and many prompt and important moves accomplished, which would otherwise be impossible. It also offers means for the closest supervision of operations and for complete harmony of action throughout the terminal. While discussing this particular feature of the terminal proposition it might be well to suggest that the official in direct charge of the operating details should not carry the outline of his plans around in his head, but rather keep it in two places clearly outlined, both in his mind and on paper. One does not know at what moment he may be called from the office either for a brief or extended period and his organization should be such that an assistant may be able to take up the reins and see at a glance the work in hand and continue along the plan outlined.

An invaluable adjunct to a trainmaster's organization is a hustling young man to make daily checks of the terminals. The dates of arrival shown in chalk marks on all cars enable him to spot immediately any cars which may show an inclination to form a permanent part of the landscape of the terminal and he takes immediate steps to have them forwarded. He also searches for delayed foreign cars and starts them via the proper home route. He examines all card waybills of loaded cars held in the terminal to ascertain from the time stamped on the back the date of arrival of the cars and any which show a delay are immediately reported for movement. He makes a notation of all his findings, reports the same to the yardmaster and also the trainmaster. When he makes his trip the next day he is careful to see that his findings of the previous day have received proper attention. He is also used as an efficiency inspector and makes a note of any violations of the rules of safety, book of rules and special instructions.

It is at the terminals that the company's representatives come in contact most with the public. Hundreds of inquiries are received daily by letter, telephone and personal call in regard to shipments en route, changing destinations, holding cars for orders, etc. This feature has grown to such magnitude at large terminals that an organization is necessary to handle it satisfactorily. All such inquiries should be referred to a car-tracing clerk in order to centralize and systematize the work. This clerk should be furnished with a system which will enable him to locate messages or other business at once when consignees or others are telephoning for information. Courtesy on the part of this clerk is of course imperative as patrons are not always in a pleasant frame of mind when making inquiries as to delayed cars and tact, judgment and diplomacy are necessary in dealing with them. If an active interest is taken in their troubles and a disposition shown to assist them he is gaining friends and business for the company. Shifting crews and employees at stations are also in constant touch with the public, the former in the shifting operations at various industries and the latter in their dealings with the public at the stations. The conduct and attitude of these employees are a large factor in securing business for the company.

Economy of operation consistent with a proper degree of efficiency is always to be desired. It should not be necessary to await a call for a reduction in expenses before shifting power is curtailed. This should work automatically with the car movement, which should be made a matter of record and advantage taken of any decided reduction in car movement to secure a corresponding reduction in shifting service. With a proper system of reports or advice the opportunities for reductions may be fore-

seen at least 48 hours before being made effective. The labor forces at stations may be similarly regulated where it is of a transient character by the incoming billing indicating the probable tonnage sufficiently in advance of arrival to regulate the force of laborers.

CO-OPERATION

It has been well said that co-operation is like faith: "The substance of things hoped for and the evidence of things unseen." This is one of the greatest contributing elements to the successful operation of a terminal or any other organization. Without it the best of organizations, personnel, equipment and facilities are doomed to failure. It should prevail not only within the terminal organization, but with every interest with which it comes in contact. Where a terminal forms a separate division it is of the utmost importance that a spirit of co-operation should exist between the connecting divisions. Each should be familiar with the troubles of the other and the energies of both centered in the accomplishment of one purpose. Have a frequent consultation and exchange of ideas between the traffic department and operating officials. Make freight solicitors feel that the latch string is hanging on the outside of the door of the trainmaster's office and that considerable is to be gained by both in team work between these two important branches of the household.

HORNE & CRANE'S AUTOMATIC STOP

Horne & Crane, 114 Liberty street, New York City, on September 30, before a large party of railroad officers, gave an exhibition at Cranford Junction, N. J., on the Central of New Jersey, of their automatic train stop, an apparatus which works without requiring physical contact between the roadside and the train-carried elements, and which includes speed control adjustments, by which enginemen can be compelled to graduate their speed from the caution to the stop signal according to any predetermined rate.

The tests were made with Central of New Jersey locomotive No. 528, on a side track; and, because of the impossibility of moving the engine on this track at high speed, the speed control apparatus was adjusted to apply the brakes in case it exceeded a speed of 12 miles an hour. The brakes were applied in satisfactory shape. Running past the brake-applying points at 11½ miles an hour, the stopping apparatus remained unaffected.

The apparatus was described in *The Signal Engineer* in January, 1914. Briefly, it consists, on the locomotive, of a valve in the air brake system, controlled by a dashpot adjusted to cause the opening of the air valve, and the application of the brakes, after a predetermined interval of time following the opening of an electric circuit. This electric circuit is controlled by an electro-magnet carried in a box about 20 in. long, suspended from the right hand equalizer of the front truck, and adjusted so as to be less than an inch above the rail. The condition of the electro-magnet is constantly affected by this nearness to the rail. The magnet box is immediately behind the front wheel, and of the same width as the wheel tread; so that the wheel serves constantly as a guard to prevent the magnet from being damaged or disturbed by obstructions on the track. Normally, the brakes of the train are held off by air pressure, the integrity of which pressure depends on the fact that the steel of the rail attracts the armature of the magnet.

On the ground, the first element is a piece of rail, in the track, right hand side, which is composed in part of manganese, and which, because of this, is practically non-magnetic. It has no appreciable effect on the engine-carried magnet. When the engine truck passes over this rail the magnet is released from the influence of the steel rail and the timing circuit is broken.

The manganese rails are inserted in the track in pairs. At Cranford Junction the second rail of the pair was 123 ft. in advance of the first; and the timing dashpot on the engine was set for a time element of seven seconds. When the engine was run faster than 12 miles an hour, it passed over this distance in less than seven seconds, and the air valve opened, on reaching the second manganese rail, and the brakes were applied. When the speed was below the prescribed rate and the period of seven seconds expired before the second rail was reached the dashpot had restored the circuits so that the brakes were not applied.

To limit the speed to 24 miles an hour the non-magnetic rails (the time element on the engine remaining unchanged) would be placed 246 ft. apart; for 36 miles, 359 ft. To control speed between a distant and a home signal a pair of rails would be installed at the distant signal, with, say, a space of 359 ft. between them; another pair half way between the distant and the home spaced 246 ft., and a third pair close to the home signal spaced close enough together to insure a stop, whatever the speed. For higher speeds the rails can be placed farther apart or the timing dashpot can be made to operate in shorter time.

When the line ahead of the home signal is clear, and the speed of the train is not required to be reduced, the effect of the manganese rail is neutralized by the action of an electro-magnet fixed in a brass box at the side of the rail. In such a case, this electro-magnet, energized by a current controlled by the track relay of the track section to which this brake-applying section appertains, practically puts the track into the same condition, so far as it affects the stopping apparatus, as though the rail were continuous steel.

Since the publication in *The Signal Engineer* the inventors have made some slight changes in the magnet parts. The locomotive magnet formerly comprised a movable core or pole, which was adapted to open the circuit controlling the valves in passing over the manganese rail. The device is now arranged so that the poles and core of the locomotive magnet swing at right angles to the rail.

The track magnets have been simplified and considerable electrical energy is saved by placing them alongside of the head of the rail. In this position a light armature, carried in the locomotive magnet case, is attracted toward them, and this closes a parallel circuit (when the track is clear) so as to prevent the magnet valves from responding to the condition produced by the absence of the ordinary steel rail. The entire device is designed on the "closed circuit" principle, and a failure of electric energy, the breaking of any spring or wire, or a cross on any of the leads, would at once cause an automatic application of the brakes. The proprietors are planning to install manganese sections suitable for maximum speeds up to 90 miles an hour, and when this is done and the necessary adjustments are made, will conduct another test, at a location where much higher speeds can be demonstrated.

Russian Railway for China.—It is reported that the Russian minister at Pekin has received the consent of the Chinese government to the construction by Russian capitalists of a railroad from the island of Sakhalin along the right bank of the Amur river to a point opposite Blagoveshchensk, and thence to Harbin with a branch to Tsitsihar.

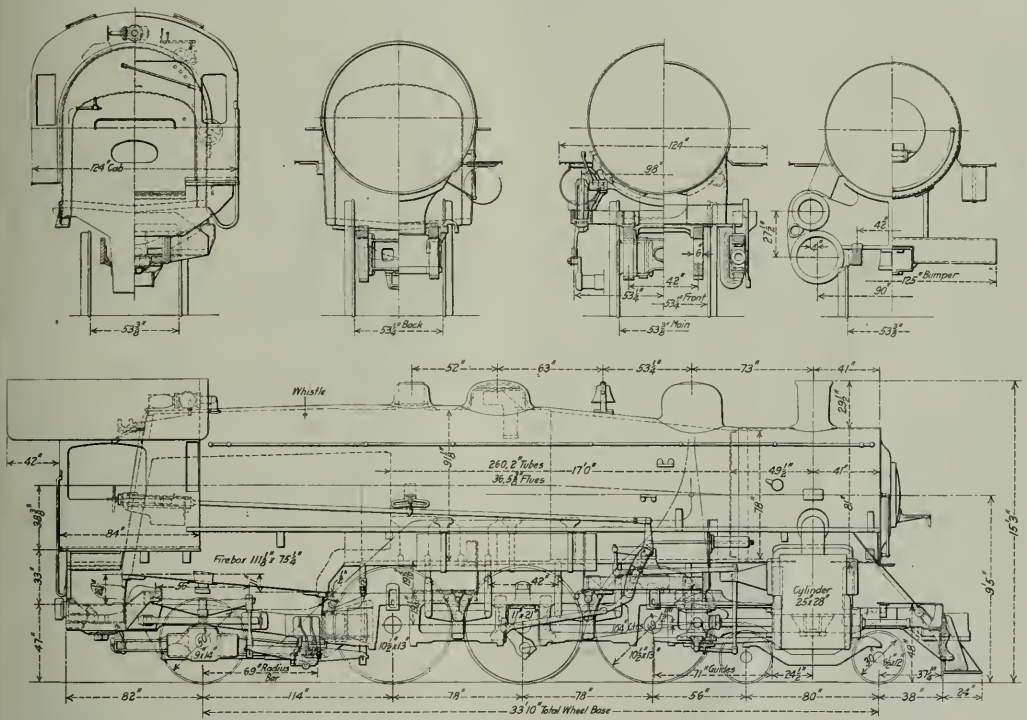
Russian Railway Ties.—Before the war ties in Russia cost about 71 cents, which is double the price they cost twenty years ago. Say they cost 75 cents each laid in the road, the amount works out at about 9½ cents a year, as they only last, on an average, eight years. Steel ties are not favored, and it is maintained that their use in Germany is not due to their actual merits and that, moreover, they are not used on the Austrian railways. Possibly one reason for the disfavor shown in Russia towards steel ties is that the track is poor and the ties will not, therefore, remain in position. Neither are ferro-concrete ties liked, but if a reliable one could be found they would probably be extensively used, particularly on the lines in Central Asia. About 180 million ties are required a year. No attempts would appear to have been made to lengthen the life of wooden ties by first treating them, although it is computed that one-fifteenth of the known forest wealth of Russia would suffice for its tie requirements.

Lackawanna Pacific Type Freight Locomotive

Second Order of These Engines for Freight Service; Cylinders Include New Type of By-pass Drifting Valve

The Delaware, Lackawanna & Western has recently received 14 Pacific type locomotives for fast freight service which were designed under the supervision of H. C. Manchester, superintendent of motive power and equipment, and built by the Lima Locomotive Corporation. This is the second lot of Pacific type service and the same general design has been followed in the new engines.

The principal change in the new engines is the introduction of a 36-in. combustion chamber in the boiler with a consequent reduction in the length of tubes from 20 ft. to 17 ft. This



Elevation and Sections of Delaware, Lackawanna & Western Fast Freight Locomotive

locomotives to be placed in freight service by the Lackawanna. The original locomotives which have been in service for about one year, were described in the *Daily Railway Age Gazette*, June 14, 1913. They have proven very satisfactory for this change has necessitated the enlargement of the boiler at its greatest diameter and has slightly increased the weight with a decrease in total evaporative heating surface of 432 sq. ft. The superheater heating surface has been increased, however, and

Delaware, Lackawanna & Western Pacific Type Locomotive for Fast Freight Service

the total equivalent heating surface is only 234 sq. ft., or a little over 4 per cent less than that of the former engines. The better distribution of the heating surface should benefit the steaming qualities and add slightly to the locomotives' hauling capacity in the service for which they are designed.

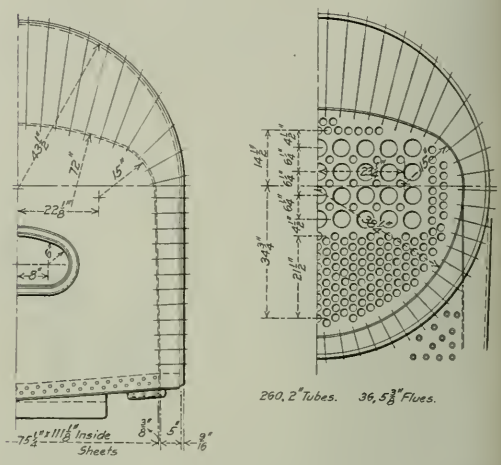
The boilers are provided with auxiliary manhole domes. These offer a clear opening 16 in. in diameter so that the boiler may be entered and inspected without the removal of the throttle valve from the main dome. The cab turret is a special form of the single manifold type, so arranged that it can be removed for repairs with the full steam pressure on the boiler.

The cylinders are provided with the Lackawanna standard by-pass drifting valve arrangement recently developed and patented by H. C. Manchester, superintendent of motive power and equipment, and S. S. Riegel, mechanical engineer. It provides for the automatic delivery of steam directly from the boiler into the cylinders during periods of coasting, and also performs the ordinary function of a by-pass valve. The valves are of the piston type operating in chambers opening from the cylinder ports, the two ports on each cylinder being connected by a 5 in. wrought iron pipe, which serves as a by-pass. A sectional view through one of the valves and its chamber, slightly distorted for the sake of clearness, is shown in one of the engravings. Live steam from a globe valve in the cab is conducted through a 13/16 in. copper pipe into the annular chamber surrounding the valve. When the throttle is open and the engine is using steam, steam chest pressure is communicated to the chamber at the outer end of the valve through a pipe under the cylinder jacket leading from the live steam cavity at the center of the valve chamber. This pressure, acting against the end of the valve, holds it in the closed position as shown while the engine is working. As soon as the throttle is closed, however, the pressure is removed and the live steam pressure, acting on an effective area equal to the difference in the area of the smaller and larger pistons, forces the valve to the open position. In opening, the packing rings on the smaller or inner piston travel over grooves leading from the annular chamber, thus admitting live steam directly into the entire cylinder space in sufficient quantities to maintain the temperature of the cylinder walls and to break up the vacuum. This prevents an inrush of air with the attendant carbonization of lubricating oil and damage to the cylinder walls. Engines equipped with this device are very free coasters and its use is claimed to have effected a considerable increase in the life of both cylinder and piston rod packing.

The main driving boxes used on these locomotives are 21 in. in length. The main pedestals are increased in width by means of steel castings between the frames. The engines are provided with the Woodard self-centering engine truck and the Miner friction draft gear has been included on the front end. Economy type grate shaker brackets, which insure against dropping of fuel through the deck, and low type tank wells are also used. The valves for these wells are operated from the ground and when closed permit blowing the water in the hose back into the tank, thus providing against freezing. Vanadium cast steel has been used in the frames. The principal dimensions and weights are given in the following table:

General Data

Gage	4 ft. 8½ in.
Service	Freight



Backhead and Section Through the Boiler, Showing the Rear Tube Sheet

Fuel	Bit. coal
Tractive effort	43,200 lb.
Weight in working order	291,000 lb.
Weight on drivers	188,000 lb.
Weight of engine and tender in working order	456,500 lb.
Wheel base, driving	13 ft. 0 in.
Wheel base, total	33 ft. 10 in.
Wheel base, engine and tender	66 ft. 4 in.

Ratios

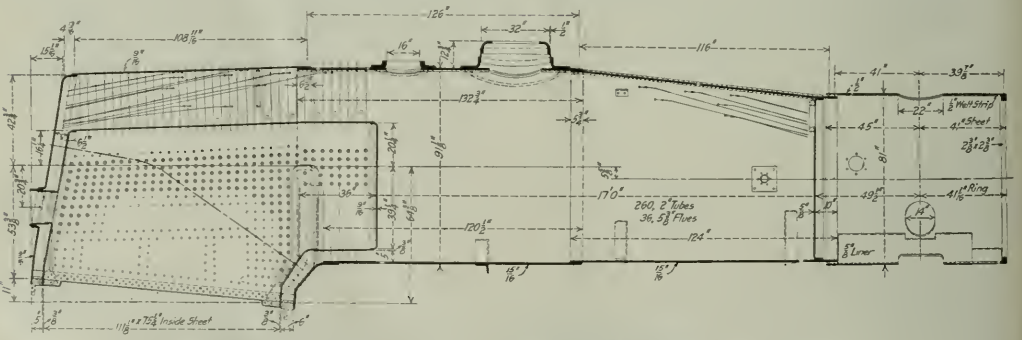
Weight on drivers ÷ tractive effort	4.35
Total weight ÷ tractive effort	6.74
Tractive effort × diam. drivers ÷ total equivalent heating surface*	589.3
Total equivalent heating surface* ÷ grate area	87.2
Weight on drivers ÷ total equivalent heating surface*	37.2
Total weight ÷ total equivalent heating surface*	57.5
Volume of both cylinders	15.9 cu. ft.
Total equivalent heating surface* ÷ vol. cylinders	318.0
Grate area ÷ vol. cylinders	3.7

Cylinders

Kind	Simple
Diameter and stroke	25 in. by 28 in.

Valves

Kind	Piston
Greatest travel	6½ in.
Outside lap	1 1/16 in.



Boiler for the Delaware, Lackawanna & Western Fast Freight Pacific Type Locomotive

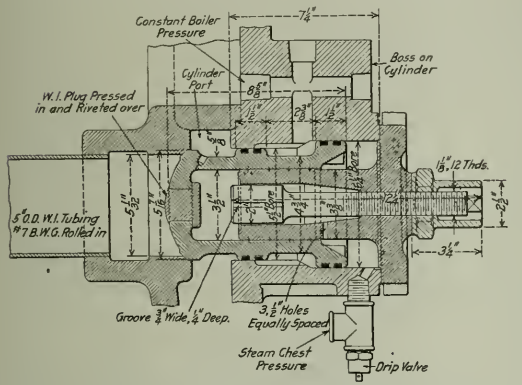
Inside clearance	3/16 in.
Lead in full gear	3/16 in.

Wheels

Driving, diameter over tires	69 in.
Driving journals, main, diameter and length	11 in. by 21 in.
Driving journals, others, diameter and length	10½ in. by 13 in.
Engine truck wheels, diameter	30 in.
Engine truck journals	6½ in. by 12 in.
Trailing truck wheels, diameter	50 in.
Trailing truck journals	9 in. by 14 in.

Boiler

Style	E. W. T.
Working pressure	200 lb.
Outside diameter of first ring	78 in.
Firebox, length and width	111⅛ in. by 75¼ in.
Tubes, number and outside diameter	265—2 in.
Flues, number and outside diameter	36—5⅜ in.
Tubes, length	17 ft. 0 in.



Section Through By-Pass Drifting Valve Chamber

Heating surface, tubes and flues	3,279 sq. ft.
Heating surface, firebox and combustion chamber	279 sq. ft.
Heating surface, total	3,558 sq. ft.
Superheater heating surface	about 1,000 sq. ft.
Total equivalent heating surface*	5,058 sq. ft.
Grate area	58 sq. ft.

Tender

Tank	Water bottom
Weight	165,500 lb.
Water capacity	9,000 gal.
Coal capacity	10 tons

*Total equivalent heating surface = total evaporating heating surface + 1.5 times the superheater heating surface.

INCREASE IN MILEAGE BOOK RATES FAVORED

Although, as mentioned in last week's issue, the secretary of the Illinois Commercial Men's Association has sent out circular letters to 100,000 traveling salesmen, asking them to fill out a blank form of protest to the Interstate Commerce Commission against the increase in rates for mileage books on the eastern railways, it is apparent that there is some division of opinion on this subject among the members of the association. Lorenzo Norvell, manager of Fairbanks, Morse & Co., at St. Louis, Mo., has addressed a letter to R. A. Cavenaugh, secretary and treasurer of the Illinois Commercial Men's Association, in which as a member of the organization he enters an emphatic protest against the attempt to incite the members of the organization to take up this movement. Mr. Norvell concludes his letter by saying that unless he is accorded the same privilege that the secretary has used in sending out his letter broadcast, by having circular copies of it printed and sent to each member, he will solicit the aid of the press of the country, having reason to believe that it will willingly join in a protest against the movement. He states that he will also send copies of his letter to the managers of many large firms with which he is acquainted, and solicit their assistance, which he feels will be willingly given.

Mr. Norvell says in his letter:

"I deny that there is any disposition on the part of railway officials to antagonize traveling men as a class. I further deny that their attempt to secure increased rates is in any way striking at the bread and butter of traveling salesmen. On the contrary, they are making a last effort to conserve their properties and I share the opinion of a great many business men that the men who are now handling our great railroad properties are to be commended for their magnificent courage against such overwhelming odds and that they should receive the united support of commercial houses and traveling salesmen throughout the country. They are our natural allies, and their mission is just as important as that of the traveling salesmen.

"Our great need today is service. We want trains in plenty to enable traveling men to get over their territory quickly without loss of time. We also want our freight handled promptly and when we get service we should be fair enough to pay for it. You have stated that the railroads have not increased their mileage rates for a period of 30 years, and I submit to you in all fairness that it is time for an increase, as there is no comparison between the service of the present day and 30 years ago. You have stated that there will be no objection to raising passenger rates on single-trip tickets. Why look at the question from your side only? As a matter of fact, I cannot see why traveling salesmen should get a better rate on transportation than individuals, particularly when in nine cases out of ten the firm for whom the man is traveling pays the bill.

"We are now facing a very grave condition—not a theory—and if there ever was a time for the doctrine of 'live and let live,' it is before us now, as the railroads throughout the country are losing money every day they operate, regardless of their utmost efforts to economize in every direction.

"You propose to ask the Interstate Commerce Commission to fix a price on a service without any reference whatever to their gross income and expenses, and yet there isn't a man in our entire organization that would consider it anything but an outrage if the same doctrine were applied to any commercial institution in this country.

"There has been entirely too much agitation against railroads and the cause for this agitation which originated long ago has passed, but the railroads are still reaping the results, and I submit to you that any traveling salesman in this organization knows of many railroad towns where the shop forces and maintenance forces have been cut down to such an extent as to seriously impair the business of the merchants with whom that salesman does business in that town.

"According to your theory, you would cut down their forces and keep the salaries of their employees at a minimum in order to put bread and butter into the mouths of traveling salesmen, and I submit that you would be fooling yourself all the time because the salesman's welfare is indissolubly connected with that of the railroad man.

"You would appeal to the Interstate Commerce Commission for relief in this matter, and yet you have lost sight of the fact that 30 years ago we did not have an Interstate Commerce Commission and that the existence of the Interstate Commerce Commission at this time has made it necessary for the railroads to spend hundreds of thousands of dollars, in fact millions, for the purpose of keeping records in order that the commission may supervise their business methods for the benefit of the people of the United States.

"I also desire to call your attention to the fact that railroad bonds are largely held by our leading insurance companies and a depreciation of their value is a blow at the integrity of the insurance policies held throughout the country.

"It is my understanding that the Illinois Commercial Men's Association was organized for the purpose of conducting a mutual accident insurance business among its members. You should, therefore, be debarred from making any such campaign at the probable expense of leading insurance companies in which nearly all of your members have policies."

General News Department

The Boylston street subway, in Boston, which has been under construction for the past two years, was opened for traffic October 3. This subway is about 1½ miles long, extending from the north-and-south subway near the Public Garden westward toward Brookline.

The Delaware, Lackawanna & Western has just finished, at Hoboken, N. J., as a part of its wireless telegraph equipment, a steel tower, 402 ft. high. The Hoboken office now has a five kilowatt Marconi apparatus, and messages have been sent from Hoboken to Buffalo, 410 miles. The wave length is 2,250 meters.

The president of the Old Time Telegraphers' and Historical Association for the present year is Andrew Carnegie; and the annual meeting next year is to be held in New York City. No meeting was held this year, the decision to omit it having been due to the disturbances caused by the European war, and the election of officers was by the executive committee. The secretary of the association is F. J. Scherrer, 30 Church street, New York City.

Members of the Switchmen's Union of North America have filed suit at Dallas, Tex., against the Missouri, Kansas & Texas, the Texas & Pacific, the Houston & Texas Central, the International & Great Northern, the St. Louis Southwestern, the Gulf, Colorado & Santa Fe, and the Brotherhood of Railroad Trainmen, to cancel contracts by which the roads are said to employ only members of the trainmen's union to the exclusion of members of the Switchmen's Union.

The management of the Pennsylvania Railroad has begun a campaign to keep passengers from standing on the platforms of moving passenger cars. Letters have been sent to the various industries around Pittsburgh, requesting them to post notices in their factories warning their employees (hundreds of whom ride on Pennsylvania trains daily, going to and from their work) of the danger of standing on the platforms of moving cars; and a general notice to passenger trainmen has been posted on the bulletin boards calling for a concerted effort on the part of trainmen to keep passengers from riding on platforms or steps of cars between or approaching stations.

C. H. Hudson, a passenger conductor on the Georgia & Florida, running between Augusta and Valdosta, proposes that railways and street railways aid the cotton growers, in their financial distress, caused by the cessation of the European demands for cotton, by ordering the general use of cotton cloth (khaki) for uniform suits for employees. By prompt action a supply of this material could be provided in time for use for summer uniforms in 1915. Mr. Hudson calls attention to the fact that the Buy-a-Bale movement, by which individuals relieve the market by buying and storing cotton, does not afford permanent and final relief; the cotton is likely again to come on the market; whereas his plan would use it up.

Samuel O. Dunn, editor of the *Railway Age Gazette*, addressed the Chicago Engineers' Club at its weekly luncheon in Chicago on October 1, on "Government Ownership of Railways." Charles Evans, commissioner of the Queensland (Australia) government railways, was present, and added a brief, informal discussion. Mr. Evans said he would not care to dispute any of the arguments made against government ownership of railways in the United States, but that the situation was different in his country, where it was necessary for the government to undertake railway construction in order to develop its territory, because the state could not depend on private enterprise to do so. He also remarked that with all the regulating commissions in the United States the American railways have all the government control they can stand without government ownership, and that actual ownership by the government would be "too much of a good thing." He thought the problems were too big and complex for the government to undertake. He added that competition under private ownership had developed a luxuriousness of passenger traffic, both in the United States and in Great Britain, which would not be afforded by government owned railway systems; and that if he were to criticize our railways he would say there are too many millions spent on "brass work and marble halls."

The University of Pittsburgh has arranged to establish an evening school of engineering this fall, giving graduate courses under the direction of Dean Bishop, in which men who are properly prepared and who have received their bachelor of science degree may obtain an engineering degree. Courses will be offered in the valuation of public utilities, and mechanical, civil, electrical, sanitary, mechanical railway and concrete engineering. The faculty will include Paul N. Lincoln, professor of electrical engineering at the university and president of the American Institute of Electrical Engineers; Louis E. Endsley, professor of mechanical railway engineering at the university; D. F. Crawford, general superintendent of motive power, Pennsylvania Lines West, who will co-operate with Professor Endsley in the work of mechanical engineering; Prof. R. T. Stewart, head of the department of mechanical engineering at the university; Prof. J. Hammond Smith, head of the department of civil engineering, and Professor Morris Knowles, director of the department of sanitary engineering, who with Prof. G. W. Case and William F. Moorehead will give the course in the valuation of public utilities.

The Firemen's Comprehensive Program

At a meeting of the Illinois legislative committee of the Brotherhood of Locomotive Firemen and Enginemen at Springfield last week, it was decided to advocate a change in the federal hours of service law, to reduce the maximum hours of trainmen from 16 to 10 hours a day. Other legislation is to be advocated which would provide for a limitation on the number of cars in a train, a uniform code of signals, giving trainmen a right to vote when they are away from home on election day, standardization of overhead and side clearances, and giving the Interstate Commerce Commission power to specify the type of steel cars to be used in passenger trains.

Armspear Lenses

The Armspear Manufacturing Company, New York City, has published a record of tests of lenses of signal lamps showing the superiority of the Armspear spheroidal lens, over the ordinary signal lenses, when the measurement is taken at any point other than on the axis of the lens. For example, at a point on the axis 575 ft. from the light the stellar magnitude of an inverted lens is 5.75; and of the spheroidal lens 5.00. At a point 2,260 ft. from the light and 2¾ deg. from the axis, both lenses measure 3.00; in other words, the ordinary lens has lost 48 per cent, while the Armspear has lost only 40 per cent. At 900 ft. from the light and 15 deg. from the axis, the inverted lens measures 0.50 and the spheroidal 4.25. At 1,890 ft. from the lamp and 15 deg. from the axis the light from the inverted lens is entirely lost, while the Armspear at that point measures 3.00. These tests were made on a clear night (August 31) with the moon seven-eighths full.

A Safety-First Motion-Picture Play

Marcus A. Dow, general safety agent of the New York Central Lines, has recently had produced a rather remarkable motion-picture play entitled "Steve Hill's Awakening" for use in connection with the safety-first work now being conducted by the Central. The picture, a brief description of which is given below, is one of the first produced under railroad auspices for this purpose, telling a story of human interest with its principal parts played by professional actors. The scheme was carried out with the idea of departing from stereotyped methods, Mr. Dow, who some time ago introduced the safety exhibit car on the New York Central Lines (*Railway Age Gazette*, August 8, 1913, p. 228), having seen the necessity of introducing a feature

OPERATING REVENUES, EXPENSES AND TAXES, AND RATIO OF THE VARIOUS OPERATING EXPENSE ACCOUNTS TO TOTAL OPERATING REVENUES
FISCAL YEARS ENDING JUNE 30, 1913 AND 1914

(Prepared by the Bureau of Railway Economics from returns to the Interstate Commerce Commission of railways having annual operating revenues above $1,000,000)

Road	Operating revenues		Operating expenses		Net operating revenue		Taxes		Ratio of the various operating expense accounts to total operating revenues—per cent											
	Amount 1914	Per cent of inc. over 1913	Amount 1914	Per cent of inc. over 1913	Amount 1914	Per cent of inc. over 1913	Amount 1914	Per cent of inc. over 1913	Maintenance of way and structures 1914	Maintenance of way and structures 1913	Maintenance of equipment 1914	Maintenance of equipment 1913	Traffic 1914	Traffic 1913	Transportation 1914	Transportation 1913	General 1914	General 1913	Total operating expenses 1914	Total operating expenses 1913	Taxes 1914	Taxes 1913
EASTERN DISTRICT:																						
Ann Arbor	$2,096,170	1.1	$1,455,001	1.4	$641,169	0.6	$164,050	0.5	11.8	14.2	12.6	12.5	3.0	2.4	37.8	35.9	4.2	4.2	69.4	69.2	7.8	7.9
Atlantic & St. Lawrence	1,657,507	d4.7	1,411,263	d10.0	246,244	44.5	129,736	d14.8	15.8	17.5	15.6	15.0	3.2	3.1	47.4	51.9	3.2	2.7	85.2	90.2	7.8	8.8
Atlantic City	2,362,004	7.1	1,823,712	5.1	538,292	14.4	149,000	34.6	19.0	17.6	7.3	8.2	1.3	1.5	48.9	50.6	0.7	0.7	77.2	78.6	6.3	5.0
Baltimore & Ohio	97,411,441	d4.1	72,054,892	d2.3	25,356,549	d8.7	3,226,466	9.0	12.6	13.8	17.1	18.0	2.2	2.0	39.7	36.7	2.4	2.1	74.0	72.6	3.3	2.9
Baltimore & Ohio Chicago Terminal	1,594,454	d11.1	1,271,433	d9.4	323,021	d17.4	220,965	5.6	11.3	12.8	17.4	15.4	0.5	0.5	46.6	46.4	3.9	3.1	79.7	78.2	13.9	11.7
Bangor & Aroostook	3,795,412	16.7	2,401,960	8.2	1,393,452	34.9	112,606	1.8	13.5	15.2	13.3	12.7	0.8	1.1	32.5	34.4	3.2	4.8	63.3	68.2	3.0	3.4
Belt Ry. Co. of Chicago	3,064,677	d4.0	1,877,279	d7.6	1,187,398	2.2	121,534	21.3	9.5	6.1	10.1	13.5	0.3	0.2	38.9	41.7	2.5	2.1	61.3	63.6	4.0	3.1
Bessemer & Lake Erie	8,488,073	d5.8	5,796,187	13.4	2,691,886	d31.0	336,000	14.7	10.5	10.9	28.4	19.0	1.4	1.2	26.1	24.1	1.9	1.5	68.3	56.7	4.0	3.3
Boston & Maine	47,413,906	d2.3	38,296,679	0.5	9,117,227	d12.4	2,059,017	1.6	13.8	11.2	16.3	16.0	1.0	0.9	46.8	47.6	2.9	2.8	80.8	78.5	4.3	4.2
Buffalo & Susquehanna R. R. Corp.	1,605,501	d12.7	1,375,759	3.7	229,742	d55.1	19,720	d24.2	19.9	18.5	24.0	14.6	1.1	0.8	35.6	34.4	5.1	3.9	85.7	72.2	1.2	1.4
Buffalo, Rochester & Pittsburgh	10,709,535	d2.2	7,938,063	3.6	2,771,472	d15.5	234,000	8.3	13.5	14.2	20.7	19.7	1.4	1.3	36.2	32.7	2.3	2.1	74.1	70.0	2.2	2.0
Canadian Pacific (Lines in Maine)	1,389,305	d5.9	1,384,587	0.9	4,718	d95.5	139,450	12.4	26.6	24.0	16.3	15.0	5.9	5.1	46.5	44.8	4.4	4.1	99.7	93.0	10.0	8.4
Central New England	3,764,255	1.5	2,515,403	28.0	1,248,852	d28.4	126,804	1.8	15.6	15.0	12.4	9.5	0.4	0.4	37.0	26.8	1.4	1.3	66.8	53.0	3.4	3.4
Central Railroad Co. of New Jersey	27,372,315	d3.6	17,783,045	8.4	9,589,270	d20.1	1,339,454	d12.0	12.1	9.8	17.2	14.9	1.4	1.3	32.2	29.9	2.1	1.9	65.0	57.8	4.9	5.4
Central Vermont	4,140,289	d1.4	3,657,577	8.7	482,712	d42.1	192,475	8.7	14.6	11.0	19.0	16.7	2.5	2.4	49.8	47.8	2.4	2.3	88.3	80.2	4.6	4.2
Chicago & Eastern Illinois	15,544,286	d4.1	12,969,011	0.7	2,575,275	d22.7	630,500	3.0	14.4	13.3	26.1	22.9	1.9	2.0	38.0	38.3	3.0	3.0	83.4	79.5	4.1	3.8
Chicago & Erie	5,460,145	d0.6	5,751,191	8.0	def. 291,046	d273.7	176,300	5.7	19.9	16.3	24.8	21.5	4.7	4.6	53.0	52.1	2.9	2.5	105.3	97.0	3.2	3.0
Chicago, Indiana & Southern	4,329,897	d1.8	3,751,198	9.4	578,699	d40.8	206,067	5.5	14.1	13.0	30.8	25.4	2.5	2.2	36.3	34.6	2.9	2.6	86.6	77.8	4.8	4.4
Chicago, Indianapolis & Louisville	6,944,005	d0.6	5,184,728	1.6	1,759,277	d6.5	332,990	13.2	15.0	15.3	15.4	14.1	3.3	3.1	38.1	38.0	2.9	2.6	74.7	73.1	4.8	4.2
Chicago, Terre Haute & Southeastern	2,162,058	12.0	1,775,928	18.3	386,130	d9.8	138,000	15.0	14.6	17.2	28.4	20.9	2.0	1.9	32.1	32.9	5.0	4.9	82.1	77.8	6.4	6.2
Cincinnati, Hamilton & Dayton	10,084,217	0.1	9,737,841	20.8	346,376	d82.8	464,609	7.9	23.4	12.3	18.6	18.6	2.5	2.3	49.6	44.5	2.4	2.3	96.5	80.0	4.6	4.3
Cincinnati Northern	1,459,278	3.0	1,437,541	18.2	21,737	d99.2	70,059	6.4	21.8	18.5	26.9	21.0	2.2	2.2	44.6	41.3	3.0	2.8	98.5	85.8	4.8	4.6
Cleveland, Cin., Chicago & St. Louis	36,027,653	d4.1	31,872,040	7.6	4,155,613	d47.6	1,471,668	7.1	14.9	14.2	24.8	19.9	2.5	2.5	43.9	40.2	2.3	2.1	88.4	78.9	4.1	3.7
Cumberland Valley	3,511,897	d0.3	2,400,808	1.9	1,111,089	d4.7	72,796	2.2	18.6	17.6	11.6	11.9	1.7	1.5	33.5	33.1	3.0	2.8	68.4	66.9	2.1	2.0
Delaware & Hudson	23,090,060	d3.8	15,309,780	4.5	7,780,280	d16.7	660,607	9.4	7.6	7.8	15.8	15.0	1.4	1.2	38.0	34.2	3.5	2.9	66.3	61.1	2.9	2.5
Delaware, Lackawanna & Western	39,819,284	d1.7	25,621,409	1.3	14,197,875	d6.8	2,100,000	20.1	13.1	12.4	15.5	15.2	2.2	2.1	31.4	30.7	2.1	2.0	64.3	62.4	5.3	4.3
Detroit & Mackinac	1,210,333	d2.6	852,880	0.7	357,453	d9.6	105,904	2.3	12.2	13.4	16.2	14.1	2.4	2.2	37.0	35.7	2.7	2.8	70.5	68.2	8.8	8.3
Detroit & Toledo Shore Line	1,544,330	14.0	768,136	20.1	776,194	8.6	66,976	0.3	9.4	10.7	8.2	5.6	1.3	1.1	28.7	27.7	2.1	2.1	49.7	47.2	4.3	4.9
Detroit, Grand Haven & Milwaukee	2,558,130	1.7	2,271,261	d5.6	286,869	158.7	40,272	d7.9	13.3	21.9	15.2	14.5	3.2	3.3	54.4	53.3	2.7	2.6	88.8	95.6	1.6	1.7
Detroit, Toledo & Ironton	1,542,734	d7.8	2,376,833	28.7	def. 834,099	id380.6	75,739	10.0	46.7	25.2	37.3	28.0	2.1	1.9	63.2	51.4	4.8	3.9	154.1	110.4	4.9	4.1
Elgin, Joliet & Eastern	11,252,392	d15.7	7,755,238	3.2	3,497,154	d40.1	426,863	5.4	15.1	10.6	21.3	15.4	0.6	0.5	29.6	28.2	2.3	1.6	68.9	56.3	3.8	3.0
Erie	52,344,668	d3.0	37,084,156	4.8	15,260,512	d17.9	1,689,427	d4.5	11.3	10.0	19.0	17.8	2.4	2.2	35.6	33.5	2.5	2.1	70.8	65.6	3.2	3.3
Grand Rapids & Indiana	5,538,484	0.4	4,426,102	1.3	1,112,382	d3.2	289,710	1.6	13.6	14.1	16.3	16.7	2.6	2.5	43.9	42.5	3.5	3.4	79.9	79.2	5.2	5.2
Grand Trunk Western	7,184,559	d3.9	6,038,874	6.7	1,145,685	d37.0	431,032	13.9	12.4	11.1	17.8	14.4	3.8	3.5	46.8	44.1	3.2	2.6	84.0	75.7	6.0	5.1
Hocking Valley	7,021,145	d10.2	4,803,746	d3.6	2,217,399	d21.8	451,136	d5.6	9.5	10.0	20.8	20.4	1.5	1.4	34.1	29.8	2.5	2.2	68.4	63.8	6.4	6.1
Indiana Harbor Belt	3,284,687	1.6	2,533,676	9.4	751,011	d18.1	75,541	13.5	13.6	12.0	12.4	12.0	1.0	1.0	47.2	44.0	2.9	2.6	77.1	71.6	2.3	2.1
Lake Erie & Western	5,743,649	d5.3	4,728,228	2.1	1,015,421	d29.0	267,640	8.2	15.4	14.8	20.3	18.8	2.9	2.3	41.2	38.2	2.5	2.3	82.3	76.4	4.7	4.1
Lake Shore & Michigan Southern	53,344,156	d8.5	40,817,260	5.9	12,526,896	d36.5	2,409,212	31.6	12.8	12.3	23.6	17.8	1.9	1.7	36.0	32.5	2.2	1.8	76.5	66.1	4.5	3.1
Lehigh & Hudson River	1,774,791	d4.0	1,293,130	4.1	481,661	d20.6	49,768	3.5	14.4	12.9	15.1	14.2	1.0	0.9	39.0	36.4	3.4	2.8	72.9	67.2	2.8	2.6
Lehigh & New England	2,255,800	25.8	1,257,280	30.6	998,520	20.2	43,126	45.2	13.0	13.9	13.4	11.4	1.0	0.9	26.0	25.0	2.3	2.5	55.7	53.7	1.9	1.7
Lehigh Valley	39,783,564	d7.6	27,609,162	d5.1	12,174,402	d12.6	1,549,895	7.1	11.5	13.2	17.6	17.6	2.5	2.3	35.4	32.5	2.4	2.0	69.4	67.6	3.9	3.4
Long Island	12,625,291	8.4	9,043,773	8.2	3,581,518	9.1	774,733	8.2	12.4	13.4	11.4	11.3	1.4	1.5	43.7	43.0	2.7	2.6	71.6	71.8	6.1	6.2
Maine Central	11,685,969	3.1	8,487,420	2.9	3,198,549	3.7	611,496	11.5	14.3	15.8	15.4	14.5	1.2	1.2	38.6	38.2	3.1	3.1	72.6	72.8	5.2	4.8
Michigan Central	34,268,454	d3.1	26,868,682	7.9	7,399,772	d29.3	1,494,814	9.4	13.3	11.8	17.5	14.6	2.2	2.3	43.4	39.9	2.0	1.8	78.4	70.4	4.4	3.9
Monongahela	1,426,965	d15.2	594,313	d11.9	832,652	d17.4	27,200	d10.7	12.7	12.6	5.8	6.8	0.3	0.2	21.0	19.0	1.8	1.5	41.6	40.1	1.9	1.8
Monongahela Connecting	964,736	d13.2	785,898	d7.1	178,838	d32.6	31,288	32.6	10.7	9.0	17.5	16.4	0.4	0.3	49.5	46.8	3.4	3.6	81.5	76.1	3.2	2.1
New York Central & Hudson River	112,705,211	d2.1	85,718,343	1.9	26,986,868	d12.9	6,206,869	d1.3	14.3	13.7	19.9	18.6	1.9	1.9	37.4	36.4	2.6	2.5	76.1	73.1	5.5	5.5
New York, Chicago & St. Louis	11,757,111	d6.9	9,678,371	3.9	2,078,740	d37.2	487,602	21.2	13.0	10.8	15.5	13.8	5.0	4.7	46.8	42.8	2.0	1.7	82.3	73.8	4.1	3.2
New York, New Haven & Hartford	66,617,693	d2.9	48,515,350	2.7	18,102,343	d15.4	3,568,219	d3.9	13.2	11.5	15.6	14.0	0.8	0.9	40.3	39.6	2.9	2.8	72.8	68.8	5.4	5.4
New York, Ontario & Western	9,040,812	d4.4	6,692,924	3.0	2,347,888	d20.6	538,562	3.2	14.1	12.6	17.3	15.9	1.4	1.4	39.0	36.7	2.2	2.1	74.0	68.7	2.6	2.4
New York, Philadelphia & Norfolk	3,812,826	0.8	3,100,747	9.1	712,079	d24.2	105,550	9.0	8.8	8.0	21.1	17.7	1.5	1.3	45.5	44.1	4.4	4.1	81.3	75.2	2.8	2.6
New York, Susquehanna & Western	2,978,174	1.8	2,045,150	3.2	933,024	d1.3	149,331	d12.9	11.0	10.8	12.5	11.9	0.9	0.8	41.9	42.0	2.4	2.2	68.7	67.7	5.0	5.9
Northern Central	13,124,536	d1.6	11,695,071	2.9	1,429,465	d27.3	485,485	d2.4	13.0	12.6	22.5	20.9	1.5	1.5	49.5	47.8	2.6	2.5	89.1	85.3	3.7	3.7
Pennsylvania Lines—East	178,963,562	d1.6	134,049,848	0.2	44,913,714	d6.6	7,352,503	0.6	13.2	13.0	20.6	21.1	1.4	1.3	37.2	35.8	2.5	2.4	74.9	73.6	4.1	4.0
Pennsylvania Lines—West	60,779,683	d8.7	45,708,160	d7.3	15,071,523	d12.7	3,284,866	12.0	14.0	16.7	18.9	18.5	1.7	1.5	38.0	35.5	2.6	1.9	75.2	74.1	5.4	4.4
Pere Marquette	16,431,939	d5.6	17,426,123	25.3	def. 994,184	d128.4	643,168	15.8	18.0	16.9	38.2	17.2	2.5	2.3	44.1	41.1	3.2	2.4	106.0	79.9	3.9	3.2
Philadelphia & Reading	47,123,370	d6.8	31,793,209	4.1	15,330,161	d23.4	1,267,503	d2.5	11.3	9.3	18.5	16.7	1.1	1.0	34.9	32.0	1.7	1.4	67.5	60.4	2.7	2.6
Philadelphia, Baltimore & Washington	20,656,989	d2.1	17,109,807	0.2	3,547,182	d12.0	656,326	1.9	15.5	16.2	18.7	18.4	1.8	1.7	44.1	42.0	2.7	2.6	82.8	80.9	3.2	3.1
Pittsburgh & Lake Erie	17,622,031	d12.1	10,898,827	9.2	6,723,204	d33.2	689,886	43.7	10.6	9.7	22.2	15.3	1.1	0.8	25.9	22.4	2.0	1.6	61.8	49.8	3.9	2.4
Pittsburgh, Cin., Chicago & St. Louis	42,096,662	d5.4	33,201,786	d5.1	8,894,876	d6.7	1,906,195	13.1	14.6	17.2	20.3	20.3	2.1	1.9	39.4	37.2	2.5	2.0	78.9	78.6	4.5	3.8
Pittsburg, Shawmut & Northern	2,099,974	4.8	1,779,947	18.1	320,027	d35.5	19,404	1.5	17.9	17.2	27.1	22.5	1.0	0.7	36.0	32.3	2.8	2.5	84.8	75.2	0.9	1.0
Port Reading	1,335,956	d16.8	625,390	11.5	710,566	d32.0	174,000	43.2	12.7	8.2	0.2	0.2	*	*	33.5	26.4	0.4	0.1	46.8	34.9	13.0	7.6
Rutland	3,714,789	0.2	2,825,317	d2.3	889,472	9.0	207,080	13.9	11.8	12.4	18.4	20.7	3.0	2.7	40.7	40.0	2.2	2.2	76.1	78.0	5.6	4.9

d Decrease. def. Deficit. id Increase deficit. *Less than one tenth of one per cent.

OPERATING REVENUES, EXPENSES AND TAXES, AND RATIO OF THE VARIOUS OPERATING EXPENSE ACCOUNTS TO TOTAL OPERATING REVENUES
FISCAL YEARS ENDING JUNE 30, 1913 AND 1914—Continued

(Prepared by the Bureau of Railway Economics from returns to the Interstate Commerce Commission of railways having annual operating revenues above $1,000,000)

Road	Operating revenues		Operating expenses		Net operating revenue		Taxes		Ratio of the various operating expense accounts to total operating revenues—per cent											
									Maintenance of way and structures		Maintenance of equipment		Traffic		Transportation		General		Total operating expenses		Taxes	
	Amount 1914	Per cent of inc. or dec. over 1913	Amount 1914	Per cent of inc. or dec. over 1913	Amount 1914	Per cent of inc. or dec. over 1913	Amount 1914	Per cent of inc. or dec. over 1913	1914	1913	1914	1913	1914	1913	1914	1913	1914	1913	1914	1913	1914	1913
EASTERN DISTRICT—*Continued:*																				
Toledo & Ohio Central	$5,336,893	d5.9	$4,568,178	12.2	$768,715	d51.9	$256,715	d0.5	18.7	15.0	21.6	18.3	1.8	1.5	41.1	35.0	2.4	2.0	85.6	71.8	4.8	4.5
Toledo, St. Louis & Western	4,588,121	5.8	3,138,146	8.2	1,449,975	1.0	204,836	14.1	10.2	12.5	12.9	13.0	4.4	3.8	38.5	35.1	2.4	2.5	68.4	66.9	4.5	4.1
Ulster & Delaware	1,076,217	d5.4	835,487	1.2	240,730	d22.9	40,129	d2.5	13.1	12.4	13.8	13.8	2.0	1.8	43.8	41.8	4.9	2.8	77.6	72.6	3.7	3.6
Union R. R. Co. of Baltimore	1,633,774	d9.1	271,309	19.5	1,362,465	d13.3	72,162	3.1	10.6	6.5	...	...	0.5	0.7	3.6	3.6	1.9	1.8	16.6	12.6	4.4	3.9
Union R. R. Co. (of Pennsylvania)	4,077,366	d13.4	3,774,092	12.2	303,274	d77.5	99,500	14.7	16.4	9.1	29.4	23.3	*	*	45.5	38.1	1.3	0.9	92.6	71.4	2.4	1.8
Vandalia	11,255,235	0.5	8,842,199	1.5	2,413,036	d3.1	381,865	3.4	12.9	14.6	20.2	20.3	2.8	2.7	40.3	38.1	2.4	2.1	78.6	77.8	3.4	3.3
Wabash	30,022,494	d5.5	24,403,832	d1.2	5,618,662	d20.6	1,044,309	15.3	13.4	13.6	18.8	16.8	3.4	3.2	42.9	41.6	2.8	2.5	81.3	77.7	3.5	2.9
Western Maryland	8,267,737	8.3	7,848,631	30.4	419,106	d74.0	263,205	9.7	19.2	15.2	22.8	16.2	3.4	2.5	46.3	42.9	3.2	2.1	94.9	78.9	3.2	3.1
West Jersey & Seashore	6,397,733	0.7	5,097,876	2.9	1,299,857	d7.0	316,850	12.1	15.8	15.2	15.9	15.6	2.9	2.8	42.6	41.8	2.5	2.6	79.7	78.0	5.0	4.5
Wheeling & Lake Erie	7,637,346	d2.5	5,274,542	d10.4	2,362,804	21.3	365,831	0.9	13.2	16.9	16.7	20.7	1.4	1.2	34.9	33.2	2.9	3.1	69.1	75.1	4.8	4.6
SOUTHERN DISTRICT:																				
Alabama & Vicksburg	1,830,544	d1.7	1,482,657	5.6	347,887	d23.9	97,798	40.6	15.4	15.1	22.7	20.0	2.6	2.3	36.2	34.4	4.1	3.6	81.0	75.4	5.3	3.7
Alabama Great Southern	5,385,308	2.9	4,227,464	10.8	1,157,844	d18.2	189,857	7.8	12.8	12.0	26.1	22.5	3.0	2.9	34.0	33.2	2.5	2.3	78.4	72.9	3.5	3.4
Atlanta & West Point	1,277,668	3.1	962,806	4.8	314,862	d1.6	82,911	2.0	13.8	12.0	21.0	18.5	4.9	5.2	31.4	33.9	4.3	4.6	75.4	74.2	6.5	6.6
Atlanta, Birmingham & Atlantic	3,399,361	4.8	2,766,954	3.4	632,407	11.7	172,042	4.8	15.9	16.3	16.0	16.1	5.0	5.7	40.4	40.2	4.1	4.2	81.4	82.5	5.1	5.1
Atlantic Coast Line	36,832,898	2.0	26,212,088	6.4	10,620,810	d7.5	1,561,159	7.6	13.9	12.9	16.5	15.5	1.8	1.7	35.6	35.5	3.3	2.6	71.1	68.2	4.2	4.0
Birmingham Southern	1,161,830	d9.0	835,856	3.3	325,974	d30.2	25,223	d11.5	16.5	12.3	15.4	12.5	0.5	0.4	35.0	33.1	4.5	5.1	71.9	63.4	2.2	2.2
Carolina, Clinchfield & Ohio	2,520,306	1.6	1,185,828	12.5	1,334,478	d6.5	124,892	25.3	7.1	6.9	13.1	10.5	3.3	3.3	18.9	17.5	4.6	4.3	47.0	42.5	5.0	4.0
Central of Georgia	14,210,743	2.6	10,745,269	4.1	3,465,474	d1.8	631,596	5.5	14.5	14.6	19.7	18.6	3.0	3.0	34.9	34.9	3.5	3.4	75.6	74.5	4.4	4.3
Charleston & Western Carolina	2,095,812	10.5	1,600,467	8.7	495,345	17.0	66,651	5.3	16.7	17.0	16.6	16.6	2.0	2.1	38.1	39.0	3.0	3.0	76.4	77.7	3.2	3.3
Chesapeake & Ohio	36,690,021	4.6	25,653,837	4.9	11,036,084	3.8	1,330,935	d3.3	11.3	12.4	21.0	20.7	1.8	1.9	33.2	32.4	2.7	2.3	70.0	69.7	3.6	3.9
Cincinnati, New Orleans & Texas Pac.	10,872,690	4.1	7,706,720	9.5	3,165,970	d7.1	368,000	6.5	10.3	10.1	25.3	23.3	2.8	2.7	30.0	29.0	2.5	2.3	70.9	67.4	3.4	3.3
Florida East Coast	5,347,819	6.2	3,653,221	2.8	1,694,598	14.3	239,717	11.7	16.2	15.3	13.8	14.0	1.8	1.8	33.9	36.5	2.6	2.9	68.3	70.5	4.5	4.3
Georgia R. R. Lessee Organization	3,327,444	6.7	2,632,073	d4.6	695,371	94.3	37,261	4.3	10.1	11.4	17.2	19.2	4.3	4.4	44.3	50.3	3.2	3.2	79.1	88.5	1.1	1.1
Georgia Southern & Florida	2,596,549	1.2	2,111,962	3.6	484,587	d8.2	136,220	2.5	12.2	12.2	19.6	18.1	3.9	3.7	40.8	41.0	4.8	4.4	81.3	79.4	5.2	5.2
Gulf & Ship Island	1,995,766	d5.6	1,375,843	0.3	619,923	d16.5	89,918	3.0	13.5	13.6	20.1	17.9	1.8	1.6	28.3	27.0	5.2	4.8	68.9	64.9	4.5	4.1
Illinois Central	65,873,700	2.5	50,775,327	1.5	15,098,373	6.1	3,341,247	15.1	14.0	13.2	22.0	21.7	2.0	2.1	36.7	38.5	2.4	2.4	77.1	77.9	5.1	4.5
Kanawha & Michigan	3,110,148	d5.8	2,219,790	1.6	890,358	d20.3	126,430	19.0	13.6	14.5	22.7	19.4	1.1	0.9	31.3	29.0	2.7	2.4	71.4	66.2	4.1	3.2
Louisville & Nashville	59,682,778	0.4	44,782,708	d*	14,900,070	1.7	2,777,540	57.7	15.6	18.6	20.5	18.9	2.2	2.1	34.6	33.4	2.1	2.4	75.0	75.4	4.7	3.0
Louisville, Henderson & St. Louis	1,371,798	11.4	1,017,076	d1.2	354,722	75.5	45,463	4.9	19.8	24.8	12.8	13.5	4.3	4.3	34.4	38.0	2.8	3.0	74.1	83.6	3.3	3.5
Mobile & Ohio	12,975,431	4.8	10,075,828	11.1	2,899,603	d12.3	416,519	16.2	11.6	11.3	20.7	19.0	3.9	3.7	38.4	36.2	3.1	3.1	77.7	73.3	3.2	2.9
Nashville, Chattanooga & St. Louis	12,778,334	d4.0	10,079,440	d3.4	2,698,894	d6.2	326,557	7.4	15.2	16.0	18.7	17.9	4.0	3.6	38.0	38.3	3.0	2.6	78.9	78.4	2.6	2.3
New Orleans & Northeastern	3,975,710	5.6	3,055,530	6.6	920,180	2.4	182,586	24.1	10.3	10.5	21.9	19.9	3.1	3.2	37.6	38.6	4.0	3.9	76.9	76.1	4.6	3.9
New Orleans Great Northern	1,873,613	4.0	1,129,951	5.3	743,662	2.1	33,583	25.5	13.3	14.7	12.2	9.2	1.6	1.7	28.4	29.5	4.8	4.5	60.3	59.6	1.8	1.5
New Orleans, Mobile & Chicago	2,204,370	d11.5	1,451,157	d17.6	753,213	3.5	85,726	23.4	14.7	15.4	12.6	10.5	2.1	1.8	32.0	39.1	4.4	4.0	65.8	70.8	3.9	2.8
Norfolk & Western	44,470,619	1.7	29,935,842	4.8	14,534,777	d4.2	1,620,000	11.6	11.2	12.7	20.7	19.0	1.7	1.6	31.6	30.2	2.1	1.8	67.3	65.3	3.6	3.3
Norfolk Southern	3,990,020	3.1	2,926,906	17.6	1,063,114	d23.1	125,810	11.4	15.4	13.3	14.1	12.4	1.8	1.7	36.7	31.8	5.4	5.1	73.4	64.3	3.2	2.9
Richmond, Fredericksburg & Potomac	2,977,081	0.3	1,896,123	4.6	1,080,958	d6.5	91,430	85.4	10.7	11.0	11.5	10.9	1.3	1.2	37.3	35.2	2.9	2.7	63.7	61.0	3.1	1.7
Seaboard Air Line	25,291,758	3.1	17,311,395	3.5	7,980,363	2.3	999,000	4.5	12.2	12.3	13.5	13.6	3.1	3.1	36.6	36.3	3.0	2.9	68.4	68.2	3.9	3.9
Southern	69,533,697	1.5	50,571,175	4.8	18,962,522	d6.4	2,679,390	8.0	13.1	13.5	17.2	16.5	3.2	3.1	36.0	34.4	3.2	2.9	72.7	70.4	3.9	3.6
Southern Ry. Co. in Mississippi	1,289,586	17.7	1,040,554	0.7	249,032	294.4	100,864	12.5	22.4	30.0	9.9	10.3	2.3	2.7	42.4	46.6	3.7	4.6	80.7	94.2	7.8	8.2
Tennessee Central	1,707,339	1.4	1,299,249	4.9	408,090	d8.4	53,763	5.5	19.7	20.2	12.0	10.3	4.1	4.0	35.2	34.0	5.1	5.1	76.1	73.6	3.1	3.0
Virginia & Southwestern	1,939,104	7.3	1,370,867	9.3	568,237	2.9	77,410	5.7	13.9	15.5	24.4	22.7	1.3	1.3	28.6	27.5	2.5	2.4	70.7	69.4	4.0	4.1
Virginian	6,340,080	8.5	3,533,221	4.7	2,806,859	13.7	257,195	20.0	13.3	12.7	15.8	18.7	1.0	1.1	23.4	23.5	2.2	1.8	55.7	57.8	4.1	3.7
Washington Southern	1,297,291	d1.6	927,366	3.4	369,925	d12.2	43,962	8.1	13.4	13.1	13.0	12.2	1.3	1.1	40.9	38.9	2.9	2.7	71.5	68.0	3.4	3.1
Western Ry. of Alabama	1,485,849	5.2	1,131,351	7.2	354,498	d0.6	59,673	0.7	17.9	17.4	20.0	18.7	5.1	5.1	28.5	28.7	4.6	4.8	76.1	74.7	4.0	4.2
Yazoo & Mississippi Valley	12,535,499	14.0	8,688,698	0.7	3,846,801	62.0	583,772	25.1	14.1	18.2	14.1	14.9	1.5	1.6	37.0	40.8	2.6	2.9	69.3	78.4	4.7	4.2
WESTERN DISTRICT:																				
Arizona & New Mexico	966,678	d8.8	473,324	d3.1	493,353	d13.7	33,383	d17.1	13.3	14.7	11.9	8.5	1.0	0.9	18.8	18.2	4.0	3.8	49.0	46.1	3.5	3.8
Arizona Eastern	2,797,811	3.9	1,644,853	11.1	1,152,959	d4.8	160,658	38.6	13.4	16.0	12.3	8.7	0.9	1.2	27.6	25.3	4.6	3.8	58.8	55.0	5.7	4.3
Atchison, Topeka & Santa Fe	93,540,268	d4.6	60,172,701	d5.7	33,367,567	d2.6	4,773,441	17.4	13.5	15.5	17.3	16.6	2.3	2.1	28.9	28.8	2.3	2.1	64.3	65.1	5.1	4.1
Bingham & Garfield	1,775,538	56.2	672,685	33.3	1,102,853	74.5	35,456	100.4	7.2	9.8	13.4	12.1	0.6	0.7	15.1	19.2	1.6	2.6	37.9	44.4	2.0	1.6
Butte, Anaconda & Pacific	1,495,391	12.4	1,004,893	d6.5	490,498	91.8	30,756	24.8	11.9	10.1	17.4	19.9	0.5	0.6	34.3	47.4	3.1	2.8	67.2	80.8	2.1	1.9
Chicago & Alton	14,156,232	d7.2	11,987,900	d6.6	2,168,332	d10.2	569,070	16.9	12.8	16.7	25.5	22.2	3.6	3.5	39.6	39.1	3.2	2.6	84.7	84.1	4.0	3.2
Chicago & Northwestern	83,677,051	0.8	59,405,142	2.0	24,271,909	d2.1	4,252,790	18.2	14.5	13.9	14.6	13.9	1.6	1.6	38.2	38.8	2.1	1.9	71.0	70.1	5.1	4.3
Chicago, Burlington & Quincy	92,750,934	d1.7	62,148,398	d1.1	30,602,536	d2.9	4,016,658	12.7	12.9	13.3	17.1	17.1	1.8	1.7	32.6	31.8	2.6	2.7	67.0	66.6	4.3	3.8
Chicago Great Western	14,260,522	1.9	10,831,168	5.6	3,429,354	d8.3	499,082	13.6	14.2	12.1	16.6	14.8	4.1	4.0	38.1	39.5	3.0	2.9	76.0	73.3	3.5	3.1
Chicago Junction	2,029,764	1.3	1,545,013	13.6	484,751	d24.7	28,433	28.0	9.2	10.2	10.2	6.1	0.7	0.7	53.4	48.7	2.6	2.2	76.1	67.9	1.4	1.1
Chicago, Milwaukee & St. Paul	91,782,691	d2.4	61,330,061	d2.5	30,452,630	d2.4	4,106,557	7.4	11.6	11.3	14.3	14.7	2.0	2.0	37.0	37.3	1.9	1.5	66.8	66.8	4.5	4.1

d Decrease. def. Deficit. id Increase deficit. *Less than one tenth of one per cent.

OPERATING REVENUES, EXPENSES AND TAXES, AND RATIO OF THE VARIOUS OPERATING EXPENSE ACCOUNTS TO TOTAL OPERATING REVENUES
FISCAL YEARS ENDING JUNE 30, 1913 AND 1914—CONTINUED

(Prepared by the Bureau of Railway Economics from returns to the Interstate Commerce Commission of railways having annual operating revenues above $1,000,000)

Road	Operating revenues		Operating expenses		Net operating revenue		Taxes		Ratio of the various operating expense accounts to total operating revenues— per cent											
									Maintenance of way and structures		Maintenance of equipment		Traffic		Transportation		General		Total operating expenses		Taxes	
	Amount 1914	Per cent of inc. over 1913	Amount 1914	Per cent of inc. over 1913	Amount 1914	Per cent of inc. over 1913	Amount 1914	Per cent of inc. over 1913	1914	1913	1914	1913	1914	1913	1914	1913	1914	1913	1914	1913	1914	1913
WESTERN DISTRICT—*Continued:*																				
Chicago, Peoria & St. Louis	$1,676,617	d1.2	$1,688,511	5.5	def. $11,894	d112.2	$72,265	37.9	19.4	15.9	23.8	21.4	4.6	4.9	49.1	47.9	3.8	4.1	100.7	94.2	4.3	3.1
Chicago, Rock Island & Gulf	2,819,779	d17.0	2,106,807	d3.7	712,972	d41.0	115,055	29.6	12.7	11.1	13.1	10.5	4.1	3.7	41.5	36.3	3.3	2.8	74.7	64.4	4.1	2.6
Chicago, Rock Island & Pacific	65,388,334	d3.8	48,893,139	d2.8	16,495,195	d6.6	3,200,577	12.0	13.0	14.0	14.4	14.3	2.8	2.7	41.7	40.5	2.9	2.5	74.8	74.0	4.9	4.2
Chicago, St. Paul, Minneap. & Omaha	17,992,371	5.9	12,632,571	6.3	5,359,800	5.0	973,283	16.9	14.5	13.0	12.7	12.9	2.0	2.1	38.6	39.7	2.4	2.3	70.2	70.0	5.4	4.9
Colorado & Southern	7,608,129	d13.8	5,582,173	d10.0	2,025,956	d22.8	397,543	13.2	14.1	13.2	18.1	22.8	1.7	1.5	36.0	29.8	3.5	3.0	73.4	70.3	5.2	4.0
Colorado Midland	1,761,982	d3.6	1,729,612	4.3	32,370	d81.0	108,000	11.1	19.5	14.8	24.2	22.4	5.3	5.0	45.2	44.7	3.9	3.8	98.1	90.7	6.1	5.3
Denver & Rio Grande	23,167,051	d5.3	16,018,196	d6.0	7,148,855	d3.5	1,009,144	6.4	14.7	14.5	18.3	18.6	2.1	2.2	31.3	31.6	2.7	2.8	69.1	69.7	4.4	3.9
Denver & Salt Lake	1,215,361	5.0	916,812	3.2	298,550	11.1	36,587	d13.4	18.4	17.4	16.6	17.7	2.0	2.5	33.9	33.9	4.5	5.3	75.4	76.8	3.0	3.7
Duluth & Iron Range	6,518,526	d8.5	3,458,919	4.1	3,059,607	d19.4	350,917	d3.1	14.1	12.5	12.0	9.6	0.2	0.2	24.2	22.4	2.6	2.0	53.1	46.7	5.4	5.1
Duluth, Missabe & Northern	7,311,844	d13.7	4,040,361	6.2	3,271,483	d30.0	406,118	d4.1	16.9	11.4	14.3	11.6	0.4	0.3	21.3	19.8	2.4	1.8	55.3	44.9	5.6	5.0
Duluth, South Shore & Atlantic	3,412,575	d*	2,763,997	1.5	648,579	d5.8	247,443	12.7	23.3	21.0	12.6	12.1	3.1	3.5	38.0	39.8	4.0	3.4	81.0	79.8	7.3	6.4
Duluth, Winnipeg & Pacific	1,743,894	30.2	1,378,570	57.7	365,324	d21.5	87,721	31.0	16.6	12.6	19.6	12.9	1.5	0.7	37.4	36.1	4.0	3.0	79.1	65.3	5.0	5.0
El Paso & Southwestern	9,057,553	4.6	5,596,630	9.3	3,460,924	d2.2	487,224	28.6	14.2	12.0	13.7	13.4	2.3	2.0	28.4	28.0	3.2	3.7	61.8	59.1	5.4	4.4
Florence & Cripple Creek	1,228,512	d*	703,305	6.1	525,208	d7.3	75,865	87.3	11.5	9.7	9.5	9.5	1.8	1.8	30.0	29.1	4.4	3.8	57.2	53.9	6.2	3.3
Fort Worth & Denver City	4,738,723	d11.2	3,533,661	d5.7	1,205,062	d24.2	182,072	41.2	12.4	11.2	15.0	18.4	1.8	1.6	41.4	35.7	4.0	3.3	74.6	70.2	3.8	2.4
Galveston, Harrisburg & San Antonio	11,824,091	d2.0	9,722,027	1.6	2,102,065	d15.7	573,952	55.9	13.6	10.8	18.7	20.5	3.4	3.4	43.0	41.5	3.5	3.1	82.2	79.3	4.9	3.1
Great Northern	75,441,366	d4.1	46,519,273	1.5	28,922,093	d11.9	4,790,573	12.0	16.9	15.7	13.0	11.9	1.8	1.6	28.1	27.3	1.9	1.8	61.7	58.3	6.4	5.4
Gulf, Colorado & Santa Fe	12,882,258	d6.0	9,959,733	d2.3	2,922,525	d16.6	583,331	24.2	15.6	15.7	16.2	15.5	2.5	2.2	39.8	38.0	3.2	3.0	77.3	74.4	4.5	3.4
Houston & Texas Central	6,551,983	d4.1	5,555,614	1.3	996,369	d26.9	326,310	40.9	16.7	15.5	14.5	17.0	2.6	3.2	47.6	41.5	3.4	3.1	84.8	80.3	5.0	3.4
Houston East & West Texas	1,443,373	2.9	1,061,696	0.2	381,677	11.0	57,010	32.9	16.6	24.0	10.9	12.3	1.6	1.8	41.0	34.1	3.4	3.3	73.5	75.5	3.9	3.1
International & Great Northern	9,941,374	d11.7	8,021,580	d5.9	1,919,794	d29.8	339,841	d*	16.4	13.1	11.2	13.8	3.2	2.8	45.9	42.6	4.0	3.4	80.7	75.7	3.4	3.0
Kansas City Southern	10,993,454	2.7	6,910,321	2.4	4,083,133	3.1	567,857	22.0	10.3	9.6	12.2	12.6	3.0	2.9	33.3	34.2	4.1	3.7	62.9	63.0	5.2	4.3
Louisiana & Arkansas	1,700,208	1.6	1,135,865	7.2	564,344	d8.0	69,255	37.9	19.1	16.2	16.2	15.2	1.8	1.7	26.1	26.6	3.6	3.6	66.8	63.3	4.1	3.0
Louisiana Ry. & Navigation Co	1,971,718	4.2	1,545,600	8.4	426,118	d8.6	80,060	34.5	18.5	14.7	12.0	12.8	3.7	3.8	40.2	39.9	4.0	4.1	78.4	75.3	4.1	3.1
Louisiana Western	2,314,284	d*	1,663,597	5.8	650,687	d12.3	114,732	26.6	11.2	12.2	21.3	18.3	3.8	3.8	32.1	30.7	3.5	3.0	71.9	68.0	5.0	3.9
Midland Valley	1,617,566	7.0	1,343,951	6.1	273,615	11.8	78,983	9.9	22.2	24.8	19.0	18.5	1.8	2.1	35.4	33.8	4.7	4.6	83.1	83.8	4.9	4.8
Minneapolis & St. Louis	9,620,884	d0.9	6,891,813	2.7	2,729,071	d9.0	410,361	15.0	13.5	12.9	14.7	12.5	2.2	2.2	38.7	39.0	2.5	2.5	71.6	69.1	4.3	3.7
Minneapolis, St. P. & Sault Ste. M.	28,775,634	d9.4	18,941,938	0.3	9,833,696	d23.6	1,182,366	d9.0	12.5	11.0	15.4	12.5	2.3	2.0	33.4	31.8	2.2	2.2	65.8	59.5	4.1	4.1
Missouri & North Arkansas	1,293,618	4.6	1,225,154	2.1	68,464	90.1	72,338	15.9	26.1	33.4	19.5	15.9	3.4	3.1	40.4	39.6	5.3	5.1	94.7	97.1	5.6	5.0
Missouri, Kansas & Texas	31,523,188	d2.6	22,669,457	d0.6	8,851,253	d7.2	1,499,521	16.4	14.5	14.3	12.4	12.7	2.3	2.3	38.8	37.9	3.9	3.3	71.9	70.5	4.8	4.0
Missouri, Oklahoma & Gulf	1,171,787	8.6	1,183,156	17.4	def. 11,369	d116.1	74,309	15.3	22.6	18.6	16.6	16.1	5.4	5.9	49.3	46.3	7.1	6.5	101.0	93.4	6.3	6.0
Missouri Pacific	26,622,041	d5.0	21,776,082	d1.2	4,845,958	d19.1	1,170,180	4.0	15.4	13.6	18.7	17.3	2.6	2.7	42.0	42.1	3.1	2.9	81.8	78.6	4.4	4.0
Morgan's La. & Tex. R.R. & S.S. Co.	4,700,887	0.9	3,614,123	d7.8	1,086,764	47.6	268,628	21.7	13.3	18.3	15.6	15.8	3.1	3.5	41.5	43.4	3.4	3.2	76.9	84.2	5.7	4.7
Nevada Northern	1,761,197	7.1	925,708	16.1	835,489	d1.4	81,242	5.0	12.5	11.3	13.4	11.9	0.3	0.3	22.9	22.2	3.4	2.8	52.5	48.5	4.6	4.7
New Orleans, Texas & Mexico	1,581,020	3.2	1,466,805	16.1	114,215	d57.6	18,515	d16.1	32.2	17.2	10.2	11.9	2.9	2.7	40.4	45.5	7.1	5.1	92.8	82.4	1.2	1.4
Northern Pacific	68,544,802	d5.7	41,472,053	d7.2	27,072,749	d3.3	5,030,584	25.8	13.7	14.0	11.8	11.8	1.8	1.8	31.7	32.4	1.5	1.5	60.5	61.5	7.3	5.5
Northwestern Pacific	3,745,805	1.0	2,653,359	2.3	1,092,446	d2.0	182,852	19.8	15.7	14.4	13.6	13.5	1.2	1.2	36.3	36.7	4.0	4.2	70.8	70.0	4.9	4.1
Oregon Short Line	22,005,594	d*	12,167,948	6.5	9,837,646	d7.1	1,516,784	5.4	12.5	11.2	12.6	11.3	2.0	1.7	25.3	25.3	2.9	2.4	55.3	51.9	6.9	6.5
Oregon-Washington R. R. & Nav. Co.	17,227,641	d5.4	11,725,239	d4.3	5,502,402	d7.5	1,298,817	9.0	14.0	14.0	11.9	10.9	3.4	3.1	34.6	36.0	4.2	3.3	68.1	67.3	7.5	6.5
Panhandle & Santa Fe	1,350,819	d10.2	911,653	d2.7	439,166	d22.5	45,010	44.5	11.0	6.7	20.0	20.7	1.4	1.8	31.8	30.2	3.3	2.9	67.5	62.3	3.3	2.1
Pecos & Northern Texas	2,396,037	d4.7	1,584,336	d9.6	811,701	6.7	88,524	46.7	10.9	12.0	18.2	20.0	1.4	1.8	32.3	32.8	3.3	3.1	66.1	69.7	3.7	2.4
St. Joseph & Grand Island	1,610,060	3.6	1,407,073	d0.3	202,987	43.1	86,482	16.9	20.3	22.8	15.0	14.9	3.7	3.8	43.2	45.0	5.2	4.4	87.4	90.9	5.4	4.8
St. Louis & San Francisco	42,458,880	d2.2	31,073,710	8.7	11,385,169	d23.1	1,415,348	d0.8	17.0	12.3	16.7	13.3	2.1	2.2	34.6	35.3	2.8	2.8	73.2	65.9	3.3	3.3
St. Louis, Brownsville & Mexico	2,660,633	d9.2	2,107,944	d10.0	552,689	d6.0	88,701	29.6	22.3	15.8	11.0	11.1	2.3	2.0	38.6	47.2	5.0	3.9	79.2	80.0	3.3	2.3
St. Louis, Iron Mountain & Southern	33,171,860	d2.8	21,346,290	d5.8	11,825,569	3.1	1,343,253	13.0	13.4	16.0	15.9	14.7	2.0	2.0	30.5	31.4	2.6	2.3	64.4	66.4	4.0	3.5
St. Louis Merchants' Bridge Terminal	1,921,263	d7.7	1,610,068	d1.9	311,195	d29.2	73,151	5.4	18.9	18.0	6.4	5.5	0.5	0.4	54.1	51.5	3.9	3.5	83.8	78.9	3.8	3.3
St. Louis, San Francisco & Texas	1,480,212	d2.2	1,321,907	7.0	158,304	d43.1	18,368	37.7	22.2	17.5	16.1	12.5	2.0	2.0	44.5	45.2	4.5	4.4	89.3	81.6	1.2	0.9
St. Louis Southwestern	8,212,255	d4.5	5,160,890	5.7	3,051,365	d17.9	389,625	15.4	9.9	10.6	18.4	14.6	4.2	4.1	26.1	23.9	4.2	3.6	62.8	56.8	4.7	3.9
St. Louis Southwestern Ry. of Texas	4,532,301	d3.6	4,606,827	6.3	def. 74,527	d120.3	212,261	61.9	24.4	20.9	24.8	20.6	3.5	3.4	43.5	42.3	5.4	5.0	101.6	92.2	4.7	2.8
San Antonio & Aransas Pass	4,648,197	d9.0	3,984,756	5.5	663,441	d50.3	160,563	14.9	22.1	17.7	15.6	12.9	1.6	1.5	43.3	39.2	3.1	2.6	85.7	73.9	3.5	2.7
San Pedro, Los Angeles & Salt Lake	10,626,703	3.8	7,214,976	5.9	3,411,727	d0.5	532,484	21.7	12.2	11.4	16.3	16.7	3.6	3.7	33.7	32.5	2.1	2.2	67.9	66.5	5.0	4.3
Southern Pacific	92,038,088	d3.5	54,991,140	0.5	37,046,948	d8.9	5,325,670	21.6	11.7	10.7	14.2	13.8	2.1	2.2	28.9	28.0	2.9	2.7	59.8	57.4	5.8	4.6
Spokane International	1,020,069	d11.1	591,933	d13.8	428,136	d7.2	42,427	10.6	15.0	17.6	6.3	6.4	2.3	2.1	29.9	29.9	4.5	3.8	58.0	59.8	4.2	3.3
Spokane, Portland & Seattle	4,901,740	d8.2	2,808,643	4.2	2,093,097	d20.9	640,800	0.0	18.0	12.6	9.3	8.7	2.0	1.8	24.8	24.5	3.2	2.9	57.3	50.5	13.1	12.0
Terminal R. R. Assn. of St. Louis	2,811,293	d5.8	1,873,483	d1.3	937,810	d13.6	335,811	5.0	16.5	15.0	7.9	7.1	0.4	0.4	39.4	37.7	2.4	3.4	66.6	63.6	11.9	10.7
Texas & New Orleans	4,174,321	d2.2	3,794,692	1.0	379,629	d25.7	214,132	38.2	18.6	21.7	22.8	20.6	2.5	2.3	43.2	40.0	3.8	3.4	90.9	88.0	5.1	3.6
Texas & Pacific	18,652,685	2.2	14,238,007	d3.6	4,414,678	33.5	757,341	9.2	11.9	13.1	15.9	16.5	2.5	2.3	43.2	46.7	2.8	3.1	76.3	81.7	4.1	3.8
Toledo, Peoria & Western	1,293,609	d7.1	1,236,155	8.9	57,454	d77.7	73,921	15.7	19.5	17.6	25.2	21.6	2.4	2.1	45.1	37.2	3.4	3.0	95.6	81.5	5.7	4.6
Trinity & Brazos Valley	2,302,679	d18.8	2,386,502	d10.0	def. 83,823	d145.4	66,167	39.3	27.0	20.7	15.4	14.8	5.2	4.4	49.7	48.5	6.3	5.1	103.6	93.5	2.9	1.7
Union Pacific	51,075,516	d1.0	29,498,632	3.8	21,576,884	d6.9	2,263,265	11.1	11.0	11.0	14.3	12.1	2.5	2.3	27.0	27.0	2.9	2.7	57.7	55.1	4.4	3.9
Vicksburg, Shreveport & Pacific	1,776,777	4.2	1,373,417	5.3	403,360	0.3	83,862	12.7	16.5	19.0	19.8	18.3	2.4	2.3	35.0	33.2	3.6	3.6	77.3	76.4	4.7	4.4
Western Pacific	6,099,573	d1.2	4,995,891	11.5	1,103,682	d34.9	379,259	36.4	23.1	15.2	13.1	8.4	5.5	5.8	36.3	38.0	4.9	5.1	81.9	72.5	6.2	4.5

d Decrease. def. Deficit. id Increase deficit. *Less than one tenth of one per cent.

that would create sufficient interest among the employees to bring them into the safety meetings willingly. And, of course, a "human interest" story will leave on their minds a more lasting impression than the ordinary didactic lecture. It is the intention of the company to show the "movie" in a specially equipped car, to be run over all of the Central lines, as has been done with the safety exhibit cars, stopping at the principal points. The pictures will also be used at large safety meetings conducted in halls or theaters in the various cities on the line.

The story is in brief as follows:

Henry Hill, a trainman, at the end of his run, coming in to the yard and jumping off the caboose, starts, against the advice of a fellow employee, to take a short cut along the tracks to his home, and is struck by an engine and killed, leaving a widow and two children, a boy and a girl. Soon after this the family is dispossessed, the widow later dies in poverty and the two children are sent to an orphan asylum. Fifteen years later, the son, Steve Hill, becomes a brakeman in the yard where his father was killed. He is of careless habits and is shown on the screen taking the usual risks, such as kicking a drawbar with his foot and jumping on the front of a moving yard engine. For this conduct he is reproved by the yardmaster, Jack Warren. The "human interest" of the story comes in when "Steve" meets Mary, the yardmaster's daughter, and courts her. The father's consent to marriage is withheld because of Steve's careless habits in his work. Steve, nevertheless, does not take the lesson to heart, and a short time after, disregarding a blue flag, he causes a slight collision on a repair track, and knocks a car body off its supporting horses, thereby causing serious injury to a car repairer. He is then discharged, at once; and is also repudiated by Mary. Going home in a disconsolate mood, he throws himself on his bed, falls asleep and has a dream, in which he sees himself taking all sorts of chances. For instance, he crosses the track between two cars and barely escapes being crushed. He is hurled from a side ladder by a car which stands out beyond the fouling point. Walking across a track without looking where he is going, he is almost run over by an engine. Finally, however, he takes one chance too many and loses his leg. He awakes from his dream with a start, overjoyed, to be sure, to find that his leg is not gone; but taught a lesson that makes him begin anew with "Safety First" as his motto. He is reinstated in his job, and marries the girl. The scene then passes to thirty years later showing him and his wife, both gray haired, in their happy home. "Steve" is telling a party of friends that his policy of Safety-First has made him a successful railroad man.

The picture is in two reels, and takes about half an hour to show. It is well done, and is to be classed as better than the average. Mr. Dow says that the Atchison, Topeka & Santa Fe; the Chicago, Burlington & Quincy, and the Delaware, Lackawanna & Western have made arrangements to use the film.

National Association of Railway Commissioners

A call has been issued for the twenty-sixth annual convention of the National Association of Railway Commissioners to begin in Washington, D. C., on November 17, and to continue for four or five days. The program provides for two special addresses, one by Chairman Harlan, of the Interstate Commerce Commission, and one by C. A. Prouty, director of valuation of the commission. The time of the convention will be largely devoted to the presentation and discussion of reports of 19 committees with 9 subcommittees. It is hoped that all the reports will be completed and sent to the secretary for printing and distribution at least 30 days in advance of the meeting. The committees to report include the following: Amendment of Act to Regulate Commerce; Car Service Demurrage; Reciprocal Demurrage; Storage Rules and Charges; Express Service and Express Rates; Grade Crossings and Trespassing on Railroads; Legislation; Powers, Duties and Work of Railway Commissions; Railroad Taxes and Plans for Ascertaining Fair Valuation of Railroad Property; Rates and Rate-Making; Railway Capitalization; Railway Service and Railway Accommodations; Safety Appliances; Statistics and Accounts; Shippers' Claims; Statistics and Accounts of Electric Railways; Telephone and Telegraph Rates and Service; Uniform Classification and Simplification of Tariffs; Rails and Equipment, and Physical Valuation.

Master Mechanics' and Master Car Builders' Associations

The executive committees of the American Railway Master Mechanics' Association, the Master Car Builders' Association and the Railway Supply Manufacturers' Association will hold a meeting at the Hotel Biltmore, New York, at 10 a. m. on October 22. It is very urgent that all members of these committees attend because the place for the 1915 meeting will be decided and arrangements made in relation thereto.

MEETINGS AND CONVENTIONS

The following list gives names of secretaries, dates of next or regular meetings, and places of meeting.

Air Brake Association.—F. M. Nellis, 53 State St., Boston, Mass. Next convention, May 4-7, 1915, Hotel Sherman, Chicago.

American Association of Demurrage Officers.—A. G. Thomason, Demurrage Commissioner, Boston, Mass. Annual convention in April.

American Association of Dining Car Superintendents.—H. C. Boardman, D. L. & W., Hoboken, N. J. Next convention, October 22-24, Washington, D. C.

American Association of Freight Agents.—R. O. Wells, Illinois Central, East St. Louis, Ill. Annual meeting, May 21-24, 1915, Richmond, Va.

American Association of General Passenger and Ticket Agents.—W. C. Hope, C. R. R. of N. J., 143 Liberty St., New York.

American Association of Railroad Superintendents.—E. H. Harman, Room 101, Union Station, St. Louis, Mo. Next meeting, May 20-21, 1915, San Francisco, Cal.

American Electric Railway Association.—E. B. Burritt, 29 W. 39th St., New York. Annual convention, October 12-16, Atlantic City, N. J.

American Electric Railway Manufacturers' Association.—H. C. McConnaughy, 165 Broadway, New York. Meetings with American Electric Railway Association.

American Railway Association.—W. F. Allen, 75 Church St., New York. Semi-annual meeting, November 18, Chicago.

American Railway Bridge and Building Association.—C. A. Lichty, C. & N. W., Chicago. Next convention, October 20-22, 1914, Los Angeles, Cal.

American Railway Engineering Association.—E. H. Fritch, 900 S. Michigan Ave., Chicago. Next convention, March 16-18, 1915, Chicago.

American Railway Master Mechanics' Association.—J. W. Taylor, 1112 Karpen Bldg., Chicago. Annual meeting, June, 1915.

American Railway Safety Association.—L. F. Shedd, C. R. I. & P., Chicago. Next meeting, November, Chicago.

American Railway Tool Foremen's Association.—A. R. Davis, Central of Georgia, Macon, Ga. Annual meeting, July, 1915.

American Society for Testing Materials.—Prof. E. Marburg, University of Pennsylvania, Philadelphia, Pa.

American Society of Civil Engineers.—Chas. W. Hunt, 220 W. 57th St., New York. Regular meetings, 1st and 3d Wednesday in month, except June, July and August, 220 W. 57th St., New York.

American Society of Engineering Contractors.—J. R. Wemlinger, 11 Broadway, New York. Regular meetings, 2d Thursday in month, at 2 P. M., 11 Broadway, New York.

American Society of Mechanical Engineers.—Calvin W. Rice, 29 W. 39th St., New York. Annual meeting, December 1-4, 1914, New York.

American Wood Preservers' Association.—F. J. Angier, B. & O., Mt. Royal Sta., Baltimore, Md. Next convention, January 19-21, 1915, Chicago.

Association of American Railway Accounting Officers.—E. R. Woodson, 1300 Pennsylvania Ave., N. W., Washington, D. C. Annual convention, April 28, 1915, Atlanta, Ga.

Association of Manufacturers of Chilled Car Wheels.—George W. Lyndon, 1214 McCormick Bldg., Chicago. Annual meeting, second Tuesday in October, New York.

Association of Railway Claim Agents.—C. W. Egan, B. & O., Baltimore, Md. Annual meeting, 3d week in May, 1915, Galveston, Tex.

Association of Railway Electrical Engineers.—Jos. A. Andreucetti, C. & N. W., Room 411, C. & N. W. Sta., Chicago. Annual convention, October 26-30, 1914, Chicago.

Association of Railway Telegraph Superintendents.—P. W. Drew, Soo Line, 112 West Adams St., Chicago. Annual meeting, June 22-25, 1915, Rochester, N. Y.

Association of Transportation and Car Accounting Officers.—C. P. Conard, 75 Church St., New York. Next meeting, December 8-9, 1914, Richmond, Va.

Bridge and Building Supply Men's Association.—L. D. Mitchell, Detroit Graphite Co., Chicago, Ill. Meetings with American Railway Bridge and Building Association.

Canadian Railway Club.—James Powell, Grand Trunk, P. O. Box 7, St. Lambert (near Montreal), Que. Regular meetings, 2d Tuesday in month, except June, July and August, Windsor Hotel, Montreal, Que.

Canadian Society of Civil Engineers.—Clement H. McLeod, 176 Mansfield St., Montreal, Que. Regular meetings, 1st Thursday in October, November, December, February, March and April. Annual meeting, January, Montreal.

Car Foremen's Association of Chicago.—Aaron Kline, 841 Lawler Ave., Chicago. Regular meetings, 2d Monday in month, except July and August, Lytton Bldg., Chicago.

Central Railway Club.—H. D. Vought, 95 Liberty St., New York. Regular meetings, 2d Friday in January, May, September and November. Annual meetings, 2d Thursday in March, Hotel Statler, Buffalo, N. Y.

Engineers' Society of Western Pennsylvania.—Elmer K. Hiles, 2511 Oliver Bldg., Pittsburgh, Pa. Regular meetings, 1st and 3d Tuesday, Pittsburgh.

Freight Claim Association.—Warren P. Taylor, R. F. & P., Richmond, Va. Annual meeting, June 16, 1915, Chicago.

General Superintendents' Association of Chicago.—A. M. Hunter, 321 Grand Central Station, Chicago. Regular meetings, Wednesday preceding 3d Thursday in month, Room 1856, Transportation Bldg., Chicago.

International Railway Congress.—Executive Committee, 11, Rue de Louvain, Brussels, Belgium. Next convention, June 23 to July 6, 1915, Berlin.

International Railway Fuel Association.—C. G. Hall, C. & E. I., 922 McCormick Bldg., Chicago. Annual meeting, May 17-20, 1915, Chicago.

International Railway General Foremen's Association.—Wm. Hall, 829 W. Broadway, Winona, Minn. Next convention, July 14-17, 1915, Sherman House, Chicago.

International Railroad Master Blacksmiths' Association.—A. L. Woodworth, C. H. & D., Lima, Ohio.

Maintenance of Way and Master Painters' Association of the United States and Canada.—T. I. Goodwin, C. R. I. & P., Eldon, Mo. Next convention, November 17-19, 1914, Detroit, Mich.

Master Boiler Makers' Association.—Harry D. Vought, 95 Liberty St., New York. Annual convention, May, 1915.

Master Car and Locomotive Painters' Association of the United States and Canada.—A. P. Dane, B. & M., Reading, Mass.

Master Car Builders' Association.—J. W. Taylor, 1112 Karpen Bldg., Chicago. Annual meeting, June, 1915.

National Railway Appliances Association.—Bruce V. Crandall, 537 So. Dearborn St., Chicago. Next convention, March 15-19, 1915, Chicago.

New England Railroad Club.—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass. Regular meetings, 2d Tuesday in month, except June, July, August and September, Boston.

New York Railroad Club.—Harry D. Vought, 95 Liberty St., New York. Regular meetings, 3d Friday in month, except June, July and August, 29 W. 39th St., New York.

Niagara Frontier Car Men's Association.—E. Frankenberger, 623 Brisbane Bldg., Buffalo, N. Y. Meetings monthly.

Peoria Association of Railroad Officers.—M. W. Rotchford, Union Station, Peoria, Ill. Regular meetings, 2d Thursday in month, Jefferson Hotel, Peoria.

Railroad Club of Kansas City.—C. Manlove, 1008 Walnut St., Kansas City, Mo. Regular meetings, 3d Friday in month, Kansas City.

Railroad Master Tinners, Coppersmiths and Pipefitters' Association.—U. G. Thompson, C. & E. I., Danville, Ill. Annual meeting, May, 1915.

Railway Business Association.—Frank W. Noxon, 30 Church St., New York. Annual meeting, December 10, 1914, Waldorf-Astoria Hotel, New York.

Railway Club of Pittsburgh.—J. B. Anderson, Room 207, P. R. R. Sta., Pittsburgh, Pa. Regular meetings, 4th Friday in month, except June, July and August, Monongahela House, Pittsburgh.

Railway Electrical Supply Manufacturers' Association.—J. Scribner, 1021 Monadnock Block, Chicago. Meetings with Association of Railway Electrical Engineers.

Railway Fire Protection Association.—C. B. Edwards, Fire Ins. Agt., Mobile & Ohio, Mobile, Ala.

Railway Signal Association.—C. C. Rosenberg, Times Bldg., Bethlehem, Pa.

Railway Storekeepers' Association.—J. P. Murphy, L. S. & M. S., Box C, Collinwood, Ohio. Annual meeting, May, 1915.

Railway Supply Manufacturers' Association.—J. D. Conway, 2136 Oliver Bldg., Pittsburgh, Pa. Meetings with Master Car Builders and Master Mechanics Associations.

Railway Telegraph and Telephone Appliance Association.—G. A. Nelson, 50 Church St., New York. Meetings with Association of Railway Telegraph Superintendents.

Richmond Railroad Club.—F. O. Robinson, C. & O., Richmond, Va. Regular meetings, 2d Monday in month, except June, July and August.

Roadmasters' and Maintenance of Way Association.—L. C. Ryan, C. & N. W., Sterling, Ill.

St. Louis Railway Club.—B. W. Frauenthal, Union Station, St. Louis, Mo. Regular meetings, 2d Friday in month, except June, July and August, St. Louis.

Salt Lake City Transportation Club.—R. E. Rowland, Hotel Utah Bldg., Salt Lake City, Utah. Regular meetings, 1st Saturday of each month, Salt Lake City.

Signal Appliance Association.—F. W. Edmunds, 3868 Park Ave., New York. Meeting with annual convention Railway Signal Association.

Society of Railway Financial Officers.—Carl Nyquist, C. R. I. & P., La Salle St. Sta., Chicago.

Southern Association of Car Service Officers.—E. W. Sandwich, A. & W. P. Ry., Atlanta, Ga.

Southern and Southwestern Railway Club.—A. J. Merrill, Grant Bldg., Atlanta, Ga. Regular meetings, 3d Thursday, January, March, May, July, September, November, 10 A. M., Candler Bldg., Atlanta.

Toledo Transportation Club.—Harry S. Fox, Toledo, Ohio. Regular meetings, 1st Saturday in month, Boody House, Toledo.

Track Supply Association.—W. C. Kidd, Ramapo Iron Works, Hillburn, N. Y. Meetings with Roadmasters' and Maintenance of Way Association.

Traffic Club of Chicago.—W. H. Wharton, La Salle Hotel, Chicago.

Traffic Club of New York.—C. A. Swope, 291 Broadway, New York. Regular meetings, last Tuesday in month, except June, July and August, Waldorf-Astoria, New York.

Traffic Club of Pittsburgh.—D. L. Wells, Erie R. R., Pittsburgh, Pa. Meetings bimonthly, Pittsburgh. Annual meeting, 2d Monday in June.

Traffic Club of St. Louis.—A. F. Versen, Mercantile Library Bldg., St. Louis, Mo. Annual meeting in November. Noonday meetings October to May.

Train Despatchers' Association of America.—J. F. Mackie, 7122 Stewart Ave., Chicago. Annual meeting June 15, 1915, Minneapolis, Minn.

Transportation Club of Detroit.—W. R. Hurley, Superintendent's office, L. S. & M. S., Detroit, Mich. Meetings monthly, Normandie Hotel, Detroit.

Traveling Engineers' Association.—W. O. Thompson, N. Y. C. & H. R., East Buffalo, N. Y.

Western Canada Railway Club.—W. H. Rosevear, P. O. Box 1707, Winnipeg, Man. Regular meetings, 2d Monday, except June, July and August, Winnipeg.

Western Railway Club.—J. W. Taylor, 1112 Karpen Bldg., Chicago. Regular meetings, 3d Tuesday in month, except June, July and August, Karpen Bldg., Chicago.

Western Society of Engineers.—J. H. Warder, 1735 Monadnock Block, Chicago. Regular meetings, 1st Monday in month, except January, July and August, Chicago. Extra meetings, except in July and August, generally on other Monday evenings.

Traffic News

The Canadian railways generally have made a rate of one fare for the round trip on the certificate plan to Calgary from all Canadian points for the International Irrigation Congress, which opened its sessions there on October 5.

The Southern Railway has applied to the Corporation Commission of North Carolina for authority to temporarily suspend the operation of a number of passenger trains, including the second sections of Nos. 37 and 38 on the main line; Nos. 15 and 16 on the Danville division and 145 and 146 on the Durham & Raleigh division. This request is made because of a falling off, in both passenger and freight business, on account of conditions due to the war in Europe.

The increase in the price of mileage tickets on the first of October led to very large sales, at many places, on the last day of September, of tickets at the old rate of two cents a mile. At Pittsburgh, Pa., one large corporation bought 1,500 books paying $30,000. At Winchester, Va., one man bought $10,000 worth. The receipts of the Boston & Maine for September were $400,000 above those of last year, and it is to the extra sales of mileage tickets that the increase is principally attributed. The Public Utility Commissioners of New Jersey on September 30 decided not to suspend the new tariffs filed by the railroads in that state advancing the price of mileage tickets.

A conference of the chief traffic officers of the St. Louis railways was held on September 28, at St. Louis, to consider the controversy that has arisen over the payment of the bridge tolls on through traffic crossing the Mississippi river. For many years all traffic between eastern and western roads had been interchanged at the east bank of the river. In 1906 a municipal commission prevailed on the eastern roads to make rates from St. Louis the same as those from East St. Louis. The western roads now demand that the eastern roads take the freight at St. Louis instead of at East St. Louis; by which action they would have to absorb the bridge toll. At the meeting the eastern roads unanimously declined to do so and no adjustment was reached.

A conference which had been called for last week between industrial traffic managers of Cleveland, Cincinnati, Columbus, Toledo, Dayton, Springfield and other Ohio cities, with the traffic officers of the Ohio railroads before the Ohio Public Utilities Commission to discuss the 5 per cent advance in freight rates in Central Freight Association territory recently allowed by the Interstate Commerce Commission, has been postponed because of the decision of the commission to reopen the case. Many representatives of the Ohio shippers had opposed the application of the 5 per cent advance to the Ohio intrastate rates and complained that the decision of the Interstate Commerce Commission constitutes a discrimination against shippers in Central Freight Association territory as compared with those outside of that territory.

The traffic department of the Chicago & North Western, in cooperation with the Upper Peninsula Development Bureau, has aided greatly in the development of the potato growing industry in the Cloverland district of Michigan during the past year. The railway paid all the expenses in establishing five potato patches, consisting of 1,000 hills in each patch, on its right of way in Menominee county, Delta county and Marquette county. This ground was prepared, cultivated and plowed by the section men at the respective stations. The seed was purchased by the railway and a liberal amount of commercial fertilizer was purchased and applied. The care and culture of the potatoes have been under the supervision of the roadmaster, and the service has been rendered by the section men. Each patch has been located on a different variety of soil, and the crops at all five stations have far exceeded many of the adjacent potato fields that have not been benefited by the same amount of cultivation and care. The object, of course, was to prove to the farmers residing in each locality that their efforts would be crowned with greater success if they would adopt more careful methods.

Commission and Court News

INTERSTATE COMMERCE COMMISSION

The Interstate Commerce Commission has suspended tariffs filed by the Union Pacific closing the Ogden gateway after October 1, to through traffic from eastern points via the Gould lines to certain points on the Union Pacific system in Idaho and other northern territory.

Examiner Thurtell began a hearing at Chicago on October 6 on the application of the transcontinental railways for a modification of the commission's order in the intermountain rate case as to 107 commodities, which are especially subject to water competition at the Pacific coast and as to which the roads desire to make low rates to the coast without making corresponding reductions to intermediate points.

The chambers of commerce of Alexandria and Shreveport, La., have filed a complaint with the Interstate Commerce Commission against the Alabama & Vicksburg, and other carriers participating in traffic to Shreveport, attacking the class rates from St. Louis, Memphis and Kansas City to Alexandria and Shreveport, which were advanced on April 1 from one to five cents per hundred pounds on the first six classes. The complaint is that the through rates from the gateways mentioned are in many instances higher than the combination of intermediate rates.

The Sioux City Commercial Club has filed a complaint with the Interstate Commerce Commission which raises questions similar to those recently decided by the Supreme Court and the Interstate Commerce Commission in the Shreveport rate case. The Sioux City club complains against new rates included in a general reduction of about 20 per cent in the state rates of Nebraska, which became effective on September 6, under order of the Nebraska Railroad Commission, on the ground that the new rates in Nebraska are lower than rates charged for like distances from Sioux City to points in Nebraska, and that this constitutes a discrimination against Sioux City merchants in favor of those in Lincoln, Omaha, Fremont, Norfolk and other jobbing centers; and that Sioux City firms cannot compete with them in north Nebraska territory, except by sacrificing a part of their profits to overcome the disparity in rates. The commission is asked to issue an order requiring the railroad defendants to cease the alleged discriminations and to publish and maintain rates, rules and specifications which will be fair to Sioux City. This will give the roads a chance to plead before the Interstate Commerce Commission that they have reduced their rates within Nebraska under compulsion by the state commission.

Rates on Starch from Cedar Rapids, Ia.

Douglas & Co. v. Illinois Central et al. Opinion by Commissioner Harlan:

The commission is of the opinion that corn starch is not to be deemed a like kind of traffic with corn meal, hominy, grits, brewers' grits, corn flour and other uncooked product of corn. It therefore holds that the railroads in refusing transit privileges on that commodity at Cedar Rapids, Iowa, do not discriminate against the complainant. It is held, however, that certain of the rates on corn starch from Cedar Rapids are unreasonable. It is therefore ordered that the rates to St. Paul and Duluth be not in excess of 17½ cents; to St. Louis, 10½ cents; to Texas common points, 66 cents, and that the all rail rates to Galveston and Houston, Tex., be not in excess of the all rail rates contemporaneously maintained from Keokuk.

The present rates to destinations in Kansas and Oklahoma, to points in Arizona and New Mexico and to California terminals and North Pacific coast destinations are not found unreasonable. It is also found that the rates from Cedar Rapids and Ohio river crossings to southeastern and Mississippi valley destinations are not unreasonable nor discriminatory.

The commission also finds that the rates on corn oil from Cedar Rapids to Chicago, Peoria, St. Louis, St. Paul and Winona are unreasonable, and it is ordered that these rates be not in excess of 11, 9½, 12, 17 and 17 cents respectively. No change is ordered in the rates to Omaha and Kansas City.

The complainant will be awarded reparation on past shipments of starch and corn oil. (31 I. C. C., 587.)

STATE COMMISSIONS

The Missouri Public Service Commission on Tuesday of this week refused to grant the petition of the railroads for permission to increase intrastate passenger rates to three cents a mile and freight rates by various percentages.

The Boston & Maine has filed with the Massachusetts Public Service Commission tariffs, to become effective November 1, making increases in the rates of fare on many classes of commutation tickets. The Public Service Commission will hold a hearing October 13, at which remonstrances will be heard.

The Montana Railroad Commission has given permission to the railroads of the state to increase the demurrage rate on refrigerator cars loaded with perishable freight to two dollars a day for the first two days after the expiration of free time and three dollars daily thereafter, effective on November 15.

The Michigan Railroad Commission has issued an order permitting the railroads of the state to make a 5 per cent advance in commodity rates, with exception of plaster, ore, iron, starch, coke, clay, tile, cement, brick and sugar beets. An increase is also allowed in lumber rates, but less than the railroads had asked. The commission withheld its decision on class rates.

The Illinois Public Utilities Commission has issued a notice to all railways in the state that at a hearing in Chicago on October 12, it will take up and consider the matter of industrial switching at all points within the state. The commission will hear all facts and statements that may be presented pertaining to the subject, and will adopt a rule to be used in lieu of canceled rule No. 23 of the Illinois Railroad and Warehouse Commission to govern the rates, rules and regulations pertaining to industrial switch movements within the state.

The four principal railways of Massachusetts have asked for approval of an increase in mileage ticket rates from 2 cents a mile to 2¼ cents. At a public hearing before the Public Service Commission in Boston on Monday they said that under the present conditions they were unable to meet expenses. The petitioners were the Boston & Maine, the Boston & Albany, the New York, New Haven & Hartford, and the Central Vermont. William J. Hobbs, vice-president of the Boston & Maine, testified that in the year ended June 30, 1914, his road showed a corporate loss of $2,014,742; and that during July and August of this year the company ran $46,022 short of the amount needed to pay charges.

The California Railroad Commission has denied the application of the railways of the state for permission to increase the present rates to passengers occupying drawing rooms and compartments. The railways contended that when a single person occupied such accommodations he received an additional service and should be required to pay an additional fare. The commission holds that passengers occupying accommodations mentioned do receive an additional service, but that such service is paid for in the cost of Pullman tickets, and that if the carriers do not receive additional compensation their contract with the Pullman Company is at fault, and that the passengers should not be required to pay in addition to the increased cost of Pullman tickets the increased fares applied for.

The Boston & Maine Railroad has notified the New Hampshire Public Service Commission that it will not accept the tariff of freight rates framed by the commission, which has been on trial by the railroad. By the terms of the act of the legislature of 1913 the Public Service Commission was to frame such a tariff, the railroad was to try its operation until October 1, and then either accept it or return to the rates in force prior to the consolidations of roads in 1883 and 1889. The determination of the railroad to return to the old rates is based upon the decision of the Supreme Court in the case of Clough and Martin against the railroad whereby the road is allowed to fix such rates upon any commodity as in the aggregate shall not be higher than the aggregate of rates charged upon that commodity prior to the consolidations.

Railway Officers

Executive, Financial, Legal and Accounting

John Leslie, assistant controller of the Canadian Pacific at Montreal, Que., has been appointed controller, with headquarters at Montreal.

T. J. Kennedy has been elected president and general manager of the Algoma Central & Hudson Bay and the Algoma Eastern, with headquarters at Sault Ste. Marie, Ont.

J. B. Wagner, acting auditor of the Toledo & Ohio Central, has been appointed auditor of the company, with headquarters at Toledo, Ohio, succeeding John Landgraff, Jr., deceased.

Herbert L. Utter, who has been elected secretary and treasurer of the Missouri Pacific, with headquarters at New York, as has been announced in these columns was born on May 1, 1868, at Morrisville, N. Y. He was a student at Wayland Academy, Beaverdam, Wis., until 1886, and later was graduated from the Canandaigua (N. Y.) High School, and from Eastman's Business College, Poughkeepsie, N. Y. On April 4, 1891, Mr. Utter entered the service of the Missouri Pacific, and has been in the continuous service of that road ever since. In 1908 he was appointed assistant secretary, and in 1911 was promoted to assistant secretary and assistant treasurer, which position he held at the time of his recent election as secretary and treasurer of the same road as above noted.

H. L. Utter

Edward J. White, whose appointment as general solicitor of the Missouri Pacific and the St. Louis, Iron Mountain & Southern has already been announced in these columns, was born February 11, 1869, at St. Louis, Mo. He attended public school at Springfield, Mo., and Joplin later; from 1883 to 1885, was a student at the University of Arkansas, Fayetteville, Ark., and in 1888 entered the University of Missouri at Columbia, Mo., graduating in 1891. He was admitted to the bar that year and commenced the practice of law at Aurora, Mo. He entered railway service in 1903 as assistant attorney for the Missouri Pacific, with jurisdiction over counties in southwestern Missouri, retaining his headquarters at Aurora. In April, 1911, he was appointed general attorney, with office at Kansas City, with jurisdiction over Jackson county, Missouri. Mr. White held the latter position at the time of his recent promotion to general solicitor, with headquarters at St. Louis, as above noted.

E. J. White

A. D. Lightner, chief officer, operating and traffic, of the New Orleans, Texas & Mexico, and the Louisiana Southern, has been appointed general manager for the receiver, having jurisdiction over all departments, with headquarters at New Orleans, La.

B. I. Spock, counsel of the New York, New Haven & Hartford for Connecticut, has been appointed general solicitor of the company, with headquarters at New Haven, Conn. Mr. Spock was born on December 31, 1872, at New Haven, and was graduated from Yale University, academic department in 1895, and from Yale Law School in 1897. He entered the service of the New York, New Haven & Hartford on September 1, 1903, as claims attorney for New York, Connecticut and western Massachusetts, with headquarters at New Haven. He subsequently served successively as assistant attorney and attorney, and at the time of his recent appointment was counsel for the state of Connecticut for the same road, as above noted.

John A. D. Vickers, whose election as vice-president and general manager of the American Express Company, with headquarters at Chicago, has already been announced in these columns, was born May 22, 1858, at Toronto, Ont. He entered the express business in Canada under his father, who was the founder of Vickers' Express Company, and became superintendent of the company in 1882. Upon the absorption of Vickers' Express Company by the American Express Company in 1889, Mr. Vickers was appointed superintendent of the Canada division of the latter company. In 1891 he was made superintendent of the National Express Company's lines in the West, with headquarters at Chicago. Later he was promoted to general superintendent and subsequently became general manager of the Western department. Upon the recent election of Mr. George C. Taylor as president of the American Express Company, Mr. Vickers was made acting vice-president and general manager of the Western lines, and on September 28 he was elected to that office, as above noted.

J. A. D. Vickers

Operating

D. Dale has been appointed superintendent of the Bevier & Southern, with headquarters at Bevier, Mo. This road has taken over the operation of the Missouri & Louisiana.

Joseph H. Butler, assistant to the general manager of the National Express Company, has been appointed superintendent, Western department, with headquarters at Chicago.

O. E. Linn, trainmaster of the Michigan division of the Vandalia at Logansport, Ind., has been transferred to Decatur, Ill., as trainmaster and road foreman of engines of the Peoria division.

D. B. Lantry, superintendent of the Superior division of the Great Northern at Superior, Wis., has been transferred to Sioux City, Iowa, as superintendent of the Sioux City division, succeeding W. D. Mason, who has been appointed trainmaster at Willmar, Minn. The Superior and Mesaba divisions have been combined and G. E. Votaw, superintendent of the Mesaba division at Superior, Wis., will have charge of the consolidated division.

M. J. Foley, assistant division superintendent of the Chicago, Burlington & Quincy at Greybull, Wyo., has been appointed superintendent of the Casper division, with headquarters at

Casper, Wyo., effective October 1. This is a new division comprising the line between Billings, Mont., and Orin Junction, Wyo., including the Cody branch; and commencing October 18 the track between Orin Junction and Hartville Junction will be leased from the Colorado & Southern and operated and maintained by the Casper division.

B. C. Byers, superintendent of the Cairo division of the Cleveland, Cincinnati, Chicago & St. Louis, has been appointed superintendent of terminals at Indianapolis, Ind. E. H. Zeigler, trainmaster at Terre Haute, Ind., succeeds Mr. Byers at Mt. Carmel, Ill., as division superintendent, and F. Jones succeeds Mr. Zeigler. The headquarters of J. V. Kennedy, division superintendent, have been removed from Cleveland, Ohio, to Bellefontaine. P. T. White, trainmaster at Cleveland, has been appointed superintendent of Cleveland terminals also.

A. M. Acheson, chief engineer of the Missouri, Kansas & Texas at Dallas, Tex., has been appointed superintendent of the Trinity district, with headquarters at Trinity, Tex., to succeed W. P. Danforth, assigned to other duties, and the former office is abolished. C. A. Thanheiser, engineer maintenance of way at Dallas, has been appointed superintendent of the Smithville district, with office at Smithville, Tex., succeeding J. F. Hickey, who has been appointed superintendent of the McAlester district, with headquarters at Muskogee, Okla., in place of F. Ringer, transferred. (See Engineering and Rolling Stock.)

Traffic

E. E. Wieland has been appointed general agent of the Chicago & Eastern Illinois at Evansville, Ind., succeeding F. P. Jeffries, retired.

J. M. Ball, general cotton agent of the International & Great Northern, has been appointed assistant general freight agent, with headquarters at Houston, Tex.

C. E. Bode has been appointed general freight agent, and W. P. Potter, general passenger agent, of the Illinois Traction system, both with headquarters at Springfield, Ill. The position of traffic manager is abolished.

C. W. Westbury, assistant general agent of the traffic department of the Southern Railway at Washington, D. C., has been promoted to general agent, with office at Washington, succeeding L. S. Brown, deceased.

S. MacClurkan, district freight agent of the Chicago, Milwaukee & St. Paul at Chicago, has been transferred to Milwaukee, Wis., as commercial agent, succeeding A. A. Wilson, who has been appointed division freight and passenger agent at Davenport, Iowa.

Engineering and Rolling Stock

C. H. Blackman has been appointed principal assistant engineer of the Louisville & Nashville, with headquarters at Louisville, Ky., succeeding J. Werness, deceased.

William R. McMunn has been appointed general car inspector of the New York Central & Hudson River, with headquarters at Albany, N. Y., succeeding F. W. Chaffee, deceased.

Paul A. G. Tilmot, assistant roadmaster of the Northern Pacific at Tacoma, Wash., has been appointed roadmaster of the South Bend and Grays Harbor branches, with headquarters at Tacoma.

J. H. Wood has been appointed supervisor of locomotive operation of the Oklahoma and Panhandle divisions of the Rock Island, with headquarters at El Reno, Okla., succeeding C. S. Yeaton, transferred.

W. S. Johns, Jr., supervisor of the Pennsylvania Railroad at East Brady, Pa., has been appointed supervisor of division No. 21, with office at Tyrone, succeeding J. D. Lovell, transferred, and N. A. Camera, assistant supervisor at Mifflin, has been appointed supervisor of division No. 34, with office at Irvona, succeeding H. S. Trimble, transferred.

L. F. Lonnbladh, engineer maintenance of way of the Missouri, Kansas & Texas at Parsons, Kan., has been appointed engineer maintenance of way of the Texas lines, with headquarters at Dallas, Tex., succeeding C. A. Thanheiser, assigned to other duties. F. Ringer, division superintendent at Muskogee, Okla., succeeds Mr. Lonnbladh at Parsons. The office of chief engineer at Dallas is abolished. (See Operating Officers.)

Harold Knight, division engineer of the Erie at Jersey City, N. J., has been appointed signal engineer, with headquarters at Jersey City, succeeding W. H. Willis, resigned. O. F. Barnes, trainmaster of the Delaware and Jefferson divisions at Susquehanna, Pa., has been appointed division engineer of the New York division, with office at Jersey City, succeeding Mr. Knight; J. W. Foote, division engineer of the Allegheny and Bradford divisions at Salamanca, N. Y., has been appointed trainmaster, with office at Susquehanna, Pa., succeeding Mr. Barnes; Arthur B. Caldwell, division engineer of the New York, Susquehanna & Western at Jersey City, N. J., succeeds Mr. Foote, and Ransom L. Dyke, assistant engineer of the Erie at Hornell, N. Y., succeeds Mr. Caldwell.

Purchasing

O. C. Wakefield, supply agent of the Northern Pacific at St. Paul, Minn., has been appointed general storekeeper, in charge of materials and supplies, with headquarters at St. Paul. S. H. Robson, supply agent at South Tacoma, Wash., has been appointed assistant general storekeeper at that place. The titles of supply agent are abolished.

OBITUARY

J. P. McCuen, formerly superintendent of motive power of the Queen & Crescent Route, died at his home in Avondale, Cincinnati, O., on October 2, aged 70 years. He was connected with the mechanical department of that system for 30 years, retiring about three years ago.

William Stewart, formerly from 1892 to 1897 freight traffic manager of the Pennsylvania Lines West of Pittsburgh, at Pittsburgh, Pa., died on October 3. He was born in July, 1833, in Ireland, and began railway work in May, 1852, as a clerk in the freight and passenger office of the Cleveland & Pittsburg at Pittsburgh, and his entire service was with that and other lines now included in the Pennsylvania Lines West of Pittsburgh. From 1858 to 1864 he was agent of the same road and the Pittsburg, Columbus & Cincinnati; he was then for four years general freight agent of the Pittsburg & Cleveland, and during the following three years was superintendent and general freight agent of the same road. From 1871 to 1892 he was general freight agent of the Pennsylvania Company and the Pittsburg, Cincinnati & St. Louis, and then to April, 1897, was freight traffic manager of the Pennsylvania Lines West of Pittsburgh.

Marshall E. Johns, superintendent of terminals of the New York, Susquehanna & Western and the Wilkesbarre & Eastern, with office at Jersey City, N. J., died on September 30, at his home in Paterson, N. J. He was born on April 17, 1860, at Washington, D. C., and was educated in the public schools of New York City. He began railway work in July, 1876, as a brakeman, and was later train baggage master and conductor on the Montclair & Greenwood Lake, now a part of the Erie. In July, 1880, he went to the New Jersey Midland, now the New York, Susquehanna & Western, as brakeman, and was then consecutively to September, 1894, freight conductor, passenger conductor and yardmaster. During the following ten years he was trainmaster on the Wilkesbarre & Eastern. In September, 1904, he was appointed superintendent of the New York, Susquehanna & Western and the Wilkesbarre & Eastern, which form a part of the Erie system, and on January 1, 1914, was appointed superintendent of terminals of the same roads.

New Line in German South-West Africa.—An English consular report for 1913 states that a railway was constructed in German South-West Africa, from Kolmans Kuppe to Bogenfels, a distance of 66 miles, during the year. It runs through diamondiferous country practically all the way, and will facilitate the exploitation of the Deutsche Diamant Gesellschaft claims, as well as many which it passes en route. The Pomona mine is traversed by the line. The report also states that the locomotives employed on the line will be driven by electricity generated on the engines with benzol as fuel.

Equipment and Supplies

LOCOMOTIVE BUILDING

The Pilsen Lumber Company, Chicago, is in the market for one 50-ton locomotive.

CAR BUILDING

The Illinois Central has ordered 4 gas-electric cars from the General Electric Company.

SIGNALING

The Union Switch & Signal Company has taken an order for the material for a mechanical interlocking plant at Dollar Bay, Mich., on the Copper-Range Railroad.

The Chicago, South Bend & Northern Indiana electric line has contracted with the Union Switch & Signal Company for A.C. automatic block signals, to be put up on its lines in Northern Indiana, 64 signals in all. They will be Style "B," upper left hand quadrant semaphores, operating in two positions between 0 deg. and 45 deg. The signals will be controlled by continuous A.C. track circuits, and the materials and construction will be similar to the installation already in service on that road, recently installed by the Union company.

Railway Construction in South Africa.—A bill has recently been passed providing for the construction of a light railway in the Cape Colony from Prieska to Upington, a distance of about 150 miles. The line, which is intended primarily for the transportation of produce and other freight, will be of 3 ft. 6 in. gage, and its estimated cost is $1,687,500.

The Ways of Train Thieves in India.—The following remarkable story is being told by Indian papers: At the instance of the commissioner in Sind, a practical demonstration of the methods of expert train thieves was arranged for by the superintendent of the North-Western state railway police, for the purpose of illustrating to the traffic officers of the railway the ease with which closed "wagons" could be opened and despoiled of their contents while a train was in motion. Three expert thieves were stationed on the line about 100 yards from the spectators. A train consisting of an engine and about a dozen open "trucks" and closed "wagons" was then run into the city station yard at a speed of from 15 to 20 miles an hour. Before the train had proceeded 100 yards from the point where the thieves were stationed three closed "wagons" had been boarded and entered. Three closed "wagons" without any kind of foothold were then selected for trial. The train steamed in at the same speed as before and the above-mentioned performance was repeated with amazing ease.

English Railways and Recruiting.—The toll placed upon the English railway company, first by the loss of those who were enrolled in the territorials who had to take up arms at mobilization and second, by the loss of those who have since enlisted has been very heavy. As the London & North Western turned in 4,736 of the former and the Great Western 6,000, it has been estimated that over 50,000 railway men must have left the service when war was declared, and yet these figures are independent of those that have since enlisted in large numbers. As there are only about 650,000 men in the British railway service, such a withdrawal, even if the number be less than is estimated, would be inconvenient to the railway administration, especially as it has adopted the motto of "Business as Usual," and it might even seriously affect the military traffic. It is said, therefore, that some companies have tried to prevent wholesale enlistment. One of the Scottish railways was so depleted of its staff that representation had to be made to the government and a body of men who had enlisted sent back.

Supply Trade News

The name of the Canton Culvert Company, Canton, O., has been changed to the Canton Culvert & Silo Company.

W. E. Jenkinson, formerly western railroad representative of S. F. Bowser & Co., Fort Wayne, Ind., has resigned from that position, effective September 30.

Charles M. Schwab, president of the Bethlehem Steel Company, has resigned as a director of the American Locomotive Company. Andrew Fletcher has been elected a director to succeed him.

Jesse C. Bader has been placed in charge of the western sales branch of the McMyler Interstate Company, Cleveland, Ohio, with offices at 1503 Fisher building, Chicago, effective September 15.

T. B. Van Dorn, first vice-president of the Van Dorn Iron Works Company, Cleveland, Ohio, has been elected president of the company, succeeding his father, J. H. Van Dorn, who died recently.

W. T. Kyle has joined the sales force of The Okonite Company at their general office, 253 Broadway, New York. Mr. Kyle for the past six years has been connected with the Duplex Metals Company, Chester, Pa., as district sales manager.

F. N. Rumbley and J. W. Stjernstedt, of the Western Engineering Sales Company, Rialto building, San Francisco, Cal., have been appointed representatives of the Track Specialties Company, New York, in that city and vicinity. E. C. Gaumitz, of the Washington-Alaska Purchasing Bureau, Mutual Life building, Seattle, Wash., will represent the Track Specialties Company in that territory.

Charles W. Allen, formerly vice-president and sales manager of the Reading Specialty Company, and manager of the railway department of the Reading-Bayonne Steel Casting Company, Reading, Pa., has become connected with the Q & C Company, New York, effective October 1. Although Mr. Allen's office will be at 90 West street, New York, he will continue to reside as at present in Reading. A sketch of Mr. Allen's life and a photograph were published in the *Railway Age Gazette* of December 12, 1913, p. 1146.

National Railway Appliances Association.

The National Railway Appliances Association has issued a bulletin on the exposition to be held at the Coliseum and First Regiment Armory at Chicago on March 15 to 19, 1915, in connection with the sixteenth annual convention of the American Railway Engineering Association. The bulletin states that applications for space at this time are the same as last year. An increase of space has been asked for by some firms, and there seems to be no question in the minds of the past exhibitors as to the advisability of exhibiting in the coming year.

Westinghouse Air Brake Company

The Westinghouse Air Brake Company in the fiscal year ended July 31, 1914, had net earnings of but $3,482,994, a decrease of $2,851,785 from the $6,064,779 of 1913. The company's plants are now valued at $6,069,862. This amount has been increased from last year's total of $5,048,776, partly because of new construction and equipment and partly because of adjustments amounting to $550,165 made as a result of recent appraisals and inventories. The company, which formerly charged off depreciation on the basis of net earnings has now created a special reserve for contemplated extensions and betterments, and plans in the future to charge off depreciation at a predetermined rate as a part of the cost of production. This reserve, now amounting to $1,850,165, includes also a former reserve to cover inventory adjustments and will be held to provide for renewals, replacements, for adjustment of inventories and for extraordinary losses by fire, etc.

The company on July 31, 1914, had total assets of $30,145,827.

This amount includes the item of $6,069,862 for factories, already mentioned; real estate other than for factories of $1,870,000; patents and good will valued at $2,785,896 and investments in subsidiary companies of $8,126,329. The cash on hand as compared with that on July 31, 1913, had decreased from $4,050,495 to $4,479,096, and the accounts and bills receivable from $4,865,762 to $3,132,723. Inventories, however, had increased from $4,307,505 to $5,625,024. The company's capital stock on the same date was $17,638,467; there are no bonds outstanding. The accounts payable, amounting to $942,490 in 1913 were but $427,377. The liabilities also included the reserve of $1,850,165 above noted; a contingent liability on account of sales of $797,615, a surplus of $5,648,865 and a contingent surplus of $1,750,000 covering the excess of the par value of the capital stock of subsidiary companies over the value shown on the company's books.

The company's pension fund has now been charged off the balance sheet. On July 31 it amounted to $229,779, and $59,961 has been paid from it since its inception in October, 1908.

TRADE PUBLICATIONS

Despatchers' Selector System.—The General Railway Signal Company, Rochester, N. Y., has issued pamphlet 2024, an advance notice of the company's despatchers' selective signaling system.

Overhead Tramrail Equipment.—The Whiting Foundry Equipment Company, Harvey, Ill., has recently issued catalog No. 111, descriptive of the company's line of overhead tramrail equipment.

Ties.—The National Steel Tie Company, Harrisburg, Pa., recently issued a 16-page booklet devoted to illustrations and the description of steel ties. It also contains a brief discussion on steel ties versus wood ties.

Monorail Cranes.—The Sprague Electric Works of the General Electric Company, New York, has issued bulletin No. 48,700 relating to the Sprague Electric monorail crane. The booklet contains descriptions, views and illustrations of the various monorail cranes manufactured by the company. There are also several views of typical installations showing the cranes in actual use.

Snow Flangers.—The Railway Appliance Company, Chicago, has recently issued an elaborate 16-page booklet in which are described and illustrated, various types of improved Ray snow flangers. A change has been made as to the method of operating the flanger. Formerly it was raised and held up in the clear position by means of an operating rod or air pressure, and allowed to fall to the operating position by virtue of its own weight. The new flanger is forced down to the operating position by air pressure, and when air is shut off a spring raises it to the clear position.

Pneumatic Drills and Hoists.—The Ingersoll-Rand Company, New York, has recently issued Forms No. 8,207, 8,013 and 4,033, descriptive respectively of "Little David" Drills for metal and wood flooring, "Little David" Pneumatic Chipping, Calking and Scaling Hammers and the "Little Tugger" Air Hoist for mines, contractors, manufacturing and power plants. Each bulletin contains excellent illustrations of the tool to which it relates. It also contains views showing the method of using the latter, and in each case a few pages are devoted to showing wherein these Ingersoll-Rand tools are best adapted for the work for which they are intended.

Structural Steel, Rails, and Track Accessories.—The 1915 edition of the Lackawanna Steel Company's handbook has just appeared. This is one of the most valuable handbooks for railway men published by steel manufacturers, as in addition to the data on standard structural shapes it contains considerable information on rails, angle bars, track bolts, spikes, etc. It also contains the usual mathematical and structural tables for use in designing and the manufacturer's standard specifications for structural steel, boiler steel, open hearth steel blooms, billets and slabs, concrete reinforcement bars and the standard practice of sampling for check analysis. The book is well printed and bound in flexible leather, the size being that commonly adopted for handbooks which is readily adapted to desk, drafting table or field use. The book is sold at $2 a copy by the Lackawanna Steel Company, Buffalo, N. Y.

Railway Construction

Alabama Roads Electric.—Work will be started soon, it is said, on the electric line from Opelika, Ala., southwest to Auburn, about 10 miles. F. Pace is chief engineer, and W. S. Lounsbury, Opelika, is interested. (April 24, p. 966.)

Atchison, Topeka & Santa Fe.—The report of this company for the year ended June 30, 1914, shows that the Minkler Southern, which was under construction at the close of the previous year, extending from Minkler, Cal., to Exeter, with a branch line connecting with the Visalia branch at Cutler, a total of 40 miles, has been completed to Exeter since the close of the year. The Northwestern Pacific, which is owned jointly with the Southern Pacific Company, is building from Willits, Cal., north to Shively, 105.64 miles, and had completed up to the first of the year 64.47 miles; during the year 29.10 additional miles were completed, leaving only about 12.07 miles still to be constructed, and at the end of the year the grading work on this remaining section was nearing completion. The company has secured 30 acres of land at Oakland, Cal., with extensive water frontage, and is now putting up necessary facilities for the handling of the increasing business. The extension of the Coleman-Lubbock line from Lubbock, Tex., to Texico, N. Mex., was completed during the year, and was opened for traffic on March 1, 1914. The mileage of second track in operation on June 30, 1914, was 974.65 miles, an increase of 76.33 miles as compared with 898.32 miles in operation at the close of the previous year.

Atlanta & St. Andrews Bay.—See St. Andrews Bay Railway & Terminal.

Branchville & Bowman.—See Savannah Western.

Bruce Mines & Algoma.—See Lake Huron & Northern Ontario.

Eastern Maine.—Final location is now being made and construction work is to be started soon, it is said, on the section from Houlton, Maine, south to Bancroft, 32 miles. The company was incorporated in Maine and started survey in 1911, for a line from Bangor northeast to Great Pond, thence north to the head of Nicatous lake and via Carroll, Prentiss, Bancroft and Haynesville to Houlton, 108 miles. G. W. Maxfield, president, Bangor.

Goodyear Logging Company's Line.—We are told that this company is building with its own forces a 5-mile standard gage logging line from West Clallam, Wash., on Clallam bay to timberlands. About two miles of the grading work is finished and another mile is nearing completion. The company expects to begin track laying soon. James Manary, manager, and L. C. Tobias, purchasing agent, Clallam Bay, Wash.

Grand Trunk Pacific.—A contract has been given to Cavicchi & Pagano, Ottawa, Ont., it is said, for constructing a wye track at Cape Rouge, Que., and the completion of the St. Malo line for the National Transcontinental Railway.

Great Northern.—This company has resumed work in Dawson county, Mont., and is laying track on its Newlon branch, from Newlon to Lambert, a distance of 22 miles. It is hoped to complete this work by November 1. No other construction work is contemplated in that territory during the present season.

Lake Huron & Northern Ontario.—A contract for the extension of the old 17-mile line, formerly the Bruce Mines & Algoma, from Bruce Mines, Ont., on Lake Huron, northerly, has been let, it is said, to the Ontario Northern Construction Company. The plans call for a line having a total length of 325 miles. G. P. McCallum, president; H. Appleton, vice-president and general manager, Bruce Mines, Ont.

Monongahela Valley Traction.—A franchise has been granted this company, it is said, to build a branch from Rivesville, W. Va., northeast to Morgantown, 15 miles.

Mountain Central.—Plans are being made, it is said, to build a 12.5 mile line from Campton Junction, Ky., east to Campton. The company has a capital of $25,000, and may use both steam

and electricity as the motive power. The incorporators include F. Day, Winchester, Ky., and E. B. McGlone.

Nashville-Gallatin Interurban.—This company has under consideration the question of building a branch line, it is said, to Springfield, Tenn., from a point on the line now in operation between Nashville and Gallatin, 28 miles.

Rocky Ford & Southwestern.—An officer is quoted as saying that the plans call for building from Rocky Ford, Ga., southwest to Portal, 12 miles, and that a bridge about three-quarters of a mile long will be built over the Ogeechee river. The plans also include putting up two or three stations. H. B. Griffin, president, Rocky Ford, Ga. (September 25, p. 587.)

St. Andrews Bay Railway & Terminal.—An officer writes that work is now under way building from St. Andrews, Fla., to a point on the Atlanta & St. Andrews Bay about one mile north of Panama City. Money has been secured to complete the line, which will be about 3.5 miles long, including a wye. J. M. Willis has the contract for the grading and track laying. There will be about 25,000 cu. yd. of excavation and 15,000 cu. yd. of embankment work. The maximum grades will be 1 per cent. There will be a pile trestle 125 ft. long on the line, and a wharf is to be constructed at St Andrews. J. H. Drummond, St. Andrews, is furnishing most of the funds, and will own personally some of the trackage at the St. Andrews terminal. The main line will be operated by the Atlanta & St. Andrews Bay. A. B. Steele, president, Atlanta, Ga., and E. L. Wood, chief engineer, St. Andrews, Fla. (August 14, p. 310.)

Savannah Western.—This company, which was recently incorporated in South Carolina, to build from Estill, northeast to St. Paul, about 90 miles, has started construction work, it is said, at Bowman. It is understood that the company has an option on the Branchville & Bowman, operating a ten-mile line from Branchville northeast to Bowman, and this road may form part of the through line. The incorporators include G. H. Milligan, Charleston, S. C.; V. Walker and A. M. Rea, Newbern, N. C. (August 28, p. 408.)

RAILWAY STRUCTURES

Clearwater, Fla.—The Atlantic Coast Line has given a contract to E. W. Parker, Tampa, Fla., it is said, for putting up a brick, stone and concrete passenger station, with tile roof and floors, at Clearwater.

Montreal, Que.—The plans for the temporary station to be built by the Canadian Northern on Lagauchetiere street, Montreal, call for a three-story building, 100 ft. by 150 ft., one story to be below the street level. The new station is to be of steel and concrete construction. (July 3, p. 40.)

New York.—The New York Public Service Commission, First district, recently opened bids for the construction of the diagonal station under Forty-second street and the connecting link between the existing subway in Park avenue and the new Lexington avenue subway. The station includes a connection with the Steinway tunnel as well as the Hudson river tube and an entrance to the Grand Central Terminal. The lowest bidder was the Rapid Transit Subway Construction Company, at $3,097,000. (September 18, p. 550.)

Portland, Maine.—Bids are wanted until November 2, by the Cumberland county commissioners at Portland, Maine, for building a bridge connecting Portland and South Portland over Fore river, Portland Terminal Company Railroad and Commercial street. The proposed bridge is to be 3,527 ft. long, and there will be a short connecting viaduct 303 ft. long. It will be of reinforced concrete and structural steel construction, and will carry double tracks for the operation of street railways.

Van Buren, Maine.—The Railway Commission of Canada has approved the location plans for the line of the Van Buren Bridge Company from the terminus of the International Railway of New Brunswick, St. Leonard, N. B., to the international boundary in the middle of the St. John river, one mile. The state of Maine has already approved the location plans for the bridge and approach on the Maine side of the river in Van Buren, and for its connection with the Bangor & Aroostook. R. Payson, president, Portland, Maine. (October 17, 1913, p. 728.)

Railway Financial News

Erie.—The New York Public Service Commission, Second district has authorized the $900,000 4½ per cent equipment trust notes mentioned in these columns last week, and the notes have been taken by Drexel & Company, Philadelphia, at 97. E. H. Gary, chairman of the United States Steel Corporation, has resigned as a director of the Erie.

New York, New Haven & Hartford.—This company has begun a suit to recover $3,900,000 from John L. Billard, a former director; Edward D. Robbins, former general counsel; Samuel C. Morehouse, Charles F. Linsley, Henry Whipple and Samuel Hemmingway.

St. Louis & San Francisco.—An arrangement has been made between the receivers and the protective committee representing the Ozark & Cherokee Central by which the first mortgage 5 per cent bonds of the latter are to be extended at 5 per cent for six months and at 6 per cent for six additional months.

Southern Railway.—E. H. Gary, chairman of the United States Steel Corporation, has resigned as a director of the Southern Railway.

Toledo, Peoria & Western.—This railway, operating 248 miles, in the fiscal year ended June 30, 1914, had a net deficit after the payment of expenses, rentals, taxes and interest of $187,842 as compared with a net income of $37,672 for the year before, the change from net income to net deficit being due to a decrease in freight revenue from $826,586 to $723,351 combined with an increase in operating expenses from $1,135,248 to $1,236,155. A large part of the stock of this company is owned by the Pennsylvania Company and the Chicago, Burlington & Quincy, but it is operated independently of either. Its main line is in two sections, the eastern extending from Effner, Ill., where connection is made with the Pittsburgh, Cincinnati, Chicago & St. Louis to Peoria and the western from Hollis, Ill., eight miles from Peoria, to the Keokuk bridge, connection between the two sections being made by trackage rights over the Peoria & Pekin Union. The company also has a branch to Iona Junction, Ill., and trackage rights over the Chicago, Burlington & Quincy to Burlington, Iowa. In 1914 the company earned passenger revenue per mile of $1,963, comparing with $1,942 in 1913. The freight revenue per mile, on the other hand, dropped decidedly from $3,337 in 1913 to $2,920 in 1914, a decrease of 12.49 per cent. This revenue constitutes 56 per cent of the total and the tonnage is made up mainly of grain and bituminous coal, both of which showed decided decreases. The ton-mile rate in 1914 was 1.23 cents as against 1.28 cents in 1913, the total ton mileage being 58,649,413, as against 64,532,455 for the previous year. The average passenger receipts per passenger mile in 1914 amounted to 1.95 cents, as against 1.97 cents in 1913. At the end of the year the company had on hand working assets of $284,972; $87,990 of this being cash and $96,181 material and supplies. The working liabilities, on the other hand were $1,446,201, of which more than half, $738,000 was loans and bills payable.

A New Railway in the Federated Malay States.—A new railway line extending from Bukit Mertajam, a railway junction near the town of Penang to Alor Star, the capital of Kedah, 56 miles north of Bukit Mertajam, has recently been opened to traffic in the Federated Malay States. The line is part of the government railways and one of several extensions now under construction. This particular branch traverses nearly the entire length of the state of Kedah, its northern terminus being at the river of that name. It passes through a still slightly developed territory, and it is believed will have a very advantageous influence on the progress and opening up of that native state. The connecting up of this branch line brings the railway still closer to the Siamese frontier, the distance from Alor Star via Perlis to the frontier being 30 miles. Further progress with the view of ultimate connection with the Royal Siamese Railway, thereby forming a line from Penang to Bangkok, is looked forward to with considerable interest.

ANNUAL REPORTS

THE DENVER AND RIO GRANDE RAILROAD COMPANY

ST. LOUIS, Mo., September 10, 1914.

To the Stockholders of

THE DENVER AND RIO GRANDE RAILROAD COMPANY:

The Board of Directors submit the following report for the fiscal year ended June 30, 1914.

The results were as follows:

	1914.	1913.	Increase or Decrease Amount.	Per Cent.
Average Mileage Operated	2,583.27	2,555.00	28.27	1.11
OPERATING REVENUES:				
Revenue from Transportation—				
Freight	$17,058,080.21	$18,078,140.01	—$1,020,059.80	5.64
Passenger	5,077,407.62	5,299,080.89	—221,673.27	4.18
Passenger—Other	99,604,16	111,951.77	—12,347.61	11.03
Mail	308,938.97	296,454.47	12,484.50	4.21
Express	312,464.04	368,297.48	—55,833.44	15.16
Miscellaneous	194,391.11	177,122.93	17,268.18	9.75
Total Revenue from Transportation	$23,050,886.11	$24,331,047.55	—$1,280,161.44	5.26
Revenue from Operation Other than Transportation	116,165.23	121,917.31	—5,752.08	4.72
Total Operating Revenues	$23,167,051.34	$24,452,964.86	—$1,285,913.52	5.26
OPERATING EXPENSES:				
Maintenance of Way and Structures	$3,393,968.31	$3,545,938.45	—$151,970.14	4.29
Maintenance of Equipment	4,245,325.39	4,538,250.98	—292,925.59	6.45
Traffic Expenses	497,431.40	546,432.39	—49,000.99	8.97
Transportation Expenses	7,249,240.29	7,738,495.55	—489,255.26	6.32
General Expenses	632,230.60	678,054.64	—45,824.04	6.76
Total Operating Expenses	$16,018,195.99	$17,047,172.01	—$1,028,976.02	6.04
Net Operating Revenue	$7,148,855.35	$7,405,792.85	—$256,937.50	3.47
Net Deficit from Outside Operations	16,148.22	6,494.54	9,653.68	148.64
Total Net Revenue	$7,132,707.13	$7,399,298.31	—$266,591.18	3.60
RAILWAY TAX ACCRUALS	$1,009,143.53	$948,738.67	$60,404.86	6.37
Operating Income	$6,123,563.60	$6,450,559.64	—$326,996.04	5.07
OTHER INCOME:				
Hire of Equipment—Credit Balance	$82,218.36	$91,652.69	—$9,434.33	10.29
Rent	200,524.78	188,427.44	12,097.34	6.42
Dividend Income	800,000.00	819,000.00	—19,000.00	2.32
Interest	180,061.58	148,842.83	31,218.75	20.97
Miscellaneous Income	129.57	14.97	114.60	765.53
Total Other Income	$1,262,934.29	$1,247,937.93	$14,996.36	1.20
Gross Income	$7,386,497.89	$7,698,497.57	—$311,999.68	4.05
DEDUCTIONS FROM GROSS INCOME:				
Rent	$360,088.16	$359,877.89	$210.27	0.06
Interest	5,626,034.44	5,244,440.02	381,594.42	7.28
Total Deductions	$5,986,122.60	$5,604,317.91	$381,804.69	6.81
Net Income	$1,400,375.29	$2,094,179.66	—$693,804.37	33.13
DISPOSITION OF NET INCOME:				
Appropriations to Sinking and Renewal Funds	$263,888.82	$247,807.92	$16,080.90	6.49
Appropriations for Additions and Betterments	80,927.52	389,000.00	—308,072.48	79.20
Total Appropriations	$344,816.34	$636,807.92	—$291,991.58	45.85
Income Balance Transferred to Credit of Profit and Loss	$1,055,558.95	$1,457,371.74	—$401,812.79	27.57
Operating Revenue per Mile of Road	$8,968.11	$9,570.63	—$602.52	6.30
Operating Revenue per Revenue Train Mile	3.10.167	2.87.153	.23.014	8.01
Operating Expense per Mile of Road	6,200.74	6,672.08	—471.34	7.06
Operating Expense per Revenue Train Mile	2.14.456	2.00.186	.14.270	7.13
Net Operating Revenue per Mile of Road	2,767.37	2,898.55	—131.18	4.53
Net Operating Revenue per Revenue Train Mile	.95.711	.86.967	.08.744	10.05
Ratio of Operating Expense to Operating Revenue	69.14%	69.71%	—0.57%	....

CAPITAL STOCK.

There has been no change in the Capital Stock.

FUNDED DEBT.

The funded debt decreased $321,000, as exhibited in detail on page 17.

NEW LINES.

Under contract of purchase a line from Helper to Storrs, 5.09 miles, and called Spring Canyon Branch, has been acquired and was placed in operation July 15th, 1913. It serves an important coal property. By virtue of contracts there is included in the operated mileage the Southern Utah Railroad and the Castle Valley Railroad, aggregating 22.5 miles, extending from Price to Mohrland, serving extensive coal mines. Details of changes in mileage operated are recorded on page 35.

ADDITIONS AND BETTERMENTS.

A detailed list of addition and betterment charges, aggregating $1,937,570.33, appears on page 18. The following are the more important items:

There were purchased and laid in track, 1,368 tons of 90-pound section rail and 7,180 tons of 85-pound section rail, the 90-pound rail being applied to the "Detour Line" Soldier Summit to Detour; the balance was employed in replacing worn rail of similar section, or displacing lighter sections, and rail thus released was laid on less important main, branch, or narrow gauge lines.

Details of composition of track as to rail as constituted at the end of the year are shown on page 28.

Approximately 388,000 tie plates and 25,000 rail anchors were installed.

The main line roadbed was widened to standard dimensions between Littleton and Larkspur (32 miles on Colorado Lines), and between Ruby Tunnel and Utaline (11 miles on Utah Lines), which latter improvement included the riprapping of the widened roadbed at various points along the Grand River.

Rectifications of grade were made at several places, but particularly between Thistle and Castella Springs, Utah, where a ruling grade of .65 per cent was established on eastbound traffic with no adverse westbound grade.

New steel bridges aggregating 1,719 lineal feet in length were installed, replacing inadequate ones and 4,372 lineal feet of wooden bridges were eliminated by permanent filling.

The Fourth South Street Viaduct in Salt Lake City was completed and opened for traffic on January 27th, 1914.

The City of Denver, by ordinance, requires the erection of a steel structure to be known as the "Colfax-Larimer Viaduct," over freight, main line and yard tracks. This Company's proportion of the aggregate cost is estimated at $81,000. Construction was begun in the latter part of the fiscal year and $1,830.00 expended.

An ordinance also requires rearrangement of tracks and laying of brick pavement on Wynkoop Street, Denver, estimated to cost $50,400.00; expended to date, $4,500.00.

At Ogden a new freight depot and more centrally located freight terminals were completed in January.

Changes were made in the shop and terminal facilities at Salida, including installation of modern coal chutes and ash pit. Coaling facilities at Malta, Minturn and Thistle were enlarged and improved.

A new 24-stall brick engine house with 100-foot turntable, together with modern coal chutes, were constructed at Grand Junction.

A new 6-stall frame engine house with turntable was erected at Thistle, made necessary by introduction of Mallet locomotives.

New tools and machinery were installed at various shops.

Second main tracks between Castle Gate and Kyune (7.7 miles) and between Detour and Thistle (15.5 miles) were completed.

The double track detour line from Soldier Summit to Detour (a new station), intersecting the existing main line at a point about one mile west of Tucker, commenced in February, 1913, was placed in operation November 16, 1913, distance 13.96 miles. Continuous double track now extends from Helper to Thistle, 54.6 miles.

Construction of second main track from Thistle to Provo (21 miles), begun in August, 1913, is about 92 per cent completed. This is the property of the Utah Railway Company, but will be operated by this Company under the provisions of a contract dated November 1, 1913.

To facilitate operations new passing tracks were installed at two places, involving construction of 1.1 miles, and existing passing tracks were extended at various other points, involving the building of 4.5 miles of track.

Industrial sidings and yard tracks were constructed and extended to serve new industries or to make provision for growing traffic involving the building of 13 miles.

A telephone train dispatching system was installed between Grand Junction and Ogden at a cost of $37,800.

Approximately 43 miles of additional right of way fence was constructed.

OPERATION.

The total Operating Revenues were $23,167,051.34, a decrease of $1,285,913.52, or 5.26 per cent under the previous year.

The revenue from freight traffic decreased $1,020,059.80, or 5.64 per cent, largely attributable to the protracted coal strike in Southern Colorado, fruit crop failure on the Western Slope in Colorado and inactivity in the building industry reducing the demand for lumber from Southern Colorado and New Mexico territory.

The number of tons of revenue freight handled declined less than 3 per cent, although the resulting tons-one-mile decreased 6.23 per cent, due to shorter average haul of 4.43 miles.

Reference is made to the comparative commodity statement on page 33.

The revenue from passenger traffic decreased $221,673.27, or 4.18 per cent—about equally apportioned between local and through travel. The number of passengers carried decreased 1.24 per cent; the number carried one mile decreased 4.80 per cent; the average revenue per passenger per mile was 2.04 cents.

Complete details of Operating Expenses with comparisons are recorded on pages 25 and 26, the total exhibiting a decrease of $1,028,976.02, or 6.04 per cent.

Continued progress has been made in improving the condition of track and particularly as to bridges. The total charge to Maintenance of Way and Structures was $3,393,968.31, and equalled $1,314.00 per mile of road operated.

The decrease in total charges to Maintenance of Equipment amounted to $292,925.59, or 6.45 per cent. Power and cars have been well kept up, and satisfactorily met the demands of traffic.

Based upon the equipment list as it stood July 1st, 1913, the maintenance charges this year, per locomotive have equalled $2,493.20; per passenger car (exclusive of those leased to other companies), $570.76; per freight car, $84.86.

Traffic Expenses were reduced $49,000.99, or nearly 9 per cent.

Unprecedented falls of snow during the winter months, followed by unusual rain-falls later in the year, resulted in many interruptions and consequent added expense in moving traffic; likewise the strike of coal miners in Southern Colorado necessitate the purchase and long haul of a large tonnage of Utah coal for locomotive consumption in Colorado, and abnormally added to operating costs, but notwithstanding these disadvantages the total charges against Transportation Expenses were decreased $489,255.26, being in a greater ratio than the decline in Operating Revenues, i. e., 6.32 per cent versus 5.26 per cent.

The number of tons of revenue freight per freight train mile averaged 337.44 against 305.18 previous year. Freight train mileage declined 15.2 per cent. The reduction of 7.11 per cent in passenger train mileage contributed to the decrease in Transportation charges.

General Expenses present a reduction of $45,824.04, and include the first charges against "Valuation Expenses," which amount to $4,180.41.

OPERATING INCOME.

Operating Income, after sustaining an increase of more than 6 per cent in direct taxes (with a decline of 5.26 per cent in Operating Revenues), exhibits a decrease of 5.07 per cent compared with the previous year.

Net Income, distinguished from Operating Income in that it represents final results after all deductions, amounted to a decrease of 33.13 per cent against last year, but an increase of 22.33 per cent compared with two years ago.

Appropriations from Net Income were:

For contributions to the Renewal Fund and Sinking Fund under First and Refunding Mortgage	$263,888.82
For Additions and Betterments	80,927.52
Total	$344,816.34

leaving a credit brought down to Profit and Loss for the year of $1,055,558.95

With the exception of ordinary current accounts the Company has no floating debt.

In addition to the items already mentioned, the Denver and Rio Grande, in common with almost all American railroads, was adversely affected as to its tonnage and revenues by the shrinkage in the demand for manufactured and miscellaneous commodities in the general markets, and the full burden of forced revisions in tariffs in the previous year, including also some made within the year, materially reduced earnings.

At the close of the year the general crops throughout the territory, especially as to fruit, were particularly encouraging, practically guaranteeing to the growers, mainly in Colorado, splendid returns. The future augurs well also for the State of Utah, the constant development of whose coal industry, along with its horticulture and agriculture, makes for prosperity in that rapidly growing state.

The Company and its officers have undertaken to warrant the confidence of the peoples served, so that the relations between all are established on sound, substantial principles.

WESTERN PACIFIC RAILWAY.

A summary of the operations of this property for the fiscal year ending June 30th, 1914, compared with preceding year is presented:

	1913-14	1912-13	Increase or Decrease
Operating Revenue	$6,099,573.37	$6,173,628.29	—$74,054.92
Operating Expenses	4,995,891.64	4,478,835.06	517,056.58
Net Operating Revenue	$1,103,681.73	$1,694,793.23	—$591,111.50
Outside Operations—Deficit	27,152.26	11,635.28	15,516.98
Total Net Revenue	$1,076,529.47	$1,683,157.95	—$606,628.48
Taxes	379,259.40	278,096.13	$101,163.27
Operating Income	$697,270.07	$1,405,061.82	—$707,791.75
Net Debit to Income	375,763.12	364,731.75*	11,031.37
Surplus without making deductions therefrom for interest	$321,506.95	$1,040,330.07	—$718,823.12

*The figures presented in the report last year were subsequently adjusted by increasing the Net Debit to Income $19,145.76, to comply with the regulations of the Interstate Commerce Commission.

The extent to which the Company suffered in earnings by reason of the business situation in general is best indicated in the figures giving the results of its interchange with the Denver & Rio Grande, in that the combined revenue of the latter road from freight and passenger traffic to and from the Western Pacific reflects a decrease slightly in excess of 5 per cent.

The increase in total Operating Expenses was entirely attributable to necessarily heavier expenditures for maintenance both of roadway and equipment. There was a substantial decrease in Transportation Costs, in Traffic and in General Expenses.

By order of the Board of Directors.

B. F. BUSH,
President.

CONDENSED GENERAL BALANCE SHEET.

June 30, 1914, Compared with Previous Year.

ASSETS.	1914.	1913.	Increase or Decrease.
PROPERTY INVESTMENT:			
Road and Equipment	$174,316,509.85	$172,351,364.26	$1,965,145.59
Reserve for Accrued Depreciation—Credit	1,952,958.59	1,432,921.27	520,037.32
Total	$172,363,551.26	$170,918,442.99	$1,445,108.27
SECURITIES:			
Securities of Proprietary, Affiliated and Controlled Companies—Pledged	$14,796,433.92	$14,316,627.39	$479,806.53
Securities of Proprietary, Affiliated and Controlled Companies — Unpledged	207,620.00	206,820.00	800.00
Total Securities	$15,004,053.92	$14,523,447.39	$480,606.53
Other Investments, at cost	$29,263,131.45	$29,262,953.93	$177.52
Total Property Investment	$216,630,736.63	$214,704,844.31	$1,925,892.32
WORKING ASSETS:			
Cash	$2,607,342.14	$2,349,346.04	$257,996.10
Securities Issued or Assumed—Held in Treasury	2,989,130.00	2,989,130.00	
Marketable Securities	4,298,155.46	3,997,930.51	300,224.95
Loans Receivable:			
Western Pacific Railway	2,420,454.11	593,272.58	1,827,181.53
Salt Lake & Alta Railroad	14,287.50		14,287.50
Grand Valley Fruit & Water Co.	516.06		516.06
Traffic and Car Service Balances due from Other Companies	987,564.90	932,417.63	55,147.27
Net Balance due from Agents and Conductors	193,227.28	134,376.52	58,850.76
Miscellaneous Accounts Receivable:			
Western Pacific Railway	559,664.05	350,677.29	208,986.76
Other Companies	691,144.03	796,723.65	—105,579.62
Materials and Supplies	1,623,385.44	1,825,790.23	—202,404.79
Other Working Assets	12,326.07	12,043.26	282.81
Total Working Assets	$16,397,197.04	$13,981,707.71	$2,415,489.33
DEFERRED DEBIT ITEMS:			
Advances:			
Provisional Fund		$648,323.34	—$648,323.34
Working Funds	$9,181.66	8,759.11	422.55
Western Pacific Accrued Interest on Second Mtge. Bonds owned by D. & R. G. R. Co. (Unpaid)	3,125,000.00	1,875,000.00	1,250,000.00
Insurance Paid in Advance	8,973.88	5,219.74	3,754.14
Special Deposits:			
Cash Proceeds, Adjustment Mtge. 7% Bonds	478,259.35	3,803,561.45	—3,325,302.10
First and Refunding Mtge. 5% Bonds, with New York Trust Co., Trustee	6,692,000.00	3,730,000.00	2,962,000.00
Cash and Securities in Sinking and Redemption Funds	237,283.56	111,117.00	126,166.56
Cash and Securities in Reserve Funds	355,382.48	333,660.22	21,722.26
Other Deferred Debit Items	123,333.47	114,474.16	8,859.31
Total Deferred Debit Items	$11,029,414.40	$10,630,115.02	$399,299.38
	$244,057,348.07	$239,316,667.04	$4,740,681.03

LIABILITIES.	1914.	1913.	Increase or Decrease.
STOCK:			
Capital Stock:			
Common—Outstanding	$38,000,000.00	$38,000,000.00	
Preferred—Outstanding	49,775,670.00	49,775,670.00	
Preferred—In Treasury	4,130.00	4,130.00	
Total Stock	$87,779,800.00	$87,779,800.00	
SECURED DEBT:			
Funded Debt:			
Outstanding in hands of Public	$123,644,000.00	$123,965,000.00	—$321,000.00
Held in Treasury	10,159,000.00	7,026,000.00	3,133,000.00
Total Debt	$133,803,000.00	$130,991,000.00	$2,812,000.00
Total Capital Liabilities	$221,582,800.00	$218,770,800.00	$2,812,000.00
WORKING LIABILITIES:			
Traffic and Car Service Balances	$253,974.97	$224,983.18	$28,991.79
Audited Vouchers and Wages Unpaid	1,500,322.41	1,940,184.08	—439,861.67
Misc. Accounts Payable	32,601.30	35,535.09	—2,933.79
Matured Interest Unpaid	1,854,334.72	1,673,823.46	180,511.26
Other Working Liabilities	36,165.01	42,898.27	—6,733.26
Total Working Liabilities	$3,677,398.41	$3,917,424.08	—$240,025.67
ACCRUED LIABILITIES NOT DUE:			
Unmatured Interest:			
Accrued Interest (Including Bond Coupons due July 1st)	$1,076,089.46	$1,082,010.88	—$5,921.42
Accrued Rental	95,519.81	105,279.06	—9,759.25
Taxes Accrued	368,637.12	370,461.83	—1,824.71
Total Accrued Liabilities Not Due	$1,540,246.39	$1,557,751.77	—$17,505.38
DEFERRED CREDIT ITEMS:			
Operating Reserves	$21,256.96	$134,906.45	—$113,649.49
Other Deferred Credit Items	143,393.69	113,184.86	30,208.83
Total Deferred Credit Items	$164,650.65	$248,091.31	—$83,440.66
Total Liabilities	$226,965,095.45	$224,494,067.16	$2,471,028.29
Deferred Income (Account of Securities Owned)	$6,152,844.45	$4,902,844.45	$1,250,000.00
APPROPRIATED SURPLUS:			
Additions since July 31, 1908, through Income	$2,519,108.00	$2,288,180.48	$230,927.52
Reserves from Income or Surplus	591,549.04	443,660.22	147,888.82
Total Appropriated Surplus	$3,110,657.04	$2,731,840.70	$378,816.34
PROFIT AND LOSS:			
Balance	$7,828,751.13	$7,187,914.73	$640,836.40
	$244,057,348.07	$239,316,667.04	$4,740,681.03

THE CHESAPEAKE AND OHIO RAILWAY COMPANY—THIRTY-SIXTH ANNUAL REPORT

To the Stockholders: Richmond, Va., September 17, 1914.

The Thirty-sixth Annual Report of the Board of Directors, for the fiscal year ended June 30, 1914, is herewith submitted.

The average mileage operated during the year by the Chesapeake and Ohio Lines was 2,345.8 miles, an increase over the previous year of 26.8 miles. The mileage at the end of the year was 2,362.4 miles, an increase of 29.7 miles over mileage on June 30, 1913. See schedule on page 12.

Unexpected increases in wages and taxes since 1910 now aggregate about 4½% per annum on the Company's stock, and to that extent the sum available for dividends or for improvements of the physical or other assets of the Company has been diminished.

RESULTS FOR THE YEAR.

Operating Revenues were (Increase $1,604,742.79, or 4.57%.)		$36,690,021.11
Operating Expenses were (Increase $1,202,376.47, or 4.92%.)		25,653,936.78
Net Operating Revenue was (Increase $402,366.32, or 3.78%.)		$11,036,084.33
Taxes were (Decrease $44,928.00, or 3.27%.)		1,330,934.89
Operating Income, Taxes deducted, was (Increase $447,294.32, or 4.83%.)		$9,705,149.44
Miscellaneous Income was (Decrease $71,005.49, or 3.19%.)		2,154,531.31
		$11,859,680.75
Rentals and Other Payments were (Increase $87,487.02, or 10.11%.)		953,217.12
Income for the year available for interest was (Increase $288,801.81, or 2.72%.)		$10,906,463.63
Interest (72.75% of amount available) amounted to (Increase $615,489.40, or 8.41%.)		7,934,647.84
Net Income for the year, equivalent to 4.73% on capital stock outstanding, amounted to (Decrease $326,687.59, or 9.90%.)		$2,971,815.79
Dividends paid during the year: Four dividends of 1% each, aggregating		2,511,264.00
Remainder		$460,551.79

FINANCIAL.

The changes in funded debt in the hands of the public during the year were as follows:

	Sold	Retired
5 per cent. Five Year Secured Gold Notes	$33,000,000.00	
4 per cent. Coal River Ry. First Mortgage Bonds		Retired
4 per cent. Raleigh & Southwestern Ry. First Mortgage Bonds	649,000.00	$36,000.00
4½ per cent. Equipment Trust Certificates, Series N	510,000.00	1,000.00
Equipment Trust Obligations	1,700,000.00	
4 per cent. Big Sandy Ry. First Mortgage Bonds		1,629,392.00
4 pepr cent. Greenbrier Ry. First Mortgage Bonds		32,000.00
4½ per cent. Three Year Secured Gold Notes		20,000.00
5 per cent. One Year Secured Gold Notes		25,000,000.00
		3,500,000.00
Net Increase	$35,859,000.00	$30,218,392.00
Other changes in obligations shown under funded debt on Balance Sheet of June 30, 1914, were:	5,640,608.00	

	Increase	Payments
5 per cent. First Lien and Improvement Mortgage Bonds	$4,293,000.00	
6 per cent. Equipment Contracts — General Equipment Co.		$19,300.00
5 per cent. Equipment Contract — Standard Steel Car Co.	45,500.00	
5 per cent. Equipment Contract—Central Locomotive and Car Works	3,190,000.00	130,852.81
6 per cent. Equipment Contract—American Locomotive Co.	95,250.00	
	446,590.00	
Net Increase	$8,070,340.00	$150,152.81
	7,920,187.19	

The five per cent. First Lien and Improvement Mortgage Bonds were issued during the year for additions and betterments and other capital purposes. The entire issue of these bonds, $37,123,000 face amount, is pledged as collateral for your Company's Five Year 5% Secured Gold Notes, of which Notes $33,000,000 were sold to provide funds for the retirement of the Notes which matured June 1, 1914, and for new equipment, improvements and other acquisitions. Coal River Railway Company and Raleigh and Southwestern Railway Company bonds were sold to reimburse the Company's treasury for expenditures previously made.

In March and April, 1910, your Company purchased certain shares of stock of The Kanawha and Michigan Railway Company from the Lake Shore and Michigan Southern Railway Company and others, at a cost for the 40,292 shares now owned by your Company of $2,901,024, upon the par value of which dividends have been received at the rate of five per cent. per annum, with an additional one per cent. paid during the fiscal year 1913. Under a decree handed down March 14, 1914, by the circuit judges in equity, in the United States District Court for the Southern District of Ohio, Eastern Division, in the case of United States of America vs. Lake Shore and Michigan Southern Railway Company, et al., the sale of this stock was ordered. The Lake Shore and Michigan Southern Railway Company owned a like amount of this stock, and the court held that this ownership by the two companies of a majority of the stock of The Kanawha and Michigan Railway Company was in violation of the Federal anti-trust law. Accordingly, your Company has sold its holdings of stock of The Kanawha and Michigan Railway Company to the Toledo and Ohio Central Railway Company as of June 1, 1914, and is to receive therefor $4,029,200 with interest from June 1, 1914, to the date of consummation of the sale and transfer of the stock, payment to be made $2,000,000 in cash and the remainder in a note of The Toledo and Ohio Central Railway Company maturing September 1, 1915, guaranteed by the Lake Shore and Michigan Southern Railway Company, and otherwise fully secured. This represents a profit to your Company of about $1,100,000. Inasmuch as this stock of The Kanawha and Michigan Railway Company has been deposited under your Company's First Lien and Improvement Mortgage, the proceeds of this sale will be deposited with the Trustee under that mortgage, and can be expended for improvements and investments which are permitted under the terms of that mortgage.

During the past five years your Company's increase in capital liabilities in hands of the public, its principal acquisitions of stocks and bonds of other companies, and its expenditures for equipment, branch line construction, second track, and other additions and betterments have been as follows:

Capital Obligations Issued or Assumed:	Par Value	
General Mortgage 4½% Bonds	$3,716,000.00	
First Consolidated Mortgage 5% Bonds	2,000,000.00	
Convertible 4½% Debentures	31,390,000.00	
Three Year 4½% Collateral Trust Notes	25,000,000.00	
One Year 5% Collateral Trust Notes	3,500,000.00	
Five Year 5% Collateral Trust Notes	33,000,000.00	
Coal River Railway Co. First Mortgage 4% Bonds	3,000,000.00	
Raleigh and Southwestern Railway Co. First Mortgage 4% Bonds	860,000.00	
Big Sandy Railway Co. First Mortgage 4% Bonds	229,000.00	
Virginia Air Line Railway Co. First Mortgage 5% Bonds	900,000.00	
Equipment Trust Certificates Series N	1,700,000.00	
Equipment Contracts	3,777,340.00	
Realizing	$109,072,340.00	
Less:		$103,489,665.00
Capital Obligations Paid or Purchased:		
Peninsula Division First Mortgage 6% Bonds maturing January 1, 1911	$2,000,000.00	
Greenbrier and New River Railroad Co. First Mortgage 5% Bonds redeemed February 1, 1911	339.000.00	
General Funding and Improvement Mortgage 5% Bonds	7,302,000.00	
Greenbrier Railway Co. First Mortgage 4% Bonds retired November 1, 1911	2,000.00	
Three Year 4½% Collateral Trust Notes	25,000,000.00	
One Year 5% Collateral Trust Notes	3,500,000.00	
Equipment Trust Payments	9,673,392.00	
Through Sinking Funds:		
Big Sandy Railway Co. First Mortgage 4% Bonds	244,000.00	
Coal River Railway Co. First Mortgage 4% Bonds	121,000.00	
Greenbrier Railway Co. First Mortgage 4% Bonds	98,000.00	
Raleigh and Southwestern Railway Co. First Mortgage 4% Bonds	15,000.00	
Costing	$48,294,392.00	
		48,601,686.33
		$54,887,978.67
Acquisitions:		
Stocks of:		
The C. & O. Railway Co. of Indiana	$5,898,800.00	
Elkhorn and Beaver Valley Railway Co.	30,000.00	
Ganley and Meadow River Railroad Co.	116,300.00	
The Hocking Valley Railway Co.	7,671,800.00	
The Kanawha and Michigan Railway Co.	4,029,200.00	
Logan and Southern Railway Co.	280,600.00	
Levisa River Railroad Co. (of Ky.)	50,000.00	
The Levisa River Railroad Co. (of Va.)	50,000.00	
Kanawha Bridge and Terminal Co.	400,000.00	
Silver Grove Land and Building Co.	200,000.00	
White Sulphur Springs, Incorporated	2,357,000.00	
First National Bank Building Corporation (Richmond, Va.)	180,000.00	
Miscellaneous	12,300.00	
Costing	$21,276,000.00	
		$21,506,146.39
Bonds of:		
The C. & O. Railway Co. of Indiana First Mortgage 5%	$6,700,000.00	
Elkhorn and Beaver Valley Railway Co. First Mortgage 5%	980,000.00	
Costing	$7,680,000.00	
		6,380,500.00
Properties of:		
Coal River Railway Co.	$2,304,359.88	
Raleigh and Southwestern Railway Co.	816,562.42	
Virginia Air Line Railway Co.	1,071,947.12	
Costing		4,192,869.42

Construction of:		
Extensions of Branch Lines, costing	$1,548,551.64	
Second Track (173.1 miles) and Additions and Betterments, costing	14,143,025.86	
(Excluding $2,119,704.98 expended on Chicago Line to April 30, 1914, for which securities have been acquired.)		15,691,577.50
Equipment:		
Additional equipment acquired (less retirals)		16,875,111.91
(Excluding $44,236.77 expended on Chicago Line to April 30, 1914, for which securities have been acquired.)		
Costing		$64,646,205.22

Your Company acquired during the year additional shares of stock of White Sulphur Springs, Incorporated of Logan and Southern Railway Company and of Gauley and Meadow River Railroad Company, and exchanged a part of its holdings of common stock of Elkhorn and Beaver Valley Railway Company for a like amount of preferred stock which was later surrendered for first mortgage bonds at par. Additional first mortgage bonds of Elkhorn and Beaver Valley Railway Company were acquired at par in reimbursement for advances made that Company for construction purposes. Further shares of stock and first mortgage bonds of The Chesapeake and Ohio Railway Company of Indiana were issued in respect of the cost of certain additions and betterments made to that line, and were pledged under your Company's First Lien and Improvement Mortgage.

A statement of charges to property accounts will be found on page 16, showing a net addition of $17,058,584.66, that is, $1,834,867.10 was added to cost of road, and $15,223,717.56 was added to cost of equipment. This includes equipment represented by securities of The Chesapeake and Ohio Equipment Corporation heretofore carried in securities owned account but transferred to cost of equipment this year, amounting to $11,166,743.30.

A schedule of securities owned June 30, 1914, will be found on page 17.

GENERAL REMARKS.

The equipment inventory as of June 30, 1914, was as follows:

Locomotives owned	586	Inc.	50
Locomotives leased	239	Dec.	36
Total	825	Inc.	14
Passenger train cars owned	366	Inc.	18
Passenger train cars leased	29	..	..
Total	395	Inc.	18
Freight train and miscellaneous cars owned	22,308	Inc.	652
Freight train cars leased	22,322	Inc.	267
Total	44,630	Inc.	919

The changes during the year in the accrued depreciation of equipment account were as follows:

Balance to credit of account June 30, 1913			$3,503,348.90
Amount credited during year ended June 30, 1914, by charges to:			
Operating expenses	$797,888.28		
Outside operations expenses	19,474.74		
		$817,363.02	
Charges to account for:			
Accrued depreciation on equipment retired during year—			
20 locomotives, 4 passenger, 1,521 freight and work cars and 1 tug	$103,584.37		
Accrued depreciation on cars changed in class during year	4,585.62		
		108,169.99	
			709,193.03
Balance to credit of account June 30, 1914			$4,212,541.93

	1914	1913	Increase
Operating Revenues amounted to	$36,690,021.11	$35,085,278.32	$1,604,742.79
Net Operating Revenue	$11,036,084.33	$10,633,718.01	$402,366.32
Operating Ratio	69.9%	69.7%	.2%
Tons of Revenue Freight carried one mile	7,064,650,082	6,694,879,287	369,770,795
Revenue train load, tons	870	843	27
Revenue tons per loaded car	30.9	29.8	1.1

At Newport News, Virginia, the Atlantic tidewater terminus of your Company, an all steel dumping pier has been constructed, one side of which was completed and put into operation June 1, 1914. This pier is electrically operated and equipped with every modern appliance for the expeditious loading of coal into cargo vessels and bunkers. The cost of this pier, with its accompanying facilities, is about $1,630,000, nearly all of which has been expended at the close of the fiscal year. The pier has a rated capacity of 5,000 tons per hour when both sides are in operation, the road cars being dumped into conveyor cars which are lifted to the top of the pier by electric elevators, and the service which your Company can give at this pier promises a record for fast transferring of coal from the railway car to vessels.

In view of the desirability of providing a connection from your Company's main line at or near Portsmouth, on the Ohio River, to the main line of The Hocking Valley Railway Company at or near Columbus, Ohio, in order to facilitate the constantly increasing shipments of coal to the Lakes and the northwest, The Chesapeake and Ohio Northern Railway Company has been incorporated in Kentucky.

Extensions of the Gauley Branch, and of Logan and Southern Railway and construction of Elkhorn and Beaver Valley Railway aggregating 31.6 miles have been completed.

The revenue coal and coke tonnage was 19,251,488, an increase of 17.7 per cent.; other freight tonnage was 8,470,527, a decrease of 3.9 per cent. Total tonnage was 27,722,015 tons, an increase of 10.1 per cent. Freight revenue was $28,866,516.16, an increase of 4.8 per cent. Freight train mileage was 8,119,349 miles, an increase of 2.3 per cent. Revenue ton miles were 7,064,650,082, an increase of 5.5 per cent. Ton mile revenue was 4.09 mills, a decrease of 0.7 per cent. Revenue per freight train mile was $3.555, an increase of 2.4 per cent. Revenue tonnage per train mile was 870 tons, an increase of 3.2 per cent.; including Company's freight, the tonnage per train mile was 927 tons, an increase of 2.9 per cent. Tonnage per locomotive, including Company's freight, was 827 tons, an increase of 4.7 per cent. Revenue tonnage per loaded car was 30.9 tons, an incerase of 3.7 per cent. Tons of revenue freight carried one mile per mile of road were 3,011,617, an increase of 4.3 per cent.

There were 6,491,256 passengers carried, an increase of 10.8 per cent. The number carried one mile was 291,653,817, an increase of 9.2 per cent. Passenger revenue was $6,098,058.96, an increase of 4.1 per cent. Revenue per passenger per mile was 2.091 cents, a decrease of 4.7 per cent. Number of passengers carried one mile per mile of road was 124,330, an increase of 8.0 per cent. Passenger train mileage was 5,230,376, an increase of 0.2 per cent. Passenger revenue per train mile was $1.166, an increase of 3.9 per cent.; including mail and express, it was $1.369, an increase of 4.4 per cent. Passenger service train revenue per train mile was $1.401, an increase of 3.9 per cent.

There were 13,645.5 tons of new rails (4,280.4 tons 100-lb. and 9,365.1 tons 90-lb.), equal to 93.5 track miles, used in the renewal of existing main tracks.

The average amount expended for repairs per locomotive operated was $2,738.18; per passenger train car, $802.74; per freight train car, $73.83.

The Board takes this occasion to make appreciative acknowledgment of efficient services of officers and employes during the year.

By order of the Board of Directors.

GEO. W. STEVENS,
President.

FRANK TRUMBULL,
Chairman.

GENERAL INCOME ACCOUNT.

For Year ended June 30, 1914, and Comparison with Year ended June 30, 1913.

TABLE 2.

	1914.	1913.	Increase or Decrease.	Per Cent.
OPERATING REVENUES.				
Freight Traffic	$28,866,516.16	$27,549,696.17	$1,316,819.99	4.8
Passenger Traffic	6,098,058.96	5,858,138.22	239,920.74	4.1
Transportation of Mails.	426,967.03	386,639.91	40,327.12	10.4
Transportation of Express	636,785.75	599,344.74	37,441.01	6.2
Other Transportation	379,500.73	396,978.48	—17,477.75	4.4
Non-Transportation	282,192.48	294,480.80	—12,288.32	4.2
Total operating Revenues	$36,690,021.11	$35,085,278.32	$1,604,742.79	4.6
OPERATING EXPENSES.				
Maintenance of Way and Structures	$4,138,091.55	$4,342,744.60	—$204,653.05	4.7
Maintenance of Equipment	7,692,748.18	7,275,439.48	417,308.70	5.7
Traffic	669,283.00	669,016.32	266.68	.0
Transportation	12,167,905.54	11,380,998.32	786,907.22	6.9
General	985,908.51	783,361.59	202,546.92	25.9
Total Operating Expenses	$25,653,936.78 69.9%	$24,451,560.31 69.7%	$1,202,376.47	4.9
Net Operating Revenue	$11,036,084.33	$10,633,718.01	$402,366.32	3.8
INCOME FROM OTHER SOURCES:				
Hire of Equipment	$684,832.80	$598,740.44	$86,092.36	14.4
Interest from Investments and Accounts	1,168,027.93	1,322,328.25	—154,300.32	11.7
Miscellaneous	301,670.58	304,468.11	—2,797.53	.9
	$2,154,531.31	$2,225,536.80	—$71,005.49	3.2
Gross Income	$13,190,615.64	$12,859,254.81	$331,360.83	2.6
DEDUCTIONS FROM GROSS INCOME:				
Interest on Debt	$7,934,647.84	$7,319,158.44	$615,489.40	8.4
Taxes	1,330,934.89	1,375,862.89	—44,928.00	3.3
Rentals Leased Roads, Joint Tracks, &c.	835,077.32	883,223.55	—48,146.23	5.5
Loss on C. & O. Grain Elevator	62,616.28	Cr. 17,493.45	80,109.73	457.9
Miscellaneous	55,523.52	.....	55,523.52	...
Total deductions	$10,218,799.85	$9,560,751.43	$658,048.42	6.9
NET INCOME	$2,971,815.79	$3,298,503.38	—$326,687.59	9.9

Amount to credit of Profit and Loss June 30, 1913		$2,514,680.78
Amount of Net Income for year ended June 30, 1914, transferred to Profit and Loss		2,971,815.79
		$5,486,496.57
Deduct:		
Dividend No. 28 of 1% paid September 30, 1913.	$627,816.00	
Dividend No. 29 of 1% paid December 31, 1913.	627,816.00	
Dividend No. 30 of 1% paid March 31, 1914	627,816.00	
Dividend No. 31 of 1% paid June 30, 1914	627,816.00	
		$2,511,264.00
		$2,975,232.57
Discounts on Bonds and Equipment Notes sold during year	$414,771.80	
Value of property abandoned prior to current year	795,633.89	
Refunds under West Virginia two cent fare law	311,300.00	
	$1,521,705.69	
Less: Sundry adjustments	108,306.51	
		$1,413,399.18
Balance to credit of Profit and Loss June 30, 1914		$1,561,833.39

GENERAL BALANCE SHEET JUNE 30, 1914.

ASSETS

(Excluding Stocks and Bonds owned of The C. & O. Ry. Co. of Indiana and of The C. & O. Equipment Corporation.)

TABLE 3.

Property Investment.		
Cost of Road	$170,865,451.08	
Cost of Equipment	47,932,910.59	
		$218,798,361.67
Accrued Depreciation of Equipment—Cr..		4,212,541.93
		$214,585,819.74
Securities of Proprietory, Affiliated and Controlled Companies—Pledged.		
Stocks—See Schedule, page 18	$13,759,738.62	
Bonds—See Schedule, page 18	3,079,408.01	
	$16,839,146.63	
Securities—Issued or Assumed—Pledged.		
Bonds—See Schedule, page 18 (Includes First Lien and Improvement Mortgage 5% Bonds $37,123,000.00. See Contra.)	37,123,001.00	$53,962,147.63
Miscellaneous Investments.		
Physical Property		282,386.44
Special Funds, and Funded Debt Issued and Reserved.		
Potts Creek Branch—Cash	$42,338.75	
Raleigh and Southwestern Railway Bonds authenticated in advance of construction.	40,000.00	
Special Deposits account of Construction and Equipment	2,340,739.07	2,423,077.82
		$56,667,611.89
		$271,253,431.63
Working Assets.		
Cash in Treasury	$1,005,380.47	
Cash in transit	787,577.26	$1,792,957.73
Cash deposits to pay Interest and Dividends		816,467.12
Cash deposits to pay Equipment Trust Principal		112,000.00
Cash deposits to pay Matured Bonds and Scrip		65,174.17
Loans and Bills Receivable		211,560.00
Traffic Balances		984,393.12
Agents and Conductors		877,045.08
Miscellaneous Accounts Receivable		1,084,148.60
Other Working Assets		34,805.10
		$5,978,550.92
Materials and Supplies		2,879,642.62
Securities in Treasury—Unpledged.		
Stocks—See Schedule, page 17	$4,711,748.77	
Bonds—See Schedule, page 17	1,497,902.00	6,209,650.77
Deferred Assets.		
Unmatured Interest and Dividends	$107,490.94	
Advances to Proprietary, Affiliated and Controlled Companies	163,492.85	
Advances, Working Funds (Fast Freight Lines, etc.)	37,628.83	
Special Deposits with Trustees, Various Mortgage Funds	80,046.28	
Cash and Securities in Sinking and Redemption Fund	47,097.07	
Cash and Securities in Insurance Reserve Fund	9,239.13	
Unextinguished Discount on Funded Debt	1,622,500.00	
Sundry Accounts	570,347.73	2,637,842.83
		$17,705,687.14
Total		$288,959,118.77

LIABILITIES

(Excluding Stocks and Bonds owned of The C. & O. Ry. Co. of Indiana and of The C. & O. Equipment Corporation.)

Capital Stock.		
Common	$62,792,600.00	
First Preferred	3,000.00	
Second Preferred	200.00	$62,795,800.00
Common—The Chesapeake and Ohio Railway Co. of Indiana		1,200.00
		$62,797,000.00
Funded Debt.		
First Mortgage, Kineon Coal Co., 5% Bonds, 1915	$200,000.00	
Secured Gold Notes, 5%—1919	33,000,000.00	
First Mortgage, Terminal, etc., 6% Bonds, 1922	142,000.00	
General Funding and Improvement, 5% Bonds—1929	3,698,000.00	
Convertible, 4½% Bonds—1930	31,390,000.00	
First Mortgage, R. & S. W. Railway, 4% Bonds—1936	885,000.00	
First Consolidated Mortgage, 5% Bonds, 1939	29,858,000.00	
First Mortgage, Craig Valley Branch, 5% Bonds—1940	650,000.00	
First Mortgage, Greenbrier Railway, 4% Bonds—1940	1,821,000.00	
First Mortgage, Warm Springs Branch, 5% Bonds—1941	400,000.00	
First Mortgage, Big Sandy Railway, 4% Bonds—1944	4,756,000.00	
First Mortgage, Paint Creek Branch, 4% Bonds—1915	539,000.00	
First Mortgage, Coal River Railway, 4% Bonds—1945	2,879,000.00	
First Mortgage, Potts Creek Branch, 4% Bonds—1946	600,000.00	
First Mortgage, Va. Air Line Railway, 5% Bonds—1952	900,000.00	
First Mortgage, R. & A. Division, 4% Bonds—1989	6,000,000.00	
Second Mortgage, R. & A. Division, 4% Bonds—1989	1,000,000.00	
General Mortgage, 4½% Bonds—1992	48,129,000.00	$166,847,000.00
Equipment Trust Obligations and Contract.		8,381,971.19
		$175,228,971.19
		$238,025,971.19
First Lien and Improvement Mortgage, 5% Bonds (see Contra)—1930		37,123,000.00
		$275,148,971.19
Working Liabilities.		
Loans and Bills Payable	$95,000.00	
Traffic Balances	364,793.58	
Audited Vouchers and Pay Rolls	4,059,865.32	
Unpaid Wages	50,936.47	
Miscellaneous Accounts Payable	229,240.25	
Interest and Dividends Unpaid	818,927.65	
Matured Mortgage and Secured Debt Unpaid	65,174.17	
Other Working Liabilities	89,940.24	$5,773,878.18
Deferred Liabilities.		
Unmatured Interest and Rents	$1,905,602.71	
Taxes Accrued	1,132,168.35	
Sundry Accounts	425,958.84	3,463,729.90
		$9,237,608.08
Appropriated Surplus.		
Additions to Property through Income since June 30, 1907	$2,984,365.23	
Reserve Invested in Sinking Fund	17,101.75	
Reserve Invested in Other Reserve Funds	9,239.13	$3,010,706.11
		1,561,833.39
Profit and Loss Balance		$4,572,539.50
		$288,959,118.77
Total		

This Company is also liable as a guarantor of the following securities in hands of the public—

The Chesapeake and Ohio Grain Elevator Co., First Mortgage, 4% Bonds due 1938	$820,000.00
Norfolk Terminal and Transportation Co., First Mortgage 5% Bonds due 1948	500,000.00
Western Pocahontas Corporation, First Mortgage 4½% Bonds due 1945	750,000.00
Western Pocahontas Corporation, Extension Mortgage No. 1, 4½% Bonds due 1945	83,000.00
Western Pocahontas Corporation, Extension Mortgage No. 2, 4½% Bonds due 1946	51,000.00
Louisville and Jeffersonville Bridge Co. Mortgage (C. & O. prop'n, ½) 4% Bonds due 1943	4,500,000.00
Richmond-Washington Co. Collateral Trust Mortgage (C. & O. prop'n, 1/6) 4% Bonds due 1943	10,000,000.00

THE HOCKING VALLEY RAILWAY COMPANY—FIFTEENTH ANNUAL REPORT

Columbus, Ohio, September 17, 1914.

To the Stockholders:

The Fifteenth Annual Report of the Board of Directors, for the fiscal year ended June 30, 1914, is herewith submitted.

The average mileage operated during the year was 351.5 miles. The mileage at the end of the year was 351.5 miles. See schedule on page 8.

RESULTS FOR THE YEAR.

Operating Revenues were		$7,021,145.07
(Decrease $796,498.79 or 10.19%.)		
Operating Expenses were		4,803,746.51
(Decrease $180,096.61 or 3.61%.)		
Net Operating Revenue was		$2,217,398.56
(Decrease $616,402.18 or 21.75%.)		
Taxes were		451,136.27
(Decrease $26,763.73 or 5.60%.)		
Operating Income, Taxes deducted, was		$1,766,262.29
(Decrease $589,638.45 or 25.03%.)		
Miscellaneous Income was		448,919.90
(Decrease $323,558.67 or 41.89%.)		
		$2,215,182.19
Rentals and other payments were		110,938.43
(Increase $13,133.02 or 13.43%.)		
Income for the year available for interest was		$2,104,243.76
(Decrease $926,330.14 or 30.57%.)		
Interest (54.58% of amount available) amounted to		1,148,503.05
(Increase $34,333.05 or 3.08%.)		
Net Income for the year amounted to		$ 955,740.71
(Decrease $960,663.19 or 50.13%.)		
Dividends paid during the year:		
Four dividends of 2% each, aggregating		879,960.00
Remainder		$ 75,780.71

FINANCIAL.

The changes in funded debt shown by balance sheet of June 30, 1914, as compared with June 30, 1913, consisted in the retirement of $14,000 par amount of The Hocking Valley Railway Company First Consolidated Mortgage 4½% Bonds through the sinking fund; in the annual payments of $316,000 on equipment trusts; in the retirement of $4,000,000 face amount two-year 4½% gold notes by the issue and sale of $4,000,000 face amount one-year 5% gold notes maturing November 1, 1914; and in the sale of $1,800,000 face amount of equipment trust obligations to provide funds for the purchase of 2,000 steel gondola cars of 115,000 pounds capacity, 6 Mikado freight locomotives, and 2 ten-wheel passenger locomotives.

Your Company acquired 3,872 shares of The Toledo Terminal Railroad Company capital stock under an agreement with other interested companies providing that the companies holding the stock will be responsible (severally but not jointly) for any deficiency in working expenses and in interest on $4,000,000 First Mortgage 4½% Bonds of The Toledo Terminal Railroad Company in the proportion which the stock held by each company bears to the total stock outstanding, your Company's proportion being 9.68%.

An analysis of the property accounts will be found on pages 12 and 13, by reference to which it will be seen that additions and betterments were made during the year to the amount of $2,966,061.09, of which $1,122,490.87 was added to cost of road, and $1,843,570.22 was added to cost of equipment.

During the past five years your Company's expenditures for equipment and other additions and betterments have been as follows:

Additional equipment acquired (less retirals)	$2,931,182.75
Additions and Betterments	3,259,745.68
	$6,190,928.43

GENERAL REMARKS.

The equipment in service June 30, 1914, consisted of:

Locomotives owned	148	Decrease	1
Locomotives leased under equipment trusts	8	Increase	8
Total	156	Increase	7
Passenger train cars owned	86	Decrease	2
Freight train and miscellaneous cars owned	9,655	Increase	227
Freight train cars leased under equipment trusts	4,556	Increase	1,206
Total freight train cars	14,211	Increase	1,433

The prolonged strike by coal miners in the Hocking district, causing almost entire suspension of mining during April, May and June in the territory covered by your line, resulted in a heavy loss of freight traffic and earnings sa follows:

	1914.	1913.	DECREASE.
Tons of revenue freight carried one mile	1,315,425,895	1,453,682,875	138,256,980
Operating revenues	$7,021,145.07	$7,817,643.86	$796,498.79
Net operating revenue	$2,217,398.56	$2,833,800.74	$616,402.18

The revenue train load increased from 988 to 1,000 tons, and revenue tons per loaded car from 36.3 to 36.9 tons.

Steel water tanks were built at Marion, Upper Sandusky and Toledo and modern water softening plants were erected at Carey, Marion, Hyatts and Linworth. The work of separating grades at South Columbus, required by the city authorities of Columbus, was completed and the South Columbus freight station remodeled. At Marion a suitable site was purchased for engine house.

The operation of the new coal dock and terminal yard on the east side of the Maumee River at Toledo, undertaken last year, was commenced on June 17, 1914. The dock is equipped with two car dumpers, which are operated by steam power, the maximum capacity of the dumpers being 8,000 tons per hour, which is about double the present needs of the Company. The coal is dumped directly from the road cars into vessels. The terminal yard tributary to the dock has fifteen and one-half miles of track with a working capacity of 1,500 cars, and is capable of considerable enlargement. The cost of the new dock and terminal, exclusive of a large part of the real estate which has been owned by your Company for many years, is about $1,450,000, nearly all of which has been expended at the close of the fiscal year, this expenditure forming the major part of the additions and betterments, except equipment, for the past two years. It was necessary to change the grade of two important streets in the city of Toledo; Front street being elevated over and Seaman street being carried under tracks of your Company. It was also necessary to elevate tracks of Wheeling and Lake Erie Belt Railway at the entrance to the terminal yard. The new dock is directly across the river from the dock heretofore used and is better located than any other railroad dock in Toledo, being nearer the mouth of the river, and is readily accessible to your Company's line over the double track of the Toledo Terminal Railroad, an interest in which has been acquired by your Company, as hereinbefore stated. Your Company is under contract to sell the old location to the Pennsylvania Company, which owns the adjoining water front, and it is expected that a very considerable sum will be realized from the sale of this valuable dock property.

The coal and coke tonnage was 7,323,139 tons, a decrease of 8.1%; other freight tonnage was 3,163,909 tons, a decrease of 1.6%. Total tonnage

GENERAL BALANCE SHEET, JUNE 30, 1914.

TABLE 3.

ASSETS.

Property Investment.			
Cost of Road	$29,586,170.38		
Cost of Equipment	13,620,329.60		
General Expenditures	23,363.35		
	$43,229,863.33		
Accrued Depreciation of Equipment—Cr.	1,019,628.37	$42,210,234.96	
Securities of Proprietary, Affiliated and Controlled Companies—Pledged.			
Stocks	108,088.66		
Bonds	300,000.00	408,088.66	
Securities of Proprietary, Affiliated and Controlled Companies—Miscellaneous—Unpledged		5,808.00	
Other Investments.			
Miscellaneous Investments—Securities—Pledged		1,566,718.24	
Special Deposit account Equipment		800,000.00	$44,990,849.86
Working Assets.			
Cash	$ 973,423.81		
Loans and Bills Receivable	102,346.46		
Traffic Balances	50,060.15		
Agents and Conductors	361,502.28		
Miscellaneous Accounts Receivable	338,594.82		
Other Working Assets	17,996.63	$ 1,843,924.15	
Materials and Supplies		784,299.47	
Securities in Treasury—Unpledged.			
Stocks	$ 501.00		
Bonds	2,785,000.00	2,785,501.00	
Deferred Assets.			
Unmatured Interest	$ 35,312.50		
Advances to Proprietary, Affiliated and Controlled Companies	53,163.63		
Advances, Working Funds	771.69		
Insurance, paid in advance	3,852.91		
Cash and Securities in Sinking and Redemption Funds	29,836.99		
Cash and Securities in Insurance Fund	34,703.07		
Other Deferred Debit Items	66,433.49	224,074.28	
			5,637,798.90
Total			$50,628,648.76

LIABILITIES.

Capital Stock			$11,000,000.00
Funded Debt.			
First Consolidated Mortgage 4½% Bonds, 1999	$16,030,000.00		
First Mortgage C. & H. V. R. R. 4% Bonds, 1948	1,401,000.00		
First Mortgage Cols. & Tol. R. R. 4% Bonds, 1955	2,441,000.00		
One Year 5% Gold Notes, 1914	4,000,000.00		
		$23,872,000.00	
Equipment Trust Obligations		2,823,000.00	26,695,000.00
			$37,695,000.00
Working Liabilities.			
Loans and Bills Payable	$ 1,400,000.00		
Traffic Balances	498,669.49		
Audited Vouchers and Wages Unpaid	648,871.69		
Miscellaneous Accounts Payable	92,023.69		
Matured Interest, Dividends and Rents Unpaid	368,826.50		
Other Working Liabilities	48,405.60	$ 3,056,796.97	
Deferred Liabilities.			
Unmatured Interest, Dividends and Rents Payable	$ 138,616.68		
Taxes Accrued	284,506.36		
Operating Reserves	17,516.68		
Other Deferred Credit Items	344,388.55	785,028.27	3,841,825.24
Appropriated Surplus.			
Additions to Property through Income since June 30, 1907	$ 181,409.11		
Reserve Invested in Sinking Fund	190,097.14		
Reserve Invested in Insurance Fund	34,703.07	$ 406,209.32	
Profit and Loss—Balance		8,685,614.20	9,091,823.52
Total			$50,628,648.76

This Company, jointly with the Toledo and Ohio Central Railway Company, guaranteed in 1901 5% First Mortgage Bonds of the Kanawha and Hocking Coal and Coke Company due 1951 ($2,878,000 outstanding), and in 1902 5% First Mortgage Bonds of the Continental Coal Company due 1952 ($1,604,000 outstanding). The Ohio courts, in quo warranto proceedings in which bondholders were not represented, have pronounced these guaranties *ultra vires*.

was 10,487,048 tons, a decrease of 6.2%. Freight revenue was $5,601,381.91, a decrease of 12%. Freight train mileage was 1,315,637 miles, a decrease of 10.6%. Revenue ton miles were 1,315,425,895, a decrease of 9.5%. Ton mile revenue was 4.26 mills, a decrease of 2.7%. Revenue per freight train mile was $4.258, a decrease of 1.6%. Revenue tonnage per train mile was 1,000 tons, an increase of 1.2%; including Company's freight, the tonnage per train mile was 1,036 tons, an increase of 1.3%. Tonnage per locomotive, including Company's freight, was 901 tons, an increase of 4.5%. Revenue tonnage per loaded car was 36.9 tons, an increase of 1.7%. Tons of revenue freight carried one mile per mile of road were 3,742,321, a decrease of 9.5%.

There were 2,156,150 passengers carried, a decrease of 5.3%. The number of passengers carried one mile on steam trains was 49,193,241, a decrease of 6.5%. Passenger revenue was $910,310.72, a decrease of 2.1%. Revenue per passenger per mile of steam trains was 1.804 cents, an increase of 4.8%. The number of passengers carried on steam trains one mile per mile of road was 139,952, a decrease of 6.5%. Passenger train mileage of steam trains was 778,581, a decrease of 4.5%. Passenger revenue per train mile of steam trains was $1.14, an increase of 2.6%; including mail and express it was $1.296, an increase of 1.5%. Passenger service train revenue per train mile was $1.35, an increase of 1.7%.

There were 2,268 tons of new 100-lb. rails, equal to 14.4 track miles, and 1,603 tons of new 90-lb. rails, equal to 11.3 track miles, used in the renewal of existing main tracks.

The average amount expended for repairs per locomotive was $1,968.67; per passenger train car $436.14; per freight train car $62.20.

Appreciative acknowledgment is hereby made of efficient services during the year of officers and employees.

By order of the Board of Directors:

GEO. W. STEVENS,
President.

FRANK TRUMBULL.
Chairman.

NINETEENTH ANNUAL REPORT OF THE ATCHISON, TOPEKA & SANTA FE RAILWAY COMPANY

OFFICE OF
THE ATCHISON, TOPEKA & SANTA FE RAILWAY SYSTEM,
No. 5 Nassau Street, New York City.

SEPTEMBER 15, 1914.

To the Stockholders:

Your Directors submit the following report for the fiscal year July 1, 1913, to June 30, 1914, inclusive.

The Lines comprising the Atchison System, the operations of which are embraced in the following statements, are as follows:

	June 30, 1914.		June 30, 1913.	
Atchison, Topeka & Santa Fe Railway	8,339.72	miles.	8,237.55	miles.
Rio Grande, El Paso & Santa Fe Railroad	20.22	"	20.21	"
Gulf, Colorado & Santa Fe Railway	1,595.89	"	1,595.77	"
Pecos & Northern Texas Railway	569.79	"	481.79	"
Pecos River Railroad*	.....	"	54.24	"
Panhandle & Santa Fe Railway†	179.16	"	124.92	"
Texas & Gulf Railway	125.49	"	125.49	"
Gulf & Interstate Railway of Texas	71.33	"	71.33	"
Concho, San Saba & Llano Valley Railroad	59.63	"	60.15	"
	10,961.23	"	10,771.45	"

*Operated by Panhandle & Santa Fe Railway under lease effective July 1, 1913.

†Formerly known as Southern Kansas Railway of Texas.

Increase during the year 189.78 miles.

The average mileage operated during the fiscal year ending June 30, 1914, was 10,908.52 miles, being an increase of 158.21 miles as compared with the average mileage operated during the preceding fiscal year.

In addition to lines covered by this report there were completed on June 30, 1914, 39.26 miles of additional line, all of which will be ready for operation on October 1, 1914.

The Company also controls, through ownership of stocks and bonds or purchase contract, other lines aggregating 228.92 miles, and is interested jointly with other companies in 593.85 miles.

For detailed statement of present mileage and of changes in mileage since last Annual Report, see pages 42 to 46.

INCOME STATEMENT.

The following is a summary of the transactions of the System for the years ending June 30, 1913 and 1914.

	1913.	1914.
Operating Revenues	$116,896,251.98	$111,109,769.86
Operating Expenses	77,642,534.73	73,469,333.68
Net Operating Revenue	$39,253,717.25	$37,640,436.18
Taxes	4,662,152.38	5,525,585.30
Operating Income	$34,591,564.87	$32,114,850.88
Other Income	2,515,623.96	2,174,353.12
Gross Corporate Income	$37,107,188.83	$34,289,204.00
Rentals and Other Charges	1,128,129.10	1,218,827.08
	$35,979,059.73	$33,070,376.92
Interest on Bonds, including accrued interest on Adjustment Bonds	13,825,325.40	12,886,412.23
Net Corporate Income (representing amount available for dividends and surplus and for necessary but unproductive or only partially productive expenditures)	$22,153,734.33	$20,183,964.69

From the net corporate income for the year the following sums have been deducted:

DIVIDENDS ON PREFERRED STOCK—		
No. 31 (2½%) paid Feb. 2, 1914	$2,854,345.00	
No. 32, (2½%) paid Aug. 1, 1914	2,854,345.00	
		$5,708,690.00
DIVIDENDS ON COMMON STOCK—		
No. 33 (1½%) paid Sept. 2, 1913	$2,914,732.50	
No. 34 (1½%) paid Dec. 1, 1913	2,916,637.50	
No. 35 (1½%) paid Mar. 2, 1914	2,925,877.50	
No. 36 (1½%) paid June 1, 1914	2,934,502.50	
	11,691,750.00	
Appropriation for Fuel Reserve Fund	51,485.83	
California-Arizona Lines Bonds Sinking Fund	12,721.10	
Appropriated for Additions and Betterments	2,719,317.76	
		$20,183,964.69
Surplus to credit of Profit and Loss June 30, 1913		$20,569,800.81
Profit and Loss Adjustments		.....
Surplus to credit of Profit and Loss June 30, 1914		20,569,800.81

Income from sources other than earnings from operation consisted of interest on cash in banks and sums collected as interest and dividends upon bonds and stocks of companies, the operations of which are not included in the System accounts.

During the fiscal year the sum of $120,000 in cash was received as the net proceeds of sales of land embraced in the Santa Fe Pacific Land Grant, but this was directly written off the book value of Railroads, Franchises and Other Property, and the transaction does not appear in the Income Account.

CAPITAL EXPENDITURES AND REDUCTION OF BOOK VALUES.

The total charges to Capital Account, as shown by the General Balance Sheet, page 26, at June 30, 1914, aggregated $651,428,708.11 as compared with $640,263,756.10 at June 30, 1913, an increase during the year of $11,164,952.01, which analyzes as follows:

Construction and acquisition of new mileage, including the acquisition of bonds and stocks of other railway and terminal companies:		
California, Arizona & Santa Fe Ry.	$ 7,462.57	
Concho, San Saba & Llano Valley R. R.	17,952.50	
Dodge City & Cimarron Valley Ry.	114,984.07	
Eastern Ry. of New Mexico	515,696.54	
Ft. Worth Union Passenger Station Co.	533.02	
Grand Canyon Ry.	14,633.62	
Gulf, Beaumont & Kansas City Ry.	702,500.00	
Joliet Union Depot Co.	10,000.00	
Minkler Southern Ry.	845,606.30	
Union Passenger Depot Co. of Galveston	360,000.00	
Union Terminal Co. of Dallas	3,000.00	
Verde Valley Ry.	80,483.24	
Western Arizona Ry.	170.13	
		$2,673,021.99
Additions and Betterments—System Lines:		
Right of Way, Station Grounds and Real Estate	$ 290,158.15	
Widening Cuts and Fills, including Protection of Banks	315,666.39	
Grade Reductions and Changes of Line	117,651.55	
Bridges, Trestles and Culverts	461,976.65	
Ballast, including cost of spreading and putting under track	356,140.15	
Increased Weight of Rail	210,584.33	
Frogs, Switches, Track Fastenings and Appurtenances	435,338.48	
Additional Main Tracks	951,524.83	
Sidings and Spur Tracks	718,279.10	
Terminal Yards	418,982.97	
Track Elevation, Elimination of Grade Crossings, and Improvements of Over and Under Grade Crossings	*4,921.09*	
Interlocking, Block, and Other Signal Apparatus	470,291.61	
Telegraph and Telephone Lines	79,627.99	
Buildings, Shops, Dock and Wharf Property	1,594,440.34	
Shop Machinery and Tools	220,932.81	
Additional Equipment	6,437,635.13	
Betterments to Equipment	49,913.75	
Other Additions and Betterments	159,530.24	
		$13,283,753.38
Fuel Lands and Other Properties:		
Real Estate held for future use	$ 139,060.41	
Tie and Timber Lands	19,706.49	
Miscellaneous Items	59,811.11	
		$ 218,578.01
Other Investments		684,317.52
Total Charges		$16,859,670.90
Reduction of Book Values:		
Gulf, Beaumont & Kansas City Ry.	$ 702,500.00	
Santa Fe Pacific R. R.—Land Sales	120,000.00	
Texas & Gulf Ry.	2,250.00	
Ice Plant, Belen	9,950.00	
Ice Plant, San Bernardino	75,798.28	
Santa Barbara Tie & Pole Co.	21,455.98	
Fuel Lands	1,050,000.00	
Reserve for Accrued Depreciation	3,712,764.63	
		$ 5,694,718.89
Net Increase in Capital Account during the year		$11,164,952.01

Credits in italics.

The item of $6,437,635.13 for "Additional Equipment" analyzes as follows:

35 Locomotives		$ 999,603.63
122 Passenger-Train Cars		1,626,492.68
3,334 Freight-Train Cars		4,434,301.55
487 Miscellaneous Cars		174,041.64
		$7,234,439.50
Less—Value of equipment retired during the year as follows:		
43 Locomotives	$171,336.85	
21 Passenger-Train Cars	84,528.23	
1,310 Freight-Train Cars	531,118.26	
31 Miscellaneous Cars	9,821.03	
		$ 796,804.37
		$6,437,635.13

MAINTENANCE OF EQUIPMENT.

The following statement shows the sums charged to Operating Expenses for Maintenance of Equipment during each year since July 1, 1896:

Year ending June 30.	Average Operated Mileage.	Total Expenditure.	Expenditure Per Mile.
1897	6,443.81	$3,443,884.82	$534.45
1898	6,936.02	4,659,277.99	671.75
1899	7,032.62	4,810,795.64	684.07
1900	7,341.34	5,267,832.40	717.56
1901	7,807.31	6,257,456.57	801.49
1902	7,855.38	7,864,951.25	1,001.22
1903	7,965.13	8,510,543.09	1,068.48
1904	8,179.59	10,006,135.41	1,223.31
1905	8,305.40	10,914,864.47	1,314.19
1906	8,433.99	10,720,040.43	1,271.05
1907	9,273.15	11,779,846.64	1,270.32
1908	9,415.01	14,246,621.44	1,513.18
1909	9,794.86	13,903,897.37	1,419.51
1910	9,916.33	15,560,047.44	1,569.13
1911	10,350.13	16,686,145.45	1,612.17
1912	10,627.92	16,521,231.41	1,554.51
1913	10,750.31	19,415,224.63	1,806.02
1914	10,908.52	19,100,724.51	1,750.99

For the year ending June 30, 1914, maintenance charges, including renewals and depreciation, averaged as follows:

Per locomotive	$4,463.93
Per locomotive mile	.1737
Per passenger car, including mail and express	1,174.63
Per passenger car mile	.0137
Per freight car	120.32
Per freight car mile	.0124

The foregoing average maintenance charges include a proportion of unlocated expenditures for Maintenance of Equipment charged to Superintendence, Shop Machinery and Tools, Injuries to Persons, Stationery and Printing, Other Expenses, and Maintaining Joint Equipment at Terminals. Repairs to motor equipment of motor coaches, which are chargeable to repairs of locomotives, are excluded in determining the locomotive averages. Refrigerator cars are not taken into consideration in arriving at freight car averages, such cars being operated by the Santa Fe Refrigerator Despatch Company, which bears the expense of their maintenance.

A statement of the locomotives in service and of their tractive power will be found on page 41.

MAINTENANCE OF WAY AND STRUCTURES.

The following statement shows the sums charged to Operating Expenses for Maintenance of Way and Structures during each year since July 1, 1896:

Year ending June 30.	Average Operated Mileage.	Total Expenditure.	Expenditure Per Mile.
1897	6,443.81	$6,282,923.15	$975.03
1898	6,936.02	8,281,397.88	1,193.97
1899	7,032.62	7,672,107.62	1,090.93
1900	7,341.34	6,354,372.10	865.56
1901	7,807.31	6,433,840.36	824.08
1902	7,855.38	6,141,466.39	781.82
1903	7,965.13	9,304,892.04	1,168.20
1904	8,179.59	9,170,234.07	1,121.11
1905	8,305.40	11,385,418.33	1,370.85
1906	8,433.99	12,475,407.97	1,479.18
1907	9,273.15	15,286,062.66	1,648.42
1908	9,415.01	14,120,828.02	1,499.82
1909	9,794.86	12,884,406.81	1,315.43
1910	9,916.33	17,807,136.20	1,795.74
1911	10,350.13	16,059,786.90	1,551.65
1912	10,627.92	16,076,833.75	1,512.70
1913	10,750.31	18,054,413.03	1,679.43
1914	10,908.52	15,308,780.25	1,403.38

COMPARISON OF OPERATING RESULTS.

The following is a statement of revenues and expenses of the System for the fiscal year ending June 30, 1914, in comparison with the previous year:

	Year Ending June 30, 1914.	Year Ending June 30, 1913.	Increase or Decrease.
OPERATING REVENUES:			
Freight	$73,638,388.01	$78,190,923.18	—$4,552,535.17
Passenger	28,497,232.68	29,425,922.44	—928,689.76
Mail, Express and Miscellaneous	8,974,149.17	9,279,406.36	—305,257.19
Total Operating Revenues	$111,109,769.86	$116,896,251.98	—$5,786,482.12
OPERATING EXPENSES:			
Maintenance of Way and Structures	$15,308,780.25	$18,054,413.03	—$2,745,632.78
Maintenance of Equipment	19,100,724.51	19,415,224.63	—314,500.12
Traffic Expenses	2,521,452.94	2,455,784.69	65,668.25
Transportation Expenses	33,818,432.83	35,135,649.15	—1,317,216.32
General Expenses	2,719,943.15	2,581,463.23	138,479.92
Total Operating Expenses	$73,469,333.68	$77,642,534.73	—$4,173,201.05
Net Operating Revenue	$37,640,436.18	$39,253,717.25	—$1,613,281.07
Ratio of Operating Expenses to Operating Revenues	66.12	66.42	—.30

The following averages are deduced from tables set forth on pages 36 and 39.

The average tons of freight (revenue and company) per loaded car mile decreased from 19.14 to 18.75, or 2.04 per cent.

The average tons of freight (revenue and company) carried per freight-train mile (freight, mixed, and company-supply) decreased from 425.41 to 420.45, or 1.17 per cent.

The average freight revenue per revenue freight-train mile increased from $3.48 to $3.55, or 2.01 per cent.

The average passenger revenue per revenue passenger-train mile decreased from $1.24 to $1.17, or 5.65 per cent.

The average passenger train revenue per revenue passenger-train mile decreased from $1.54 to $1.45, or 5.84 per cent.

The tons of freight carried one mile (revenue and company) decreased 782,191,703, or 8.07 per cent., while miles run by freight cars (loaded and empty) in freight, mixed, and company-supply trains decreased 33,993,215, or 4.75 per cent., and the mileage of such trains decreased 1,591,321, or 6.98 per cent.

The number of passengers carried one mile decreased 14,824,376, or 1.12 per cent., while miles run by passenger cars in passenger and mixed trains increased 40,066, or .03 per cent., and the mileage of such trains increased 657,069, or 2.77 per cent.

The following is a consolidated statement of the business of the System for each fiscal year during the period since January 1, 1896:

Fiscal Year Ending June 30.	Average Miles Operated.	Gross Revenues, Including Income from Other Sources.	Expenses, Including Taxes, Rentals and Other Charges.	Interest on Bonds.	Net Corporate Income.
1897 (18 mos.)	6,443.81	$44,532,628.99	$36,038,455.30	$8,440,387.91	$53,785.78
1898	6,936.02	39,396,126.41	30,513,553.17	7,045,988.30	1,836,584.94
1899	7,032.62	40,762,933.47	29,332,964.11	7,241,972.00	4,187,997.36
1900	7,341.34	46,498,899.04	29,414,427.56	7,345,166.50	9,739,304.98
1901	7,807.31	54,807,379.78	34,502,039.87	7,830,810.83	12,474,329.08
1902	7,855.38	60,275,944.33	36,272,432.45	8,438,985.00	15,564,526.88
1903	7,965.13	63,668,390.99	40,635,576.48	9,134,485.24	13,898,329.27
1904	8,179.59	69,419,975.41	44,641,434.10	9,418,770.00	15,359,771.31
1905	8,305.40	69,189,739.65	47,835,883.50	9,611,510.09	11,742,346.06
1906	8,433.99	79,390,749.05	51,035,355.71	10,622,184.22	17,733,209.12
1907	9,273.15	94,436,574.68	61,779,916.16	11,487,934.70	21,168,723.82
1908	9,415.01	91,289,770.61	65,031,582.67	12,579,301.77	13,678,886.17
1909	9,794.86	95,424,091.89	61,458,019.13	13,548,081.93	20,417,990.83
1910	9,916.33	107,543,250.16	75,133,314.54	11,984,151.36	20,425,784.26
1911	10,627.92	110,322,328.13	77,001,227.38	13,660,859.50	19,660,241.25
1911	10,350.13	109,772,481.69	75,689,094.83	12,712,319,31	21,371,067.55
1913	10,750.31	119,411,875.94	83,432,816.21	13,825,325.40	22,153,734.33
1914	10,908.52	113,284,122.98	80,213,746.06	12,886,412.23	20,183,964.69

The following statement shows the gross operating revenues of the System (exclusive of income from other sources) per mile of road operated for each fiscal year since July 1, 1896:

Year Ending June 30.	Gross Operating Revenues.	Average per Mile of Road.
1897	$30,621,230.10	$4,752.04
1898	39,214,099.24	5,653.69
1899	40,513,498.63	5,760.80
1900	46,232,078.23	6,297.49
1901	54,474,822.61	6,977.41
1902	59,135,085.53	7,527.97
1903	62,350,397.28	7,827.92
1904	68,171,200.18	8,334.31
1905	68,375,837.25	8,232.70
1906	78,044,347.25	9,253.55
1907	93,683,406.91	10,102.65
1908	90,617,796.38	9,624.82
1909	94,265,716.87	9,624.00
1910	104,993,194.67	10,587.91
1911	107,565,115.62	10,392.63
1912	107,752,359.91	10,138.61
1913	116,896,251.98	10,873.75
1914	111,109,769.86	10,185.60

The following statement shows the development of the freight and passenger revenues of the System since July 1, 1896:

Year Ending June 30.	Freight Revenue.	Passenger Revenue.
1897	$22,067,686.77	$5,574,288.31
1898	28,588,716.76	7,347,361.59
1899	29,492,586.65	8,126,141.85
1900	33,729,332.83	9,334,661.57
1901	39,052,557.43	11,678,017.25
1902	41,815,607.05	13,439,384.57
1903	44,622,438.71	13,469,985.78
1904	47,762,653.23	15,433,773.63
1905	47,408,982.36	16,045,380.27
1906	54,598,902.82	18,013,988.56
1907	65,500,309.42	21,171,629.08
1908	61,848,638.51	21,643,427.49
1909	64,212,638.10	22,734,505.32
1910	71,194,055.59	25,437,181.98
1911	71,787,200.89	27,204,867.66
1912	71,529,467.67	27,453,525.41
1913	78,190,923.18	29,425,922.44
1914	73,638,388.01	28,497,232.68

PROPERTY INVESTMENT AND RATE OF RETURN.

The development of the Company's business and of its efficiency have been due principally to the very large expenditures (over $298,000,000) which have been made in the extension and improvement of the property since January 1, 1896. In order to make such expenditures, your Company has raised since 1896 over $217,000,000 of "new money" by the sale of bonds which are now outstanding or which (in the case of many of the Convertible Bonds sold) are represented by Common Stock now outstanding.

The following statement shows, for each year, the amount of investment, the amount of net income applicable to bond interest, dividends, improvement of property and strengthening of credit, and the rate of return which such net income represents on the amount of the investment.

Year Ending June 30th.	Property Investment.*	Income Applicable to Bond Interest, Dividends, Improvement of Property and Strengthening of Credit.†	Per Cent. Income of Property Investment.
1896 (6 months)	$372,104,262.77	$2,432,870.06	.65
1897	387,957,477.68	6,070,364.45	1.57
1898	392,169,842.02	8,871,947.26	2.26
1899	399,527,444.30	11,409,315.36	2.86
1900	407,187,811.22	17,064,850.91	4.19
1901	419,541,440.17	21,196,714.38	5.05
1902	439,911,035.33	23,921,018.14	5.44
1903	454,290,057.89	23,032,814.51	5.07
1904	466,273,139.34	24,778,541.31	5.31
1905	473,020,998.79	21,353,856.15	4.51
1906	496,782,342.35	28,355,393.34	5.71
1907	519,004,129.48	32,724,274.07	6.31
1908	541,727,328.96	25,633,510.34	4.73
1909	548,251,270.97	33,523,437.28	6.11
1910	579,793,768.23	32,387,712.39	5.58
1911	609,287,764.18	34,102,511.86	5.59
1912	621,869,989.29	33,321,100.75	5.36
1913	640,263,756.10	36,078,744.55	5.63
1914	651,428,708.11	33,070,376.92	5.08
Annual Average	$495,810,135.11	$24,288,073.19	4.90

*The amounts above shown as "Property Investment" do not include anything for necessary working capital such as materials and supplies and cash. Ordinarily such necessary working capital considerably exceeds $35,000,000.

In the years 1901 to 1908 the "Property Investment" was reduced by "writing off" sums aggregating $21,066,685.78, which sums are excluded from the "Property Investment" as above stated.

In the years 1910 to 1914, sums ranging from $8,211,433.32 in the former year to $19,790,186.11 in the latter year, representing depreciation of equipment accrued pursuant to the rulings of the Interstate Commerce Commission, have been deducted from the amounts shown as "Property Investment" and are excluded in the above statement.

†The "Income" shown above is determined after allowing for adjustments made through profit and loss.

The foregoing statement emphasizes the striking fact that the total net income is now barely in excess of five per cent. per annum upon the investment, and of course not all of this income can be distributed in the way of interest and dividends since it is desirable to appropriate a substantial amount of net income each year to Additions and Betterments for the due preservation of the credit of the Company.

The ability of your Company, under the conditions reflected by this statement, to pay six per cent. on the common stock is explained by the fact that it pays an average of very little more than four per cent. on its bonded debt, much of the bonded debt having been created when money could be borrowed at or near four per cent. But for several years it has been impracticable to borrow large amounts of money for railroad purposes at as low a rate or even as low as four and one-half per cent., and under present conditions it is believed the rate of interest which would have to be paid would be substantially greater.

CAPITAL STOCK AND FUNDED DEBT.

The outstanding Capital Stock (deducting stock in treasury) on June 30, 1913, consisted of:

Common	$190,836,500.00	
Preferred	114,173,730.00	
		$305,010,230.00

Issued during the year:

Common Stock issued in exchange for Convertible Bonds retired	4,975,000.00

Capital Stock outstanding June 30, 1914:

Common	$195,811,500.00	
Preferred	114,173,730.00	
		$309,985,230.00

The outstanding Funded Debt of the System (deducting bonds in the treasury) amounted on June 30, 1913, to.....$319,146,148.50

The following changes in the Funded Debt occurred during the year:

Obligations Purchased or Retired:

Serial Debenture 4% Bonds,		
Series K	$ 5,000.00	
Series L	270,000.00	
Convertible 4% Bonds	4,975,000.00	
Miscellaneous Divisional Bonds	702,500.00	
		5,952,500.00
Total System Funded Debt outstanding June 30, 1914		$313,193,648.50

Interest charges for year ending June 30, 1915, will be approximately $12,809,000 or an average monthly charge of about $1,067,417. In making this approximation, exchanges of Convertible Bonds for Common Stock made since June 30, 1914, aggregating $364,000, are considered.

TREASURY.

Neither this Company nor any of its auxiliaries has any notes or bills outstanding.

The Company held in its treasury on June 30, 1914, $20,062,758.99 cash, and had available $3,780,000 General Mortgage Bonds, including bonds not yet certified by the Trustee. The Company also has in the treasury unpledged a large amount of stocks and bonds of other companies, of which part are carried in the balance sheet as Investments and part are included under Railroads, Franchises and Other Property.

FUEL RESERVE FUND.

The fund has been increased during the year by appropriations of income, as follows:

Amount to credit of Fund June 30, 1913	$1,726,846.19
Added during the year	51,485.83
In Fund June 30, 1914	$1,778,332.02

KANSAS SOUTHWESTERN RAILWAY COMPANY.

During the year your Company acquired from the Receivers of the St. Louis & San Francisco Railroad Company that company's interest in the stock and notes of The Kansas Southwestern Railway Company (the stock of which company has heretofore been owned jointly by your Company and the St. Louis & San Francisco Railroad Company). However, under the terms of the transfer the St. Louis & San Francisco Railroad Company and its successors have the option of re-acquiring such securities within five years from April 17, 1914, upon payment to your Company of one-half of the sums expended by it in the maintenance, operation and improvement of the property.

MINKLER SOUTHERN RAILWAY.

This line, which was under construction at the date of the last annual report, extending from Minkler to Exeter, California, with branch line connecting with the Visalia Branch at Cutler, a total of about 40 miles, has been completed to Exeter since the close of the year and will be opened for traffic October 1, 1914.

NORTHWESTERN PACIFIC RAILROAD COMPANY.

Reference was made in the last annual report to the construction of the line of this company (whose capital stock is owned, one-half by your Company and one-half by the Southern Pacific Company) from Willits to Shively, a distance of 105.64 miles. Of this mileage 64.47 miles had been constructed at the beginning of the year, 29.10 miles were completed during the year, leaving only 12.07 miles still to be constructed, the grading for which was nearing completion at June 30, 1914.

OAKLAND WHARF PROPERTY.

In order to provide for the increasing business of your Company at San Francisco Bay points, 30 acres of land with extensive water frontage, situated at Oakland, California, have been acquired, upon which your Company is at present erecting necessary facilities for the handling of business offered it.

WEST TEXAS CONSTRUCTION.

The extension of the Coleman-Lubbock Line from Lubbock, Texas, to Texico, New Mexico, was completed during the year and was opened for traffic March 1, 1914. The completion of this line closes the gap between the lines of The Pecos and Northern Texas Railway and the Gulf, Colorado and Santa Fe Railway Companies running southeast to the Gulf of Mexico and the lines of your Company extending west from Texico to the Pacific Coast, and places in service the shortest line between Galveston, Texas, and San Francisco, California. It is expected that through passenger service over this line between the Gulf of Mexico and the Pacific Coast will be inaugurated during the current year.

ST. LOUIS, ROCKY MOUNTAIN AND PACIFIC RAILWAY.

On August 1, 1913, your Company took possession of this line under an agreement with the St. Louis, Rocky Mountain and Pacific Company (the owner of all of the capital stock of the St. Louis, Rocky Mountain and Pacific Railway Company) under a contract of purchase, provided transfer can be made free of all liens, the consideration being $3,000,000 of 4 per cent. fifty-year bonds of your Company secured by a mortgage on the St. Louis, Rocky Mountain and Pacific Railway. This line is 106.04 miles in length, extending from Des Moines, New Mexico, to Ute Park, New Mexico, with two branches, one to Raton and one to Koehler, New Mexico. This line serves a coal mining territory, a large part of the product of which is used for company fuel and the balance of which is distributed chiefly to points on your Company's lines.

ADDITIONAL MAIN-TRACK MILEAGE.

The mileage of second track in operation on June 30, 1914, was 974.65 miles as compared with 898.32 at the close of the preceding year, being an increase of 76.33 miles.

TAXES.

Special attention is called to the menacing increase in the taxes imposed upon railroad property. Your Company's taxes for the year 1914 were $5,525,585.30. This represents more than 14¼% of the total net income which the Company had available for the payment of taxes, interest, dividends, etc.

Your Company's taxes have increased 188% in the last ten years, although the investment in the property has increased in that time less than 40% and although the net income available for taxes, interest and dividends has increased in that time less than 45%.

In the last five years the Company's taxes have increased over 83%, although the investment has increased less than 19% and the net income available for taxes, interest, dividends, etc., has increased less than 5%.

While there are various contributing causes to this condition (including the expiration of some tax exemptions in Arizona and New Mexico), the principal cause, which continues in apparently increasing force, is the disposition to increase public expenditures shown by practically all governmental agencies of the States, cities, counties and taxing districts (not to mention the Federal Government, whose tax burdens to a large extent fall on the railroads indirectly and therefore are not fully reflected in the amount of railroad taxes paid). Governmental agencies generally counsel the railroads to increase their economies and to improve their efficiency, and stern necessity, even if there were no other motive, has forced the railroad companies to do this; but there is nothing to indicate that the governmental agencies themselves have practiced what they have preached in this respect. The evidences of extravagance in all grades of governmental activity are very numerous and the evidences of governmental economies are exceedingly rare. The result is proving dangerously burdensome to the railroad properties of the country.

The movement which has for its aim the assessment of all property at full value has indirectly largely contributed to the prevailing extravagance. Rarely have tax rates been reduced in the same measure that assessments have been increased. Even where State bodies have increased assessments of all property two and three fold it has been exceedingly difficult to bring about any reduction of local rates. Although still in its infancy the good roads movement has already received large appropriations. Expenditures for this purpose are likely to assume large proportions in the near future.

GENERAL.

Your Directors feel that heavy responsibilities devolve on them in the present state of governmental activities directed at the railroad industries. It has been found almost impossible to make even an approximate estimate of the cost of "regulation" which has been imposed on us by the State and National governments. Without criticising the policy of proper supervision, it is fair to say that many of the laws are not only expensive but in the opinion of your officers unnecessary and superfluous. Constant whittling of rates, plus constant legislation which adds to your expenses without adding to revenue, have had their inevitable effect. Your own Company has been less crippled by these conditions than some of those less fortunate, but by reference to page 14 it will be seen on how narrow a margin we have been working. There are some evidences of a disposition on the part of those in authority to realize that great injustice has been done in the guise of regulation and that it is time to call a halt, but the relief which the railroads need cannot come until this disposition shall be transmuted from mere expressions of friendliness into positive remedial measures. General words of sympathy will accomplish nothing if governmental agencies continue in each specific instance to impose additional burdens or to find excuses for not granting specific relief. Hence your Directors deem it their duty again to warn stockholders that their interests are more endangered by the various governmental regulations than from any other source.

But in making the foregoing statement the threatening attitude of the labor organizations must not be lost sight of as a vigorous second in the menace of the times. Your Company has always shown the utmost consideration for its employes, and as a class they are a credit to themselves and to the road. Left to themselves there would be little of which to complain, but the organizations as a body have been aggressively demanding increased wages for their members with no regard for the ability of their employers to pay, and have been steadily demanding, and frequently with success, many varieties of legislation, such as full-crew bills, designed to increase operating expenses. Between the repressive forces of Government and the demands of organized labor it is evident that the sum remaining as the share of invested capital is in serious danger.

Under these conditions it is the intention of your Directors to make no additions or betterments, however desirable, which can not be paid for out of current earnings, and to continue the policy of incurring no floating debt.

It is the sorrowful duty of your Board to record the death on March 22, 1914, of Byron L. Smith, a member of the Board of Directors since November 14, 1900. His active interest in the affairs of your Company and his knowledge of the territory served by it made him a most valuable counselor. He was a man who realized his responsibilities as a director and discharged his full duty in serving the interest of others in all his business affiliations. It is appropriate that there be placed before the stockholders this expression of appreciation of his services in their behalf, and of the loss which has been sustained by his death.

Your Directors take pleasure in acknowledging the faithful and efficient services of the Company's officers and employes during the year.

EDWARD F. RIPLEY,
President.

Railway Age Gazette

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L. B. Sherman, *Vice-President.* Henry Lee, *Sec'y & Treas.*
The address of the company is the address of the officers.

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Sworn to and subscribed before Harry E. French, Notary Public for Kings County, N. Y. (No. 15), whose certificate is filed with the County Clerk of New York (No. 13), and whose commission expires March 30, 1916, on September 17, 1914.

Volume 57 October 16, 1914 Number 16

Contents

*Illustrated.

Vanadium in Rail Steel

Vanadium has become favorably known through its use as an alloy in rolled and cast steel and to a limited extent in cast iron. The principal application of this metal in the railway field has been in wheels, axles, locomotive frames and tires, main rods and piston rods, crank pins and springs, in all of which it has been in service long enough to demonstrate its ability to improve the quality of the steel either by reducing the breakage, increasing the wear, or both. This success has prompted an experiment in the application of this alloy to rail steel. On account of the service required of a rail and the differences inherent in the manufacturing process, particularly the impracticability of heat treating rails as commonly practiced for locomotive parts, the result of this experiment will be looked forward to with much interest. The laboratory tests reported elsewhere in this issue show favorable comparisons with untreated open hearth rails rolled at the same time, but the service of these rails in the track will be the ultimate measure of their value. The reduction in the cost of vanadium, which has amounted to more than sixty per cent, is the important feature at present, as this makes it commercially possible for this alloy to enter the rail field and insures further tests, which will increase the number of possibilities of solving the rail problem.

Is This Petty Politics?

October 19 has been set as the day for a rehearing in the eastern rate case. Now comes the announcement by the Interstate Commerce Commission that the investigation into the Chicago, Rock Island & Pacific has been set for October 16, with J. W. Folk, of the New Haven investigation notoriety, as counsel. Just before the commissioners announced their refusal to grant an increase of freight rates in the last investigation, they made public a report on the New York, New Haven & Hartford affairs which, regardless of the accuracy of the facts, was presented in a yellow manner wholly unworthy of the Interstate Commerce Commission. For years every right-thinking railroad man and banker has deplored the Rock Island situation. The holding companies scheme, which vested control of the Chicago, Rock Island & Pacific Railway in the hands of Daniel G. Reid and Judge Moore, was and is indefensible. It has fallen to the ground through its own inherent defects. Is it possible that the Interstate Commerce Commission is going to permit the confusing, either in its own deliberations or, still worse, in the public mind, of the questionable practices of a few men a dozen years ago and the broad, vitally important economic question of the present straits of the transportation system of the United States? We venture to predict that every important fact which the Interstate Commerce Commission is going to "discover" about Rock Island affairs has been made public already, and the subject has been fully discussed in the *Railway Age Gazette*. Is it possible that the commissioners take such a small view of the tremendous responsibilities resting on them at present that they will let this particular stale scandal cloud the minds of even the least thinking people in connection with the reopening of the rate advance case?

Yard Maintenance and Standards

One of the serious drawbacks to efficient yard operation is a lack of appreciation of the importance of high standards of track construction and maintenance and the necessity for good locomotives. New 100-lb. rail and rock ballast on yard tracks could not be justified, but on the other hand 65-lb. rail and no ballast are not economical on yard ladder tracks which frequently carry more cars than the main line, and the same locomotives, although at reduced speeds. The importance of better track construction in yards is being realized on a number of roads

which are laying heavier rail and using better ballast. At the same time the condition of the tracks in the average yard is far below what it should be. As a result there is too much repairing of tracks after derailments have occurred and not enough upbuilding to prevent derailments. A derailment not only results in the destruction of track and equipment, but, more important, it interferes with and ties up the operation of that portion of the yard until the damage is repaired. Fully as important is the question of proper switching locomotives. When road locomotives which require overhauling are assigned to switching service for a time to secure a greater mileage before making repairs or locomotives too light to haul tonnage trains on the main line are sent into the yard, the yard operation suffers. Worn drivers increase the number of derailments and are destructive of track, while defective locomotives in general are inefficient in operation in a yard the same as on a main line. Likewise, engines too light to handle a full cut of cars delay operation through the entire yard. It is coming to be the more general practice to equip yards with engines designed especially for switching service, which is in line with economical operation. The old feeling that as long as the track and motive power will stand up they will do for the yard is fast disappearing. As about forty per cent of the total time of the average loaded freight car is spent in yards, an entirely disproportionate part of a railway company's total operating expense is in its terminals, and as the freight yards are always the first points of congestion, at least the same effort should be made to provide facilities necessary for the economical operation and proper handling of railroad traffic in the yards as on the main line.

Circular or Rectangular Engine Houses

Rectangular engine house designs are not new, but the one adopted by the Algoma Central at Sault Ste. Marie, Ont., and described elsewhere in this issue, is unique and furnishes a good illustration of proper adaptation of uncommon designs to local conditions. In most cases where such houses have been built, as on European railways, and in a few instances in this country, the considerations governing their choice have been a desire to economize space or to eliminate the turntable with its possibility of tying up all engines in the house when it is out of commission. Neither of these advantages is secured by the Algoma Central design, for the turntable is retained in the center of the house, and by the use of radial tracks the economy of space inherent in parallel track arrangements is sacrificed. The controlling factor in this case was the severe climatic conditions prevailing during the winter months, making it extremely desirable to place all facilities for handling engines under cover and to provide for the economical heating of this enclosed space. In view of the improvements in turntable design and standards of construction, and the fact that the table will always be protected from the weather, the danger of tying up the house by a turntable failure is not worth considering. The slight disadvantage which the house possesses as to the space occupied is also unimportant for the required engine capacity was small, the available space was ample and the radial arrangement of tracks with the consequent wide spacing at the outer ends contributes to economy in working on the engines in the house. The size of the building was practically fixed by the standard roof truss span adopted for the adjacent shops, since by using this standard truss on the engine house as well, at least as large a saving was effected as could have been secured by reducing all dimensions to the allowable minimum. The use of steel for the frame of the engine house is also uncommon enough to attract attention. Reliance is being placed on an English product which is reported to have the ability to preserve the structural steel against injury by corrosion. If such protection can be demonstrated to be entirely adequate for this purpose, it is quite probable that steel construction will be more generally adopted in buildings of this nature.

THE USE OF TORPEDO MACHINES IN ENGLAND

THE Railway Inspecting Officers of the British Board of Trade have recommended the general use of automatic train control (stopping apparatus actuated from outside the train), as noted in the *Railway Age Gazette* two weeks ago. Not only that; they realize the likelihood of delay in reaching an agreement as to what type of apparatus should be used, and under what conditions, and they go on, therefore, to "strongly recommend an extended use" of torpedo placers, controlled by the signals or the signalman, "as a temporary expedient." (These devices are already used in England to a very limited extent.) The inspectors summarize their recommendations as follows:

That railway companies should be urged (1) to take all possible steps to ensure that their regulations are strictly adhered to by their employees, and that the conditions under which the latter work admit of their so doing; (2) to extend the use of track circuit in connection with the control of signals or block instruments; (3) to carry out combined experiments with different systems of cab-signaling and automatic control, with the object of supplementing the present system of semaphore signaling; and meanwhile to extend the use of detonator-placing machines.

The significance of these recommendations lies in the fact that in matters affecting safety on railways, these three inspectors, when agreed, come pretty near to being the mouthpiece of the British government. They are not the Board of Trade, and the Board of Trade takes no radical action without specific authority from Parliament; but the inspectors' opinions are, in effect, the government's guide in legislation. And these conservative officers of the Royal Engineers seem to be not in the least worried about the dangers of "open circuit" schemes. A torpedo machine might be out of order and inoperative, and the failure not be discovered till a train was wrecked; but here we find the machine recommended without qualification. Torpedoes, in enormous numbers, have been and are used in England to repeat the indications of distant signals in time of dense fog; but here the inspectors call for their use in clear weather as well. Moreover, they say nothing about a proceed or "all-right" indication, though the all-right signal of the fogman who attends to the torpedoes, which is given by hand or hand-lamp, is an important element in the "fogging" as practiced in England for the last forty years.

American signal engineers have turned the cold shoulder to the torpedo machine for the reason—or for one main reason—that it is not sure to disclose its own failures. The conservative Englishman is apparently not so conservative as the progressive American. But this is not saying that our British friends are wrong. It is not for an American to criticize them if, instead of looking to this young country, they take their lesson from their near neighbor, France, where one large road, as was recently noticed, has used torpedo machines for fifty years and claims a record of 100 per cent efficiency. This does not mean that the machines have never got out of order; the French officer's statement means, we assume, that they have never failed when needed. The whole system of train running, of which the torpedo apparatus is a part, has never failed in this particular feature; there is no record of an engineman running past a stop signal.

Why is the British government taking this advance step? It can hardly be said that there has been any very marked change in the safety record of the English roads, as regards passengers' lives and limbs. Are enginemen found to be less careful than formerly? Some English railway officers say that they are. Whatever the reason, or motive, this systematic effort or purpose to prevent *all* collisions is in every way commendable. Of the three recommendations formulated by the inspectors, the first one—the one which, as a preventive of enginemen's errors, the American Railway Association seems to deem sufficient—is, evidently, held to be adequate to meet only a part of the troubles that need to be remedied. To what extent the conditions on the

best American roads are different from those in England cannot perhaps be told with precision; but there will be no dissent from the proposition that perfect conduct in the locomotive cab is as much needed here as anywhere, and as greatly desired. When we get perfect conduct in the cab, or when American railways generally shall have come as near to it as have the Interborough and Hudson Terminal subways in New York, or as near to it as appears to be the case on the Orleans Railway, of France, we can purge our rule-books of that perennial source of perplexity, the flagging rule. At the same time we shall relieve passengers from the annoyance of unnecessary torpedoes and from the midnight whistle that calls in the flagman.

WHAT WE ARE TRYING TO DO

WE published in a recent issue a brief abstract of a paper by John W. Alvord, an eminent consulting engineer, on the subject, "How Can Engineers Best Utilize the Technical Journals?" One answer to Mr. Alvord's question is that neither engineers nor any class of readers can utilize technical papers at all unless they are so edited as to make them really useful. It is a proper function of all classes of periodical publications to publish matter regarding current affairs which has merely the purpose and effect of satisfying the curiosity of their readers as to what is going on. But the trade and technical press has more important functions and to be really useful they must perform those functions.

Their main functions, the functions without which they would have no excuse for their existence are: First, to aid in establishing and maintaining good relations between their constituencies and the rest of the public; and, second, to help their readers to do their work better, and thereby contribute toward increasing the efficiency of industrial and commercial operations.

The *Railway Age Gazette* ventures at this time, with more or less modesty, to say to its readers, that it is trying as hard as it can to perform in the field of railway transportation all of the proper functions of a technical paper. It is trying to satisfy the curiosity of its readers regarding the developments taking place in their field by publishing current railway news. Not only do we have a large department devoted solely to current railway news, but it is seldom that we publish an article, either short or long, which does not possess the element of timeliness. But what we are trying most to do is to accomplish the other two great purposes above mentioned.

A publication devoted to the interests of any class of large concerns cannot at the present time set for itself any more difficult or important task than that of helping them to establish and maintain good relations with the general public. Large concerns of all kinds are under fire; and their future will depend very largely on the kind of treatment they shall receive from the public. Of no class of concerns is this more true than of the railways. It is essential to the establishment of satisfactory relations between the roads and the public that the public shall be to the largest extent possible supplied with all the facts which tend to show how well managed the railways are and what they are doing to promote the interests of the public. But the relations of railways and large concerns to the public are not going to be made and kept satisfactory merely by telling the people how virtuous and well-managed they are. There have been so many disclosures of shortcomings in the management of large concerns of various kinds in recent years that the public knows that the way in which many of them have been managed has been far from perfect, and it is not going to be fooled by partisan attempts to defend what is indefensible. Therefore, publications intelligently devoted to the interests of classes of business concerns which are the subjects of popular discussion realize that they would not render their constituencies the best possible service, to say nothing of doing their duty to the public, if they told merely the good things their constituencies did or tried to defend everything that they did, or even if they told and defended only what they did that was defensible and passed over in silence the things that they did which were not defensible. If a publication devoted primarily to the interests of a particular class of concerns is to be of any real service in establishing satisfactory relations between its constituency and the public, it must frankly and courageously criticize its constituents when it thinks they do wrong, as well as defend them when it thinks they are unjustly attacked.

Intelligent and friendly criticism from such a source is, or ought to be good for those who receive it, and probably it also tends to cause the general press and public to respect and be convinced by what publications having expert knowledge say in extenuation or defense of the methods and policies of the concerns with which they are closely identified.

It is for these reasons that the *Railway Age Gazette* follows the policy of not only defending railway managements when it thinks they are unjustly criticized, but also of criticizing them when it thinks they deserve it. There have been cases where railway men have found fault with this paper, because they have thought either that things which it has said were unjust to the railways or were things that should have been left to be said by other publications if they were to be said at all. But it has been a cause of satisfaction and encouragement to us that apparently a large majority of railway officers have endorsed our policy of saying at all times what we have honestly thought, and there can be no question that if this paper is contributing toward establishing better relations between the railways and the public, it is chiefly because it does follow this policy.

As important as is the work of a trade or technical paper in helping to establish good relations between industries with which it is identified and the public, of yet greater importance is its work of helping to increase the efficiency of the management and operation of the concerns in its special field. The *Railway Age Gazette* has decided that it may best do this in its field, by keeping in close touch with the problems of those actively engaged in practical work for railways and railway supply concerns, and then making its columns a clearing house for the exchange of the best ideas and the most illuminating experiences of these practical men; and this is the chief thing that we are trying to do. For example: One of the main problems of railway operating officers is to get more effective service out of freight cars. The ton miles per freight car per day and year are too small, and one of the principal reasons is that cars are not handled expeditiously enough in classification and terminal yards. It seemed, therefore, that the handling of cars in classification and terminal yards was a subject needing thorough discussion, and it was to secure this that we advertised sometime since for papers on the handling of cars in classification yards, and that we later advertised for papers on the handling of cars in terminal yards. Articles on the handling of cars in classification yards were published sometime ago, and, it is hoped and believed, proved of much value. More recently a large number of very able papers on the handling of cars in terminal yards has been received. The first of them was published last week, and the rest will follow in later issues. It was to contribute what we could toward increasing efficiency in railway mechanical departments that our *Mechanical Editian* was established; and it was to contribute toward increasing the efficiency of maintenance of way work that our monthly *Maintenance of Way* section was established. We believe the various discussions of means of increasing efficiency have accomplished their objects because they have been participated in by railway men who are among the best equipped in the country to deal with the subjects on which they have written.

The extent to which a publication such as this can be made of real practical value depends, however, very greatly on the extent to which it secures the confidence, support and co-operation of its readers. We have the co-operation of our readers to such an extent as to encourage the hope and belief that we have their confidence. But, we venture to confide to them that if they are satisfied with the *Railway Age Gazette* and what it is doing they think better of it than its editors do. We think we are getting out a good and useful paper; but we are but too well aware that it can be made much better and more useful, if the railway men of the country will help us. The best way they can help us, and

thereby help themselves, is to make the *Railway Age Gazette* more and more a clearing house for their own ideas and experience.

Gentle reader, we are doing our level best for you, but you can help us do better for you. If you have any suggestions to offer or any criticisms to advance, which you think might tend to help us to make this paper more useful to railways and railway men, don't hesitate to communicate them to us. What we are trying to do is to make every issue of the *Railway Age Gazette* such that it will be of *real practical service* to men in every rank and branch of the railway organizations of America.

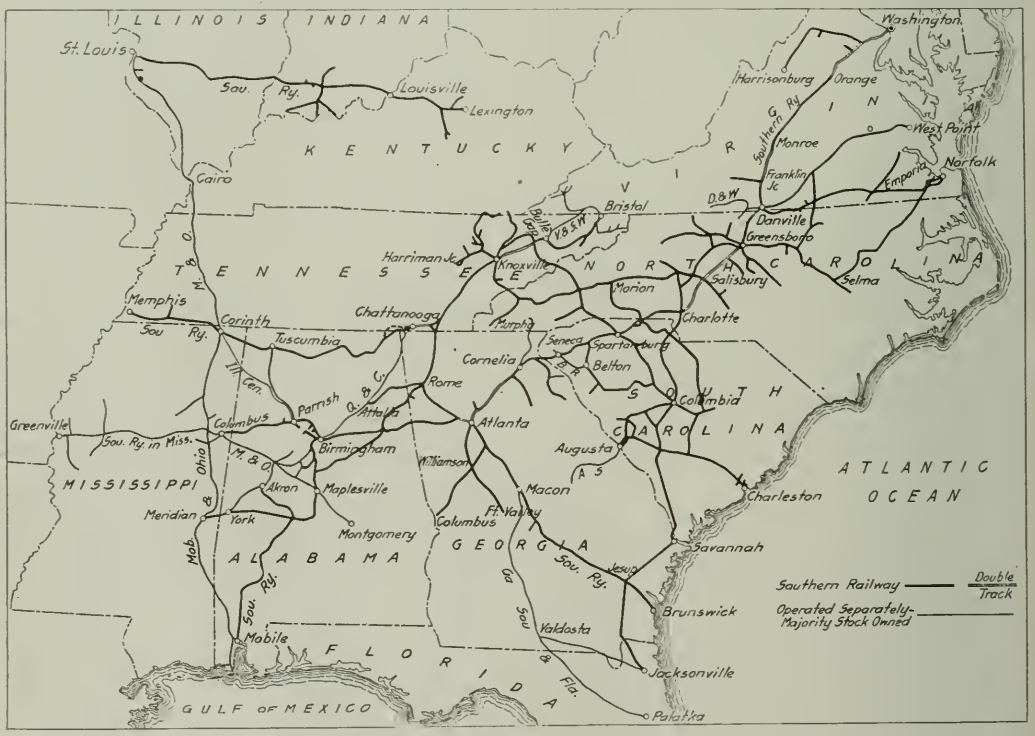
SOUTHERN RAILWAY

THE south is at present seriously affected by the European war principally, of course, because of the difficulties of financing and selling the cotton crop. While the prosperity of the rest of the country has had both ups and downs since 1907, the prosperity of the south has grown steadily during these years and this growth has been sound as well as rapid. One of the most, if not the most, important factors in this growth in prosperity has been the improvement, both in aims and ideals and in actual quality and quantity of service, of the transportation system of the South. Even in the fiscal year ended June 30, 1914, there was no serious interruption to the Southern Railway's progress. Total operating revenues amounted to $69,534,000, an increase over the previous year of 1.47 per cent; expenses amounted to $18,963,000, an increase of 6.38 per cent over the previous year; and after the payment of taxes and interest there was available for dividends $4,840,000 as against $7,079,000 the year before.

The actual tonnage of cotton carried by the Southern Railway is not a large percentage of its total tonnage. In the fiscal year ended June 30, 1914, it was but 2.48 per cent, and the tonnage of seed, hulls, meal and cake, and oil was an additional 2.73 per cent. Since, however, the price received for the cotton crop represents a large proportion of the income of a great number of people in Southern Railway territory, the loss in revenue to the railway from the inability of the cotton planters to sell their cotton is by no means measured by the loss that would result from the non-movement of 5 per cent of the total tonnage. On the other hand, since the growth in prosperity, both of the Southern Railway and the people served, has been sound, the problem presented by the cotton situation is one which, if met in the proper spirit, should entail but a temporary loss and may in the long run have actually beneficial results, in that it may lead to more diversified agriculture in the South. How the situation is being met cannot be better expressed than in President Fairfax Harrison's own words in the annual report to his stockholders:

> The loss in revenue since the beginning of the European war and the outlook for the immediate future have demanded a strict policy of retrenchment, always a disagreeable duty. The consequent reduction of service of employees means a reduction of the opportunity of many men to earn the livelihood to which they have been accustomed, and it has seemed fair to the officers that they too should share the sacrifice, so that as a temporary measure the salaries of all officers earning in excess of $2,500 per annum have been voluntarily and loyally reduced in fair proportions. Under these circumstances the board has deemed that it was fair also for the preferred stockholders to share the necessities of the situation. Accordingly, although the full 5 per cent on the preferred stock was safely earned for the year before the current acute conditions were apparent, the dividends declared for the year were reduced from 5 per cent to 4½ per cent. Furthermore, the dividend for the second half of the year was declared payable not in cash but in scrip, redeemable in five years and meanwhile bearing interest at the rate of 4 per cent per annum.

To judge adequately of the results of operation of a great railway property like that of the Southern in one year as compared with another it is essential that a general picture of the property, the requirements of its service and the sources of its



The Southern Railway System

income be kept vividly in mind. The company operates 7,010 miles of road, the greater part of which is a network of branch lines connecting one community with another, built originally in the majority of cases irrelevantly to any general scheme of transportation. To have operated this great mass of intersecting mileage as separate local lines would have not only been impossibly expensive if any kind of service were to be given, but it would have failed utterly to develop the natural resources of the country and of its people. The line running from Washington to Atlanta naturally forms a main artery of traffic on which the movement of both freight and passengers must be uncongested and performed so economically as to offset the cost of running trains on branch lines where traffic conditions make such operation unprofitable, although such operation is necessary to meet the requirements of public service. The old main line of the Southern Railway was single-track, 60 and 70-lb. rail, with an almost constant ascending or descending grade of 1 per cent. The Washington-Atlanta line now is about two-thirds of it double-track, the total road mileage being 649 miles, of which about 400 miles has double-track. The double-track is stone ballasted, laid with 90-lb. rail, and has a maximum grade of 0.5 per cent. Arrangements have been made for the completion of this double-track work and the company has available for sale to pay for this work $20,000,000 Atlanta & Charlotte Air Line bonds. This capital expenditure on betterment of the main line, although the most expensive single piece of work, is typical of the policy of improvement which, however, must of necessity proceed only so rapidly as can be justified by increasing business as a whole.

Mounting expenses have been one of the great problems of the Southern Railway as of other railways. One source of increased expense deserves special mention. Taxes in 1914 amounted to $2,679,000, an increase of 8 per cent over the previous year. This is out of all proportion to the increase in railway revenues or increased land values in the South and shows a shortsighted attitude on the part of the public authorities that in time public opinion ought to correct. Nevertheless, the management has consistently stuck to its conviction that the growth of the railway property and the growth of the prosperity of the people served were so intimately connected that nothing which adversely affected the one could fail to be reflected in adversity to the other. A retrenchment which meant a saving in dollars and cents directly to the railway company, but which adversely affected the ability of the people served to make the most of their opportunities was a shortsighted economy.

This is rather strikingly illustrated in the train and traffic statistics for the fiscal year ended June 30, 1914. It is axiomatic that the shipper does not suffer, but that the railway does gain in economy in proportion to the reduction in train-miles of freight trains necessary to handle the total freight business.* This statement, however, does not apply to passenger business. Frequency of service, especially in local passenger service, may be of even greater importance to the community than the speed of trains. It is not enough that all the people who desire within the week to go from Athens, Ga., to Lula should within the week have a train provided for them. It is this fact that the Interstate Commerce Commission, apparently, ignores in its theoretical dictum that each branch of the service should bear its share of the total expenses. Where extra passenger-train mileage is the result of competition, a reduction in this mileage is generally a profitable economy for the railroad and not a loss to the public; but a reduction in passenger-train mileage which represents an impairment of service, even where the service is unprofitable, or a failure to increase passenger-train mileage to meet a reasonable increased demand for it, even where such additional train mileage is not profitable, is an uneconomical economy. This at least is the view that the Southern Railway management takes and it might be called the statesmanlike way of regarding rates and service as contrasted with the Interstate Commerce Commission's leaning theoretically toward making each branch of the service pay its own way.

*This is assuming, of course, that there is no undue delay in handling commodities moving to market. There was no such delay on the Southern.

As an illustration of what the Southern Railway is doing, the number of passengers carried one mile was 888,300,000 in 1914, an increase over 1913 of 5.15 per cent. Passenger-train mileage was 18,362,000 in 1914, an increase of 5.63 per cent, with, however, a considerable decrease in mixed-train mileage—887,000 mixed-train miles in 1914 as against 999,000 in 1913. The total number of ton-miles handled was 4,584,000,000 in 1914, an increase of 0.15 per cent. The freight-train mileage in 1914 was 15,756,000, a decrease of 5.31 per cent, with a decrease also, it must be remembered, in mixed-train miles; and an even better showing is made by the decrease in freight-train locomotive mileage, the total in 1914 being 16,586,000 miles, which is less by 5.81 per cent than in 1913. In this connection the fact pointed out by President Harrison that passenger train-miles for the year aggregated over 52 per cent of the total revenue train-miles and exceeded the total freight-train mileage by 2,607,000, while revenue from passengers was but 27.62 per cent of the total revenue from transportation, is striking. It will be seen, therefore, that the proportion of trains to travelers was maintained in 1914, the average number of passengers per train being 46 in both 1914 and 1913. On the other hand, the trainloading of freight was materially increased. The revenue freight-trainload in 1914 was 275 tons as against 260 tons in 1913, an increase of 6.14 per cent, and the total trainload, including company freight, was 339 tons in 1914 as against 321 tons in 1913. The trainload is not small when we consider the proportion of train-miles run on main line to the proportion of train-miles run on branch lines.

The total tonnage carried in 1914 was 29,650,000; in 1913, 29,450,000. The average length of haul was 155 miles in both years. The average ton-mile rate was 9.83 mills in 1914 and 9.82 mills in 1913.

The economies in the handling of freight would have been in 1914 more clearly reflected in comparative transportation expenses were it not for two principal factors—increases in wage scales and the addition of passenger trains and passenger train-mileage—which offset these economies.

Total transportation expenses in 1914 amounted to $25,052,000, an increase of $1,447,000 over 1913; but of this increase $566,000 was an increase in payments for injuries to persons, so that leaving out this probably abnormal factor, transportation expenses increased but 3 per cent.

Maintenance of way was $8,780,000 in 1914 as against $9,040,000 in 1913. In addition there was spent for what the Interstate Commerce Commission classifies as additions and betterments, but which the Southern Railway management considers expenditures for upkeep, $2,540,000 in 1914 as against $2,083,000 in 1913.

The Southern Railway is particularly fortunate in having financed its immediate needs before the European war began. At the end of the year the company had on hand $15,393,000 cash, with total working liabilities of $13,892,000, which included but a nominal amount—$455,000—of loans and bills payable. During the year the company sold $10,000,000 3-year 5 per cent collateral notes and $1,250,000 first consolidated mortgage 5 per cent bonds. The net increase in outstanding bonds and notes was $11,226,000, and in equipment trust obligations, $3,238,000.

The following table shows the principal figures for operation in 1914 as compared with 1913:

	1914	1913
Average mileage operated	7,033	7,036
Freight revenue	$45,077,048	$44,943,748
Passenger revenue	19,004,783	18,220,489
Total operating revenues	69,533,697	68,529,490
Maint. of way and structures	9,098,912	9,275,553
Maint. of equipment	11,974,090	11,290,337
Traffic expenses	2,243,556	2,094,010
Transportation expenses	25,051,780	23,605,046
General expenses	2,202,836	2,008,977
Total operating expenses	50,571,175	48,273,924
Taxes	2,679,390	2,480,387
Operating income	16,310,958	17,855,715
Gross income	19,578,364	21,221,686
Net income	4,839,706	7,078,625
Dividends	2,700,000*	3,000,000
Appropriations for additions and betterments	91,929	48,660
Surplus	2,047,777	4,029,965

*The semi-annual dividend on the preferred was reduced in second half of the year from 2½ per cent to 2 per cent and was paid in scrip and not in cash.

Practical Hints on Operation of Terminal Yards

Second Series* of Papers Discussing This Subject from Standpoint of Yardmaster and Superintendent

SECOND PRIZE—REGULARITY THE FIRST ESSENTIAL IN THE OPERATION OF A TERMINAL

By F. Lincoln Hutchins
Baltimore & Ohio, Baltimore, Md.

The basic principles of terminal operation are simple, but their application is difficult because of lack, or inconvenient layout, of tracks and warehouses; irregularities in road service; unfavorable power conditions; orders for special services; or lack of support on the part of superior officers.

The most important requirement is order and regularity. Run of business settles into a rut in which it continues with but few and infrequent interruptions, season fluctuations here being considered as regular. All yard work should follow its regular routine until some irregular occurrence makes necessary the master's direction. That terminal is necessarily inefficiently operated and is most easily disorganized and thrown into confusion, where the directing head has to give orders for details of ordinary routine. The criterion by which to judge of the qualifications of a superintendent of terminals or of a yardmaster, is in the minimum of direct attention he is obliged to give to the ordinary details of operation.

At the outset conditions must be made to secure the greatest degree of order and regularity. Patrons must be made to understand that yard work, to be effective, must be in regular routine, that their requests for cars, switching, or forwarding, may not be attended to at any time to suit their convenience, but that they must anticipate their needs and give such timely notice as will permit of doing their work in the regular order laid down for the guidance of the switching crews, with the assurance that only in this way can they be best served all of the time. Interference by traffic, or other, officials with such orderly procedure leads to a demoralization of the work, and prevents adherence to schedule performance, if indeed it does not prevent the adoption of any schedules for the work. Such interference greatly increases the terminal costs; increases which cannot be located in any item and consequently are undiscoverable in any analysis of costs.

In all railroad operation time is almost the most important element and particularly so in all yard work; hence a good yard superintendent will know by actual study the standard time for all the different operations and hold his subordinates as closely thereto as may be possible. It is entirely practicable to determine the average time for breaking up trains, making deliveries to each particular siding, switching at houses, industrial layouts, private tracks, stock yards, icing, weighing, and to secure the actual time used in each of these services with the number of cars handled in each.

Records are necessary to the efficient operation of any terminal. Its superintendent should have placed upon his desk at regularly stated times a tabulation showing not only the work done as a whole, but the efficiency of each switching crew. Unit records, made contemporaneously with the work, are simple and feasible, while tabulations are cheaply made by sorting and entering upon properly prepared tables. The use of tickets, similar to the transfer slips used by trolley car conductors, provide a cheap and effective means for the making of such records.

Employment of men is a matter of the greatest importance, yet one which has received scant attention. Because a man has two arms and two legs is no sign that he will make a good yard man. There are certain simple tests which will very clearly determine a man's characteristics and these should be applied before setting the man at work. The personal injury column would be largely reduced were men of careless disposition eliminated, to say nothing of avoidance of rough handling and errors of other kinds.

The foundation of discipline is found in an even observance of justice as between man and man. The man who allows his digestion to affect his treatment of those under him, or who does not recognize their individuality, cannot secure that discipline that is requisite in all railroad work. Treatment of men as though they had sold their individuality for a per diem is a most expensive method, while interested consideration of the welfare of subordinates pays large dividends.

The qualifications necessary for the efficient control of any terminal are: a thorough knowledge of conditions and requirements of operation; love of order and regularity; love of justice and the "square deal"; tact in handling men, both employees and patrons; resourcefulness in emergencies, and ability to secure and use records, and men with all these qualifications are entitled to adequate remuneration.

Upon large systems it is not enough to have competent men in charge of its terminals. There should be a staff of men familiar with conditions and methods at all terminals. A competent man with good observing powers, having the all-round information which a study of all the terminals would give him, would be able to suggest efficiencies now undreamed of and to reduce the unit costs which have grown to such large proportions during the past decade. He could formulate a code of best practices and assist in establishing schedules and standards of operation.

The breaking up of trains should proceed as fast as the trains arrive, if that be possible, so that the receiving tracks may always be open for incoming trains. The neglect of this has been a fruitful cause of special orders to make quick delivery of cars arriving upon different trains at different times, when they have been allowed to accumulate upon the receiving tracks. A regular order for handling all rush cars containing perishable, or immediate demand, freight should be adopted and no interference with it tolerated. This is particularly true if prompt delivery of all such business is to be maintained. An order for special service for one consignee will seriously interfere with the orderly delivery of all other similar consignments, even if it does not affect materially other routine.

As it takes no longer to marshal cars before, rather than after they are loaded, all cars for outbound freight houses should be put in order for forwarding before being placed in the houses. This provision adds to the surety of proper loading, as the cars for certain points will always be at the same berths. The freight house men soon learn the location of these cars and misloading naturally diminishes. It also permits of the localizing of receiving doors, so that shipments may be received at points nearest the cars in which they are to be forwarded. These houses and perhaps warehouses are the only ones which should have stub tracks.

Cars should flow regularly from the breaking up tracks into the tracks leading to inbound freight houses, which should have a slight downward grade so that freight house men can bar them along as needed, thus saving the attendance of a switching locomotive and crew; the only requirement being the removal of all empties before they block the house tracks.

Switching upon team tracks should be done at definite times, even if two, three, or more pullings should be established during the 24-hour day. Such times should synchronize with the business habits of the community so that the disturbance of cars upon these tracks may come at times when least used by patrons and also at such times as loading, or unloading, naturally finishes. Switching at other times leads to waste of car time in that it increases the time of empty cars upon these tracks, prevents the opportune setting of other cars and reduces the time of customers for loading and unloading.

*The first prize article submitted in the recent contest on this subject was published in the *Railway Age Gazette* of October 9.

At junction points there should be reciprocal relationship with the head of the connecting terminal in order to secure an efficient transfer of cars. Frequent consultations will do much to smooth out the little frictions before they become large enough to interfere with the orderly flow of traffic. Much may be gained by both roads if their respective terminal heads will endeavor to so deliver cars as to make it easier for "the other fellow."

In marshaling trains for forwarding we again have the necessity for regularity as it results in trains being made up and ready for the regular calling of the crews and the elimination of costly delays in the yard. Yard and despatching forces need to work in harmony in this respect. Fifteen minutes waiting for crew is very much more economical than crew waiting 15 minutes for train.

In transferring heavy freight there must be co-operation between the freight house and yard forces, and a man should be put in charge of this work who can bring about such co-operation. Exact records of costs of this work, put up to the proper official, often lead to a cure of the causes making such transfers necessary, especially when the cause is bad loading.

In conclusion, the efficient operation of any yard can be determined only by intelligent study of that yard, the introduction of schedules with standards of performance, and the setting up of unit records of actual results to compare with the standards. Supplementing this there is need for some one to be familiar with all terminals, whose whole duty is to secure the most efficient yard operation throughout the road's territory.

THE ADVANTAGES OF A CAR DESPATCHER

By D. S. Farley

Division Superintendent, Atchison, Topeka & Santa Fe, Kansas City, Mo.

The operation of a large terminal yard is very similar to flowing water. If obstructions are placed in the stream the water dams back immediately, and if there are enough obstructions, disaster occurs. If business is well handled and the system perfect, cars move through without delay or confusion; the shipping public is satisfied and the management is pleased. But let the system be poor and the organization bad, cars go wrong, and delays follow, the stream is dammed, confusion ensues and then follow bad feeling, diversion of business and a generally deplorable condition. The two most essential things to obtain the best results are organization and system.

ORGANIZATION

To get the best results the superintendent in charge of a terminal must surround himself with loyal and competent men. Once having formed an organization he must outline his policy to his subordinate heads and then leave it to them to obtain the results. No two men can run the same job at the same time and no two men ever do things in the same way. By placing the responsibility squarely up to the individual, it tends to make him use his own head at all times, and he will manage to overcome difficulties that otherwise would stall him. A man that cannot or will not assume responsibility should be dispensed with, not only for the good of the service, but also of the man himself.

A system of reports, daily, weekly and monthly, can easily be arranged which will keep the superintendent advised of what is being accomplished, leaving him time for more important things. The superintendent who tries to handle detail places himself in the class of cheaper help, or, in other words, he is being paid a superintendent's salary for doing work that the messenger or a clerk could do, leaving the office of superintendent vacant.

Frequent meetings of all heads of departments, preferably weekly, should be held in the superintendent's office to discuss matters of importance and a free discussion should be indulged in by all. The superintendent can well afford to have his department heads understand that he is having such meetings in order to get the benefit of their ideas, and any new ideas advanced should be given careful consideration. Such meetings do much to bring about harmony and good feeling, eliminating the old and erroneous departmental feeling, and help the service wonderfully. They make each man feel that he has a personal interest in the welfare of the company and that he should remove all obstacles that make it hard for another department to do business. Once such a feeling exists among the heads of departments, it will permeate the lower classes and business will be handled with the least expense. In other words, through a good organization of loyal men, economy of operation can be reached and through no other way.

The superintendent should be very careful in his discipline, to be sure that he has all the facts before him before he assesses discipline. A kind talk to a loyal and well-meaning employee, pointing out his error, will make a better and more loyal man, while a harsh letter of reprimand may destroy his loyalty. Habitual carelessness should not be tolerated, but no man who can be made into a good man should be dismissed, unless the case is so grievous that it would be bad policy to retain the culprit in the service.

SYSTEM

So far as possible there should be a time for doing everything and a set way of doing it, that is; a regular time should be made for transfers from one yard to another, deliveries to connecting lines, setting of the house, pulling and setting team tracks or handling industries. Emergency cases of course will occur which will necessitate some variation, but it is surprising how few exist when a regular system has once been adopted. When a time is set for doing work and all understand the work to that time, it eliminates special runs, leaving the power that would be so occupied, to do its regular work. This reduces overtime and moves the business with regularity.

Each yardmaster should be assigned a yard or territory, over which he has control so far as the handling of the business is concerned, and he must understand that he will be held personally responsible for the proper handling of all business through that particular yard or territory. The yards should then again be divided into yard clerk's or yard checker's territories, and they should understand that they must keep a complete check of their territory and not allow cars to be delayed for any cause. They will make reports as directed by the offices and work directly with the offices on the telephone, or with the yardmaster in their locality.

In the superintendent's office there should be a car despatcher, who will keep a check from reports sent him, of all movements. On inbound business, the bills or their equivalents should be kept on the inbound carload desk, for every car until some disposition is given for it. As soon as disposition is given, the bills should be removed from the case and the car ordered and carded. At regular intervals, a report of all cars ordered, showing the number, initial, contents and destination, should be given to the car despatcher in the superintendent's office, who will copy these onto a sheet which he keeps constantly before him, until the car reaches its destination. If a car does not reach its destination, be it an industry, a connecting line, house or team track, the despatcher should consult his last location of the car, and reach the yard clerk by telephone, in whose territory it was last reported, keeping on until he locates it, and then keeping after the yardmaster until it is moved. A delayed car should be given preferred attention. The yard clerk's reports must go to the car despatcher in the superintendent's office where delays, movements of cars, etc., can be checked, and reports should be made frequent enough to permit of every car ready to move, being traced by the despatcher quickly enough to prevent serious delays.

Under normal conditions 95 per cent of all cars in a terminal move with regularity, but the 5 per cent are the ones which become lost, placed on sidings, overlooked or delayed, causing complaints, claims, correspondence, bad feeling and diversion of business. Let one car be delayed or poorly handled, and it will cause more hard feeling than can be offset by the perfect handling of 99 other cars. The yard checks turned in to the despatcher makes it possible for him to keep after delayed cars and keep them moving before they have caused trouble. By this plan it will be noted that every car, regardless of its contents or importance, has a

tracer after it. The same plan should be followed on outbound cars.

Each day's reports when completed should be closed up and filed for future reference. These records will give a complete history of the movement of every car through the terminals, and will furnish valuable information in handling claims and other correspondence, as well as eliminate a vast quantity of unnecessary correspondence. The completion of these daily sheets consists of showing every car at its destination, the time ordered, time set and the average time in moving. If bad order, the time consumed in getting to and from the repair track and the time on this track; if held for any purpose, the time and reason therefor. This furnishes the superintendent immediately, information concerning delays which otherwise might go on for a long time and do much damage before being corrected. Also, these reports are totaled and averaged, which gives him a correct idea of the average time consumed in switching the entire terminal or any part thereof.

The cost of maintaining the despatcher's force is more than offset by the elimination of expense in other directions. As all cars move promptly and in regular connections, the old plan of making special moves to get some delayed car to its destination is eliminated. The prompt moving of all business stops correspondence, not only with the public, but among the employees. In special cases where the detailed handling of a car is asked, the information can be given immediately from the despatcher's sheets, as they show the entire handling of the car from the time it is ordered until set, and the cause for any delays it may have encountered.

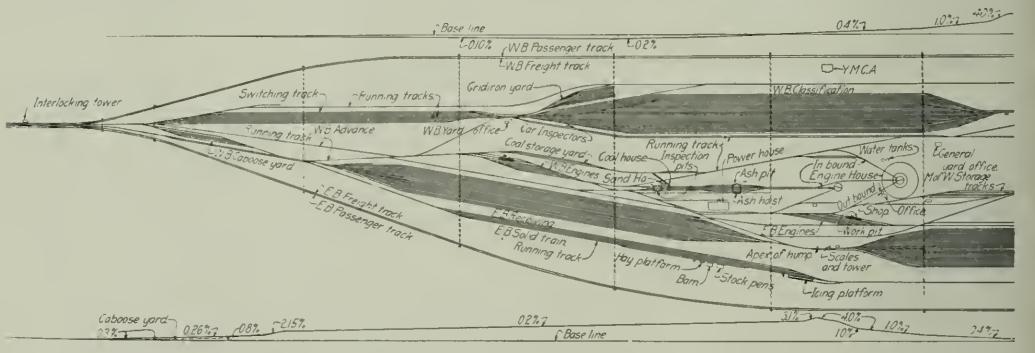
the resourcefulness and alertness of the officers in charge.

2. That under normal conditions it takes about as long to move a car of freight through one terminal as to haul it 100 miles in road movement. Were it not for this condition, thousands of freight cars would be available in times of shortage which are now tied up in their snail's pace movement through our terminals, and thousands more would need never have been built.

3. That approximately 70 per cent. of the total freight transportation expenses pertain to the direct cost of yard and road movement which represent about 35 per cent. of the total operating expenses chargeable to freight. In view of the strategical position of our yards in the movement of traffic, this percentage has added significance and becomes worthy of equally as much careful research and highly trained thought as is devoted either to the maintenance of way or motive power departments. On how many railroads is this attention given to the science of transportation—to road and yard operations? It should be noted by comparison that M. W. & S. expenses run about 20 per cent. and M. P. expenses 25 per cent. of the total operating expenses.

While we cannot, then, prescribe a formula for yard practice, there are a number of controlling factors that deserve special emphasis, and which demand as much training and thoughtful study as each of our organizations can acquire.

Road Power and Engine Terminals.—The necessity for adequate road power and engine terminal facilities is of first importance if a yard is to be kept open and receiving tracks clear for the free entrance of incoming trains. One will frequently hear the yardmaster say "Take the trains from me as fast as made up, and I can classify all that arrive without holding them out." To do this we must have ample power for outbound movement, and, equally as important, engine facilities that will insure the prompt handling and preparation of the locomotives. It is wasteful to have an excess of power to offset the unnecessary delays in preparing engines for service. The design of engine terminals should provide for such water, coal, ash pit, inspection pit and turntable facilities, and track arrangements that engines will move through in minimum time and with least interference to traffic.



A Suggested Design for a Large Classification and Terminal Yard at the Junction of Four Main Line Divisions

ANALYTICAL STUDY OF YARD DESIGN AND OPERATION

By J. H. Hopkins

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To the practical man in railway transportation the operation of terminal yards is a factor too variable to fall within the scope of those phases of the railroad problem for which "plans and specifications" may be drawn up and a standard practice adopted with higher efficiency as its aim. Each location of a terminal yard, each breaking-up point for through traffic has its own difficulties for solution dependent upon a variety of influences.

So we find every yard becomes an individual study in transportation efficiency, and as has been suggested, in public service. That this involves a vital factor in our transportation problem we need only be reminded:

1. That terminal yards are the gateways through which the entire volume of our freight traffic must pass and when we allow any of these gateways to become clogged, the whole train of traffic on one division, or as frequently happens, on a number of adjoining divisions, becomes affected, perhaps completely paralyzed, depending upon the severity of the blockade and.

Yard Power.—Yard power, more frequently proving inadequate as to quality than quantity, is a feature too often neglected, resulting in locomotives unsuited to the work required, and in frequent interruptions to classification as well as industrial work, a loss which is always permanent, offset by no advantages whatever. The amount of time lost in switching with old and wornout power frequently breaking down in service, or with engines too light for quick movements with average loading, is more than we often realize. Using such power at busy points is a false economy, too commonly practiced. More particularly should this be guarded against at outlying points or intermediate yards through industrial districts where shop facil-

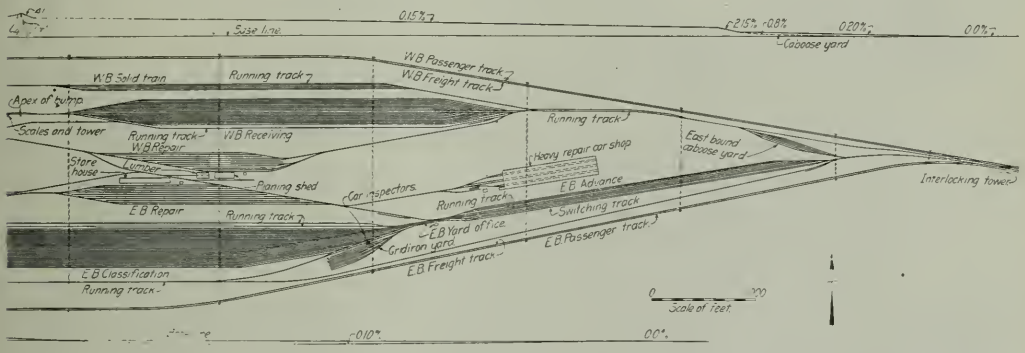
ities are lacking and engines must be run to the nearest terminal for light repairs of almost any nature. Inconvenience to manufacturer, interruption to work and loss of crews' time are, in such instances, aggravating and costly to all concerned.

Yard Design.—The design of a yard, like its operation, is dependent on too many indeterminate factors to allow of a standard plan, even for yards of the same type. In the accompanying diagram, drawn to typify an ideal arrangement for a large classification yard at the junction of four divisions, some salient features may be mentioned as applicable to any terminal of this character or of less extensive proportions.

Attention is called to the arrangement of engine terminal and running track facilities to avoid conflicting movements and the crossing of traffic wherever possible. The grade of receiving yards, while depending often on the contour of site selected, should approximate, where possible, the ruling grade of the division over which incoming trains arrive. In this way the road engine performs a good share of the work of lifting the cars up to the summit for gravity switching. The yard power then required to shove trains over the hump will be considerably less than were the receiving yard level with a sharp rise to the summit. The apex of the hump should be placed sufficiently high to give an effective fall through the ladder tracks to the classification yard, and thence a continuing grade which will carry cars as far along as desired. The hump profiles shown on the accompanying diagram have been designed to give this pulling out tracks from the classification or advance yard so as to facilitate movements to the main line and clear the yard as rapidly as possible after road engines are coupled on and air tested. Advance tracks should be provided to allow for emergency room where trains cannot be taken promptly by despatcher, for classification tracks must be cleared to avoid blocking operations at the hump.

Where road engines get their trains from the classification yard it is not necessary to have yard power to haul the cars to a departure yard. At large yards this will save two engines at each classification yard. This plan requires that classification tracks be of 50 per cent greater capacity than that required to hold the maximum train, and the grade of tracks must be such that cuts will run freely and couple up to cars ahead. While it is true that with this practice the engine provided for returning car droppers will be needed often to make couplings and shove down cuts, and that a road engine will occasionally meet some delay in throwing out shop cars or the like, it is doubtful whether these drawbacks offset the saving of yard power that can be effected where the classification yard can be designed with the proper grade and sufficient capacity for this method.

Where yards are located on single or double track railroads, it is important that freight running tracks should be provided at either end of the yard that outbound trains may get away promptly and the throat not be congested by holding trains for



A Suggested Design for a Large Classification and Terminal Yard at the Junction of Four Main Line Divisions

ideal condition as nearly as possible, though it is realized that such factors as loaded and empty cars, difference in rolling resistance, and the season of the year are important influences to be reckoned with. With this design a second hump engine should be unnecessary under normal conditions where the train of a single road engine is to be handled.

The grouping of ladders to the classification yard in the double fan style here shown enables the cars to reach the clearance point at a minimum distance from the hump, insuring more rapid classifying and avoiding the danger of blocking the ladders, a frequent trouble where cars must run long distances to clear, and the short, steep grades near the summit cannot be carried with safety a greater distance.

The gridiron yards shown at the ends of classification yards afford a place to classify local cars in station order after having first drilled them indiscriminately onto one or more classification tracks. It will be noted that this work can proceed without interruption to trains pulling from the classification yard, or to other movements to advance tracks located each side of the two pulling out tracks.

The caboose has long been the yardmaster's annoyance, and often will take more time to "classify" than the whole train which it follows. The scheme shown on accompanying plan provides a simple, effective means of disposing of the cabin car at entrance of receiving yard as the arriving train pulls in.

An essential feature in yard design is the arrangement of movement on the passenger tracks where any appreciable amount of this class of service is encountered. The length of such outbound freight tracks will depend largely on the grades, railroad crossings, or other interfering factors that tend to retard road movement. Freight tracks to take care of inbound movements are not so important where the humps can keep clear receiving tracks at all times, and this in turn will depend largely on the prompt despatch of outbound trains, which is the keynote to efficient handling of any terminal.

Industrial Yards.—The value of regularity in switching at industrial plants may be realized as often in the increased business diverted to the line affording most reliable and efficient service, as in the freedom from blockades and congestions which run switching costs away up, with reduced capacity for service, and lowered efficiency of the plants both of railroad and manufacturer. A little foresight on the part of a yardmaster and adequate supervision from division headquarters would often avert such paralyzing of business as has too frequently occurred during periods of heavy traffic. Yards serving industrial territory should never be too crowded for the most expeditious handling and disposing of cars, and the heavier the business the more care should be exercised that the switching work is not hampered. The reverse is too commonly true, so that as business increases, the facilities for doing it are reduced or worked at a disadvantage, with the effect of increasing the congestion until an embargo is called or freight is set off at intermediate points.

to the interference of other operations and adding much to the expense of final delivery.

The loss in claims, detention of equipment, providing of extra switching power, interruption of road movements, and actual losses of business will run into thousands of dollars in an amazingly short period by failure to act quickly and decisively at the strategic time.

In conclusion, it might be said that the four factors most essential to the efficient operation of terminal yards are:

1. Adding to the services of the practical yard man that exhaustive study and special training which have accomplished so much in the maintenance and mechanical departments.

2. Providing adequate motive power and facilities for caring for it, that our yards may be free from congestion and able to take trains as fast as they arrive.

3. Giving design in each instance the subject of all possible care and study, with a view to providing track facilities commensurate with the business, and so arranged that movements across or against the traffic will be avoided wherever possible, and switching will not be interfered with by trains arriving or departing or by other operations within the yard.

4. Assuring regular and adequate service to industrial plants, that their deliveries may be made as fast as they can be prevailed upon to take them, at all times guarding against a surplus of cars that will cause congestion, reducing the capacity of switching power, and thereby threatening a blockade, the thing most to be avoided if we are to look for high efficiency in operation and give reliable service to the public.

SYSTEMATIZING YARD OPERATION

By F. H. Garner

Transportation Inspector, Union Pacific, Omaha, Neb.

Many things enter into the successful operation of any large industrial terminal. The first and most important essential is to have the proper man at the head of the terminal organization. The general yardmaster in charge of a large freight terminal should not only be a man who can handle men and who thoroughly knows every detail of the operation of his yard, but he must also be an executive, and a diplomat in the handling of the patrons of the line. In order to operate a large yard successfully a general yardmaster must have absolute charge of operation. I find that in yards where the general yardmaster reports direct to the superintendent the results are much better than in yards where he reports to a local agent or to a trainmaster. The interference and supervision of a trainmaster in large terminals has never helped anyone, but, on the other hand, has tended to disorganize the organization.

The yard clerks should all report to the general yardmaster. A mistake is made at some terminals by having the clerical force report to the local agent. A yardmaster should have sufficient clerical help to properly keep his office records and should have a chief clerk who is competent to relieve him of all clerical work. In nearly all yards the clerical force is watched closer than are the noon hours and the engine house. A good yardmaster can save enough every day by getting out and looking after his engines to pay the salary of two or three clerks.

A number of systems are being used in large terminals, not one of which perhaps could be applied to all yards on account of the difference in operating conditions. A system in office work must be instituted so that the general yardmaster can keep an accurate check on his yard work from the office. The yardmaster should know at all times how much work has been done, how much there is to do and when it will be done.

A few years ago I was connected with one of the largest terminal yards on the Pacific coast and one of the first things I had to work out was a system of office records that would be so complete and kept so nearly up to the minute that at any time, day or night, my switching clerk would be able to answer almost any question on the handling of any industrial car in the yard. To do this we made a regular switch order for all industrial cars immediately on arrival and for cars as soon as they were released from the hold track. These orders were numbered consecutively with a Bates numbering machine and for ready reference the car number and the switch order number were entered up in a terminal number book, so that after the orders were completed they could be located quickly after being filed away. We had the switching territory divided into districts, each engine foreman having a certain district to serve and he was held responsible for the switching in his territory, as well as for any delay that might occur to loads or empties in and out of any industry tracks located on his territory. This engine foreman kept a record, on a switch list of the car numbers, where placed or taken out, which list was turned into the office at noon and night for the information of the switching clerk and to enable him to complete his record on the switch orders which were always kept in the office.

Every morning the engine foreman of each district was handed a switch list made up by the switching clerk showing all the cars in the yard for his territory, with the date of their arrival, together with the track location, so that he would know just where to find his cars and also so that he could, unless otherwise ordered, place the oldest cars first. I had a track assigned in the yard for the reception of industry cars for each district, and as the trains were broken up the cars were put on the different tracks which were reserved for industry cars.

In addition to the switching clerk, I had a clerk, whom I called the industry clerk, who was, in fact, a trainmaster over this switching territory. It was this man's duty to watch the industry switching, riding over the different districts watching for delayed cars, and calling on the patrons to see that work was being handled to their satisfaction. As the engines left the yard in the morning and at noon, this man would take a check of all the cars each engine handled out, sending this check to the switch clerk at the general yard office for his information, so that he would be in a position to say just what cars would be spotted that morning or afternoon. I found out that if one is in a position to tell a shipper when he will get his cars, and if he makes him any particular promise on the delivery of a car, and keeps that promise he is making a friend for the railroad.

There are several different tagging systems in effect in large terminals. I believe the best system is a tag made of different colors, or a combination of colors, each color representing a switching district. This tag can be seen for some distance and helps to expedite switching. Another important thing is for industry engines to leave the yard on time, so that the patrons along each man's route will know what time to expect to have his switching done.

One of the bad features, in all large yards, is the holding of cars for disposition. One of the best ways to eliminate delays to "hold" cars is to have a track set apart for these cars only, and this track should be switched on schedule. In one yard we switched this track at 5 a. m., 11 a. m., and 5 p. m. This assured that the "hold" cars which had been released would get into the industry drag, morning, noon and night. The handling of special request cars, that is, cars that have been delayed en route, or which for some special reason the shipper wants rushed to his track, is a problem in every yard. In order to keep down the yard expense the general yardmaster does not like to cut off an engine, and make a special run with some car to an industry, on which patrons of the line are given regular switches about the same time every day and where all cars which are in the yard at the time the industry engine leaves are delivered to them. Whenever I had a shipper who was continually asking for special switching I sent the industry clerk over to explain how it disorganized our good service to make this special run, and also to tell him about the good service he was getting. I found that as an operating man this clerk could do more good with the patrons of the line than our traffic department could.

I have also found that much benefit can be derived from a weekly staff meeting in the general yardmaster's office, which should be attended by the assistant yardmasters. It pays when possible to have the industry engine foreman attend this meeting, where yard operating problems are talked over, and schemes and systems worked out for better and cheaper operation.

Eight-Wheel Steel Caboose for the Pennsylvania

Another Step Taken by This Road Toward Providing Equipment of Steel Construction; Design Not Standard

The Pennsylvania Railroad has recently designed and built at Altoona an all-steel cabin car or caboose designated as class N-5. This car has not been made standard, but is a tentative design and will be thoroughly tried out on different parts of the road before a decision is made as to its suitability. The severe conditions to which the car will be subjected made it necessary that the construction be as strong as that of heavy steel freight cars, and very careful consideration has been given to each feature of the design, including those which tend to add to the comfort and convenience of the trainmen.

So far as can be learned, this is the first all-steel caboose ever built, the inside lining, the flooring through the passageway, the platform floor and the window sash being the only parts for which wood is used. The car weighs 38,000 lb., and is 31 ft. long from face to face of drawheads, 14 ft. 9½ in. high over the cupola lamp, and 10 ft. 2½ in. wide over handholds. There is a 30 in. platform on each end, with a 1¾ in. floor and side box steps. Ratchet hand brakes are used.

First All-Steel Caboose Built for Service on the Pennsylvania

UNDERFRAME

The center sill construction of the underframe is similar to that used on the Pennsylvania's steel freight cars, being composed of two 10 in. 25-lb. channels, a 21 in. by ½ in. cover plate riveted the full length of the center sills, and a 4 in. by 4 in. by ¾ in. angle riveted to the bottom of each channel on the inside, and extending continuously between back draft lugs, the total area being 36 sq. in. This construction is reinforced by a striking plate at each end, a center plate reinforcing casting above the center plate, and pressed steel spreaders between the diaphragms. The front and back draft lugs are cast integral with the striking plate and the center plate reinforcing castings. Two dished diaphragms ⅜ in. thick are located 3 ft. 7 13/16 in. on either side of the center line of the cupola, which is 12½ in. off the center line of the car, and are riveted to the center and side sills. The usual body bolster has been eliminated and the body side bearings are supported by steel cantilever castings, which are riveted to the center sills and to a ½ in. tie plate, which extends across the bottom of the center sills and outward to the ends of the side bearing castings.

The side sill, or side floor supporting member, is a 4 in. by 4 in. by ⅜ in. angle, with the back turned outward. This angle is continuous between the side and end sill connecting castings, which form the side supports of the platforms and connect the side sills, the diagonal braces and the end sills, and are shaped at the outer ends to form corner push-pole pockets. The diagonal braces are of U-shaped section, 6 in. wide and ⅜ in. thick, with 3 in. flanges turned downward. They are flattened out at either end and riveted to the top flange of the center sills and the side and end sill connection.

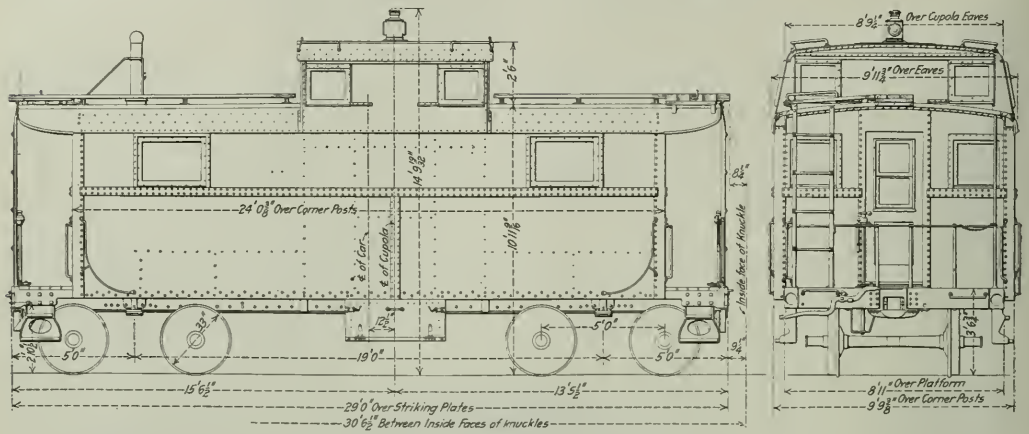
The end sill is also a pressed U-shaped section, which is fastened to the striking plate and the side and end sill connecting casting. The entire underframe, with the exception of the platform, is covered with ¼ in. steel plate, which extends from the center sill cover plate to the side sill angle. The brake rigging supports and the equipment box, which is 4 ft. long, 23 in. deep, and 21⅞ in. high, are secured to this floor sheet. The equipment box is made of ⅛ in. sheets, with a door at the front which swings down.

SUPERSTRUCTURE

There are no posts used in the superstructure, the transverse stiffness being obtained through the end construction and bulkheads, which form the sides of the lockers at the center of the

car. These bulkheads are so located that they are directly above and riveted to the diaphragms of the underframe, thus forming four stiffeners at the center of the car each 3 ft. deep. The sides and ends of the car are made up of ⅛ in. sheets and a 4 in. by

is of the same general design, the sheets being fastened to the underframe by a 2 in. by 2 in. by ¼ in. angle, as well as riveted beneath the corner cover plate, the belt rail and the end door frame. The end is further supported by two 4 in. channels, which act as

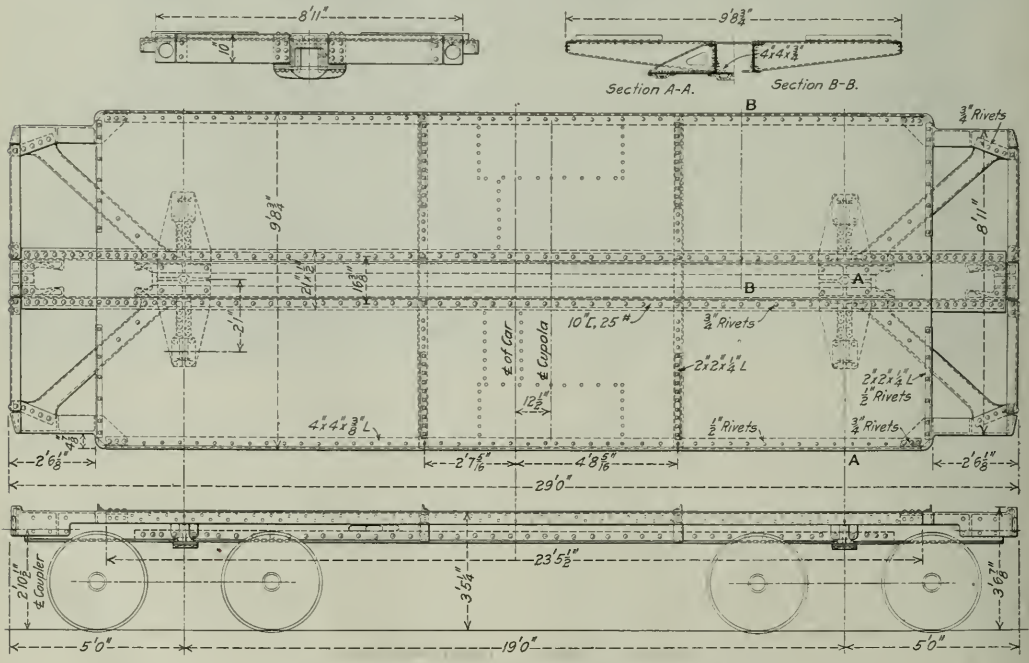


Elevations of the Pennsylvania Steel Caboose

½ in. belt rail. The bottom panel is composed of two sheets, joined on the center line of the cupola by a butt strip, and butting against the top side sheets beneath the belt rail, which is 4 ft. 2 in. from the bottom of the side sill angle. The top panel is com-

door posts. These channels are fastened at the bottom to a cast steel threshold plate and the underframe, while at the top they are secured to the roof sheets.

On the inside of the belt rail, and at the eaves, extending from



Underframe Construction Used on the Pennsylvania Steel Caboose

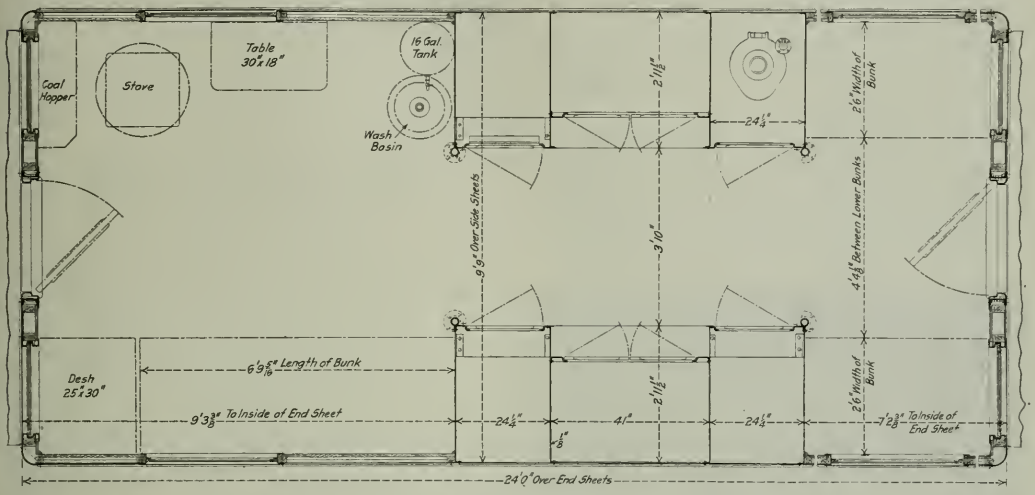
posed of three sheets, which are connected by the window frames. At the corners, the side and end sheets are connected by a 3/16 in. cover plate, which acts as a corner post. The end construction

end sheet to bulkhead, is a U-shaped section, which stiffens the sides of the car at these points and also provides a means of securing nailing strips for the support of the lining.

The side window frames, which are riveted to the outside of the side sheets, are 3/16 in. thick. A ½ in. by 3/16 in. filler extends along the top of the side sheets, between the window frames, so that it is possible to extend them up under the roof sheets, making the construction waterproof and at the same time forming a straight surface to which the roof sheets can be attached. outside is to leave the interior smooth. The sides of the cupola are inclined towards the center line of the car to allow for tunnel clearance.

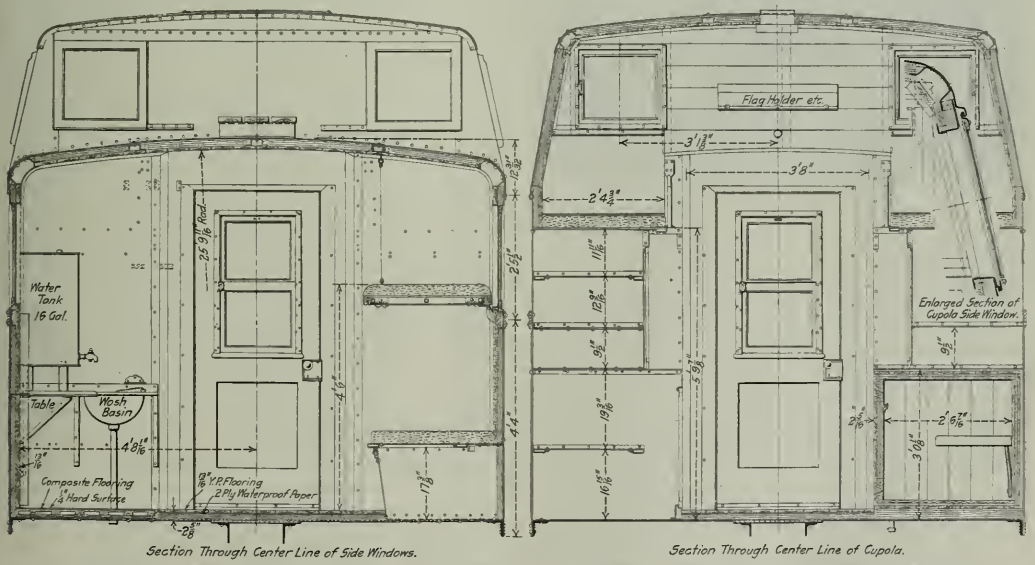
ROOF

The roof sheets, which are 3/32 in. thick, extend lengthwise of the car in three panels, two of which, forming side panels, ex-



Floor Plan Showing the Location of the Different Interior Fittings

The cupola extends 2 ft. 6 in. above the body of the car and is of the same general type of construction. The side and end windows of the cupola are all hung on the outside, a top guide tend down over the sides of the car and fasten to the side sheets and eaves; a central panel, which overlaps the two side panels, is secured with ¼ in. rivets spaced 1½ in. apart. Tar paper is



Cross Sections Through the Pennsylvania Caboose

rail being incorporated with the eaves, while the window sill forms the bottom guide. This construction is such that when the window is pushed up against the end projection strip it forms a weathertight construction. The object in placing the windows placed between the lap of the center and side sheets, to insure a watertight joint. The main roof is supported by U-shaped purlins, which extend from the end sheets of the car to the cupola end sheets. The cupola roof is of the same construction.

These purlins answer the double purpose of supporting the roof and providing a means of securing nailing strips for the ceiling.

The main roof extends over the platform 2 ft. 2½ in., and has a 2 in. by 2 in. by ¼ in. angle extending around the edge, which lends stiffness to the structure and also acts as a weather strip for leading the water away from above the platform.

INTERIOR ARRANGEMENT

Convenience, comfort and safety were given great consideration in fitting up the inside. The car is equipped with a stove for heating and cooking purposes, a drop table, water cooler, washstand, refrigerator, desk and hopper, as well as lockers, drawers and cupboards for the men's personal belongings. Three pairs of bunks, upper and lower, are located along the sides, one at the stove end and two at the opposite end. The lower bunks are of a box type, 6 ft. 10 in. long and 2 ft. 5 in. wide, and are arranged for the storing of equipment necessary to the car in the bottom. The upper bunks, which are of the same dimensions, are attached to the belt rail by means of a cast steel hinge bracket, and when not required may be lowered and used as a back for the lower

Interior of the Pennsylvania Caboose

bunk when used as a seat. The upper bunks, when raised, are held in position by chains secured to the roof purlins, and hooked to the side of the bunk frame, which is composed of 1¾ in. by 1¾ in. by ¼ in. angles, to which wooden nailing strips are secured for tacking down the canvas top. Including cupola seats, the car has sleeping facilities for eight men, the cupola seats being the same width and length as the bunks.

The lockers, which are located between the bulkheads and the lower cupola seats, contain the refrigerator in the lower center section, on the side opposite the stove and the hopper in one of the end lockers on the other side. The arrangement is such that there is ample room for dishes, food, lamps, oil and waste. All locker doors, drawers, shelves, etc., are 1/16 in. thick.

The side and end windows are above the belt rail, so that the light is not cut off when the upper bunk is raised. The side windows are fixed, while those at the end, including the end door windows, may be dropped. All locks or catches, with the exception of the refrigerator door lock, are flush, thus eliminating projections against which a man might be thrown by a sudden lurch of the car. The cupola is also equipped with a safety rail, extending between the end sheets of the cupola on the center line of the car, which is of convenience as a handhold when descending from the cupola seat.

TRUCKS

The car is equipped with specially designed arch bar trucks of 5 ft. wheelbase, having axles with 3¾ in. by 7 in. journals. The usual column castings are replaced by a malleable casting which serves as a column casting, brake hanger support, spring seat, and spring plank extension. The bolster is of the inverted U-shaped type, with malleable iron stiffening castings, spring seats and bolster guides. The springs are full elliptical, 34 in. long, and there are three in each group. The spring plank is U-shaped, ⅜ in. thick and 8 in. wide, with 1½ in. vertical legs turned upward. It extends across the truck 45⅝ in. beyond the center line of the arch bars, and is flattened at either end and bolted to the bolster guide spring seat and brake hanger support.

EFFECT OF THE WAR ON PRICES OF AMERICAN RAILROAD BONDS*

By Lewis B. Franklin

Vice-President of Guaranty Trust Company of New York

The normal factors governing the prices of securities are to a large extent rendered ineffective by the present war and the consequent international financial situation, and any discussion of the trend of prices of American railroad securities involves a consideration of the economic effects of the conflict. In the effort to determine what this effect will be, it is natural to refer back to other occurrences of similar nature and endeavor to forecast from them something of the future.

Upon careful analysis we find that no war in history is comparable in its effect upon financial transactions with the present upheaval.

The Balkan wars involved no nation of importance in commerce or finance, and the theatre of war was strictly localized. Neither Russia nor Japan was a large factor in international business and their operations were confined to the far east. The war between Russia and Turkey in 1876-7 was of similar nature. The Boer war was carried on entirely in South Africa and had no large immediate effect on international business relations, while our conflict with Spain scarcely caused a ripple in the waters of finance. During all these conflicts, communication between the great capitals of the world remained open and international trade was not disturbed. It must not be understood, however, that these wars did not have their effect on the finances of every civilized country. Such a destruction of capital as was involved in even the least of these conflicts has a deep underlying effect on the finances of the world that may take years to overcome, even though no immediate change is apparent.

Not since 1870 have two nations which might be ranked as among the leaders in commerce and finance been engaged in war, and for this reason it is natural to review the effect of the Franco-Prussian war upon international finance in general and American finance in particular.

War was declared by France on July 15, 1870. Prior to and after the declaration there was a rapid fall in prices of securities on the London stock exchange, such American stocks as were listed there sharing in the decline, while in our market there was no great excitement and only a moderate fall. This was followed here by a considerable rise during the progress of hostilities and immediately thereafter. During this period our money market remained undisturbed, except for a seasonal stringency at the end of the year, due to internal causes, while foreign exchange with the leading capitals of Europe continued normal, except with Paris during the siege of that city. The amount of our securities sold to us by Europe was inconsiderable and it was not necessary to resort to any extreme expedients, such as the closing of the stock exchange. It may seem strange that any such upheaval involving, as it did, some 1,700,000 men engaged in

*Address before the Society of Railway Financial Officers, September 16, 1914.

warfare and costing over $2,500,000,000, should have such a limited effect on our markets, in comparison with the effect of the present struggle, and yet the reason is not hard to find. During the calendar year 1869 our total imports were valued at $463,424,421, and our exports at $394,731,999, a total foreign commerce of $858,156,420, while for the year 1913 our imports were $1,892,168,000 and our exports $2,638,593,000, making a total of $4,530,761,000, or an increase of about 500 per cent over 1869. The interchange of credits involved in transactions of such magnitude is enormous, and this interchange has through the disturbance of financial systems been seriously deranged in some cases and entirely stopped in others. With Germany alone our foreign commerce in 1913 amounted to the stupendous total of $520,647,283, which is now at an absolute standstill, while our commercial relations with other countries are heavily restricted.

In 1870 our country was just emerging from the chaos of the civil war, our currency was depreciated to the extent of over 10 per cent, and we had practically no stock of gold in our banks. On June 9, 1870, our national banks reported liabilities subject to reserve of $406,140,873, against which there was held in the reserve, specie to the extent of only $2,912,275, or less than 1 per cent. On June 30, 1914, our national banks reported gold or gold certificates in their reserve of $626,000,000.

These facts demonstrate that whereas in 1870 we were financially weak and unimportant, we are now among the leaders in international finance. In the middle ages, the merchant trader sent out his ships with gold in their strong boxes or domestic products in their holds, and they returned from their voyages laden with the products of foreign countries. From this primitive method of barter commerce has progressed until the present complex system of international credits has been established, a system far more intricate than that in existence even in 1870, and it is evident that no consideration of the effects of that conflict can be of value at the present time. We have, therefore, in the past no safe guide to point the way to the solution of the problems which have arisen and will arise on account of the crisis. A study of the probable effects of the war leads naturally to a division of these into two classes, namely: those of a temporary or artificial nature and those of a permanent or basic nature.

We have already experienced most of the immediate results. We have seen the system of international credit relations disrupted at the first blow. Moratoria have been generally declared throughout Europe, and payments due us are held up, while we, as a neutral country, are expected to meet our obligations at maturity. American securities held abroad have been dumped into our markets in such volume that self preservation compelled us to call a halt by the closing of our principal stock exchange and the cessation, by agreement, of the sale of all unlisted securities. Our enormous exports of gold and the consequent strain of our banking facilities have forced us to resort to the expedients of clearing house certificates and emergency currency.

Our foreign commerce, except in foodstuffs, is almost at a standstill. The bureau of agriculture in its recent report gives promise of one of the largest cotton crops in the history of the country. Normally we export approximately 60 per cent of this crop, and at the present time, through the shutting down of foreign mills on account of scarcity of labor, lack of demand for the finished product or inability to finance, hardly a bale of export cotton is moving, and extreme measures are being taken to care for the surplus which is sure to exist.

Despite the fact that the stringent measures already adopted have prevented panic and to some extent opened the channels of trade, we have still to face the problem of meeting the wave of foreign liquidation which is likely to break upon us upon the reopening of our markets. It has been estimated that American securities to the extent of from four to seven billion dollars are held in Europe, and while it is evident that a large part of these are not for sale at any price, it is quite certain that the drain on the resources of the belligerent nations will be so tremendous as to necessitate enormous liquidation. Their own securities are due to suffer more than ours and our markets are therefore likely to be the most available. This problem must wait until our international credit and commercial relations have been placed on a more normal footing. We cannot buy securities unless we can sell commodities.

If we are unable to take care of our securities now offered for sale by Europe how can we expect to find a market for the additional securities which corporations are so anxious to sell to provide for maturing obligations and necessary improvements and extensions? The prospect is indeed not a favorable one. There is no market for bonds now, and it is hard to say when there will be one and what prices bonds will command when the market opens. In any event, our railroads on the average have now an overproportion of bonded debt compared with the investment represented by capital stock, and it should be by additional issues of stock that present necessities should be financed. How this can be done under present business conditions and the public prejudice against railroad securities is a difficult problem.

Against such an array of unfavorable factors as the immediate result of war, what have we that may be of benefit? In a few lines of business increased activity is indeed noted on the expectation of increased exports of goods to neutral countries heretofore supplied by belligerents, but here again we are confronted with the difficulty of financing any such shipments and the lack of neutral ships to act as carriers. In one respect only is there an immediate benefit and that is in the larger demand at increasing prices for our food supplies, and despite the difficulty of transportation and payment, such shipments are being made in quantity.

It is probable that this abnormal demand for foodstuffs will continue long after the war has ceased. The farmer of Europe has been turned into a soldier, and while his place has been taken to some extent by the women and children, it is evident that the output of the agricultural districts will be greatly reduced both this year and next.

In this emergency, our executives, legislators and business men have been co-operating with a single purpose, to solve some of the intricate problems now presented, and I am hopeful that this close relationship may lead to a better understanding on the part of each and be productive of a more liberal attitude on the part of the government toward our great railroad and industrial corporations.

Having discussed in a very general way the immediate effects of the conflict, let us delve deeper into the situation and see if we can determine the basic factors and the permanent results upon our economic condition.

The first and foremost factor of an unfavorable nature is the enormous destruction of fixed capital which is occurring, and the consequent expectation of higher rates for its use, as there will be an enormous demand to make good the ravages of war. Just let us consider for a moment the difference between fixed and liquid capital. To reduce this to the simplest distinction, fixed capital is wealth represented by permanent plant, such as factories, rails, cars, steamers, etc., while liquid capital is wealth represented by cash, bank balances, loans and other readily convertible items.

Much has already been written on the cost of the present war and its effects on money rates and the supply of capital, but the mistake has frequently been made of confounding currency with capital and expenditures with waste. From an economic standpoint, the waste of capital incident to war is not the total *expense* of the nations involved, but is made up chiefly of the destruction of *productive* property, such as merchant ships, factories, houses and harvests and the tem-

porary loss in the productive capacity of the nations engaged through the enlistment of such a large proportion of their producing population and the permanent loss in productive capacity by death and mutilation.

In a recent article Roger W. Babson points out that the destruction of battleships and fortifications is not in *itself* a destruction of capital, as such property is not productive.

The destruction of capital in this case took place when the fortifications and battleships were built. It is usual to allude to the tremendous loss which will take place if a super-dreadnought, costing upwards of $10,000,000, is destroyed. The loss has taken place, but not then. The date of the loss from an economic standpoint was the date on which her builders turned her over a completed engine of destruction. She has never produced or helped to produce a single dollar of wealth, she has been a constant drain on the resources of her owner to keep her running and her destruction is a gain rather than a loss to mankind in general. Another loss will occur when she is replaced, but to this I will refer later.

Neither is the feeding and clothing of an army a waste of capital, as these men must be fed and clothed even in times of peace. The enormous loss in capital which is taking place comes from neglected harvest fields, idle factories, deserted mines and wasted towns and villages, and in the killing and maiming of hundreds of thousands of citizens who have heretofore been producers, and many of whom through wounds and illness are destined to become charges upon the commonwealth. In the aggregate this actual consumption of capital is enormous, but we must not be deceived by some of the figures now being published. Professor Charles Richet, of the university of Paris, in discussing the possibility of a war such as is being carried on today, estimated that it would cost $50,000,000 a day, but of this amount, $25,050,000 is made up of the items of food, pay to soldiers and workmen and the support of helpless poor, none of which can be considered as capital destruction. The item of transportation, amounting to $6,300,000 per day, should probably be divided as being a partial economic waste, while he estimates an actual expenditure for munitions of war of $11,000,000 per day, which is an actual waste of capital, in so far as such munitions are being replaced. In all, his estimate shows a capital loss of over $20,000,000 per day. No attempt, however, to make an *exact* estimate of either the expenses of the conflict or the amount of the economic waste is of any great value to us, but we may rest assured that the whole world is sure to feel the effects for a long while to come. Capital which for the past few years has been difficult to obtain will be in still greater demand to make good the losses of war, and it is reasonable to look forward to a long period of higher interest rates on fixed investments, a small supply of new capital and lower prices for investment securities unless we can discover off-setting factors of a sufficiently favorable nature.

Let us look then and see what we have on the other side of the picture. Possibly there may be a ray of sunshine somewhere.

One of the first results of a condition of affairs such as we are now experiencing is increasing economy on the part of practically every class of society.

I believe that the generally prosperous condition of this country during the last twenty years has led to a gradual reduction in the *proportionate* amount of savings which has in the last few years contributed to our higher cost of living and our higher cost of capital. It is generally conceded that the maximum of saving does not take place in periods of great prosperity and an upheaval such as the present crisis is often the signal for a return to a simpler scale of living and an increased proportion of saving. It will not take a very large increase of savings per capita to make a radical increase in the amount of capital available yearly. In this connection, it is interesting to note that our people in general are far behind those of other countries in the habit of saving. It has recently been stated that the ten leading nations of Europe boast of 373 savings bank depositors per thousand of population, while in the United States the proportion is only 99 to the thousand. Here is room for improvement. The increase or decrease in the wealth of a person or a nation is the difference between income and expenditure.

I have already referred to increased activity in certain lines of business as one of the immediate results of the war, and there are likely to be permanent results of a similar nature. Efforts are already being made looking to the restoration of our merchant marine to its former place of prominence in the commerce of the world, which, if successful, will result in many millons of dollars per annum formerly paid to foreign carriers remaining in this country.

Our imports of drugs, dyes, chemicals, toys, gloves, clothing, etc., from Germany have been stopped and supplies of these articles are diminishing and prices rising. American ingenuity is already at work in an effort to manufacture in this country much that we have heretofore imported. If this effort is crowned with success, our productive capacity will be permanently increased and our trade balance benefited. Markets heretofore held by belligerents, principally Germany, whose foreign trade is now at a standstill, are now open to our manufacturers, and if our opportunities in this respect are not neglected our export business should be permanently benefited. The favorable factors just mentioned redound to our benefit as a neutral nation and although of importance can scarcely offset the effect which the general destruction of capital will have on the civilized world and in which we must suffer with the rest. Is there any result of the conflict which may in any way counteract the evil influences upon the general economic condition? I believe there is, but to discover what it is we must consider carefully the underlying causes which led to the outbreak of the war.

It is generally conceded that the massacre of Archduke Francis Ferdinand of Austria and the consequent ultimatum from Austria to Servia was the *pretext* for the war and not its *cause*. It has been held by some that Germany's ambition to extend her influence through the Balkans to the Aegean sea, to control the Dutch and Belgian harbors, and to further extend her colonial possessions was at the bottom of the trouble. Russia, of course, has always had a jealous eye on the Balkans, and hope for the ultimate possession of Constantinople, and apparently it was the probable increase of German and Austrian influence in southeastern Europe in case of the overthrow of Servia that lead the Czar into the present struggle. France was bound by treaty obligations to support Russia, and her people saw an opportunity of regaining the beloved territory lost in 1870. England and Belgium stepped in upon the violation of the latter's neutrality. With the prospect of an absolute upsetting of the balance of power, self-preservation demanded that Great Britain take a hand in the struggle.

The *immediate* cause of the general outburst seems to have been the support offered by Germany to Austria in her demands upon Servia and Russia's protest against this action, but we must look below the surface and see if we can discover a motive for this radical move on the part of the German statesmen.

Germany's appropriation for the year ended April 1, 1913, for the maintenance of her army and navy amounted to the equivalent of $285,000,000, an increase of approximately $85,000,000 over 1911. This is equal to about $7.32 per capita on the entire population. This enormous sum and a still greater amount proposed for the year 1914 could only be met by the imposition of an onerous direct tax. This rapid increase in military appropriations was apparently forced upon Germany by the action of Russia, who increased her military budget from $335,555,000 in 1911 to $463,690,000

in 1913. Both Germany and France have also recently increased the term of compulsory military service.

Such a competition in expenditures and in military service could not continue indefinitely. Germany, in addition to the protests against the heavy taxes, was confronted with an evergrowing wave of socialism. The socialist has always been arrayed against war and in favor of peace, and this movement was of sufficient strength to threaten even the established form of monarchical government. Something had to be done to stop or justify the mad competition of military expenditures to quiet the socialistic element, and to re-establish the "divine right of kings." Germany was ready; her enemies not so ready as they would be in a few years. War was the only solution and a pretext was not hard to find. In other words, I believe that Germany's action was inspired by causes internal rather than external.

Granting if you will that this hypothesis is correct, what bearing has it upon the subject of capital and interest rates?

There seems to me to be three possible terminations to the struggle:

1st—Mediation before complete victory by either side.

2nd—Complete victory for Germany and Austria.

3d—Complete victory for the Allies.

In case the war is settled before a decisive victory, it seems to me that while there may be important adjustments in the map of Europe, no radical changes of an economic nature will result. Europe will continue to be an armed camp, and it is not unlikely that the struggle would be renewed some years later. Military equipment, battleships, forts and guns destroyed in the conflict would have to be replaced and military appropriations would continue on an even heavier scale. In this connection, it must be remembered that Europe is even now staggering under a load of national debt approximating, for the five principal nations, only $20,000,000,000, demanding at 3½ per cent $700,000,000 per annum for interest alone. The world, already suffering under its present load of debt and useless expenditure, and with the ravages of war to be paid would indeed be in a bad way, while the condition of Europe, from a financial standpoint, would be appalling.

Under such circumstances what can we expect the effect to be upon *our* securities and upon the future financing of *our* great corporations. Europe until recently has been a constant and heavy purchaser of our stocks and bonds and has been of immense assistance in developing the natural resources of the country, but if her burdens are to be increased to the extent that I have outlined, we need look for no more help from that quarter and would indeed be compelled to repurchase many of our securities now held abroad. With such a prospect before us we cannot but anticipate higher interest rates for fixed investments, greater difficulty in selling securities and a consequent period of retrenchment.

In case of a complete victory for Germany and Austria, the result is also easy to forecast. Germany has been created, enlarged and solidified by the "blood and iron" policy enunciated by Bismarck in 1863. Her military organization again justified by victory, is it reasonable to suppose that she would agree to abandon the sword which has brought her into power? And if Germany retains her army and navy in undiminished strength, can others afford to adopt a different policy? We think not.

The third possible outcome presents a different aspect. In case of complete victory for the Allies, it seems evident that England will have a predominant position in the making of terms. She wants little or nothing in the way of territory and desires chiefly the prosperity of her people and the peace of Europe. England only a short time before the war is reported to have made, without result, a suggestion to Germany for a mutual reduction of the naval program. This indicates that England, despite her small standing army, has felt the strain of military expenditures even in times of peace, and the attitude of her diplomats prior to the outbreak clearly demonstrated her desire to prevent the conflict. France, with all her warlike history, is a peaceful nation at heart, while Belgium desires only reparation for damages and an effective guaranty of neutrality. Servia and Japan cannot be considered as important factors in the making of terms of peace. Every nation involved has felt the enormous strain of military expenditures, and in the event of an ultimate victory for the Allies, is it a wild dream to expect that as the only remedy the practical disarmament of Europe, nay, of the whole world, may be the outcome? Germany beaten, with its military organization unjustified, would hardly be in a position to protest or even to persuade her own people to rebuild the organization, if such a thing were to be allowed under the terms of settlement.

Russia, with its monarchical government, seems to be the key to the problem, yet it must not be forgotten that, whatever his motives, it was from the present Czar, even then disturbed by the growth of military expenditure, that there came in the year 1898 the first tentative proposition for universal disarmament. If this could be accomplished, what would it mean to Europe and to the world?

During the last fiscal year for which figures are available the estimated expenditures of the principal nations of Europe for military purposes amounted to the huge total of $2,000,000,000. Imagine, if you can, what it would mean if this sum were to be diverted from the support of the destructive forces and used in the development of the natural resources of the world. Such a sum added to the present amount available annually for investment would mean an abundance of capital for industrial development, both here and abroad, lower interest rates and probably lower cost of living. Add to this the transfer of some 4,500 000 men which make up the standing armies of Europe on a peace footing, from a life of economic waste to productive pursuits, and it is not hard to believe that Europe would require very few years to recover from the ravages of war and enter upon a long period of prosperity from which we would be one of the greatest beneficiaries. Under such conditions, capital would accumulate with surprising rapidity, and Europe would soon be a heavy buyer of our securities, and we would witness in the country an era of expansion and prosperity such as we have never before experienced. If disarmament can be accomplished, the outlook is indeed bright, but under no other conditions can I feel that there is anything to look forward to except a long period of retrenchment, lack of capital, high interest rates and general business depression in which Europe will be the principal sufferer, but in which America is bound to share.

The United States, as the greatest neutral nation, with nothing at stake except the progress of humanity is in a position to exert her strongest influence with her friends on the other side of the water that permanent good may result from this awful catastrophe.

Under such circumstances, is it not the patriotic duty of every American, regardless of his present sympathies, to work unceasingly to the end that public opinion both here and abroad may be so united and strengthened in the resolve for complete disarmament that it can be disregarded by neither Congress nor Parliament, Czar nor Emperor?

In making these suggestions as to the possible outcome I do not want to be understood as taking a partisan attitude or violating the injunction of our president as to strict neutrality, in thought, word and deed. It is surely not partisan but Christian to hope that the outcome may be such as to relieve the world of its burden of militarism and usher in an abiding era of peace, prosperity and happiness.

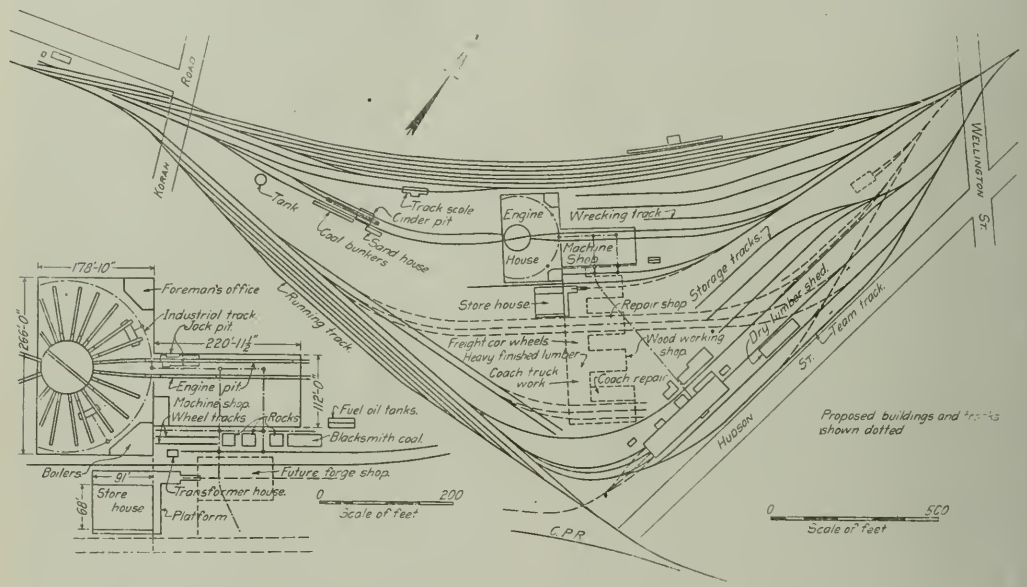
English Railway Employees to Assist in Railway Operation in France.—The British war office has recently called for 1,000 special railway men to proceed to France to assist in the operation of the French railways. Several enginemen, telegraphers, inspectors and officers have volunteered from Crewe. They are all experts in their particular branch of work. It is stated that the officers who go will rank as officers in the army and the inspectors as non-commissioned officers.

The New Algoma Central Engine House and Shops

Novel Features Designed to Meet Climatic Conditions Characterize the Terminal at Sault Ste. Marie, Ont.

The Algoma Central Railway recently completed extensive terminal facilities in Sault Ste. Marie, Ont., which include an engine house, shop layout and miscellaneous facilities embodying a number of unusual features of design. The terminal is comparatively small but it was essential in the design of the buildings that unusual precautions be taken to insure its satisfactory operation throughout the winter weather which is severe and is accompanied by almost continuous heavy snow. As the exposed turntable is one of the greatest sources of expense and delay under such climatic conditions, it was determined to enclose the turntable in the engine house. This necessity naturally led to the consideration of a square house as the most economical form of building, and since the number of doors in such a house could be cut down to two, thus greatly reducing the difficulty of heating the house, and the structural features of the building could be readily standardized with the machine shop, storehouse and proposed car shop, this type was finally adopted.

The house is designed to contain 24 stalls, but as this capacity is not required at present, a portion of the building covering 14 pits has been built, with provision for extending this to the full size when desired. The pits are kept close to the turntable, for with the comparatively few radial tracks only about 12 ft. is re-



General Plan of Algoma Central Terminal at Sault Ste. Marie, Ont., with Detail of Engine House and Shops

New Rectangular Engine House at Sault Ste. Marie, Ont., Showing Typical Winter Conditions

quired between the end of the 80-ft. table and the 70-ft. pit to secure the necessary clearance. These dimensions would require a house at least 250 ft. square to cover the complete circle, and in order to allow space around the ends of the pits for an industrial track and to enable the roof construction to be arranged in 44 ft. units, which was desirable for the shop buildings, the sides of the engine house were made 266 ft. The present width is 178 ft. 10 in., and the front wall is so constructed that it can be easily removed and the material used in the corresponding wall of the complete house when it is desirable to make the addition of 88 ft. and provide the remaining 10 pits of the complete circle. The triangular spaces in the corners of the building are utilized for a foreman's office and locker room, and the boiler equipment for heating the buildings.

The foundations are of concrete, which is carried up to a height of 5 ft. 6 in. above grade, for the outside walls, above which brick is used, with 3-ft. pilasters spaced 22 ft. center to center. The long spans, the advantage of fireproof construction, and the ability to use the same details as in the other buildings of the group led to the adoption of steel roof trusses supported on the brick walls and on latticed steel channel box columns. Monitors 22 ft. wide are provided over each bay running parallel with the direction of the prevailing wind in order to reduce the accumulation of snow on the roof. The monitors are all equipped with Pond continuous steel sash hinged at the top for ventilation. The roof trusses carry steel purlins on which is laid 2-in. wood sheathing covered by a 5-ply Barrett specification roofing, finished at the edges with a graveled copper guard. The steel roof trusses are protected from corrosion by a special preservative paint known as "Ferro-Rubron," an English product, and the additional precaution of allowing ample metal in all trusses was taken.

The turntable is 80 ft. long, has a capacity of 200 tons, and is operated by a pneumatic tractor. The center pier is of concrete, liberal in size, being 11 ft. 6 in. square at the base. The concrete pit floor is 5 in. thick pitched to drain to a circular gutter 14 ft. from the center of the pit, which carries the drainage to a large sump connected with the sewer. The pits under the engine stalls are 70 ft. long and 3 ft. 11 in. wide, varying in depth from 2 ft. 8 in. to 3 ft. 2 in. The 80-lb. pit rails are spiked to 6 in. by 8 in. by 1 ft. 4 in. creosoted cross ties, anchored in the concrete walls of the pit. The floor consists of paving brick laid on a 6-in. concrete base. A driving wheel drop pit is provided under two tracks and a truck wheel drop pit under two other tracks. These drop pits have a 24-in. gage track from end to end for transferring wheels, which, when lifted to the floor level, can be run out on a narrow gage track connected to the circular industrial track at the ends of the stalls.

Interior View of Rectangular Engine House

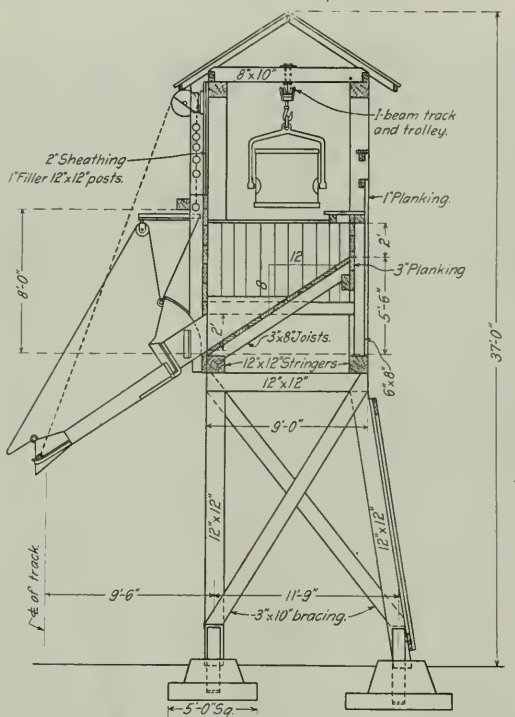
The smokejacks are of sectional cast iron construction, furnished by the Paul Dickinson Co., Ltd.

The building is heated by the indirect system, consisting of a steam driven fan and Green "Positivflow" horizontal heater coils. The hot air is forced through underground concrete tunnels and vitrified tile ducts to the turntable pit and all engine pits. The heating provisions are somewhat in excess of standard practice. Steam is supplied by three internally fired boilers of 150 h. p. each. The building is lighted with large capacity Tungsten units and flaming arc lamps. Electric power for the shops is purchased from a local hydro-electric company.

The machine shop is 112 ft. wide and 221 ft. long, connecting directly with the engine house. Two tracks extend through both buildings passing over engine pits in the machine shop, served by a 10-ton electric crane and an electrically operated locomotive screw jack. A space 54 ft. wide extending practically the full length of the shop is devoted to the machine tools and black-

smith shop, the foreman's office, tool room and toilet room occupies one end of this space.

The foundations and walls of the machine shop are of the same type as in the engine house. The building is divided into two bays, one 44 ft. wide and one 66 ft. wide. The former is covered by a single pitch steel truss roof supported by steel columns at each end, with a clearance above the floor of 18 ft. 2 in. The 66-ft. bay is covered by double steel trusses with steel monitor framing extending the full length of the building. Steel sash and Pond operating devices are used throughout. The roof consists of reinforced cement tiles 1¼ in. thick, cast in slabs about 5 ft. 6 in. long and 2 ft. wide. These slabs bear directly on the steel purlins and on the walls, and are covered with 5-ply Barrett specification roofing finished in the same



Typical Cross Section Through the Coaling Station

manner as on the engine house. The floor of the building consists of 5 in. of concrete covered with a 1-in. sand cushion on which are laid 3-in. creosoted maple paving blocks. The building is heated in the same manner as the engine house, except that the hot air is partially distributed through overhead galvanized sheet metal ducts.

The storehouse, which is 68 ft. by 91 ft. in size, is located with reference to a proposed development of freight and passenger car repair shops arranged along a covered runway for a traveling crane and the storage of material so that in severe weather all work can be handled between the various portions of the shop under cover. The central connecting passage with shops extending at right angles to it allows any desired expansion to be made in the size of the individual shops without affecting the general plan as long as a longitudinal shop is not objectionable.

The coaling station is of an unusual type, similar in general details to a number of stations that have been developed for use in the northern portions of the country where the operating conditions are very severe during the winter. The building is entirely of timber well over-sized to allow for deterioration, and all posts rest on concrete footings with heavy steel plate anchor straps. The supply of coal for the winter months must be purchased during the summer when it can be delivered in lake boats, and it is stored on the ground adjacent to the coaling station. Only a limited storage is provided in the 13 inclined bottom coal pockets in the house, the supply being conveyed from the storage pile to the dock in quantities to meet the daily demand. The coal is loaded into one-ton steel buckets with bales which are moved to the ends of the coal dock. The buckets are then hoisted to a trolley track extending longitudinally over the elevated delivery bins by a plain inverted pneumatic hoist operating in conjunction with a jib crane to allow the buckets to be swung around and the bale hooked on a plain I-beam trolley on the runway track. The hoist is then released by the operator, who pushes the loaded bucket along the track directly over the pocket to be filled, and, by releasing an automatic catch on the bale, the bucket empties the coal into the pocket and is then conveyed back to the storage pile for refilling. The delivery pockets are designed to deliver predetermined amounts of coal to locomotive tenders, the capacity ranging from two tons to eight tons. Each pocket is equipped with an Ogle delivery gate and spout which is said to be frost-proof. The entire structure is covered with a wood-sheathed roof and composition roofing.

This work has been carried out under the general direction of R. S. McCormick, chief engineer. The plans were made by The Arnold Company, Chicago, who were also the constructors of the entire plant. P. L. Battey, vice-president of the Arnold company, supervised the work and construction was carried out under the direction of H. H. Dickinson.

RAILWAY AFFAIRS IN OTHER COUNTRIES

Financial conditions in Brazil were not of the best during 1913, and this state of things is reflected in the recently issued report of the Brazil Railway for that year. This company, which was incorporated in 1906, operates directly some 3,280 miles of railway in southern Brazil, and has a large interest in the Paulista and Mogyana Railways, which own 1,795 miles of line in the state of São Paulo. It has a large interest in the Madeira-Mamore Railway and the Uruguay Railway, and in subsidiary enterprises, which are expected eventually to produce a profit in themselves and also to bring new traffic. An all-rail connection between São Paulo and Montevideo was established during the year by the completion of the bridge over the River Uruguay and of the connection with the Central Uruguay at Sant' Anna.

From the lines in southern Brazil directly operated by the company, gross receipts were secured in 1913 of $14,479,920, representing an increase of $1,422,228, or 10.89 per cent. Operating expenses ($9,200,534) were, however, higher by $1,716,639, or 22.94 per cent, leaving net receipts lower by $261,074, or 5.28 per cent. Receipts show increases under nearly all headings, because of the stimulus given to low-grade traffic by reductions in tariffs and because of improved train facilities. The higher percentage of operating expenses (63.54 against 57.31) is due partly to the greater mileage of line in operation, 154 additional miles having been opened during the year. There was also a heavier renewal of ties, and an increase in tonnage and train-mileage, consequent on the better service given both for passengers and merchandise, which entailed a heavier coal consumption and a larger wages bill.

In spite of the commercial crisis in Brazil the receipts of the Paulista and Mogyana Railways, in which the Brazil Company is largely interested, showed a steady expansion, and the same dividends of 12 and 10 per cent, respectively, as in the previous year, were declared by each company, and their reserves further augmented. This was done in spite of the increase in working expenses.

The earnings of the Madeira-Mamore Railway, on the other hand, were affected by the severe depression in the Amazon valley following a severe crisis in the rubber industry.

Effect of the Panama Canal on Coast-to-Coast Traffic

Improved Service and Reduced Rates Take Business from Rail Lines. Ask Relief from Fourth Section

Interesting testimony showing the effect of the Panama canal on water rates from the Atlantic to the Pacific coasts was presented at a hearing before Special Examiner Thurtell of the Interstate Commerce Commission in Chicago on October 6, 7, 8, 9 and 10, on the application of the transcontinental railways for relief from the recent fourth section order of the Interstate Commerce Commission, to enable them to make reduced rates to the Pacific coast terminals on 107 commodities sufficiently low to meet water competition without making a reduction in the rates on these commodities to the intermediate points.

The hearing was held pursuant to a petition filed by the carriers with the commission on July 9, following the decision of the Supreme Court sustaining the commission's order in the Intermountain rate case, in which the roads submitted to the commission three schedules of rates. Schedule A is a list of commodities on which the rates to Pacific coast terminals will apply as maxima to intermediate points and on which no relief is requested. Schedule B consists of commodities subject to water competition at the Pacific coast terminals, but on which the rates from the Missouri river to the Pacific coast by rail are generally not less than $2 for less than carload lots and $1 for carload lots, and as to which the carriers will observe the fourth section rule of the commission, applying only such percentages over the through rates at the intermediate points as were designated for the respective zones in the original order of the commission, 7 per cent from Mississippi river and Chicago territory, 15 per cent from the Buffalo-Pittsburgh and Cincinnati-Detroit territories, and 25 per cent from New York territory. Tariffs are now being compiled by the carriers of the rates on commodities named in schedules A and B to become effective on November 15. Schedule C is a list of 107 commodities covering generally manufactured articles subject to the most severe water competition, on which the rates to the coast are less than $1 in carloads and $2 in less than carloads, which rates the carriers consider subnormal to a marked degree, measured by any recognized standard that has been fixed by the commission as reasonable, but which are necessary to move a share of this water competitive traffic by rail, also to enable manufacturers and shippers at points of production not located directly on the Atlantic seaboard to share in the trade of the Pacific coast. These rates are so low that the carriers consider they should not be used as a basis for rates to interior points. As to these rates the carriers asked permission to present to the commission such evidence as in their opinion would completely justify a greater degree of relief from the provisions of the fourth section than was granted in the order.

THE CONTENTION OF THE RAILWAYS

An opening statement outlining the position of the railways was made by Charles Donnelly, assistant general counsel of the Northern Pacific. Mr. Donnelly said that the order of the commission, which was sustained by the Supreme Court, provided only for a relation of rates, and the carriers might have complied with it literally by advancing all terminal rates to the level of the intermediate rates complained of. In the meantime, the conditions existing at the time when the order was entered had changed radically. The carriers were confronted, therefore, with the necessity of adopting that method of compliance with the order which would best conserve their revenue. Their position is that upon the commodities in schedule C the existing rates to intermediate territory tried by the standards afforded by the decisions of the commission in other cases involving rates into the intermountain territory are just and reasonable for the service performed, and that the roads ought to be allowed to make rates to the terminals without reference to the existing intermediate rates. The general justification which has always existed for the maintenance of lower rates to the Pacific coast terminals is that they were necessary primarily to enable rail carriers moving traffic from the Atlantic coast to the Pacific coast to get any of that traffic in competition with other carriers who were moving it to the same destination by cheaper means of transportation. The proposition of the carriers has always been that if this traffic can be given to a boat in New York, and carried to San Francisco for 50 cents they ought to be allowed to charge a rate of 60 cents for the movement of the traffic to that destination, if such a rate would yield something in excess of the out-of-pocket expense, and to charge it without in any way affecting those rates which were at the same time collected to intermediate territory. The carriers maintained that that was true not only of traffic originating in New York, but as well of traffic originating in territory immediately adjacent.

They also contended that if in point of fact railways having their eastern termini in the Middle West could find that same commodity produced or manufactured there, they ought to be permitted to pick it up at that point and deliver it at the Pacific coast upon rates which would enable them to do so in competition with the rates established by the water carriers upon the same traffic originating at the Atlantic seaboard, and that they ought to be permitted to do so without any reference to the rate to the intermediate points. He cited, for example, that at the present time 15,000 lb. of wrought iron pipe was moving from Youngstown, Ohio, to a Pacific coast destination upon the combination rate of 18 cents from Youngstown to New York plus 35 cents from New York to the Pacific coast, or a total of 53 cents, while the existing rail rate is 65 cents. The rate cannot move the business in competition with the rate established by the rail and water route. Can any conceivable reason be assigned, he asked, why, if the carriers can under existing operating conditions move the same traffic from point of origin to the same destination at rates only slightly in excess of this combination they ought to be penalized by the depression of rates otherwise just and reasonable to intermediate territory? No conceivable reason can be assigned, he said, why, as the condition of allowing carriers to compete for such traffic, they should be compelled to forego what they might otherwise lawfully and reasonably ask for the service they render to interior points. The question also involves, he said, the interests of the Middle West. The interests of the interior communities are no more affected if the carriers are allowed to pick up the same traffic in the interior and move it to the Pacific coast on rates which will allow them to compete with water carriers than they would be if the carriers are allowed to compete from the Atlantic seaboard. The question involved, therefore, is: Shall the transcontinental carriers, in view of the conditions existing now as the result of the construction of the Panama Canal, be compelled to go out of the business of moving to the Pacific coast traffic which, if they move it at all, they must move in competition with the water carriers?

NEW CONDITIONS CREATED BY THE CANAL

The first witness for the carriers was P. P. Hastings, assistant general freight agent of the Atchison, Topeka & Santa Fe coast lines, at San Francisco, Cal. Mr. Hastings said that the sea competition within the past few months has been increasing by leaps and bounds, particularly because of the opening of the Panama Canal. The opening of the canal has resulted in much better service by water; the time is shorter and the dates of sailing are more frequent on the lines which were doing business across the isthmus either of Panama or of Tehuantepec, prior to the opening of the canal, and new lines have gone into the business and are still going in, which make the sailings from

the ports on both the east and west very much more frequent than they were before. Moreover, water lines are loading vessels at additional ports, principally gulf ports, and there is no longer the necessity of trans-shipment from sea to rail and from rail to sea again in crossing the isthmus with the intervening rail haul between trans-shipments. Whether entirely because of the opening of the canal or of the new lines entering the service, there has also been a very radical reduction in the rates of the water lines since the opening of the canal, and the roads are daily receiving reliable information about further reductions being made. These things have served very materially to increase the tonnage moving by water lines, not only on schedule C commodities, but also on other commodities. Advice had been received within the last day or two from railroad representatives at both New York and San Francisco and Los Angeles, and on the north coast, of a reduction announced on October 1, on from 300 to 400 commodities, these reductions being either further reductions or reductions on commodities not formerly announced. Even prior to these reductions by the water lines the rail rates did not, in most instances, fully meet the sea competition, but the rail lines were able to obtain a considerable share of the traffic because of their better service. Pending the decision in this case the rail carriers did not feel at liberty to make any changes in their terminal rates to meet the new conditions. Most, if not all, of the rates on the schedule C commodities must be reduced if the railroads are to continue to share in the traffic at the terminal points.

RATES VIA THE CANAL

Mr. Hastings then presented an exhibit showing the water rates prior to the opening of the canal and the rates quoted as of September 5, 1914, and also the movements by sea for the first put out only on the heavier articles, or those which moved in largest quantity, is now applied to the iron list generally by the water lines in carloads. Wine has been quoted at 30 cents in carloads. Wire fencing, formerly 65 cents, is now quoted at 30 cents. In addition there have been a great many reductions on schedule B commodities. Even before the opening of the canal there was a considerable movement from points west of the Pittsburgh-Buffalo territory, which is very materially increasing, but at the time the shipments moved, the movement by sea was largely from those territories. There is also a great amount of traffic by water of practically all commodities from New York City. There are also shipments from Boston, Charleston, S. C., and Gulfport, Miss.

Mr. Hastings introduced a statement showing the tonnage of freight handled westbound by water lines from the Atlantic seaboard to Pacific coast ports, for the years 1907-13, inclusive, compared with that moving through the Panama Canal in September, 1914, the first full month since the canal has been open for business. The total tonnage to American Pacific coast ports, excluding that via the Straits of Magellan and Cape Horn, which was not available, has been as follows: 1907, 139,448; 1908, 141,484; 1909, 254,387; 1910, 290,122; 1911, 397,974; 1912, 451,582; 1913, 434,115. For the month of September 1914, the Emery Steamship Company carried 8,400 tons; the Panama Railroad Steamship Company, 444 tons; the Atlantic & Pacific Steamship Company, 13,482; the American-Hawaiian Steamship Company, 43,312; the Luckenbach Steamship Company, 12,277, making a total of 77,915 tons. This, multiplied by 12, equals 934,980 tons, which would be over twice the tonnage moving by water in any previous year. The figures for September do not include any business via two of the new lines from the South Atlantic and Gulf ports. Mr. Hastings explained that as the canal was

Summary of Service via Water Lines Between Atlantic and Gulf Ports and Pacific Coast Ports Since Opening of Panama Canal

Steamship line	Number of vessels	Total tonnage capacity	Ports from	Ports to	Frequency of sailings	Time in transit to San Francisco	Remarks
American Hawaiian S.S. Co.	26	260,000	New York	San Diego Los Angeles Harbor San Francisco Portland Seattle Tacoma	5 days	23 days	Have declared intention to make Gulf ports, eastbound, and Charleston, S. C., westbound, soon.
Luckenbach S.S. Co.	8	40,500	New York *Philadelphia	Los Angeles Harbor San Francisco (Cargo for North Pacific Coast ports transshipped at San Francisco)	10 days	27 days	Will make Gulf ports early in October, both directions.
W. R. Grace & Co. (Atlantic & Pacific S.S. Co.)	4	30,000 to 40,000	New York	Los Angeles Harbor San Francisco Puget Sound	15 days to 20 days	20 days	
Emery S.S. Co. (Boston & Atlantic S.S. Co.)	2	17,000	Boston	Los Angeles Harbor San Francisco	35 days to 40 days	27 days	
Swayne & Hoyt	3	15,000	New York	Los Angeles Harbor San Francisco	30 days	23 days	
Sudden & Christianson	6	27,000	New York	Los Angeles Harbor San Francisco	15 days	24 days	Announce will make Gulf ports, including Mobile, New Orleans and Galveston.

*Effective October 8.

year 1913, on the items covered by schedule C. These rates were quoted by the American-Hawaiian Steamship Company. Since September 5 many other reductions have been announced. For example, the carload rate on calcium chloride, which before the opening of the canal was 45 cents per 100 lb., has been reduced to 35 cents in carloads; on canned goods from 55 and 60 cents to 45 cents; coffee, 55 to 45; telegraph line material, 55 to 35; window glass, 75 to 60; ink 90 to 75; a large number of iron and steel articles, from rates ranging from 45 to 60 cents to 30 cents; nails, from 50 cents to 30 cents; oils from 60 to 50; paints, 65 to 50; white lead, 55 to 50; paper and articles of paper, 75 to 60; roofing materials 75 to 65; tin 55 to 50; wire and wire goods, 55 to 30; rail fastenings, from 50 to 30. The general item of hardware, formerly quoted at $1, both l. c. l. and carloads, is now quoted at 80 to 85 cents. Pipe fittings and connections have recently been reduced from 40 to 30 cents; cast iron pipes from 40 to 35 cents. On iron and steel articles the 30-cent quotation, opened on August 15, and was in complete operation during the last half of August, any freight that was held back awaiting the opening might reasonably be supposed to have got through before September, so that the figures for September should indicate a normal month, except for the fact that rates are going down and new lines and new ports are entering into the traffic, so that it may be reasonable to expect an increase, unless there should be a change in the rate situation.

SERVICE VIA THE CANAL

Another exhibit showed the lines which are now engaged regularly, or will be within the coming month, in the traffic through the canal, and some information regarding the proposed service. This exhibit is shown in the accompanying table. From this table Mr. Hastings estimated a monthly capacity of 111,600 tons. Moreover, he had just received an announcement of the inauguration of a fleet by the Panama-Pacific Line, to begin

operations between San Francisco and New York in May, 1915, with two boats of 4,000 tons each.

PROPOSED RATES

Another exhibit showed the tonnage of schedule C commodities moving by rail from the east to Pacific coast terminals during the year 1913, with a column showing the movement of the same commodities by sea. Another showed the commodities covered by schedule C, with the rates now in effect to California terminals, and the suggested disposition of schedule C items in terminal rates under which the rail carriers might hope to hold a reasonable portion of the traffic. The publication of the tariff which will become effective on November 15, under the commission's more recent order, will cancel a considerable number of the commodity rates which have formerly been carried to the terminals only, 460 items in less than carloads and 151 in carloads. These rates were eliminated on business where it was thought that the volume of the movement was not sufficient to justify their continuation. He said that this would improve the relationship of the rates from the standpoint of the intermediate points, because the commodities will then take the class rates, and the class rates are no lower to the coast than to any intermediate points, and are lower to Phoenix, Reno and many other points than they are to the terminals. Schedule B also will include 58 less than carload and 389 carload items, on all of which the rates from the Missouri river will be the maxima at intermediate points with the percentages added from points further east. These rates will in most instances materially reduce the rates to Reno and other interior points, probably on 85 to 90 per cent of the commodities.

RATES COVER OUT-OF-POCKET COST

Mr. Hastings then explained that, taking the basis used by the commission in the southeastern fourth section case, for the purpose of roughly computing the out-of-pocket cost of transporting traffic, it had been figured that the out-of-pocket cost on the Santa Fe for transporting the commodities in schedule C would average 3.28 mills per ton per mile, and that the rates suggested by the carriers would all yield a greater revenue than that amount. If the carriers are enabled to participate in this traffic to the Pacific coast terminals, he said, on a basis by which they will earn something over the out-of-pocket cost, it will contribute that much to the overhead expenses and other items of expense which are not included in out-of-pocket cost, and so contribute to the total earnings of the road, so that the burden will not be laid entirely upon the other traffic hauled by the transcontinental carriers, that is, the traffic left to them if they were forced to discontinue participation in the terminal business. Moreover, the rail rates to the interior would be reduced by the combinations on the terminals if the roads are allowed to put in the rates which will meet this competition; and this will not only reduce the actual volume of the rates, but will also establish a different, and for the interior man a better, relation of rates as compared with the terminals. The interior man could also have the advantage of water service and water rates by trans-shipment at the Pacific coast ports; but if the rail carriers are permitted to carry these rates to the terminals on a basis which they can afford, the interior man will have the same combination on the terminals at a very much better service by the rail line than he would were he dependent on trans-shipment at Pacific coast ports. If the carriers cannot be given relief and are forced to abandon the terminal traffic to the sea carriers, no possible advantage would accrue to the interior points.

RATES TO THE NORTH COAST

J. B. Baird, freight traffic manager of the Northern Pacific Railway, gave supplementary testimony applying to the northern lines. Mr. Baird introduced an exhibit showing the present rates to the Pacific coast terminals on schedule C commodities, and the rates which it is thought necessary for the carriers to establish as to the terminals. These are substantially the same as the rates to the California terminals, although there are some slight variations. The class rates which were lower to the coast than to Spokane at the present time grade normally from the east to the west coast. Mr. Baird said that as to the north Pacific coast terminals, the tonnage of schedule C commodities would be somewhere in the neighborhood of 45 per cent of the total traffic. He introduced a number of exhibits as to the rates to the North Pacific coast terminals and intermediate points, similar to those presented by Mr. Hastings. He said that a number of commodity rates had been eliminated from the terminal tariff because the tonnage was so small that the carriers thought they could better afford to eliminate the rates and surrender the business to the water carriers, than to make those rates the basis of their rates to the intermediate territory.

He also produced a statement showing the movement of empty cars over the Northern Pacific from January 1 to August 31, 1914, showing a great preponderance of empty car movement westbound, to show that the Northern Pacific could handle a very much larger tonnage of westbound traffic to Pacific coast territory than it is handling, without materially increasing its transportation expense. The cars could be moved westbound fully loaded, he said, without materially changing the present engine mileage, and with very little additional cost, except such as would be involved in the consumption of fuel. Passing Billings, Mont., this table showed about 24,000 empties in excess of the loads for the period of eight months, so that the Northern Pacific could increase its loaded westbound tonnage to the extent of about 100 cars per day without a considerable increase in operating expense. Mr. Baird said it was not believed that the reduction in the terminal rates would involve any reduction in the revenue because it was expected to get business under those rates that could not be secured at the present time. Many of the present terminal rates secure practically no business now. This preponderance of eastbound movement has prevailed for at least 10 years.

MR. PLAISTED'S TESTIMONY

F. H. Plaisted, assistant director of traffic of the Southern Pacific, explained how the opening of the Panama Canal had changed the conditions affecting transcontinental rates. Mr. Plaisted said that the water service had now been extended to apply not only to New York territory, but to the South Atlantic and Gulf ports, so that these ports are now placed in the same status as the territory adjacent to New York. Water service has also been extended to some of the Missouri river territory, including Galveston and New Orleans. He cited an example of a shipment of pipe and pig iron from Birmingham to the Pacific coast at a rate of 15 cents for the rail haul from Birmingham to New Orleans, and 35 cents for the water haul from New Orleans to San Francisco, making a through rate of 50 cents. The all-rail rate is 65 cents. Such traffic has previously moved by rail in large quantities, but the roads are now unable to hold that traffic against the water competition at that rate, and it is proposed to make a rate of 55 cents if it can be done without reducing the intermediate rates, in order to share in the traffic. Mr. Plaisted took the position that the low rates proposed by the carriers to meet water competition would have no effect in the intermediate points, because if the railroads do not meet the rates the traffic will go by water.

For example, he cited a shipment of paper bags from Sand Hill, N. Y., via the canal at a rate of 55 cents. The former rate by water was 65 cents and the rail rate is $1. Formerly there was no water service from Boston to the Pacific coast. On August 25, the steamship Atlantic sailed from Boston carrying 2,500 tons of nails, 4,500 tons of structural iron originating in Pennsylvania, 10 000 tons of wire fencing originating in Pennsylvania, 5 cars of automobile tires from Massachusetts, 1 car of paper from Maine, 8 cars of electrical machinery from Lynn, Mass., Schenectady, N. Y., and Pittsfield, Mass., 20 cars of printers' ink from Massachusetts, 1 car of canned goods from Massachusetts and 4 cars of boilers from Massachusetts. He also cited a shipment of 1,200 tons of rails from Lorain, Ohio, to San Francisco, which moved by water at a rate of 30 cents from New York to San Francisco, a reduction of 50 cents under the former rate. In 1913, the total tonnage of rails shipped by water was 609. He also cited a shipment of wrought iron pipe

from Wheeling, W. Va., at a rate of 30 cents from New York to San Francisco and 16 cents from Wheeling to New York. This business has moved almost exclusively by rail in the past. He also cited shipments from Youngstown, Ohio, which had formerly always moved by rail. He also mentioned a company which formerly supplied San Francisco from its Milwaukee branch. Shipments are now made from the New York branch by the Panama Canal. The Sherwin-Williams Paint Company, he said, having plants at Newark, N. J., and Cleveland, Ohio, now ships from Newark. Paper oyster pails, formerly moving from Chicago by rail to the coast, are now moving by the canal. It makes no difference to the interior points whether this traffic goes by sea or by rail, even if the rail rates are lower than those available to the interior points. Referring to the rails from Birmingham, he said that the 55-cent rate proposed by rail was not considered as fairly remunerative, nor did it actually meet the water competitive rates, but it was believed the rail service was worth 5 cents more, and that the railroads could get 55 cents, but no more. He said that if he was figuring on a rate that would meet all expenses and a return on the investment he would have to make the rate higher than 55 cents, but that this would meet the out-of-pocket cost. He said that the boat lines can make rates without notice, while the railways cannot change their rates except on 30 days' notice and the approval of the Interstate Commerce Commission. The roads, of course, do not expect to be able to fully meet the water competition for this reason, but desire to have the restrictions imposed by the long-and-short-haul clause removed as to this traffic, in order to obtain a share of it. If the boat lines reduce their rates too low, of course, the rail lines cannot follow them. Mr. Plaisted said the question of castbound rates by the canal would have to be taken up, but that it had not been included in this case. However, the same principle would apply. The roads would have to meet water competition at the points of origin, but not at the points of destination. Mr. Baird, on cross examination, said that out of the rates from Chicago to Seattle, 15 per cent would go to the lines between Chicago and St. Paul, out of the rate from New York to Seattle 25 per cent would go to the eastern lines.

Representatives of the state railway commissions of Nevada, Arizona, New Mexico, Idaho, Kansas, Nebraska, Montana and Minnesota were present and cross-examined the witnesses for the railways. Representatives of the chambers of commerce and other commercial organizations were also present from the principal commercial centers of the United States, including both eastern cities and terminal and intermountain cities in the west. The Nevada, Arizona, New Mexico, Idaho and Montana commissions, and shippers from the intermountain territory, opposed the plan of the railways, arguing that to make lower rates to the coast would be discriminatory against their shippers. Representatives of shippers' organizations in the middle western cities appeared in support of the railroads' position. H. C. Barlow, traffic director of the Chicago Association of Commerce, said that unless the commission allows the railways to make lower rates to the coast the entire mid-western section of the country will lose its business with the coast to the Atlantic seaboard cities. It is much cheaper at present, he said, to send goods by rail to New York and thence by water to San Francisco, than to ship across the continent by rail and the eastern cities therefore have an advantage over the middle west.

Mr. Barlow submitted the following exhibit, comparing the water-and-rail rates from Chicago to San Francisco since the opening of the canal with the transcontinental rail rate:

	Combination rate, C. L.	Rail rate, C. L.
Cotton piece goods	$1.55	$1.60
Starch	.85	1.00
Pickles	1.20	2.45
Shoe findings	1.50	1.90
Tinware	1.55	*1.70
Paper articles	1.40	*1.90
Leather	1.35	1.95
Iron and steel	.60	.80
Paints	.90	.95
Hardware	1.35	1.90
Earthenware	1.40	1.50
Twine	1.10	2.45

*L. C. L.

TESTS OF VANADIUM STEEL RAILS

Convinced from results along other lines that the use of vanadium in rail steel will reduce rail failures and increase the wearing quality of the rails, the manufacturers of this alloy recently had several heats of basic open hearth vanadium steel rolled into rails for test purposes by the Cambria Steel Company. Although the price of vanadium until the past year has been too high to make it commercially practicable in rails, it is now possible to sell rails with this alloy for about $40 a ton.

Three heats of vanadium steel were made to the following chemical specifications:

Heat	1	2	3
Carbon	.45 to .65 per cent	.40 to .52 per cent	.60 to .75 per cent
Manganese	1.10 to 1.40 per cent	1.00 to 1.30 per cent	.75 to 1.00 per cent
Silicon	Under .20 per cent	Under .20 per cent	Under .20 per cent
Phosphorus	Under .05 per cent	Under .05 per cent	Under .05 per cent
Sulphur	Under .05 per cent	Under .05 per cent	Under .05 per cent
Vanadium	4 lb. to ton	4 lb. to ton	4 lb. to ton

In the first two heats, the manganese specified is higher than usual, as previous investigations have shown that with manganese somewhat higher than usual the effect of the vanadium on the physical properties of the steel is still further increased. The third heat, however, conforms to the usual specification for rail steel.

The chemical compositions of the heats were as follows:

Heat	1	2	3
Carbon	.55 per cent	.51 per cent	.558 per cent
Manganese	1.51 per cent	1.11 per cent	.78 per cent
Silicon	.17 per cent	.12 per cent	.158 per cent
Phosphorus	.015 per cent	.010 per cent	.017 per cent
Sulphur	.019 per cent	.029 per cent	.025 per cent
Vanadium	.148 per cent	.146 per cent	.156 per cent
Actual per cent vanadium added	.168 per cent	.16 per cent	.177 per cent

The manganese in the first heat is higher than called for due to the percentage of loss in manganese addition not being nearly as great as allowed for in usual practice. The percentage of carbon in the third heat is about 5 points below the limit called for due to various mill delays.

The following chemical specifications were used for the carbon steel rails with which the vanadium rails were compared:

Carbon	Manganese	Silicon	Phosphorus
.62 to .75 per cent	.60 to .90 per cent	Under .20 per cent	Under .04 per cent

The production percentage of the vanadium steel or yield of rails per ton of ingots was higher than usual, as shown thus:

Heat	1	2	3
Ingots, weight	121,000 lb.	104,400 lb.	108,000 lb.
Rails, weight	89,500 lb.	79,900 lb.	82,000 lb.
Rails, number	77—1st; 5—2nd	73—1st; 1—2nd	73—1st; 2—2nd
Rails—Scrap	None	None	None
Per cent yield	74.0	76.9	75.9

All three vanadium steel heats rolled perfectly, and the blooms were all clean and free from seams and cracks. The standard gages were used, indicating that the shrinkage of the steel is the same as for standard carbon steel and that no change in this respect is necessary. Nothing developed in the heating and rolling to indicate that the mill output would be in any way reduced by the use of vanadium steel. The top portion of some of the ingots from the first heat was a little soft or green when bloomed, and they were cropped heavily on this account.

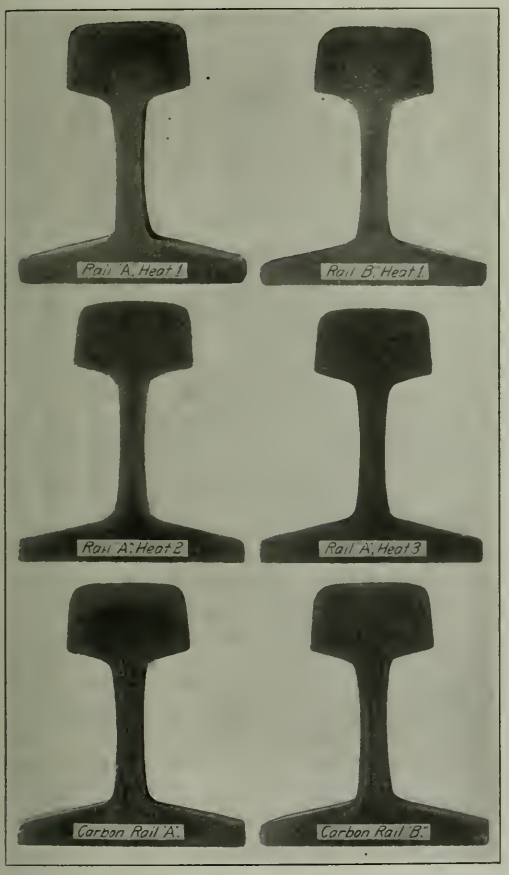
DROP TESTS

When the first heat was made, it was arranged to make drop tests on crop ends from both the "A" and "B" rail of three ingots, representing the beginning, middle and end of the pouring. Through misunderstanding this was not carried out on the second heat, and only three drop tests were made from this heat, one being from a "C" rail crop, as the top blooms from the ingots were rolled into three-rail lengths. The arrangement for two drop tests from the beginning, middle and end of the third heat was carried out, excepting that the tests were made on "C" rail crops instead of "B" rail, on account of the top blooms all having been rolled into three-rail lengths.

The usual requirements for the drop test were followed, the height of the drop being 15 ft. for the carbon rails and 18 ft. for all but two of the vanadium rails. One vanadium rail was tested with the flange up. All the others were tested in the usual manner with the head up. Six one-inch spaces were laid off on

the bottom of the flange in order to determine the ductility or stretch after each blow of the drop, the requirements being 5 per cent or 5/100 in. stretch in two adjacent inch spaces.

The vanadium steel met the ductility requirements in all of the 15 tests and in all but one of the 12 tests made with the 18-ft. drop, the requirement was met under the first drop. The deflection in inches under the first drop in the two cases in which a 15-ft. height was used was 0.7 and 0.9 in., respectively. The similar figures for the 18-ft. drop are 1.0 in four cases, 1.1 in seven cases and 1.2 in one case. The carbon rails in three such drop tests also met the requirement as to ductility, the deflection in two cases under the first drop of 15 ft. being 1.0 and in the third case 1.1. The fractures of the vanadium steel test pieces showed sound interior metal in all cases but one in which a small



Etched Cross Sections of Vanadium and Carbon Steel Rails

indication of piping which showed on one side of the wedge-shaped piece was broken out when the rail was fractured under the drop.

In addition to drop tests, one full length "A" rail from each of the three vanadium heats was broken into ten pieces and the fractures carefully examined. Every fracture was found to be free from any evidence of piping.

PHYSICAL TESTS

Tensile tests, alternating impact, and bend tests and also wear and hardness tests were made from rail crops from each heat. The crops from the "A" rails were taken from the top end of the rail. Tensile tests were also made from the middle section of each of the vanadium steel rails which were broken under the gag press. Corresponding tests for comparison were made from an "A" and "B" 100-lb. section carbon steel rail. Due to the more rapid cooling of the rail crops, the tests from these show a little higher in elastic limit than the tests from the mid section of the three rails broken in the gag press, as these rails cooled much more slowly on the hot bed.

The average elastic limit of the vanadium steel as shown in 61 tests was 95,000 lb. per sq. in., the corresponding figure for 16 carbon steel tests being 65,000 lb. per sq. in. The tensile strength of the 61 vanadium specimens averaged 129,000 lb. per sq. in., and of the 16 carbon steel specimens 119,000 lb. per sq. in. The ratio of the elastic limit to tensile strength was 70 per cent or more for the vanadium steel as compared with about 57 per cent for the carbon steel. The per cent elongation in two inches averaged 12.1 for 57 vanadium steel specimens and 10.9 for the 16 carbon steel specimens. The per cent reduction of area was 29.2 for the vanadium and 15.9 for the carbon steel.

The bend tests were made on rectangular pieces about 8 in. long. The load was supplied 6 in. from the fixed end of the test piece. The radius of the jaws holding the bend specimen was not over ⅛ in., and the edges of the specimens were not rounded. The alternating impact tests were made on bars turned to ⅜ in. diameter. The bar was held firmly in a vise and the upper end moved backwards and forwards by means of a slotted arm, through a total distance of ¾ in. at the rate of 600 movements per minute. The distance from the vise to the slotted arm was 4 in. Each movement was accompanied by an impact or blow on the bar by the slotted arm.

The results of these tests show that the vanadium steel compares favorably with the carbon steel in these respects.

The hardness tests were made by the Brinell method. This consists of measuring the impression made by a standard steel ball under a standard load. The tests were made on sections from the same rail crops from which the other tests were made. The sections from the first heat showed an average hardness of about 340; from the second heat about 302, and from the third heat about 293; carbon rail "A" about 248, and carbon rail "B" about 269.

The wear test was made by rotating a test piece 1 in. long by 1 in. diameter between three manganese steel rollers of 3 in. diameter. The two bottom rollers were driven by gears with a different number of teeth, giving the rollers different speeds and causing the test piece to slip as well as rotate, imitating the action of a car wheel on the rail. The test pieces were all taken from the head. A direct load of 110 lb. was applied to the test piece by loading the top roller. In previous tests a load of 220 lb. was used, but owing to the great tendency of soft rails like carbon rail "A" to flow and form a fin or bead the weight was reduced to 110 lb. It was found that the abrasion of the test piece was better with this weight than with the heavier load. The test pieces were weighed before and after test. The loss in weight in milligrams was divided by the original weight of the test piece in order to obtain comparative figures and allow for variations in weight of test pieces. The tests were all run 50,000 revolutions. The relative loss for all specimens was as follows:

Heat		
1	"A"—Crop	16.3
1	"B"—Crop	13.1
2	"A"—Crop	12.8
3	"A"—Crop	12.2
Carbon	"A"	28.8
Carbon	"B"	21.1

CHEMICAL ANALYSES

Chemical analyses were made of rails from each of the vanadium heats to determine whether there was any tendency to segregation and how the vanadium steel compared in this respect with the carbon steel. For this purpose drillings were taken from two locations in the head of the rail. One sample was taken from the top corner of the head, corresponding to the outer portion of the ingot, and the other sample was taken from the junction of the head with the web, corresponding to the axial

center of the ingot where any segregation present would be most certain to be found. No segregation was found in the case of the vanadium steel rails, the results all being within the limit of analytical error.

Sections from the rails tested were polished and etched in boiling dilute sulphuric acid and photographed. Rail "A" of the first heat showed a small amount of piping at the top of the web and in the web. The appearance of the center of the head of this etched section would indicate that the center of the top of the ingot was a little soft or green when bloomed. A few of the ingots from this heat were heavily cropped at the bloom shears on this account. Rail "B" of the first heat showed a few small streaks in the web. Rail "A" of the second heat showed a perfectly uniform, dense structure with no evidence of residual piping. Rail "A" of the third heat showed a uniform, dense structure, with only the very slightest indication of residual piping. Carbon rail "A" is typical of most "A" rail structures and is really better than many because more than the usual discard was made from the top of the ingots in rolling this lot of rails. Carbon rail "B" shows evidence of residual piping, more marked on the left side of the etching.

The time required for etching the vanadium steel rail sections was several times longer than for the carbon rails. The average time required was about 30 minutes, as against about 5 minutes for the "A" carbon steel rail and about 15 minutes for the "B" carbon steel rail. The difference in length of time of etching is a very good indication of the comparative resistance to wear.

CONCLUSIONS

From the results of the tests made on these three heats, the American Vanadium Company recommends the following chemical specification for vanadium steel rails:

Carbon	.45 to .60 per cent
Manganese	1.00 to 1.25 per cent
Silicon	Over .10 per cent
Phosphorus	Not over .05 per cent
Sulphur	Not over .05 per cent
Vanadium	4 lb. added per gross ton

BRITISH AND GERMAN EXPORTS OF RAILWAY MATERIAL

The British Board of Trade has recently compiled statistics regarding British and German exports of railway supplies and equipment to the principal markets of the world, which should be of great interest at this time to American railway supply companies that are now studying the possibility of extending their business in foreign markets.

During the year 1912 the total value of railway material exported by Germany to all destinations amounted to $29,490,200. Of this $6,844,200 consisted of railway wheels and axles and parts of railway wheels, hubs, tires, frames, etc., and $22,656,000 of other railway material. British exports in the year 1913 amounted to $6,050,000 for railway wheels, axles and their parts, and $25,948,000 for other railway material, making a total of $31,998,000. Exports from Austria-Hungary in 1913 amounted to $194,350, of which $7,000 was for railway wheels, axles, hubs, tires, and parts, and $187,350 was for other equipment.

The value of exports of railway material, other than rolling stock and railway wheels, tires and axles, exported to all destinations from Germany, United Kingdom and Austria-Hungary, are shown in the following table:

Exported from Germany (1912)

Rails, including tramrails	$14,503,000
Sleepers of iron	3,819,000
Fishplates and bedplates	1,646,300
Fishplate screws and wedges, bolts for sleepers, gage bars, clamp plates, hooked nails	1,250,000
Railway carriage metal fittings, railway buffers	377,000
Parts of railway switches, parts of signals	596,000
Railway carriage springs, buffer springs	464,500
Total	$22,656,000

Exported from Austria-Hungary (1913)

Rails for railways, pierced or not	$178,300
Other railway material, including fastenings, frogs, buffers, etc.	9,050
Total	$187,350

Exports from United Kingdom (1913)

Rails, new perfect rails, for use on steam or electric railways, and conductor rails for electric traction	$17,289,000
Tram rails, with grooved heads	782,500
Chairs and sleepers (of iron or steel)	3,724,500
Railroad iron or steel, unenumerated	4,052,000
Total	$25,948,000

The values of railway axles, railway wheels and parts, hubs, tires, frames, etc., exported from Germany to all destinations in the year 1912 to the United Kingdom and to the principal neutral markets of the world were as follows:

To United Kingdom	$200,000	To Italy	$1,375,000
" British India	300,000	" Turkey	60,000
" Canada	450,000	" Egypt	65,000
" Australia	995,000	" Dutch East Indies	160,000
" Norway	70,000	" China	310,000
" Denmark	140,000	" Japan	440,000
" France	200,000	" Argentina	80,000
" Spain	195,000	" Brazil	315,000
" Portugal	50,000	" Chile	70,000

British exports of railway wheels and parts, including tires and axles to the various colonial and foreign markets, in the year 1913, were as follows:

	Railway wheels and axles complete	Tires and axles	Total
To British India	$1,975,000	$330,000	$2,305,000
" Canada	60,000	130,000	190,000
" Australia	345,000	1,075,000	1,420,000
" Norway	.....	5,000	5,000
" Denmark	.....	.....	.....
" France	2,500	23,000	25,500
" Spain	30,000	10,000	40,000
" Portugal	2,500	7,500	10,000
" Italy	.....	1,000	1,000
" Turkey-in-Asia	2,500	2,500	5,000
" Egypt	5,000	55,000	60,000
" Dutch East Indies	.....	3,500	3,500
" China	115,000	35,000	150,000
" Japan (and Formosa)	20,000	35,000	55,000
" Argentina	510,000	415,000	1,425,000
" Brazil	175,000	75,000	250,000
" Chile	80,000	25,000	105,000
Total	$3,822,000	$2,227,500	$6,050,000

The total of British exports to the above markets exceeds those of Germany, but while the United Kingdom easily takes the first place in supplying this material to British India and Argentina, Germany has taken the bulk of the trade in the other markets specified. The Board of Trade memorandum reports that competition from Germany with British manufacturers of railway axles, wheels and tires during the last few years has been extremely keen. In many foreign and colonial markets, large contracts have been placed with German manufacturers. A number of the contracts which were under execution, or which had just been placed in Germany before the war cannot now be fulfilled in that country.

The table on the following page shows for the year 1912 the values of the principal descriptions of railway material other than rolling stock and railway wheels and axles exported from Germany to the United Kingdom and the principal neutral and colonial markets.

The following statement shows for the year 1913, the exports of certain classes of railway material from the United Kingdom to the colonial and neutral markets principally served by Germany:

Exported to:	Rails	Chairs and sleepers	Miscellaneous
British India	$4,063,000	$2,700,000	$1,297,500
British East Africa	94,000	55,000	13,500
British South Africa	2,138,000	42,500	474,500
Australia	4,595,000	16,500	555,500
Norway	5,500	.....	.....
Sweden	20,500	.....	.....
Denmark	.....	.....	1,000
Netherlands	22,500	129,000	3,500
Belgium	86,500	.....	3,500
France	162,500	.....	4,000
Switzerland	.....	.....	.....
Spain	78,500	.....	10,500
Portugal	36,500	.....	8,000
Italy	28,500	.....	2,000
Greece	1,000	.....	500
Servia	.....	.....	.....
Roumania	.....	.....	500
Russia	327,000	.....	60,000
Turkey	34,000	.....	6,500
Egypt	652,000	19,500	191,000
Siam	1,000	.....	.....
Portuguese East Africa	641,500	387,500	121,000
Portuguese West Africa	2,000	500	2,000
Morocco	.....	.....	.....
Dutch East Indies	.....	.....	13,500
China	3,500	.....	11,500

Exported to:	Rails	Chairs and sleepers	Miscellaneous
Japan	4,000	500	1,000
Brazil	319,500	40,000	132,500
Argentina	1,942,000	27,500	555,500
Chile	87,500	500	77,000
Uruguay	76,000	.....	11,000
United States	.....	.....	.....
Mexico	120,000	.....	57,500
Total to above markets	$15,542,000	$3,419,000	$3,604,500
Total to all destinations	$18,071,500	$3,824,500	$4,052,000

Austrian exports of railway material are insignificant when compared with those of Germany or the United Kingdom. The bulk of the exports were rails and were sent mainly to Roumania, $153,050, and Servia, $24,350.

Germany's principal market for railway material in 1912 and the aggregate amounts sent to each, were as follows: Dutch East Indies, $2,594,500; Turkey, $2,366,000; Argentina, $1,595,500; Sweden, $1,516,500; Switzerland, $1,440,000; Netherlands, $1,488,000; Chili, $969,500; Brazil, $905,500; United Kingdom, $900,500; Japan, $834,500; and Denmark, $752,000. The most important item exported was rails, the exports of rails accounting for fully one-half of the total.

The following particulars are given as to the special requirements of some of these markets:

CANADA

The British trade commissioner in his last annual report for Canada, stated that of the gross imports of railway material the British imports represented the proportion of 7.6 per cent, but over 90 per cent of the railway material has been classed as non-competitive, including rails, etc., which for various reasons British firms do not normally supply to the Canadian market. Of the balance, consisting of axles and parts, springs and parts, switches and crossings, and tires for locomotives, tenders and cars, the imports show a proportion for the United Kingdom of 11½ per cent, while Germany secured 20.18 per cent. During the year ended March 31, 1913, the imports of axles and parts into Canada from all countries amounted to $775,130, including $33,139 worth from the United Kingdom and $713,848 worth from the United States. The imports of springs and parts from all countries amounted in value to $108,381 including $783 worth from the United Kingdom and $107,203 worth from the United States. The imports of tires for locomotives, tenders, and cars from all countries amounted to $548,148, including $134,916 worth from the United Kingdom, and $87,150 worth from the United States. Imports of axles and parts, and tires for locomotives, tenders and cars from Germany amounted in value to $27,678, and $326,082 respectively.

AUSTRALIA

There is said to be a large demand for wrought steel, axles in Australia, the American pattern being preferred. A firm in Sydney reported that instead of ordering 500 sets from the United Kingdom, as at present, they would order 3,000 sets if British manufacture would closely follow the American pattern and quote a lower price. At present the difference in price is said to amount to about 30 per cent in favor of the American axle. The trade in light springs is mostly with the United States. The trade in heavy axles and springs is very largely with the United Kingdom.

The following were the values of rails, fish plates, fish bolts, tie-plates, and rods, switches, points, crossings, and intersections for railways and tramways, imported into Australia from the undermentioned countries in 1910, 1911, and 1912:—

	1910	1911	1912
United Kingdom	$1,997,735	$2,498,145	$4,223,665
Germany	169,320	1,053,785	438,665
All countries	4,103,385	5,399,640	6,500,425

INDIA

The following table shows the values of railway cars and parts imported into British India from the United Kingdom, Germany and Belgium in the years 1910-1911, 1911-1912, and 1912-1913:

	1910-11	1911-12	1912-13
United Kingdom	$4,845,860	$4,419,940	$7,474,890
Germany	57,085	91,490	322,985
Belgium	94,765	37,830	108,490

The values of the imports from Germany show large increases during the three years under view as compared with those from the United Kingdom. In 1910 and 1911, according to consular reports, the German exports of tires amounted to 3,700 metric tons, and railway axles to 1,400 metric tons. Wheels are said to be imported for the most part from the United Kingdom.

GERMAN EXPORTS, 1912

Exported to:	Rails	Steel ties	Fish-plates, tie plates	Fishplate screws and wedges, holts, gage-bars, clamp plates, hooked nails	Metal car fittings, buffers	Switch and signal parts	Car springs, buffer springs
United Kingdom	$649,500	$80,000	$85,000	$13,000	.....	.....	$69,500
British India	192,500	93,500	7,500	25,000	.....	.....	.....
Australia	272,500	.....	7,500	8,500	.....	.....	.....
British East Africa	70,000	70,000	.....	.....	.....	.....	.....
British South Africa	161,500	82,000	146,500	61,000	.....	10,500	.....
Norway	323,000	.....	47,500	37,500	.....	.....	13,500
Sweden	1,363,000	.....	108,500	8,500	5,500	23,500	.....
Denmark	536,500	13,000	119,000	31,500	12,500	12,000	26,500
Netherlands	1,054,500	102,000	82,000	101,000	54,500	18,000	76,000
Belgium	227,000	11,000	.....	18,000	49,500	.....	29,000
France	98,500	27,000	.....	.....	48,000	8,000	10,500
Switzerland	733,500	478,500	12,000	16,500	27,500	113,500	38,500
Portugal	52,500	.....	.....	.....	.....	8,000	5,000
Spain	64,500	23,000	.....	9,500	.....	25,500	28,000
Italy	183,500	12,000	8,000	21,500	28,000	14,500	15,500
Servia	.....	.....	.....	29,000	.....	16,500	.....
Roumania	87,500	.....	.....	12,500	.....	64,000	.....
Russia	76,000	.....	.....	10,000	.....	13,000	.....
Greece	.....	18,000	.....	.....	.....	.....	.....
Turkey	999,000	853,500	267,000	187,000	.....	53,500	.....
Siam	320,000	.....	59,500	45,000	.....	.....	.....
Morocco	56,000	.....	.....	.....	.....	.....	.....
Egypt	374,000	43,500	32,500	.....	.....	.....	.....
Portuguese East Africa	166,000	47,500	9,500	23,500	.....	.....	.....
Portuguese West Africa	.....	6,000	.....	.....	.....	.....	.....
Dutch East Indies	1,447,000	652,000	143,500	205,000	53,000	59,000	34,500
China	50,500	10,500	9,500	10,500	.....	17,000	.....
Japan	713,000	5,500	20,500	46,500	.....	.....	49,500
Brazil	776,500	23,500	41,500	22,500	7,000	26,000	7,500
Uruguay	79,000	.....	.....	.....	.....	.....	.....
Argentina	1,188,500	228,500	103,500	29,500	14,000	20,000	11,500
Chile	587,000	241,500	60,500	47,000	10,000	20,000	.....
Mexico	70,000	9,500	.....	12,000	.....	.....	.....
United States	82,500	9,500	9,500	.....	.....	.....	.....
Total to above markets	$13,405,000	$3,078,000	$1,031,500	$1,031,500	$310,000	$522,500	$413,000
Total to all markets	$14,503,000	$3,819,000	$1,250,000	$1,250,000	$372,000	$596,000	$464,500

EGYPT

The following were the values of iron and steel rails imported into Egypt from the undermentioned countries in 1912 and 1913:

	1912	1913
United Kingdom	$176,885	$532,115
Germany	301,635	99,900
All countries	583,250	924,900

The position of the United Kingdom improved greatly in 1913 at the expense mainly of Germany.

THE INCREASE IN MILEAGE BOOK RATES

E. B. Leigh, president of the Chicago Railway Equipment Company, has sent the following letter to all company representatives directing attention to the recent circular letter from the secretary of the Illinois Commercial Men's Association urging members to protest to the Interstate Commerce Commission against the proposed increased price of mileage books already granted by the commission subject to revision.

"This ill directed move on the part of the Illinois Commercial Men's Association (voiced by its secretary) is not only illogical but manifestly unfair; to say nothing of being directly opposed to the view now almost universally held by industrial and commercial interests of the country, which are substantially a unit in the belief that railways are in sore need of increased revenue, and to which end they are now lending their aid. Furthermore, we look upon this effort as being most presuming on the part of the secretary of the Illinois Commercial Men's Association, who seems to overlook the very pertinent fact that in the case of probably over 90 per cent of the firms and corporations employing traveling salesmen, *employers pay their bills,* and are consequently the interested parties, *not* the individual members of the Illinois Commercial Men's Association or similar organizations, and any independent action of such employees is manifestly unwarranted.

"One of the first and foremost duties of the selling representative is to stand by the policy of his employer, and, knowing as you do, our views on the railroad rate question, we feel it wholly unnecessary to more than call your attention to this matter, in full belief you will lend your hearty aid to overcoming any recognition of, or action upon, this attempted undertaking.

"On the other hand, we are equally confident of your active co-operation with us in making the railroad situation better understood, and in your efforts to do all possible within the radius of your personal acquaintance and influence to bring about general business prosperity."

In last week's issue there was published a letter written by Lorenzo Norvell, of Fairbanks, Morse & Co., to the secretary of the Illinois Commercial Men's Association, protesting against his action in attempting to incite the members of that organization to protest to the Interstate Commerce Commission against the increase in mileage book rates on the eastern roads. Among other similar letters sent to Secretary Cavanaugh is the following by C. R. Wescott, president of the M-C-B Company:

"Your favor of the 18th inst. captioned 'Attention, Traveling Men!' has reached me and after reading, as you suggest, have arrived at the conclusion that the Illinois Commercial Men's Association is drifting in decidedly hazardous territory.

"It is certainly to be regretted that the management should have so far forgotten the objects of the association as to permit its good name to be dragged into and its resources dissipated in scattering broadcast a document notable only for the extremely low tone in which it is pitched and the suggestion contained that the membership be further humiliated by being made the cat's-paw of politicians.

"The Illinois Commercial Men's Association, as an accident insurance company, has interest in transportation only, so far as it relates to *safety*—its membership and travelers in general, in securing *safe, comfortable and expeditious service.* Such service, however, costs money to produce and can be reasonably expected only when a fair margin of profit is derived from its rendering.

"If your appeal to the membership was warranted it should have been accompanied by something material—data showing that American railroads are performing a less safe, a less comfortable, or a less expeditious service than is given for a like amount in other parts of the civilized world, that American railroads collectively are at present rates earning a fair return on passenger service rendered. In the absence of such evidence, why should the membership, blindly following your lead, attempt to deny railroads that which is claimed for itself, namely, the right to do business on a fairly remunerative basis? The latest authentic information the writer has been able to locate on the subject of passenger rates is found in report of the Interstate Commerce Commission recently issued, after exhaustive research, and is so widely at variance with your ideas as to make a protest based purely upon self-interest, prejudice and unsupported generalities highly presumptuous.

"When railroads, *the largest individual purchasers of material in America,* are denied the privilege of earning sufficient money to buy material with which to keep pace with absolute maintenance requirements, to say nothing of carrying forward contemplated and much needed improvements, a condition anything but healthy is created, a condition that promises anything but safe, comfortable and expeditious service to the traveling public.

"One of the most hopeful signs of the present depressed time is the rapid change taking place in public sentiment, and indicates that the American business man is beginning to realize that upon the prosperity of American railroads his success is, to a marked degree, directly or indirectly dependent.

"The writer is not attempting to justify or apologize for the many indiscreet acts of railroad officials, either past or present, and believes that there are many methods of handling now in force that can, should and will ultimately be improved upon, resulting in substantial economies. These changes, however, will result from intelligent effort rather than by muck-raking methods which appeal only to the vicious and unsophisticated."

PRIVATE RAILWAYS EXCEL IN RUSSIA

The Bureau of Railway News and Statistics has issued the following: "Had Russia's government railways been operated as economically in 1910 as were her private lines the saving in operating expenses would have exceeded $37,000,000. Such a discrepancy in comparative efficiency of state and private railway operation in Russia is brought out in the annual report for 1910.

"Private companies in European and Asiatic Russia operate 13,256 miles of railway against 28,366 miles operated by the state. In 1910 these companies paid out $59 to operate, for every $100 received in gross revenues. Against this showing the state railways spent $70. Moreover, whereas in 10 years since 1901 the private companies effected a reduction in operating expenses from $68 for every $100 revenue to $59, a saving of over 13.2 per cent, the state railways in the same time contracted their expenses only 1.4 per cent, from $71 to $70. With over $342,000,000 in gross business the government railways would have saved exactly $37,644,903 had they equalled the private companies' performance.

"Overstaffing of the government railways is largely responsible for this unfavorable showing. Whereas the private companies handle a relatively larger traffic, $12,989 per mile against $12,426 on the government roads, they accomplished the work with only 169 employees for every 10 miles against 203 for every 10 miles on the state railways. Even more striking than this discrepancy is the gap between Russia's most efficient roads and railways of the United States, which in 1910 operated with only 70 employees for every 10 miles of line.

"Comparison of rates charged in the two countries likewise demonstrates the efficiency of the United States railway system, for with higher cost of materials, wages four times those paid to Russian railway employees, and with the value of the cent correspondingly higher in Russia than in this country, United States railways received only 0.75 cents per ton mile against 0.94 cents received by Russian carriers. Average receipts per passenger mile were only one-third ours, but 91.5 per cent of the travel was third and fourth class against ½ of 1 per cent first class. One day's wage, 70.5 cents, will buy 103 miles of this third and fourth class travel in Russia against 124 miles of first class travel for a day's wage in the United States."

General News Department

The Grand Central station at Houston, Tex., was damaged by fire on October 5, the loss being estimated at between $10,000 and $15,000.

The Kansas City Commercial Club is planning a two-day celebration on October 30 and 31, in connection with the opening of the Union station of the Kansas City Terminal Railway.

An unfinished pier of the Philadelphia & Reading Railway at Delaware avenue and Catharine street, Philadelphia, was destroyed by fire on the night of October 14; estimated loss $250,000.

The Agricultural Department at Washington reports that fines imposed on railroads during the month of August for the violation of the 28-hour law regulating the transportation of cattle amounted to $25,000. In July the aggregate of the fines was $9,001, and in June $4,972. More than half the penalties collected in August came from three roads, the Chicago, Rock Island & Pacific, the Chicago & North Western and the Chicago, Milwaukee & St. Paul. For violation of the live stock quarantine law the Fort Worth & Denver City was fined $100. The company was convicted of moving cattle affected with scabies from one state to another.

Supplementing the fire notice recently issued the Baltimore & Ohio has furnished trainmen with blanks to notify trackmen of the existence of minor fires. When a trainman discovers a small blaze in the grass along the right of way which is not sufficiently dangerous to justify stopping the train, he is instructed to fill out a printed form, locating the blaze, and throw it off to the first track gang or trackwalker or station agent passed. The blank is marked conspicuously "Go Back and Put Out Fire."

J. Pierpont Morgan has informed the Secretary of the Interior that the owners are willing to sell or lease to the United States the Copper River & Northwestern Railroad in Alaska. It is the desire of his firm and others interested to co-operate with the government in building the government railroad by placing the Copper River property at the government's disposal. The Copper River road is 196 miles long and extends from Cordova, its southern terminus on Prince William Sound, in a northeasterly direction to Kennicott, the location of copper mines. It passes within thirty miles of rich coal fields.

A hearing in the government suit to terminate the Southern Pacific's ownership of the Central Pacific was held in Chicago on October 7 and 8, before Special Master Frank R. Hanna. W. H. Connor, general agent of the Union Pacific at Cincinnati, and formerly general agent of the Southern Pacific at Cincinnati, testified regarding present and former competition between the Union Pacific and Southern Pacific. J. A. Munroe, vice-president, in charge of traffic of the Union Pacific, also testified regarding competitive conditions. The hearing was postponed to a later date on account of the illness of an important witness. Further hearings will be held in San Francisco.

Wells Fargo & Company report gross express receipts for the year ended June 30, 1914, of $31,862,932, a decrease of $3,071,881 compared with the previous year. Operating income after taxes was $1,072,161, a decrease of $596,587. Other income of $1,272,432, brought the year's surplus up to $2,344,595, which is equal to 9.78 per cent on $23,967,400 capital stock, against 12.71 per cent earned on the same stock the previous year. President Caldwell, speaking of the new rates which went into effect February 1, 1914, said that they had not been in operation long enough to determine to what extent the reductions may be expected to stimulate traffic. The lower rates have influenced a return to the express companies of some of the business which had been previously diverted to the parcel post.

President Fairfax Harrison of the Southern Railway, announcing a reduction, from 5 per cent to 4¼ per cent in the dividend on the company's preferred stock, says that the officers of the company have also been asked to make a sacrifice. He has reduced his own salary 20 per cent, and has asked all the other officers receiving annual salaries in excess of $2,500 to accept temporary reductions on a descending scale. A man receiving a salary of $2,700 will be reduced 2 per cent. The officers affected have all accepted the situation with loyal appreciation of the necessity of a spirit of mutual sacrifice. While the actual saving to the company on this account is relatively small, the principle of common interest of all those who draw their livelihood from the railway company has been the controlling motive. Many hundreds of the employees are earning less than before the depression.

Watch the Details; "Trifles Make Perfection"

On the Pittsburgh division of the Pennsylvania Lines West, conductors of trains that pick up cars labeled "inflammable" or "explosive," whether empty or loaded must make the fact known to every member of the train crew, including the engineman. At terminals the yardmaster must give such notice on a prescribed form.

Evening Engineering Courses at University of Pittsburgh

An evening school of graduate courses in engineering will be a new feature introduced at the University of Pittsburgh this fall by the Dean, F. L. Bishop. It is stated that in the Pittsburgh district there are more engineering graduates than in any other district of equal size in the United States, and the University will provide for men who do engineering work during the day an opportunity to study engineering in the evening. Courses will be offered in the valuation of public utilities; civil, electrical, sanitary, mechanical, railway and concrete engineering. The faculty will include Paul M. Lincoln, professor of electrical engineering; Louis E. Endsley, professor of railway engineering; R. T. Stewart, head of the department of mechanical engineering; J. Hammond Smith, head of the department of civil engineering, and Morris Knowles, director of the department of sanitary engineering, all of the University of Pittsburgh. Professor G. W. Case and William S. Moorehead will also assist in the course in the valuation of public utilities, and D. F. Crawford, general superintendent of motive power of the Pennsylvania Lines West of Pittsburgh, will co-operate with Professor Endsley in the work of mechanical railway engineering.

Twelve-ton Pacific Type Engines

The Panama-Pacific International Exposition at San Francisco next year is to have on the grounds a steam passenger railroad. Electricity is not absolutely supreme and all-pervasive. However, the track is to be of 19-inch gage and the locomotives are only 17 ft. long. As in the case of the Centennial Exposition at Philadelphia in 1876, the little railroad is designed not only to ride over but also to be looked at. There will be 2½ miles of road and 5 miles of track, work on which has just been begun. There will be eight or ten Pacific type locomotives equipped with air brakes, standard couplers and electric headlights. Each little giant will haul a train of ten miniature passenger coaches, and running on regular schedules on a double-track system. Each of the coaches, with a width of 42 in. and a length of 20 ft., will contain ten transverse seats, and will seat twenty passengers. With ten coaches to each train and eight trains in operation, 1,600 people can be put in motion at once.

The route, commencing at the terminal at the southeast corner of the Palace of Machinery, will be northerly across the plaza of the exposition ferry slips, to the water front, thence west along the Marina, around three sides of the Yacht Harbor, diagonally across the gardens of the California building, and thence by way of the bayshore and the many state buildings to the race track. The main loading station, at the beginning of the line at the Machinery Palace, will be 300 ft. in length, with five tracks; between which will be elevated loading platforms. The entire line will be double tracked, with rails weighing 39 lb. per yard.

Canadian Ticket Agents' Association

The twenty-eighth annual convention of the Canadian Ticket Agents' Association was held in Chicago on October 6, 7 and 8, and was attended by about 250 members, with members of their families. Addresses of welcome were delivered on behalf of city officers and by W. K. Pattison, president of the British Empire Association. As one feature of the program William P. Leffingwell delivered a stereopticon lecture on the routes to the Pacific coast and features of the Panama-Pacific Exposition to be held next year. The program also included a lake trip, an inspection of the elevated railroad system of the city, and an inspection of the new passenger terminal of the Chicago & North Western, following a luncheon in the dining room of the terminal, at which the members were the guests of the North Western.

MEETINGS AND CONVENTIONS

The following list gives names of secretaries, dates of next or regular meetings, and places of meeting.

Air Brake Association.—F. M. Nellis, 53 State St., Boston, Mass. Next convention, May 4-7, 1915, Hotel Sherman, Chicago.

American Association of Demurrage Officers.—A. G. Thomason, Demurrage Commissioner, Boston, Mass. Annual convention in April.

American Association of Dining Car Superintendents.—H. C. Boardman, D. L. & W., Hoboken, N. J. Next convention, October 22-24, Washington, D. C.

American Association of Freight Agents.—R. O. Wells, Illinois Central, East St. Louis, Ill. Annual meeting, May 21-24, 1915, Richmond, Va.

American Association of General Passenger and Ticket Agents.—W. C. Hope, C. R. R. of N. J., 143 Liberty St., New York.

American Association of Railroad Superintendents.—E. H. Harman, Room 101, Union Station, St. Louis, Mo. Next meeting, May 20-21, 1915, San Francisco, Cal.

American Electric Railway Association.—E. B. Burritt, 29 W. 39th St., New York. Annual convention, October 12-16, Atlantic City, N. J.

American Electric Railway Manufacturers' Association.—H. C. McConnaughy, 165 Broadway, New York. Meetings with American Electric Railway Association.

American Railway Association.—W. F. Allen, 75 Church St., New York. Semi-annual meeting, November 18, Chicago.

American Railway Bridge and Building Association.—C. A. Lichty, C. & N. W., Chicago. Next convention, October 20-22, 1914, Los Angeles, Cal.

American Railway Engineering Association.—E. H. Fritch, 900 S. Michigan Ave., Chicago. Next convention, March 16-18, 1915, Chicago.

American Railway Master Mechanics' Association.—J. W. Taylor, 1112 Karpen Bldg., Chicago. Annual meeting, June, 1915.

American Railway Safety Association.—L. F. Shedd, C. R. I. & P., Chicago. Next meeting, November, Chicago.

American Railway Tool Foremen's Association.—A. R. Davis, Central of Georgia, Macon, Ga. Annual meeting, July, 1915.

American Society for Testing Materials.—Prof. E. Marburg, University of Pennsylvania, Philadelphia, Pa.

American Society of Civil Engineers.—Chas. W. Hunt, 220 W. 57th St., New York. Regular meetings, 1st and 3d Wednesday in month, except June, July and August, 220 W. 57th St., New York.

American Society of Engineering Contractors.—J. R. Wemlinger, 11 Broadway, New York. Regular meetings, 2d Thursday in month, at 2 P. M., 11 Broadway, New York.

American Society of Mechanical Engineers.—Calvin W. Rice, 29 W. 39th St., New York. Annual meeting, December 1-4, 1914, New York.

American Wood Preservers' Association.—F. J. Angier, B. & O., Mt Royal Sta., Baltimore, Md. Next convention, January 19-21, 1915, Chicago.

Association of American Railway Accounting Officers.—E. R. Woodson, 1300 Pennsylvania Ave., N. W., Washington, D. C. Annual convention, April 28, 1915, Atlanta, Ga.

Association of Manufacturers of Chilled Car Wheels.—George W. Lyndon, 1214 McCormick Bldg., Chicago. Annual meeting, second Tuesday in October, New York.

Association of Railway Claim Agents.—C. W. Egan, B. & O., Baltimore, Md. Annual meeting, 3d week in May, 1915, Galveston, Tex.

Association of Railway Electrical Engineers.—Jos. A. Andreucetti, C. & N. W., Room 411, C. & N. W. Sta., Chicago. Annual convention, October 26-30, 1914, Chicago.

Association of Railway Telegraph Superintendents.—P. W. Drew, Soo Line, 112 West Adams St., Chicago. Annual meeting, June 22-25, 1915, Rochester, N. Y.

Association of Transportation and Car Accounting Officers.—G. P. Conard, 75 Church St., New York. Next meeting, December 8-9, 1914, Richmond, Va.

Bridge and Building Supply Men's Association.—L. D. Mitchell, Detroit Graphite Co., Chicago, Ill. Meetings with American Railway Bridge and Building Association.

Canadian Railway Club.—James Powell, Grand Trunk, P. O. Box 7, St. Lambert (near Montreal), Que. Regular meetings, 2d Tuesday in month, except June, July and August, Windsor Hotel, Montreal, Que.

Canadian Society of Civil Engineers.—Clement H. McLeod, 176 Mansfield St., Montreal, Que. Regular meetings, 1st Thursday in October, November, December, February, March and April. Annual meeting, January, Montreal.

Car Foremen's Association of Chicago.—Aaron Kline, 841 Lawler Ave., Chicago. Regular meetings, 2d Monday in month, except July and August, Lytton Bldg., Chicago.

Central Railway Club.—H. D. Vought, 95 Liberty St., New York. Regular meetings, 2d Friday in January, May, September and November. Annual meetings, 2d Thursday in March, Hotel Statler, Buffalo, N. Y.

Engineers' Society of Western Pennsylvania.—Elmer K. Hiles, 2511 Oliver Bldg., Pittsburgh, Pa. Regular meetings, 1st and 3d Tuesday, Pittsburgh.

Freight Claim Association.—Warren P. Taylor, R. F. & P., Richmond, Va. Annual meeting, June 16, 1915, Chicago.

General Superintendents' Association of Chicago.—A. M. Hunter, 321 Grand Central Station, Chicago. Regular meetings, Wednesday preceding 3d Thursday in month, Room 1856, Transportation Bldg., Chicago.

International Railway Congress.—Executive Committee, 11, Rue de Louvain, Brussels, Belgium. Next convention, June 23 to July 6, 1915, Berlin.

International Railway Fuel Association.—C. G. Hall, C. & E. I., 922 McCormick Bldg., Chicago. Annual meeting, May 17-20, 1915, Chicago.

International Railway General Foremen's Association.—Wm. Hall, 829 W. Broadway, Winona, Minn. Next convention, July 14-17, 1915, Sherman House, Chicago.

International Railroad Master Blacksmiths' Association.—A. L. Woodworth, C. H. & D., Lima, Ohio.

Maintenance of Way and Master Painters' Association of the United States and Canada.—T. I. Goodwin, C. R. I. & P., Eldon, Mo. Next convention, November 17-19, 1914, Detroit, Mich.

Master Boiler Makers' Association.—Harry D. Vought, 95 Liberty St., New York. Annual convention, May, 1915.

Master Car and Locomotive Painters' Association of the United States and Canada.—A. P. Dane, B. & M., Reading, Mass.

Master Car Builders' Association.—J. W. Taylor, 1112 Karpen Bldg., Chicago. Annual meeting, June, 1915.

National Railway Appliances Association.—Bruce V. Crandall, 537 So. Dearborn St., Chicago. Next convention, March 15-19, 1915, Chicago.

New England Railroad Club.—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass. Regular meetings, 2d Tuesday in month, except June, July, August and September, Boston.

New York Railroad Club.—Harry D. Vought, 95 Liberty St., New York. Regular meetings, 3d Friday in month, except June, July and August, 29 W. 39th St., New York.

Niagara Frontier Car Men's Association.—E. Frankenberger, 623 Brisbane Bldg., Buffalo, N. Y. Meetings monthly.

Peoria Association of Railroad Officers.—M. W. Rotchford, Union Station, Peoria, Ill. Regular meetings, 2d Thursday in month, Jefferson Hotel, Peoria.

Railroad Club of Kansas City.—C. Manlove, 1008 Walnut St., Kansas City, Mo. Regular meetings, 3d Friday in month, Kansas City.

Railroad Master Tinners, Coppersmiths and Pipefitters' Association.—U. G. Thompson, C. & E. I., Danville, Ill. Annual meeting, May, 1915.

Railway Business Association.—Frank W. Noxon, 30 Church St., New York. Annual meeting, December 10, 1914, Waldorf-Astoria Hotel, New York.

Railway Club of Pittsburgh.—J. B. Anderson, Room 207, P. R. R. Sta., Pittsburgh, Pa. Regular meetings, 4th Friday in month, except June, July and August, Monongahela House, Pittsburgh.

Railway Electrical Supply Manufacturers' Association.—J. Scribner, 1021 Monadnock Block, Chicago. Meetings with Association of Railway Electrical Engineers.

Railway Fire Protection Association.—C. B. Edwards, Fire Ins. Agt., Mobile & Ohio, Mobile, Ala.

Railway Signal Association.—C. C. Rosenberg, Times Bldg., Bethlehem, Pa.

Railway Storekeepers' Association.—J. P. Murphy, L. S. & M. S., Box C, Collinwood, Ohio. Annual meeting, May, 1915.

Railway Supply Manufacturers' Association.—J. D. Conway, 2136 Oliver Bldg., Pittsburgh, Pa. Meetings with Master Car Builders and Master Mechanics Associations.

Railway Telegraph and Telephone Appliance Association.—G. A. Nelson, 50 Church St., New York. Meetings with Association of Railway Telegraph Superintendents.

Richmond Railroad Club.—F. O. Robinson, C. & O., Richmond, Va. Regular meetings, 2d Monday in month, except June, July and August.

Roadmasters' and Maintenance of Way Association.—L. C. Ryan, C. & N. W., Sterling, Ill.

St. Louis Railway Club.—B. W. Frauenthal, Union Station, St. Louis, Mo. Regular meetings, 2d Friday in month, except June, July and August, St. Louis.

Salt Lake City Transportation Club.—R. E. Rowland, Hotel Utah Bldg., Salt Lake City, Utah. Regular meetings, 1st Saturday of each month, Salt Lake City.

Signal Appliance Association.—F. W. Edmunds, 3868 Park Ave., New York. Meeting with annual convention Railway Signal Association.

Society of Railway Financial Officers.—Carl Nyquist, C. R. I. & P., La Salle St. Sta., Chicago.

Southern Association of Car Service Officers.—E. W. Sandwich, A. & W. P. Ry., Atlanta, Ga.

Southern and Southwestern Railway Club.—A. J. Merrill, Grant Bldg., Atlanta, Ga. Regular meetings, 3d Thursday, January, March, May, July, September, November, 10 A. M., Candler Bldg., Atlanta.

Toledo Transportation Club.—Harry S. Fox, Toledo, Ohio. Regular meetings, 1st Saturday in month, Boody House, Toledo.

Track Supply Association.—W. C. Kidd, Ramapo Iron Works, Hillburn, N. Y. Meetings with Roadmasters' and Maintenance of Way Association.

Traffic Club of Chicago.—W. H. Wharton, La Salle Hotel, Chicago.

Traffic Club of New York.—C. A. Swope, 291 Broadway, New York. Regular meetings, last Tuesday in month, except June, July and August, Waldorf-Astoria, New York.

Traffic Club of Pittsburgh.—D. L. Wells, Erie R. R., Pittsburgh, Pa. Meetings bimonthly, Pittsburgh. Annual meeting, 2d Monday in June.

Traffic Club of St. Louis.—A. F. Versen, Mercantile Library Bldg., St. Louis, Mo. Annual meeting in November. Noonday meetings October to May.

Train Despatchers' Association of America.—J. F. Mackie, 7122 Stewart Ave., Chicago. Annual meeting June 15, 1915, Minneapolis, Minn.

Transportation Club of Detroit.—W. R. Hurley, Superintendent's office, L. S. & M. S., Detroit, Mich. Meetings monthly, Normandie Hotel, Detroit.

Traveling Engineers' Association.—W. O. Thompson, N. Y. C. & H. R., East Buffalo, N. Y.

Western Canada Railway Club.—W. H. Rosevear, P. O. Box 1707, Winnipeg, Man. Regular meetings, 2d Monday, except June, July and August, Winnipeg.

Western Railway Club.—J. W. Taylor, 1112 Karpen Bldg., Chicago. Regular meetings, 3d Tuesday in month, except June, July and August, Karpen Bldg., Chicago.

Western Society of Engineers.—J. H. Warder, 1735 Monadnock Block, Chicago. Regular meetings, 1st Monday in month, except January, July and August, Chicago. Extra meetings, except in July and August, generally on other Monday evenings.

Traffic News

The Augusta-Aiken electric road has requested the South Carolinia State Railroad Commission to authorize the increase of the passenger rates on the road from one cent a mile to two cents.

The southwestern railroads have filed tariffs with the Interstate Commerce Commission, to become effective December 1, making an advance of 10 cents a ton in the freight rates on coal from points in Arkansas, Oklahoma, Louisiana, Mississippi, New Mexico and Texas to all destinations in the southwest and south. A similar advance both on coal and coke is proposed from southern Illinois points and Mississippi river transfer points, including Cairo and East St. Louis, Memphis, Vicksburg and New Orleans to all destinations in Texas.

Practically complete tariffs have been filed with the Interstate Commerce Commission by the railroads in Central Freight Association territory, making an advance of five per cent in the rates as allowed by the commission in the Eastern rate case decision.

P. H. Burnett, industrial commissioner of the Lehigh Valley, has been named by the governor of New York as a representative of the state to the 34th session of the Farmers' National Congress, which is being held this week in Fort Worth, Tex. Mr. Burnett expects to gather at Fort Worth many bits of information which will be of benefit to the farmers along the line of the Lehigh Valley.

After several conferences, the traffic officers of the eastern and western lines at St. Louis have decided to submit to the Interstate Commerce Commission the controversy regarding whether bridge tolls between St. Louis and East St. Louis on through freight shall be paid by the eastern or the western lines. A complaint is to be filed on behalf of the western lines asking for an order by the commission. For many years the east bank of the river has been recognized as the point of interchange at St. Louis, and the western lines have been absorbing the bridge tolls in the through rate, but they wish to discontinue doing so.

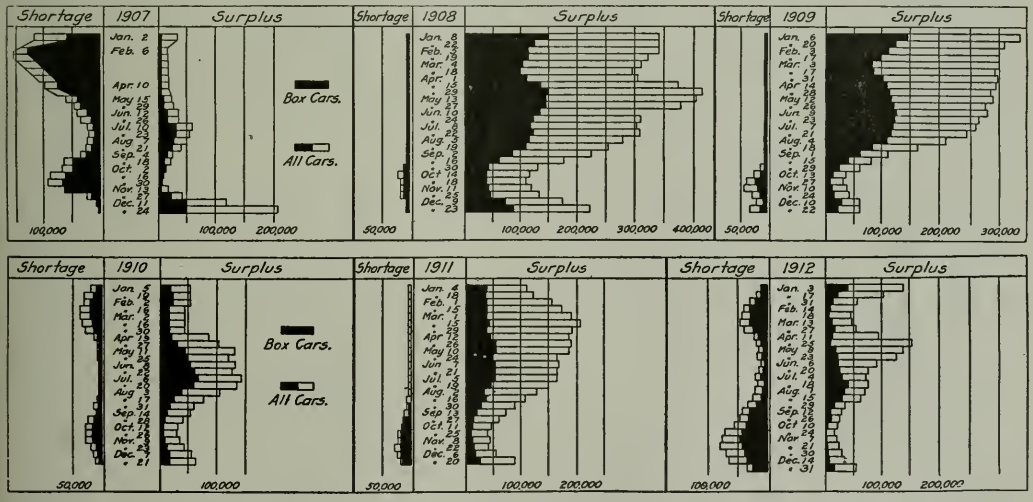
Car Surpluses and Shortages

Arthur Hale, chairman of the committee on relations between railroads of the American Railway Association, in presenting statistical bulletin No. 177, giving a summary of car surpluses and shortages by groups from June 1, 1913, to October 1, 1914,

Car Surpluses and Shortages

Date	No. of roads.	Surpluses: Box.	Flat.	Coal, gondola and hopper.	Other kinds.	Total.	Shortages: Box.	Flat.	Coal, gondola and hopper.	Other kinds.	Total.
Group *1.—October 1, 1914	9	186	515	1,007	591	2,299	181	463	216	9	869
" 2.— " 1, 1914	34	1,254	417	4,102	2,784	8,557	74	0	0	10	84
" 3.— " 1, 1914	31	4,509	1,333	17,009	3,602	26,453	90	12	0	326	428
" 4.— " 1, 1914	12	4,770	1,616	4,534	1,073	11,993	0	30	185	0	215
" 5.— " 1, 1914	24	2,074	696	3,763	1,994	8,527	73	2	0	0	75
" 6.— " 1, 1914	30	12,788	1,558	3,257	5,285	22,888	0	0	30	0	30
" 7.— " 1, 1914	4	1,794	29	564	384	2,771	0	0	0	0	0
" 8.— " 1, 1914	16	3,395	468	1,544	2,987	8,394	44	45	260	120	469
" 9.— " 1, 1914	15	1,232	132	212	889	2,465	22	0	5	17	44
" 10.— " 1, 1914	23	7,347	1,011	2,004	8,964	19,326	0	11	76	48	135
" 11.— " 1, 1914	6	16,266	1,521	0	1,922	19,709	0	0	0	6	6
Total	204	55,615	9,296	37,996	30,475	133,382	484	563	772	536	2,355

*Group 1 is composed of New England lines; Group 2—New York, New Jersey, Delaware, Maryland and Eastern Pennsylvania lines; Group 3—Ohio, Indiana, Michigan and Western Pennsylvania lines; Group 4—West Virginia, Virginia, North and South Carolina lines; Group 5—Kentucky, Tennessee, Mississippi, Alabama, Georgia and Florida lines; Group 6—Iowa, Illinois, Wisconsin and Minnesota lines; Group 7—Montana, Wyoming, Nebraska, North Dakota and South Dakota lines; Group 8—Kansas, Colorado, Missouri, Arkansas and Oklahoma lines; Group 9—Texas, Louisiana and New Mexico lines; Group 10—Washington, Oregon, Idaho, California, Nevada and Arizona lines; Group 11—Canadian lines.



Car Surpluses and Shortages, 1907 to 1914

says: The total surplus on October 1, 1914, was 133,382 cars; on September 15, 1914, 138,108 cars, and on October 1, 1913, 41,994 cars.

The reduction in surplus is about equally divided between box, coal and miscellaneous cars. There is very little change in the flat car surplus.

The total shortage on October 1, 1914, was 2,355 cars; on September 15, 1914, 2,059 cars; on October 1, 1913, 31,620 cars.

The total shortage shows an increase of 304 cars since our September 15 report.

The table on the preceding page gives car surplus and shortage figures by groups for the last period covered in the report, and the diagram shows total bi-weekly surpluses and shortages from 1907 to 1914.

Car Balance and Performance

Arthur Hale, chairman of the committee on relations between railroads of the American Railway Association, in presenting statistical bulletin No. 172, covering car balances and performances for June, 1914, says:

The committee presents herewith statistical bulletin No. 178, covering car balance and performance for June, 1914.

The miles per car per day were 22.7, compared with 22.2 for May. This figure for June, 1913, was 24.3.

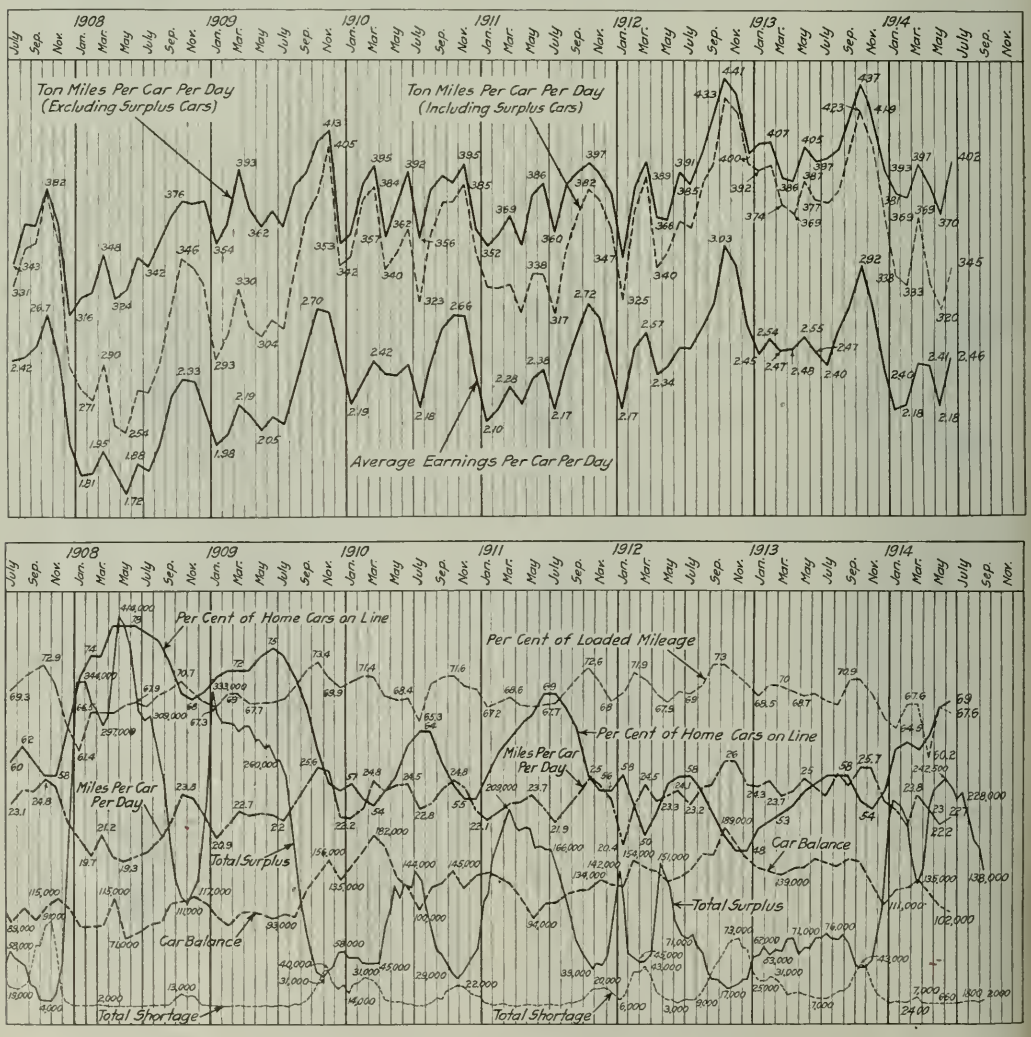
Ton miles per car per day for June were 345, compared with 320 for May. This is a decrease of 8.5 per cent compared with the figure for June, 1913, which was 377.

The proportion of home cars on line was 69 per cent, compared with 68 per cent in May. This is an increase of 13 points over June, 1913.

The per cent of loaded car mileage decreased from 68.0 per cent in May to 67.6 per cent in June. This figure for June, 1913, was 69.0 per cent.

The average car earnings per car per day for all cars on line increased 28 cents to $2.46 in June. This figure for June, 1913, was $2.47.

The table on the following page gives car balance and performance in the month covered by the report, and the diagram shows the earnings and car mileage and different car performance figures monthly from June, 1907.



Freight Car Mileage, Earnings and Performance, 1907 to 1914

Car Balance and Performance for June, 1914

	New England.	N. Y., N. J., Del., Md., Eastern Pa.	Ohio, Ind., Mich., Western Pa.	Va., W. Va., No. and So. Carolina.	Ky., Tenn., Miss., Ala., Ga., Fla.	Iowa, Ill., Wis., Minn., Dakotas.	Mont., Wyo., Neb.	Kan., Colo., Okla., Mo., Ark.	Texas, La., New Mex.	Ore., Idaho, Nev., Cal., Ariz.	Canadian Lines.	Grand Total.
Revenue freight cars owned	88,672	710,794	198,551	195,999	165,973	456,097	21,707	144,545	31,851	144,369	179,732	2,338,290
Average number of system cars on line	55,348	466,204	151,227	130,551	108,917	350,879	10,612	97,149	24,681	84,802	128,101	1,608,471
Railway-owned cars: Average foreign on line	38,028	219,774	73,314	55,186	42,698	101,747	9,252	46,458	17,100	35,998	31,273	670,828
Total railway-owned cars on line	93,376	685,978	224,541	185,737	151,615	452,626	19,864	143,607	41,781	120,800	159,374	2,279,299
Excess	4,704	*24,816	25,990	*10,262	*14,358	*3,471	*1,843	*938	9,930	*23,569	*20,358	*58,991
Per cent of cars on line to total owned:												
Home	62	66	76	67	65	77	49	67	77	59	71	69
Foreign	43	31	37	28	26	22	43	32	54	25	17	28
All railways	105	97	113	95	91	99	92	99	131	84	88	97
Private cars on line	3,508	31,769	8,697	5,120	9,970	14,806	1,551	8,370	4,046	9,676	2,753	100,266
Total, all cars on line	96,884	717,747	233,238	190,857	161,585	467,432	21,415	151,977	45,827	130,476	162,127	2,379,565
Per cent of cars in shop	9.83	8.22	13.49	10.66	11.47	5.81	5.86	10.27	9.16	6.49	5.33	8.65
No. of freight engines owned	1,427	11,188	2,961	3,475	2,750	7,355	492	2,944	856	2,940	2,620	39,008
Average cars on line per freight engine owned	68	64	79	55	59	64	44	52	54	44	62	61
Total freight-car mileage	55,679,040	481,226,955	129,641,450	147,489,669	126,004,532	306,396,527	24,212,632	92,251,607	32,445,453	115,339,612	103,522,577	1,614,210,054
Average miles per car per day	19.2	22.3	18.5	25.8	26.0	21.8	37.7	21.1	23.6	29.5	21.3	22.7
Per cent loaded mileage	71.4	64.7	65.4	62.8	67.8	69.9	77.1	68.6	68.4	71.4	74.1	67.6
Ton-miles of freight, including company freight	654,818,562	7,822,865,056	2,221,981,601	2,341,511,699	1,758,166,397	3,399,350,653	384,067,579	1,049,727,097	405,013,221	1,614,562,771	1,468,184,880	23,120,249,516
Average ton-miles, including company freight:												
Per car-mile	11.8	16.3	17.2	15.9	14.0	14.2	15.9	14.1	12.5	14.6	14.2	15.2
Per loaded car-mile	16.5	25.1	26.3	25.3	20.6	20.5	20.6	20.7	18.2	20.5	19.1	22.5
Per car per day	225	363	320	409	363	313	598	293	295	423	302	345
Gross freight earnings	$7,473,292	$47,519,492	$12,045,793	$12,662,940	$20,529,337	$28,698,044	$2,965,537	$8,938,830	$3,452,502	$17,165,542	$10,622,345	$172,073,654
Average daily earnings: Per car owned	$2.81	$2.22	$2.02	$2.15	$4.12	$2.35	$4.55	$1.98	$3.61	$4.00	$1.97	$2.50
Per railroad car on line	2.67	2.31	1.79	2.27	4.51	2.36	4.98	2.07	2.75	4.81	2.22	2.57
All cars on line	2.57	2.21	1.72	2.21	4.23	2.28	4.62	1.96	2.51	4.46	2.18	2.46

*Denotes deficiency.

Commission and Court News

INTERSTATE COMMERCE COMMISSION

A hearing was held at Toledo, Ohio, on October 9, before Examiner Carmalt on the relations between the trunk lines and the industrial roads.

Storage-in-Transit Rates on Cotton

The commission has issued the following statement:

For the purpose of assisting the cotton people and carriers in meeting the extraordinary demand for the storage of cotton occasioned by the European war, and for the purpose of providing temporary warehousing space under arrangements approved by the secretary of the treasury and the federal reserve board; and for the purpose of permitting the carriers to recognize the warehouses as points for the storage of cotton in order that such points should be given the benefit of transit privilege, the commission has authorized the carriers to publish tariffs establishing regulations and charges governing storage during the cotton year ending August 31, 1915, in substance as follows:

1. Cotton shipped for warehousing must be consigned to the warehousing point and freight thereto paid on basis of the full local rate.

2. Upon reshipment the shipper will be required to surrender to the agent of the line bringing the cotton into the warehousing point the paid freight bill covering that identical cotton. The number of bales, marks and weights, as forwarded from the warehousing point, must conform to the paid freight bill, and in addition the shipper will be required to certify on the back of the paid freight bill that the cotton tendered is the identical cotton received thereunder. The shipper will also be required to surrender to the railway agent at the time of reshipment the bill of lading covering the movement of the cotton into the warehousing point, unless the bill of lading for such shipment shall have been previously surrendered to the railway.

3. Thereupon the agent will issue a through bill to the further final destination at the through rate from the point of origin to such final destination in effect at the time of the original shipment into the warehousing point, plus three cents per 100 lb., provided such final destination is a point to which there are established through rates in effect from the original point of shipment via the warehousing point (provided, that at the option of any interested line the minimum through rate will be that from the warehousing point plus the stoppage charge of three cents per 100 lb.).

Shipments will be waybilled out of the warehousing point at the balance of the rate, plus the stoppage charge of three cents.

STATE COMMISSIONS

The application of the Illinois railroads for permission to increase grain rates five per cent has been denied by the Illinois Public Utilities Commission.

The Missouri Public Service Commission has suspended tariffs recently filed by the western railways canceling the concentration privilege on poultry and dairy products.

The commissions of both North Carolina and South Carolina have given approval of the discontinuance of certain trains on the Southern Railway, as applied for by the company, on the ground that income had been seriously diminished by the dullness of general business.

The Kansas Public Utilities Commission has filed complaints with the Interstate Commerce Commission against the proposed advance of five cents per 100 lb. in the rates on codfish goods from points east of the Mississippi river to points in Kansas; also against new tariffs filed by the western roads incrasing the demurrage charges for refrigerator cars.

Citizens of East Berlin, Adams county, Pennsylvania, have appealed to the Public Service Commission of that state to compel W. G. Leas to show cause why he does not operate the East

Berlin Railroad. This road extends from East Berlin south about 7 miles to a junction with the Western Maryland, between Hanover and Gettysburg. The property was bought at receivers' sale in July, and on September 9 its operation was discontinued. Now the residents of East Berlin have no railroad facilities and the nearest railway station is New Oxford, seven miles distant.

The Illinois Public Utilities Commission at a hearing in Chicago on October 12, which was attended by a large number of shippers and railroad officials, announced its intention of formulating a new set of switching rules and regulations for the state. The present rules, reached by agreement of a committee of railroad men and shippers about three years ago, have been the subject of many complaints, and the commission has decided to make an investigation of the entire subject. Two committees, one representing the shippers, and another representing the railroads, will be appointed to meet with one of the commissioners to draft uniform rules.

The Missouri Public Service Commission, on October 6, issued an order denying the application of the Missouri railways to put into effect increased passenger, freight and excess baggage rates which were filed with the commission on September 15. The commission said that the roads were without authority to change rates fixed by statutes by simply filing tariffs without first obtaining authority to do so from the commission. The commission declined to issue any such order without a protracted investigation, and therefore denied the petition. It announced, however, that it would consider the application of the roads for increased rates at a hearing to begin at Jefferson City on October 27, when it will undertake a detailed investigation.

The New York State Public Service Commission, Second district, has received petitions from large numbers of citizens asking the commission to forbid the discontinuance of passenger and freight trains on the line of the Buffalo & Susquehanna Railway between Buffalo and Wellsville, which has been announced to take effect November 1. It is said that milk to the amount of 6,000 gallons is brought into Buffalo each day by this road. Justice Charles H. Brown of the State Supreme Court tells the commission that "consternation seems to have swept the whole of the Genesee Valley" because of the proposed suspension of traffic, which is looked upon as a calamity. It is said that the Pennsylvania Railroad has made a proposition to operate the line in question, which is 90 miles long.

PERSONNEL OF COMMISSIONS

F. H. Bagley, signal supervisor of the L. C. & L. division and the Louisville terminals of the Louisville & Nashville, has taken a position as senior signal engineer with the valuation department of the Interstate Commerce Commission of the southern district. His headquarters are at Chattanooga, Tenn.

COURT NEWS

The appellate court of Kentucky has sustained the decision of a lower court imposing a fine of $1,900 on the Nashville, Chattanooga & St. Louis for failure to make reports of values required by the state auditor under the taxing laws of the state.

Judge Adams of the United States Circuit Court at St. Louis, in charge of the receivership of the Wabash, has ordered the receiver to apply to the Interstate Commerce Commission and the various state Public Service Commissions for authority to increase passenger and freight rates. The order was issued after Receiver Pryor had submitted the annual report showing that with the second largest gross earnings in the history of the road, it was unable to pay its fixed charges.

The United States Department of Agriculture announces that a railroad company and two individuals have been fined in court for shipping lumber from an area quarantined by the government on account of the gipsy and brown-tail moths. The fines were imposed as follows: Boston & Maine Railroad Company, five violations, $125; L. M. Perkins, agent for the B. C. Jordan estate, Alfred, Me., $75; L. L. Clark, Hollis, Me., $50. The quarantine became effective on November 25, 1912, and was designed to prevent the spread of the injurious insects named.

Railway Officers

Executive, Financial, Legal and Accounting

G. F. Buskie has been appointed auditor of the Missouri, Kansas & Texas, with headquarters at St. Louis, Mo., succeeding E. B. Pierce, resigned.

E. W. Grice, assistant general manager of the Chesapeake & Ohio at Richmond, Va., has been appointed assistant to president, with headquarters at Richmond.

G. K. Wecks has been elected president of the San Francisco-Oakland Terminal Railways, with headquarters at Oakland, Cal., succeeding W. A. Bissell, resigned.

George P. Johnson, who resigned recently as general manager of the Chesapeake & Ohio, has been elected president of the Virginia-Carolina and the New River, Holston & Western, succeeding W. E. Mingea, resigned.

Bryan Snyder, secretary and traffic manager of the Marshall & East Texas, has been elected vice-president and general manager, with headquarters at Marshall, Tex., in place of J. E. Votaw, resigned. Mr. Snyder will have charge of all departments and the position of traffic manager is discontinued.

J. W. Comiskey has been appointed car accountant of the Galveston, Harrisburg & San Antonio, the Texas & New Orleans, the Houston & Texas Central, the Houston East & West Texas and the Houston & Shreveport, with headquarters at Houston, Tex., succeeding D. B. Keiser, retired under the pension regulations. Mr. Comiskey has been chief clerk in the office of Mr. Keiser.

L. A. Farquhar, whose appointment as auditor of the Norfolk Southern, with headquarters at Norfolk, Va., has been announced in these columns, was born on July 17, 1880, near Hempstead, Tex., and graduated in 1896 from the Hempstead high school. He began railway work on August 1, 1900, as a clerk in the local office of the Houston & Texas Central, at Hempstead, Tex., and subsequently was cashier in the same office. In November, 1905, he was appointed joint station ticket agent of the Houston & Texas Central and the Missouri, Kansas & Texas at Austin, and in August of the following year became chief clerk to division superintendent of the Houston & Texas Central. From June 9, 1909, to November 18, 1911, he was in the service of the Sunset-Central Lines consecutively as chief clerk in the general accountant's office, traveling and general office accountant, chief clerk to auditor, and accountant in the auditor's office at Houston. He was then special accountant on efficiency work in the controller's office of the Union Pacific and Southern Pacific Systems at New York until January 31, 1913, and then became special accountant on efficiency work in the controller's office of the Union Pacific System at New York, which position he held at the time of his recent appointment as auditor of the Norfolk Southern as above noted.

Operating

W. T. Tyler has been appointed division superintendent of the Northern Pacific, with headquarters at Pasco, Wash.

E. C. Penn has been appointed chief despatcher of the Virginian Railway, with headquarters at Princeton, W. Va., succeeding A. A. Owen, deceased.

R. T. Arthur has been appointed trainmaster of the Missouri, Kansas & Texas at Denison, Tex., succeeding A. N. Williams, resigned, to take service with another company.

E. D. Hogan has been appointed superintendent of transportation of the New Orleans, Mobile & Chicago, with office at Laurel, Miss., succeeding D. W. Davis, assigned to other duties.

J. B. Purkheiser, trainmaster of the Baltimore & Ohio Southwestern at Cincinnati, Ohio, has been transferred to Seymour, Ind., as trainmaster of the Cincinnati & Louisville district, and E. J. Lampert has been appointed trainmaster of the Cincinnati terminals.

T. S. Mahoney, superintendent of the New Orleans division of the Texas & Pacific, has been appointed superintendent of the Transcontinental division, with headquarters at Texarkana, Tex., succeeding R. B. Ayres, resigned. Mr. Ayres has been with the Texas & Pacific continuously since 1880.

C. C. Walker, assistant to general manager of the Chesapeake & Ohio at Richmond, Va., has been appointed superintendent of passenger transportation, and E. P. Goodwin, superintendent of transportation at Richmond, has been appointed superintendent of freight transportation, both with headquarters at Richmond, Va.

Traffic

Robert W. Dowe has been appointed live stock agent of the International & Great Northern, with headquarters at Eagle Pass, Tex.

Gordon Alexander, traveling freight agent of the Cleveland, Cincinnati, Chicago & St. Louis at New York, has been appointed general eastern freight agent, with headquarters at New York.

W. P. Hinton, assistant passenger traffic manager of the Grand Trunk Pacific at Winnipeg, Man., has been appointed assistant passenger traffic manager also of the Grand Trunk, and his headquarters have been transferred to Montreal, Que.

Stuart A. Allen, general agent, freight department, of the Baltimore & Ohio Southwestern and the Cincinnati, Hamilton & Dayton at Cincinnati, Ohio, has been appointed general manager of the Continental Line and Central States Despatch, to succeed T. H. Noonan, deceased.

O. P. Bennett, general agent, freight department, of the Chicago & Alton at Minneapolis, Minn., has been appointed general agent, traffic department, at Kansas City, Mo. C. R. Murray, district passenger agent at Detroit, Mich., has been appointed western passenger agent at Kansas City. W. C. Mueller, general agent, passenger department, at Kansas City, has been appointed general agent, traffic department, at Milwaukee, Wis. W. J. Dibble, commercial agent at Kansas City, has been appointed general agent, traffic department, at Minneapolis.

William T. Grier, general coal and freight agent of the Lehigh Valley at New York, has been appointed to the new position of general traffic manager in charge of passenger and freight business, with headquarters at New York. He was born on April 8, 1886, at Philadelphia, Pa., and was educated in the common schools. He began railway work in August, 1883, and was office boy and stenographer in the coal traffic department of the Philadelphia & Reading until 1888. He was then to August, of the following year, assistant chief clerk in the freight department of the same road. From August, 1889, to November, 1895, he was chief clerk in the coal, freight and passenger departments of the Beech Creek Railroad, now a part of the New York Central & Hudson River, and was then to June, 1906, general manager of the Delaware River & Union. In June, 1906, he was appointed coal freight agent of the Lehigh Valley, and in January, 1912, was appointed general coal and freight agent, which position he held at the time of his recent appointment, as general traffic manager of the same road as above noted.

W. T. Grier

Engineering and Rolling Stock

G. F. McKenzie, section foreman on the Houston & Texas Central, has been appointed roadmaster at Corsicana, Tex.

R. F. Morkill, signal engineer of the Grand Trunk Railway System, has been gazetted a lieutenant in the Engineers' Corps, Canadian Contingent, and has left with his company for active service in England and France.

C. S. Yeaton, supervisor of locomotive operation of the Chicago, Rock Island & Pacific at El Reno, Okla., has been appointed road foreman of equipment at that place, succeeding O. F. Covalt, assigned to other duties.

Harold Knight, whose appointment as signal engineer of the Erie, with headquarters at Jersey City, N. J., has been announced in these columns, was born in October, 1881, at Stockport, Pa., and was graduated from Lawrenceville school in 1901, and from Yale university in 1904. In August of the latter year he began railway work as a rodman on the Susquehanna division of the Erie. The following March he went to the Pennsylvania Railroad as rodman at Elmira, N. Y., and in July, 1905, returned to the service of the Erie as transitman on the Susquehanna division. Shortly afterward he was appointed assistant engineer on the same division, and in June, 1908, he was made division engineer of the Allegheny division. On November 1, 1912, he was appointed division engineer of the New York division, which position he held at the time of his recent appointment as signal engineer of the same road as above noted.

OBITUARY

C. J. Drury, division master mechanic of the St. Louis & San Francisco at Sapulpa, Okla., died on September 30, at the age of 36.

George N. Mills, who had been real estate and tax agent of the Missouri district of the Chicago, Burlington & Quincy since 1897, died at his home in St. Louis, Mo., October 7.

Oliver S. Lyford, vice-president of the Chicago & Eastern Illinois, died at the home of his son, W. H. Lyford, at Wheaton, Ill., on October 12, aged 91 years. He had been connected with the Chicago & Eastern Illinois since January, 1878, and had been in railway service 68 years.

George A. Goodell, general manager of the Northern Pacific lines east of Paradise, Mont., with headquarters at St. Paul, Minn., died on October 3, aged 59 years. Mr. Goodell had been in railway service since July, 1868, when he began as messenger boy for the Chicago, Burlington & Quincy. He was successively telegraph operator, station agent and train despatcher of that road until July, 1876, when he became ticket agent of the Toledo, Peoria & Warsaw at Burlington, Iowa. The following October he went to the Burlington, Cedar Rapids & Northern, and was consecutively telegraph operator, station agent, train despatcher, superintendent of telegraph, assistant superintendent and superintendent, until March, 1902, when he was appointed general superintendent of the Chicago Great Western at St. Paul. He left that road in December, 1907, to become general superintendent of the Central district of the Northern Pacific, and in November, 1909, he was promoted to general manager of the lines east of Paradise.

George A. Clark, president of the Tennessee, Kentucky & Northern, died at the Hyde Park Hotel, Chicago, on October 11, aged 45 years. He began railway work in 1880 with the Chicago, Milwaukee & St. Paul as messenger, and subsequently was employed with that road, the Chicago, St. Paul, Minneapolis & Omaha, the Atchison, Topeka & Santa Fe, the St. Paul & Duluth, the Chicago Great Western, the Great Northern and the "Soo" Line successively as clerk, agent, telegraph operator, train despatcher and trainmaster. From 1895 to January, 1903, he was with the Illinois Central as trainmaster, superintendent of the Omaha division at Ft. Dodge, Iowa; superintendent of the Springfield division at Clinton, Ill., and superintendent of the Tennessee division at Fulton, Ky. He then became general manager of the Tennessee Central, and subsequently was vice-president and general manager until December, 1905, at which time he went to the New Orleans, Texas & Mexico as vice-president. In July, 1908, Mr. Clark returned to the Tennessee Central as general manager, and in October, 1909, he was appointed receiver of the Cincinnati-Nashville Southern, which office he held until he became president of the Tennessee, Kentucky & Northern in September, 1912.

Equipment and Supplies

LOCOMOTIVE BUILDING

Mitsui & Company, New York, are in the market for 3 0-4-2 type locomotives.

The Richmond, Fredericksburg & Potomac is in the market for 5 Pacific type locomotives.

The New Zealand Government Railways are inquiring for a number of Pacific type locomotives.

The United States Gypsum Company, Chicago, is in the market for one six-wheel switching locomotive.

The Citizens' Gas Company, Indianapolis, Ind., is in the market for one six-wheel switching locomotive.

The Hoboken Manufacturers' Railroad has ordered one switching locomotive from the Baldwin Locomotive Works.

The Cuban-American Sugar Company, New York, has ordered one Mogul type locomotive from the Baldwin Locomotive Works.

The Randolph MacDonald Company, Toronto, Ont., has ordered one four-wheel switching locomotive from the American Locomotive Company.

The Cranford Company, Brooklyn, N. Y., is reported to have ordered one four-wheel switching locomotive from the American Locomotive Company. This item has not been confirmed.

The Nashville, Chattanooga & St. Louis, reported in the *Railway Age Gazette* of October 2 as being in the market for 7 Pacific and 10 Mikado type locomotives, is now reported to have postponed its inquiries until after the first of the year.

CAR BUILDING

The Nashville, Chattanooga & St. Louis is in the market for 6 steel passenger and 2 steel postal cars.

Okura & Company, New York, are asking prices on 1,000 30 and 40-ton standard gage cars for export.

The Southern Pacific is in the market for 16 coaches, 6 combination passenger and smoking cars, and 2 combination passenger and express cars.

The Louisville & Nashville has ordered 1,000 underframes which it will apply in its own shops. The same road is also planning to place an order for 870 cars in the near future.

IRON AND STEEL

The Union Terminal Company has ordered 1,285 tons of steel for the Union station at Dallas, Tex., from the American Bridge Company.

The Missouri Pacific has ordered 228 tons of material for a viaduct at Atchison, Kan., from the Morava Construction Company, Chicago.

SIGNALING

The Northern Pacific has given the Union Switch & Signal Company a contract for a mechanical interlocking plant at Steilacoom Creek lift bridge, Washington.

The Queensland Government Railway Shop.—The principal shops of the government owned railways of Queensland, Australia, are at Ipswich. These shops were established about 1869 and over $2,500,000 has been expended on them. The employees number 1,700. The locomotives and other rolling stock of the railways are built and repaired here, and the yearly output has recently been about 16 large locomotives, 50 passenger cars and 500 freight cars. There are, it is claimed, no car shops in the world in which native timbers of such great variety and beauty of grain and color are utilized as at Ipswich.

Supply Trade News

Spencer Van Cleve, president of the Erie Foundry Company, died on September 29.

I. H. Case, railroad representative of the Dearborn Chemical Company, Chicago, has resigned from his position with that company.

The Independent Pneumatic Tool Company, Chicago, has appointed V. W. Robinson its representative in Michigan, with headquarters at Detroit. F. J. Passino, the former representative in Michigan, has been appointed representative in the southwest to succeed H. F. Finney, promoted to a position in the general sales office at Chicago.

Frank W. Skinner, for many years senior associate editor of the Engineering Record, has opened consulting offices at 45 Broadway, New York, and in the Crabtree Annex, St. George, Staten Island, and is associated with C. E. Fowler, of Seattle, Wash. Mr. Skinner will continue in the field of bridge and structural steel work, foundations and general civil engineering field construction methods, operations and plant with which he has long been extensively identified, and will also specialize in the preparation of engineering cases for litigation, expert witness research and testimony, preparation and mediation of cases in controversy, and in the preparation of technical, commercial, popular and miscellaneous descriptions of engineering construction.

TRADE PUBLICATIONS

Cranes and Hoists.—The Canton Foundry & Machine Company, Canton, Ohio, has issued a leaflet descriptive of the new Canton back geared portable floor crane and hoist.

Fire Shovels.—The National Malleable Castings Company, Cleveland, Ohio, has recently issued circular No. 53, descriptive of the company's line of malleable iron fire shovels.

Electrical Appliances.—The Sprague Electric Works of the General Electric Company, New York, has issued bulletin No. 48701, descriptive of Sprague Electric Dynamometers.

Pneumatic Tools.—The Monarch Pneumatic Tool Company, East St. Louis, Ill., has issued bulletin No. 18-A, illustrating a large number of the Monarch line of pneumatic tools.

Pumping Machinery.—The American Well Works, Aurora, Ill., has issued a folder illustrating and treating of the advantages of the American deep well turbine centrifugal pumps.

Railway Signal Apparatus.—The Union Switch & Signal Company has recently issued bulletins Nos. 79 and 80 descriptive, respectively, of the Model 14 Electric Crossing Gate and the Model 13 Low Voltage Direct Current Switch Movement.

Iron.—The American Rolling Mill Company, Middletown, Ohio, has recently issued a booklet, the idea of which is well expressed by the quotation from Thackeray that is printed on the cover: "Next to excellence is the appreciation of it." The booklet contains 28 pages of letters from persons and companies who have used Armco-American ingot iron and have desired to express their appreciation of it.

Electrical Apparatus.—The General Electric Company has recently issued bulletins No. 48014, 42800 and 46390. The first deals with mine hoist equipment, takes up the question of the economy of electric drive, and treats of the general subject of underground hoists, their operation and control. Bulletin No. 46390 describes the Thomson direct current test meter, type CB-5, which combines in one standard several capacities covering a range from light load to full load, and thereby makes possible rapid testing, since no time is lost in changing standards. Bulletin No. 42800 is a reprint of an article on air compressors for foundry use which appeared in the General Electric Review. This article compares centrifugal compressors with the ordinary fan blower and the positive pressure blower. It aims to show the superiority of the centrifugal compressor for foundry work. All three bulletins are profusely illustrated.

Railway Construction

Campbellford, Lake Ontario & Western.—See Canadian Pacific.

Canadian Pacific.—Plans have been made for extending the Georgian Bay & Seaboard from Bethany Junction, Ont., to Belleville, also for an extension of the Campbellford, Lake Ontario & Western from Shannonville to Kingston. The extensions have been surveyed, but the company has no intention of extending these lines in the near future.

The route map for a projected line from Dunelm, Sask., southwest to Instow has been approved by the minister of railways, but the company does not expect to start the construction work in the near future. Dunelm is nine miles south of Swift Current, on the line to Vanguard, and Instow is about 28 miles south of Gull Lake.

The Coronation sub-division of the Alberta division has been extended from Monitor, Alta., east to Kerrobert, Sask., 74.6 miles. The Suffield sub-division has been extended from Retlaw, Alta., west to Lomond, 27.1 miles, and the Columbia Valley subdivision of the British Columbia division has been extended from Spillimacheen, B. C., south to Edgewater 18.5 miles.

Cedar Rapids & Iowa City.—The Mt. Vernon division has been extended from Mt. Vernon, Iowa, to Lisbon, two miles.

Fourche River Valley & Indian Territory.—This road has been extended from Bellevue, Ark., to Thornburg, 5.6 miles.

Georgian Bay & Seaboard.—See Canadian Pacific.

Jonesboro, Lake City & Eastern.—This company, which operates a 63-mile line from Jonesboro, Ark., to Barfield, is planning to build two extensions, it is said, to timber lands.

McKinney, Bonham & Paris Interurban.—Preliminary surveys have been made, it is said, and rights of way are being secured to build a 60-mile line in Texas. L. A. Scott, president, and J. F. McReynolds, director, McKinney, Tex.

Missouri Roads.—Preliminary work is now under way, it is said, for a line to be built from Springfield, Mo., southeast to Mountain Home, Ark., about 80 miles. E. C. McAfee, Woodruff building, Springfield, is interested.

New York Subways.—Bids were recently opened by the New York Public Service Commission, First district, for the section of the Park Place, William and Clark street subway from the Seventh avenue subway in West Broadway through Park Place and under the postoffice building and Beekman street to William street in the borough of Manhattan. The contract was given to Frederick L. Cranford, Inc., the lowest bidder, who offered to do the work for $1,571,363.

The commission has approved the award by the New York Municipal Railway Corporation to the Thomas Crimmins Contracting Company at $197,442, of the contract for the installation of the third-rail, etc., in the Fourth avenue subway, borough of Brooklyn, between the Manhattan bridge and Eighty-sixth street. It has also approved the award made by the same corporation to the Terry & Tench Company, Inc., the lowest bidder at $321,306 of the contract for the construction of additional tracks on the Broadway elevated railroad in the borough of Brooklyn between Havemeyer street and Myrtle avenue.

Niagara River & Eastern.—Under this name a company has been incorporated in New York with $1,500,000 capital, it is said, to build a railroad. The incorporators include F. C. Conette, Buffalo; C. Hickey, Lockport, and F. A. Dudley, Niagara Falls.

Oil Belt Terminal.—Incorporated in Oklahoma, with headquarters at Jennings, Okla., to build from Jennings, south to Drumright, thence west to Cushing, about 25 miles. It is understood that the line is eventually to be extended south into Lincoln county. Surveys are now being made. C. N. Haskell, Tulsa, former governor of Oklahoma, is back of the project, and H. Fulton is chief engineer.

Seaboard Air Line.—An officer writes that it is undecided when the construction work will be carried out to complete the 22-mile line from Bartow, Fla., east via Alturas, and a point north of Lake Wales, to about 1.6 miles east of Hard Luck lake. A grading contract was let in the early part of this year to A. F. Langford, Valdosta, Ga., and track has been laid on about 35 per cent of the line.

Southern Pacific.—The Susanville sub-division of the Salt Lake division has been extended from Susanville, Cal., to Westwood, 29.4 miles.

Uvalde & Northern.—Arrangements are now being made, it is said, to resume construction work on this line, which was suspended on account of the financial stringency. Several miles have been graded on the first section under contract from Uvalde, Tex., north to the kaolin mines near Leakey. It is understood that the line is to be extended north to San Angelo, about 200 miles. L. J. Hurd, president, Kansas City, Mo.; F. H. Dillon, chief engineer, Sansom, Tex. (June 5, p. 1257.)

Waycross & Western.—This road has been extended from Sirmans, Ga., to Newgrade, two miles.

RAILWAY STRUCTURES

Bentley, Iowa.—The Chicago Great Western is contemplating the construction of a small passenger station at Bentley, Iowa. This company has also under construction a passenger station at Mason City, Iowa, which is of brick, hollow tile and stucco construction with a green tile roof. It is 107 ft. 6 in. by 32 ft. 6 in. in area and one story high. D. L. Stratton, Mason City, Iowa, is the contractor. The work is expected to be completed in about a month. At Conception, Mo., the Chicago Great Western and the Wabash are jointly building a passenger station. At this point the Wabash is elevated, while the Chicago Great Western runs below grade. The station is placed between the two elevations and will be used by both roads. T. S. Leake & Co., Chicago, is the contractor. Small passenger depots are also being built at Randolph, Minn., and at Dewar, Iowa. John Jacobs, Marshalltown, Iowa, is doing the work. The work completed by this railroad company consists of three 100-ton Holmen type coaling stations at the following points: Carroll, Iowa; St. Joseph, Mo., and Kenyon, Minn., and a wooden 50-ton coaling plant, Holmen type, at Red Wing, Minn. Roberts & Schaefer, Chicago, were the contractors. At Kansas City, Kan., four additional grain tanks have just been added to the company's grain elevator at that point. These tanks are of concrete construction and are 28 ft. in diameter and 85 ft. high, each, and have a total added capacity of 86,500 bu.

Carthage, N. Y.—Contracts have been let by the New York Central & Hudson River for the elimination of the present grade crossings at West End avenue, at John street and at Pannery street, in Carthage, as follows: For the sub-structures to W. M. Ballard, for the superstructures to the Fort Pitt Bridge Works and for the waterproofing to Bird & Son, New York.

Jacksonville, Fla.—A contract is reported let by the Atlantic Coast Line to E. W. Parker, Tampa, Fla., for putting up a storage building, 130 ft. by 267 ft. The proposed structure is to have retaining walls, foundations and floors of reinforced concrete with a wood superstructure. The cost of the improvements will be about $45,000.

Jane Lew, W. Va.—The station at Jane Lew, W. Va., on the West Virginia & Pittsburgh division of the Baltimore & Ohio, which was recently destroyed by fire, will be rebuilt by the railroad company's forces. Work will be started at once.

New York.—The New York Public Service Commission, First district, has given the contract to the Rapid Transit Subway Construction Company at their bid of $3,097,312 for building the diagonal station under Forty-second street and the connecting link between the existing subway and the new Lexington avenue subway, in the borough of Manhattan. (October 9, p. 671.)

Philadelphia, Pa.—The Public Service Commission of Pennsylvania has approved the track elevation contract entered into between the officers of the city of Philadelphia and the Philadelphia & Reading. The contract provides for the opening of Emerald and Tulip streets, which are to pass under the P. & R. elevated tracks between Lehigh avenue and Somerset street. The cost of the work, about $1,000,000, is to be equally divided between the city of Philadelphia and the railroad company.

Waycross, Ga.—Work is now under way by the Atlantic Coast Line, it is said, on the foundations for an addition to the machine shops at Waycross.

Railway Financial News

Atlantic Coast Line.—See Florida Central.

Baltimore & Ohio.—The following is an abstract of a circular sent to stockholders:

At the stockholders' meeting to be held on November 16, 1914, the stockholders will be asked to consider a plan for a general refunding and improvement mortgage, which will provide in a comprehensive way for present needs and future financial requirements of the company. This company has now outstanding bonds secured by its several mortgages as follows: Prior lien bonds $75,000,000, maturing July 1, 1925; first mortgage bonds $81,000,000, maturing July 1, 1948; redeemable on and after July 1, 1923; Pittsburgh junction & middle division bonds $6,125,280, maturing November 1, 1925; Southwestern division bonds $45,000,000, maturing July 1, 1925; Pittsburgh, Lake Erie & West Virginia system refunding mortgage bonds $43,441,500, maturing November 1, 1941, redeemable on and after November 1, 1925. This company has also outstanding its convertible bonds $63,250,000, maturing March 1, 1933, redeemable on and after March 1, 1923. In addition there are outstanding bonds secured by underlying mortgages on railroads forming a part of the system and subsidiary lines aggregating $30,781,000 and maturing at different dates.

The market for other securities not having been favorable in the recent past it became necessary for the company to issue short-time notes for its requirements; the issue of such notes at present outstanding amounts to $35,000,000, maturing June 1, 1915.

With the exception of the first mortgage, which provides for a further issue of $1,000,000 of bonds each year for nine years, the several mortgages of the company afford no provision for future requirements. Consequently, there has been under consideration for some time past a plan for making a mortgage covering the entire system and subsidiary lines, under which bonds may be issued to retire existing indebtedness as it matures, and to provide funds needed from time to time for additions to and extension of the company's railroad and property, necessary for the further development of the important territory occupied by your lines and to care for the constantly expanding traffic.

The stockholders will be asked to consider a plan to meet the financial requirements of the company as above indicated and, if approved, to authorize the execution of a mortgage covering the entire system and subsidiary lines, under which bonds may be issued in series from time to time for refunding and other corporate purposes. Each series as issued will bear such rate of interest and generally be in such form as to best meet then existing conditions; but all will be equally secured by the same mortgage. It is proposed to limit the amount of bonds which may be issued under the mortgage to $600,000,000, unless the stockholders should later give further consent to additional issue, but at no time shall the amount outstanding, together with all prior debt, exceed three times the capital stock of the company.

Chicago, Rock Island & Pacific.—Judge Mayer, in the federal district court, has denied the application of some of the railroad collateral bondholders to delay the sale of the collateral under the Railroad 4's, and has ordered this collateral sold. The protective committee, of which James N. Wallace is chairman, has announced the plan which this committee has for the purchase of the collateral. The plan provides for the purchase by the committee of the Railway company stock which is collateral for the Railroad bonds, and the distribution of this stock to depositing bondholders on the basis of ten shares of stock to each $1,000 bond. If all the bondholders do not assent to the plan it will be necessary to raise cash to pay off the non-depositing bondholders. This is the only cash to be called for.

Holders of certificates of deposit for the bonds, who shall have complied with the conditions of the plan and the deposit agreement, and paid their proportionate share of the cash requirements, are to receive, on the completion of the plan and surrender of their certificates, for each $1,000 bond represented: (1) ten shares of stock of the Chicago, Rock Island & Pacific Railway, the operating company; (2) their proportionate part of so much of the pledged stock acquired by the committee as shall be in excess of the face amount of the deposited bonds, and that shall not have been disposed of by the committee as provided toward meeting the cash requirements; (3) a certificate entitling the holder to $1,000 face amount of deposited bonds when stamped as required in the foreclosure suit to indicate the payment of the amounts paid or credited thereon out of the proceeds of sale of the pledged stock.

Erie.—Robert W. Pomeroy, of Buffalo, N. Y., and M. D. Follansbee, of Chicago, have been elected directors, succeeding Charles A. Peabody and H. P. Davidson.

Florida Central.—This road, running from Thomasville, Ga., to Fanlew, Fla., 47 miles, has been sold under foreclosure to the Atlantic Coast Line for $22,000, subject to a mortgage which the Atlantic Coast Line holds for $200,000.

New York Central & Hudson River.—Of the $40,000,000 4½ per cent bonds which were offered by bankers in April at a price to yield 4.70 per cent, about $8,000,000 remain unsold and these bonds are being offered at a price to yield 5.03 per cent.

The New York Public Service Commission, Second district, has unanimously approved the plan of consolidation of this company and of the Lake Shore & Michigan Southern. In part the commission says:

"We find nothing to indicate any intent on the part of the petitioners to over-capitalize either in stocks or bonds. The proposed stock issue of about $250,000,000 by the new company is some $50,000,000 in amount less than the combined capital stock of the constituents; while the outstanding bonded indebtedness of the new company on account of the New York Central-Lake Shore collateral trust bonds can at no time exceed the precise amount at that time unpaid of the original debt, whether represented by the original bonds or by the new 4's." The commission approves heartily of the system of financing to be adopted under the merger, and says that the consolidation of the properties would inure to the advantage of the general public.

In settling the question raised by opponents of the merger, as to whether or not an increase in the interest rates from 3½ per cent on Lake Shore collaterals to 4 per cent on new bonds to be issued in exchange therefore, constitutes a violation of the state railroad law in connection with the issue of additional securities, "in connection" or "in consideration for" consolidation, the commission is of the opinion that if the law were interpreted as argued by the objectors to the consolidation it would effectually prevent the issue of all refunding bonds in consolidation proceedings.

New York, Ontario & Western.—F. L. Lovelace has been elected a director.

Ohio River & Columbus.—This road, which runs from Ripley, Ohio, to Sarginia, 22 miles, has been placed in the hands of Charles J. Finger, general manager, as receiver. The receiver was appointed on the application of the minority stockholders.

Southern Railway.—See comments on the annual report and the reduction of dividends in the editorial columns; also reduction in salaries noted in general news columns.

Dr. Edwin A. Alderman, president of the University of Virginia; John Kerr Branch, a banker of Richmond; Dr. John C. Kilgo, bishop of the Methodist Episcopal Church and a resident of Durham, N. C., and Robert Jemison, of Birmingham, Ala., have been elected directors, succeeding W. W. Finley and H. C. Fahnstock, both deceased, and George F. Baker, Jr., and E. H. Gary, resigned. Charles Steele, of J. P. Morgan & Co., was re-elected, as were the other directors.

Union Pacific.—The monthly statement of revenues and expenses for August contains the announcement that "in order to save the expense of issuing these statements monthly they will be discontinued, and hereafter a statement of operating revenues and operating expenses will be enclosed with the quarterly dividend check."

The Swiss State Railways.—A press despatch states that the federal railways of Switzerland in August of this year, the month in which as a rule their earnings are largest, had traffic receipts of only $2,002,000, showing a falling off of $2,036,185 as compared with August, 1913—more than 50 per cent. The operating expenses, on the other hand, amounted to very little less than in 1913—$1,963,400 as compared with $2,199,288.

ANNUAL REPORT

TWENTIETH ANNUAL REPORT—SOUTHERN RAILWAY COMPANY

RICHMOND, VA., October 13, 1914.

To the

Stockholders of Southern Railway Company:

The Board of Directors submits the following report of the affairs of the Company for the year ended June 30, 1914:

This is the twentieth annual report of the Company and concludes the record of the administration under the Voting Trust, which was created on its organization in 1894. It is, therefore, a fitting time for retrospect, and the Board of Directors deems it appropriate to submit again to the stockholders, as a part of this report, the circular issued by the Voting Trustees under date of June 30, 1914, announcing the surrender of their trust. It will be found at page 12. This circular is not only a history of what this Company has accomplished, but, as it illustrates the growth of the industrial South during the past twenty years, serves also as an earnest of the future which may reasonably be expected for this Company.

The actual result of the operations for the year, and the financial condition of the Company at the close of the year, will appear by reference to the Income Statement (page 30) and the General Balance Sheet (pages 34 and 35), which are part of this report. It will be observed that the operating revenues continued to increase during the year, but that the rate of such increase (1.47 per cent.) was less than in recent years, while the rate of increase of operating expenses (4.76 per cent.) continued undiminished. The slackening in the general volume of business done in the United States, which has been so marked during the past year, was felt last of all in the South, but had become part of the problem of management of this Company with the opening of the calendar year 1914. The high level of expense of operation is maintained not so much by any natural economic law, not by any deliberate intention or neglect of management, as by general social tendencies which are in substantial measure abnormal and beyond control of management. It can hardly be expected that the operation of an American railroad shall be again on a normal basis unless, and until, the question of the railroads shall cease to be a factor in American politics. To state this fact is but to repeat the statement of the contemporary plight of the railroads which has been so frequently ureged upon the American public in recent years. It is mentioned here simply to illustrate its application to the fortunes of Southern Railway Company.

An intelligent appreciation of what is meant by the Income Statement of a railway company is obscured for many people by the very size of the figures which make it up. To talk in millions, even of expenses and debts, seems to some to be riches. It is, therefore, illuminating to reduce the results of such a company as this to a smaller and more comprehensible unit, such as that applied to their own affairs by many of those who do business with a railway company. To that end we have adopted for the following statement the unit of $100., and submit it here to show what have been the results for the year just closed and in order to demonstrate general tendencies. There are added similar units for the two three-year periods included in the past six years of the history of the Company.

OPERATING RESULTS REDUCED TO BASIS OF $100.

	Three Years Ended June 30,		Year Ended June 30,
	1911.	1914.	1914.
Income:			
From Operations	$94.77	$95.18	$95.51
From Interest, Dividends, Rents, Privileges, etc.	5.23	4.82	4.49
Gross Income	$100.00	$100.00	$100.00
Disposition of Income:			
For Operating Expenses	$64.20	$67.22	$69.44
For Taxes	3.41	3.59	3.68
For Rents of Roads Leased, Trackage Rights, Equipment, Privileges, etc.	4.24	4.72	5.22
For Interest on Bonds, Notes, Equipment Obligations, etc.	18.70	15.62	15.02
For Discount on Securities Sold, charged to Income	.52	.04	...
For Additions to Property through Income	.11	.09	.12
Surplus	8.82	8.72	6.52
	$100.00	$100.00	$100.00
Investment in Property:			
Per $100 of Revenue	$592.41	$528.68	$518.48
Average return on Investment in Property	1.49%	1.65%	1.36%
DIVIDENDS PAID:			
Per $100 of Income	$0.67	$3.96	$3.71
Average Rate of Dividends	0.67%	4.67%	4.5%
DISCOUNT CHARGED TO PROFIT AND LOSS:			
Per $100 of Income	$5.02	$0.92	$0.26

The most significant item in this statement is the marked decrease in the average return on the investment in property, accompanied by constant additions to property through income and through new capital. This has resulted despite an increase in operating revenue and a decrease in the fixed charges and discount, and has been brought about chiefly by the increase in operating expenses and taxes.

TAXES.

It may be assumed that the stockholders and those of the intelligent public who may read this report are generally familiar with the causes and conditions which have contributed to the increase in operating expenses, but it seems appropriate to say a word here on the subject of the increase in taxes.

For the year the Company paid out for taxes $2,679,389.67, an increase of $199,002.39 over the previous year, or 8.02 per cent., as compared with an increase of 1.47 per cent. in operating revenues. Special attention would not under ordinary circumstances be called to the question of taxes, but the growth of the item is becoming serious. The nature and use of railroad property make its earning power the obviously fair test of its duty to contribute to the support of government. It is expected that reasonable increases may be looked for as the revenues increase, but the current practice of arbitrary assessment of nominal value upon railroad property for the purpose of taxation and the ease with which such assessed values can be increased have made such property a main source of securing additional governmental revenue for purposes upon which the owners of railway property are not consulted. That the taxes of this Company have been increased out of proportion to the increase in its revenues will be apparent from the following statement of a ten year tendency:

Increase in revenue 1914 over 1905.....44.42 Per Cent.
Increase in expenses 1914 over 1905.....50.06 Per Cent.
Increase in taxes 1914 over 1905.....93.90 Per Cent.

THE ADDITIONS TO CAPITAL ACCOUNT AND TO PROPERTY INVESTMENT.

The investment in Road and Equipment, exclusive of depreciation, increased $4,137,859.79, of which $3,000,698.08 was in Roadway and Structures and $1,137,161.71 in Equipment. This increase represents net additions made during the year. (See pages 36 and 37.)

There was an increase of $11,225,700 in outstanding Mortgage and Collateral Trust Bonds and Notes and $3,238,000 in Equipment Trust Obligations. (See pages 39-41.)

On February 13, 1914, there were sold $1,250,000 Southern Railway Company First Consolidated Mortgage Five Per Cent. Bonds, theretofore held by the Company.

On March 2, 1914, there were sold $10,000,000 Southern Railway Company Three-Year Five Per Cent. Collateral Gold Notes, issued, pending a market for the sale of long term bonds, to provide funds for Additions and Betterments, chiefly terminals.

There were retired, at maturity, July 1, 1913, $34,300 Charlottesville and Rapidan Railroad Company First Mortgage Six Per Cent. Bonds and $5,000 Franklin and Pittsylvania Railroad Company First Mortgage Six Per Cent. Bonds; $39,400 First Consolidated Mortgage Five Per Cent. Bonds were drawn on account thereof and placed in the treasury. By reason of these and previous drawings for similar purposes, and the sale of $1,250,000 Southern Railway Company First Consolidated Mortgage Five Per Cent. Bonds, there remained free in the treasury on June 30, 1914, $154,200 of these bonds.

During the year there were drawn and taken into the treasury $5,000,000 Development and General Mortgage Four Per Cent. Bonds, which, under the terms of that mortgage, could be drawn for the calendar year 1914 for Additions and Betterments. There were also drawn and taken into the treasury $1,131,000 of such Bonds representing the proportion of Equipment Trust Obligations paid during the year and charged to capital account.

The total amount of Development and General Mortgage Four Per Cent. Bonds owned by the Company on June 30, 1914, was $32,123,000, of which $16,667,000 are pledged as collateral under Southern Railway Three-Year Five Per Cent. Collateral Trust Indenture, dated March 2, 1914, leaving $15,456,000 free in the treasury.

Double Track:

Negotiations were concluded during the year with The Atlanta & Charlotte Air Line Railway Company by which that Company undertook to issue its First Mortgage Bonsd to the authorized amount of $20,000,000., of which $5,500,000. of 4½ per cent. bonds were issued and sold on July 1, 1914, to retire a like amount of outstanding bonds of that Company heretofore acquired and pledged under the First Consolidated Mortgage of Southern Railway Company, but subject to call, as they were called, by the obligor. The proceeds of the Atlanta & Charlotte Air Line bonds so sold thus made available to this Company a sum sufficient to complete the additional track on all of the main line between Washington and Atlanta (except the Atlanta & Charlotte Air Line), and this work is now in progress. The remainder of the $20,000,000. of bonds authorized by the Atlanta & Charlotte Air Line mortgage are available for sale at any time and the proceeds will be applied to complete the double track on the Atlanta & Charlotte Air Line. With the completion of the work for which this plan makes financial provision, the entire main line from Washington to Atlanta, 649 miles, will be double track.

The total double track in operation at the close of the year was 402.64 miles, of which 17.25 miles were put in operation during the year, viz.: between Amherst and Monroe, Va., Cross Keys and Armour, Ga., between 27th Street, Birmingham, and east end of the Finley Yard at North Birmingham, Ala., and short stretches elsewhere.

Yards and Terminals:

Substantial progress was made during the past year in the construction of important and long needed additional terminal yards at Richmoud, Va., at Spencer and Winston-Salem, N. C., at Mobile and at Finley (near Birmingham), Ala., and at Forrest (near Memphis), Tenn. Other work of this character is planned and will be undertaken with the proceeds of the note issue made during the year. New and additional spur and side tracks, aggregating 42.70 miles, were constructed.

Automatic Block Signals:

Electrical automatic block signals were completed and put in operation on the main line between Cameron Run and Orange, Va., a distance of 75 miles, making a total of 189.5 miles of such signals in operation at the close of the year. Similar signals are under construction on all other double track.

OPERATING CONDITIONS.

The effort has been made to supply in the report of the Vice-President and General Manager, and in the tables making up the report of the Comptroller, which are hereto attached, all the details which are necessary for a comprehension of the problem arising in current operations, but it is fitting to call attention here to some of the more salient facts. The most striking item in the year's accounts is the adverse balance in the item of hire of equipment. The increase of the debit to this account was $606,786.79 as compared with the previous year. For several years past the account of hire of equipment has contributed to the income of the Company, but, beginning with September, 1913, the balance began to turn against us and so continued throughout the year. This is explained by two conditions:

(*a*) The actual reduction in the items of freight car equipment owned by the Company and by it contributed to the general car pool of the United States; such decrease resulting from retirement of old freight cars which had passed the stage of economical maintenance or, by reason of their original standards of construction, had become of obsolete type. This accounts for the fact that the average number of freight cars in service decreased 2.93 per cent., while the average capacity of freight cars in service increased 2.52 per cent. The result is that while the carrying capacity of the Company's equipment has not been materially diminished, the car hire account, which is based on a per diem per unit of equipment without regard to capacity, has suffered;

(*b*) The heavy movement throughout the year of empty foreign cars on the home route. Such a movement is always an acute symptom of a general business depression and is a measure of self defense to which every railroad has recourse under such circumstances. Its effect is felt most heavily by the lines like those of this Company which in times of prosperity have handled large numbers of cars originating their ladings in other territories.

With steady confidence that the prevailing business depression is temporary, the Board of Directors has dealt courageously during the year with the first item of this condition. To keep up and refresh the car supply normally required by the Company and so to balance the car hire account, orders were placed for 5,945 items of new freight cars, as well as for additional power and passenger equipment. The total cost of this equipment was $7,828,688, a figure actually large but representing an investment at a most fortunate time for the purchaser, for, because of lack of other business, the equipment manufacturers made unprecedented prices. The result was that for the same money the Company secured a largely increased number of items of equipment as compared with any previous purchase, and, as the new equipment is of contemporary type and construction, was so enabled to make substantial progress in raising the general level of its equipment to modern standards.

The constant and unremitting effort of management under existing conditions of operation is, of conrse, to check the current tendency of encroachment of operating expenses upon operating revennes by the practice of greater efficiency, without too great demands for new capital. This is the most difficult, as, when successful, it is the most admirable, achievement in the operation of a railroad to-day. This Company's results have shown steady improvement and warrant cordial approval by the stockholders of the faithful and resourceful work of the technical operating officers.

The elements of efficiency gained in operations during the past six years, by reason of increased operating efficiency, as well as by what it has been possible to do in the way of elimination of grades and curves, enlargement of yards, construction of double track, additions to and lengthening of passing tracks and the substitution of heavier power, may be briefly stated as follows:

Comparing 1914 with 1908:

Increase in ton miles	36.3 per cent.
Decrease in freight-train miles	8.3 "
Increase in freight car miles	25.6 "
Increase in net tons per train mile	48.6 "
Increase in tons per loaded car	8.2 "
Increase in locomotive tractive power	12.3 "
Decrease in coal consumed per 100 ton miles	31.4 "

By reason of its many branch lines over which, of necessity, arbitrary train service must be maintained, the average tons per freight-train mile is relatively low. This disability, however, is being largely overcome through the systematic rating of engines and loading of trains between termini on the main lines. Substantial progress has been made during the year in this respect, as will be noted from the following comparison:

Gross tons per train mile:	October November, 1913.	July, 1914.
In the direction of heavy traffic	1,301 tons	1,442 tons
Per cent. of locomotive efficiency utilized	92.1	97.4
In the direction of light traffic	721 tons	881 tons
Per cent. of locomotive efficiency utilized	65.4	73.4
In both directions	1,017 tons	1,163 tons
Per cent. of locomotive efficiency utilized	80.7	86.7

While the tonnage transported during the year was practically the same as that transported during the preceding year, the mileage made by freight trains decreased 5.31 per cent. and the tons handled per train mile increased 5.74 per cent.

Maintenonce:

The maintenance accounts reflect the continuance of the policy of keeping the physical condition of the property up to a constantly increasing standard. The management would be glad to apply more money than has ever yet been spent on these accounts. The actual appropriations have been liberal, considering the revenues from which the funds are derived, and a review of what has been accomplished during the year brings the comforting assurance of substantial progress. There is great need of a reliable unit for measuring the efficiency of maintenance of railway property. The accepted units, based on dollars alone, may mean efficiency, or, when compared with the similar units of other companies having different physical conditions and maintenance equipment, they may mean parsimony or they may mean extravagance, but in no event do they reveal any of these things. It may be said that the management of this Company believes that under its conditions it has got a dollar's worth of work for most of the dollars disbursed in these accounts, and with that statement the following figures are submitted, viz.:

Cost to Maintain:

(Exclusive of renewals and depreciation.)

	1913.	1914.
A mile of track	$1,413.68	$1,387.86
A locomotive	2,621.17	2,729.58
A freight-train car	64.29	76.44
A passenger-train car	739.11	786.20
The ratios of the total of such expenses to revenues have been		
Maintenance of Way and Structures	13.54	13.09
Maintenance of Equipment	16.48	17.22
Total Maintenance ratios	30.02	30.31

While the charge to expenses on account of Maintenance of Way and Structures showed a nominal decrease of 1.90 per cent., the actual expenditures for upkeep, as shown in detail in the Vice-Presideot and General Manager's report, were $197,696.85 greater than for the previous year. This is explained by a modification of the technicality of accounting.

TRAFFIC CONDITIONS.

It will be noted from the statistics that while the revenue derived from the transporation of passengers increased $784,293.27, or 4.30 per cent., the passenger-train miles increased 5.63 per cent. This increase in the Company's passenger trains reflects its policy and desire to provide adequate passenger train service. This policy has been liberal to the point of daring and it has accomplished much for the upbnilding of the South. It has, however, an effect on income which should not be overlooked. Passenger train miles for the year aggregated over 52 per cent. of the total revenue train miles and exceeded the mileage made by freight trains by 2,607,216 miles, while revenue from passengers was only 27.62 per cent. of the total revenues from transportation.

The general depression in business conditions that prevailed throughout the United States and more particnlarly during the last six months of the fiscal period, while less acute in the South than in other parts of the country, was responsible for decreases in important items of this Company's freight traffic, as follows:

Pig Iron, Steel Rail and Fastenings, Manufactured Iron and Structural Steel	108,698 tons
Cement, Brick, Lime and Fire Clay	48,527 tons
Lumber, Shingles, Staves, Headings, etc	99,466 tons
	256,691 tons
Abundant grain crops in Southern Railway territory resulted in a decrease in the movement of grain, grain products and hay, principally from the West, of	228,489 tons
The failure of the Georgia peach crop resulted in a decrease in the movement of that commodity of	45,013 tons
Total	530,193 tons

That there should have been an increase of 200,867 tons in the total movement, and an increase of $133,300.02 in revenue from Freight Traffic, regardless of the heavy decreases in these five important items, indicates the rapid development of diversified industry and general business throughout the South, and the strong position of the Southern Railway with relation to it.

BUSINESS CONDITIONS.

The effect upon business in the United States of the European war, coming on top of a period of general business hesitation, has been apparent in the revenues of the Company since the close of the fiscal year. The South particularly has been hard hit, for it is peculiarly dependent upon the stability of the price and market for its cotton crop. While the tonnage of this staple represents a comparatively small percentage of the total tonnage hauled by this Company, any disturbance which affects its sale has far reaching influence on business generally, as it limits the purchasing power of the producer.

While the Company may be expected to suffer alike with other forms of industry in the South, it behooves it to set an example of patience and fortitude, which qualities, together with faith in the future, are most needed in this period of distress.

In snch a crisis, when more than ever it is apparent that the interests of the Railway Company are identical with those of the public it serves and that it can prosper only as the communities which it serves develop and grow, it is gratifying to be able to state that it has never been a time within its history when the relations of Southern Railway Company were more close and cordial with the people of the South than now. The determination of the management at all times to deal frankly and fairly with the public has been instrumental in bringing about this condition. The era of suspicion and distrust on the part of the pnblic seems to be nearing an end, and the purposes and ideals of the Company are beginning to be understood and approved. No better omen for the futnre of the Company can be found than that discernible in the growing good will in the public mind.

DIVIDENDS.

The loss in revenue since the beginning of the European war and the outlook for the immediate future have demanded a strict policy of retrenchment, always a disagreeable duty. The consequent reduction of service of employees means a reduction of the opportunity of many men to earn the livelihood to which they have been accustomed, and it has seemed fair to the officers that they too should share the sacrifice, so that as a temporary measure the salaries of all officers earning in excess of $2,500. per annum have been voluntarily and loyally reduced in fair proportions. Under these circumstances the Board has deemed that it was fair also for the preferred stockholders to share the necessities of the situation. Accordingly, although the full five per cent. on the preferred stock was safely earned for the year before the current acute conditions were apparent, the dividends declared for the year were reduced from 5 per cent. to 4½ per cent. Furthermore, the dividend for the second half of the year was declared payable not in cash but in scrip, redeemable in five years and meanwhile bearing interest at the rate of 4 per cent. per annum.

SERVICE OF EMPLOYEES.

The faithfulness, loyalty and ability of its officers and employees constitute one of the prime assets of Southern Railway Company. In tendering its thanks to each officer and employee for the faithful and intelligent service rendered during the past year, the Board desires to express its gratification at the high morale that obtains among the great number of individuals in the rank and file, and to record its confidence in, and its appreciation of, the men making up the organization. Not only departmental unity but individual loyalty exists. As a result co-operation among the officers and the men and between the men themselves has been developed to an extraordinarily high degree. This growing spirit of cohesiveness and unity of purpose is a source of pride to the management and foretells for the future better results both for the public and the Company. Individual membership in an organization of such generally recognized ability and high character may well be, as it is, considered a badge of honor.

ACCOUNTS AND STATISTICS.

Statements of the accounts and statistics of the Company in detail will be found in the tables hereto annexed.

The accounts have been examined, as usual, by Certified Public Accountants, Messrs. Patterson, Teele & Dennis, and their certificate is made a part of this report.

Appended to this report is a minute of the resolution adopted by the Board on December 1, 1913, following the death at his home in Washington, D. C., on November 25, 1913, of William Wilson Finley, late President of this Company.

It has also been the sad duty of your Directors to record the death, which occurred at his home in New York, on June 4, 1914, of their esteemed associate, Mr. Harris C. Fahnestock, who had been a faithful and valuable member of the Board since the organization of the Company.

Respectfully submitted, by order of the Board,

FAIRFAX HARRISON,
President.

TABLE 4.

GENERAL BALANCE SHEET, JUNE 30, 1914, AND JUNE 30, 1913.

ASSETS.			LIABILITIES.		
June 30, 1913.		June 30, 1914.	June 30, 1913.		June 30, 1914.
	Property Investment:			*Capital Stock:*	
	Road and Equipment:		$120,000,000.00	Common	$120,000,000.00
	Investment to June 30, 1907:		60,000,000.00	Preferred	60,000,000.00
$287,434,900.33	Road	$287,434,900.33	$180,000,000.00	Total	$180,000,000.00
46,672,108.87	Equipment	46,672,108.87			
$334,107,009.20	Total	$334,107,009.20		*Mortgage, Bonded and Secured Debt:*	
	Investment since June 30, 1907:			Mortgage Bonds:	
$20,528,069.86	Road	$23,528,767.94	$195,276,300.00	Outstanding	$196,492,000.00
18,830,114.91	Equipment	19,967,276.62	29,356,800.00	Held by Company	34,277,200.00
$39,358,184.77	Total Investment since June 30, 1907	$43,496,044.56	$224,633,100.00	Total	$230,769,200.00
$373,465,193.97	Total Road and Equipment	$377,603,053.76		Collateral Trust Bonds, Notes and Certificates:	
14,321,746.67	*Less:* Reserve for Accrued Depreciation on Equipment	14,995,466.18	$19,790,700.00	Outstanding	$29,800,700.00
			42,000.00	Held by Company	42,000.00
$359,143,447.30	Total Net Road and Equipment	$362,607,587.58	$19,832,700.00	Total	$29,842,700.00
	Securities:		5,107,000.00	Other Notes, Outstanding	5,107,000.00
	Securities of Proprietary, Affiliated and Controlled Companies, Pledged:		$249,572,800.00	Total	$265,718,900.00
$2,487,586.26	Stocks	$2,505,086.26	15,146,000.00	Equipment Trust Obligations (See Table 6)	18,384,000.00
21,508,920.74	Bonds	21,508,920.74	$264,718,800.00	Total	$284,102,900.00
$23,996,507.00		$24,014,007.00			
2,000,000.00	Bonds Issued or Assumed, Pledged	18,667,000.00		*Working Liabilities:*	
	Securities of Proprietary, Affiliated and Controlled Companies, Unpledged:		$455,000.00	Loans and Bills Payable	$455,000.00
$116,887.21	Stocks	$116,887.21	1,071,555.36	Traffic and Car Service Balances due to other Companies	1,189,414.73
678,418.75	Bonds	673,416.75	6,945,724.58	Audited Vouchers, Accounts and Wages Unpaid	7,462,688.21
$795,305.96		$790,303.96	270,825.39	Miscellaneous Accounts Payable	237,830.09
$26,791,812.96	Total	$43,471,310.96	2,933,534.68	Matured Interest, Dividends and Rents Unpaid, including amounts due July 1.	2,796,932.42
	Other Investments:		38,673.80	Matured Mortgage Bonds not presented for Redemption	4,673.80
	Advances to Proprietary, Affiliated and Controlled Companies for Construction, Equipment and Betterments		1,949,702.92	Other Working Liabilities	1,745,800.04
$408,234.86		$416,592.14	$13,665,016.73	Total	$13,892,339.29
	Miscellaneous Investments:				
$401,844.24	Physical Property	$431,019.64		*Accrued Liabilities Not Due:*	
33,640,943.91	Securities, Pledged	33,650,943.91	$1,571,827.65	Unmatured Interest and Rents Payable	$1,803,379.34
9,283,027.94	Securities, Unpledged	9,320,594.28	982,398.61	Taxes	1,045,011.58
$43,325,816.09		$43,402,557.83	$2,554,226.26	Total	$2,848,390.92
$43,734,050.95	Total	$43,819,149.97		*Deferred Credit Items:*	
	Working Assets:		$1,286,086.33	Operating Reserves	$1,747,071.73
$8,295,928.23	Cash	$15,392,707.51	1,886,103.62	Other Deferred Credit Items	2,072,841.35
27,148,800.00	Securities Issued or Assumed, or Held in Treasury	15,652,200.00	$3,172,189.95	Total	$3,819,913.08
	Marketable Securities:				
$256,522.00	Stocks	$256,522.00		*Appropriated Surplus:*	
179,060.04	Bonds	179,060.04	$1,500,000.00	Dividend No. 26, 2½ Per Cent, on Preferred Stock, paid in October, 1913	.....
$435,582.04		$435,582.04	.....	Scrip Dividend No. 28 on Preferred Stock—2%	$1,200,000.00
398,402.85	Loans and Bills Receivable	820,074.75	410,161.02	Additions to Property since June 30, 1907, through Income	500,331.96
826,707.66	Traffic and Car Service Balances due from other Companies	785,793.91	989,354.41	Insurance Reserve Fund	920,208.73
449,968.74	Balances due from Agents and Conductors	300,384.25	$2,899,515.43	Total	$2,620,540.69
2,932,361.60	Miscellaneous Accounts Receivable	3,465,942.13	$17,374,558.20	*Profit and Loss*	$18,676,904.51
5,343,032.61	Material and Supplies	5,080,699.04			
774,248.79	Other Working Assets	686,347.05			
$46,605,032.52	Total	$42,619,730.68			
	Accrued Income Not Due:				
	Unmatured Interest, Dividends and Rents Receivable				
$962,243.79		$984,400.61			
	Deferred Debit Items:				
	Temporary advances to Proprietary, Affiliated and Controlled Companies				
695,737.86		$954,707.21			
255,034.61	Working Funds	264,430.35			
986,782.28	Other Advances	845,950.41			
1,486.68	Insurance Premiums Paid in Advance	869.89			
29,089.11	Taxes Paid in Advance	31,887.07			
.....	Unextinguished Discount on Securities	190,166.84			
2,718,164.33	Special Deposits	7,331,247.35			
39,298.80	Cash and Securities in Sinking and Redemption Funds	4,948.80			
989,354.41	Cash and Securities in Insurance Reserve Fund	920,208.73			
1,432,770.97	Other Deferred Debit Items	1,914,392.04			
$7,147,719.05	Total	$12,458,808.69			
$484,384,306.57	Grand Total	$505,960,988.49	$484,384,306.57	Grand Total	$505,960,988.49

TABLE 1.

INCOME STATEMENT FOR YEAR ENDED JUNE 30, 1914, COMPARED WITH YEAR ENDED JUNE 30, 1913.

1913.		1914.
	Operating Revenues:	
$44,943,747.82	Freight Revenue	$45,077,047.84
18,220,489.43	Passenger Revenue	19,004,782.70
330,547.81	Miscellaneous Passenger-Train Revenue	407,560.71
1,379,165.00	Mail Revenue	1,443,151.58
2,008,008.99	Express Revenue	1,902,563.25
924,656.90	Other Transportation Revenue	978,043.76
722,874.25	Revenue from Operations other than Transportation	720,547.40
$68,529,490.20	TOTAL OPERATING REVENUES	$69,533,697.24
	Operating Expenses:	
$9,275,553.17	Maintenance of Way and Structures	$9,098,911.83
11,290,337.19	Maintenance of Equipment	11,974,089.80
2,094,009.69	Traffic Expenses	2,243,556.47
23,605,046.02	Transportation Expenses	25,051,780.30
2,008,977.48	General Expenses	2,202,836.14
$48,273,923.55	TOTAL OPERATING EXPENSES	$50,571,174.54
$20,255,566.65	NET OPERATING REVENUE	$18,962,522.70
80,535.87	AUXILIARY OPERATIONS—NET REVENUE	27,824.78
$20,336,102.52	NET REVENUE	$18,990,347.48
2,480,387.28	TAXES	2,679,389.67
$17,855,715.24	OPERATING INCOME	$16,310,957.81
	Other Income:	
$65,000.00	Rents for Lease of Roads	$65,000.00
5,072.83	Hire of Equipment—Balance	.....
210,696.09	Joint Facility Rent	212,112.35
108,095.03	Miscellaneous Rent	110,291.69
27,396.19	Net Income from Rail Leased	26,123.51
1,318,235.55	Dividends on Stocks	1,331,794.24
1,390,490.35	Interest on Bonds and Notes	1,380,317.26
214,434.38	Interest on Unfunded Securities and Accounts	131,722.78
26,550.08	Miscellaneous Income	10,044.53
$3,365,970.50	TOTAL OTHER INCOME	$3,267,406.36
$21,221,685.74	*Total Gross Income*	$19,578,364.17
	Deductions from Total Gross Income.	
$48,213.72	Income from Operation, Southern Railway Company in Mississippi, Alabama State Line to Columbus, Miss.	$39,682.45
1,783,327.58	Rents for Lease of Other Roads (See Table 2)	1,790,637.01
.....	Hire of Equipment—Balance	601,713.96
969,219.82	Joint Facility Rent	1,052,062.51
35,920.74	Miscellaneous Rent	38,276.45
167,633.10	Separately Operated Properties	189,215.84
12,017.04	Amortization of Discount on Funded Debt	.....
244.56	Interest on Unfunded Debt	37.93
87,509.61	Miscellaneous Deductions	87,436.05
$3,104,086.17	TOTAL DEDUCTIONS	$3,799,062.20
$18,117,599.57	TOTAL AVAILABLE INCOME	$15,779,301.97
$10,105,356.65	INTEREST ACCRUED ON FUNDED DEBT (See Table 2)	$10,053,022.78
706,809.75	INTEREST ACCRUED ON EQUIPMENT OBLIGATIONS (See Table 2)	660,565.59
226,808.00	DIVIDENDS ACCRUED ON SOUTHERN RAILWAY—MOBILE AND OHIO STOCK TRUST CERTIFICATES	226,008.00
$11,038,974.40		$10,939,596.37
$7,078,625.17	BALANCE OF INCOME OVER CHARGES	$4,839,705.60
	FROM WHICH DEDUCT DIVIDENDS ON PREFERRED STOCK:	
$1,500,000.00	Nos. 25 (2½%) and 27 (2½%) paid in April	$1,500,000.00
1,500,000.00	No. 26 (2½%) paid in October, 1913	.....
.....	No. 28 (Scrip Dividend 2%)	1,200,000.00
$3,000,000.00	TOTAL DIVIDENDS	$2,700,000.00
$4,078,625.17	BALANCE OVER DIVIDENDS ON PREFERRED STOCK	$2,139,705.60
48,660.48	APPROPRIATION OF INCOME FOR ADDITIONS AND BETTERMENTS	91,928.91
$4,029,964.69	*Balance Carried to Credit of Profit and Loss*	$2,047,776.69

TABLE 3.

PROFIT AND LOSS FOR YEAR ENDED JUNE 30, 1914.

Balance at Credit of this Account June 30, 1913		$17,374,558.20
Add:		
Credit Balance of Income for the Year		2,047,776.69
Net Miscellaneous Credits		88,764.18
		$19,511,099.07
Deduct:		
Discount on Securities charged off during the year	$189,320.00	
Property Abandoned	21,870.01	
Damages to Property occasioned by explosion of dynamite at Jellico, Tenn., September, 1906, and provision for claims and damages not yet docketed	565,765.87	
Advances to Delta Southern Railway written down	57,238.68	
		834,194.56
Credit Balance June 30, 1914		$18,676,904.51

Railway Age Gazette

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WE GUARANTEE, that of this issue (the monthly Engineering & Maintenance Edition) 10,750 copies were printed; that of those 10,750 copies 7,402 were mailed to regular paid subscribers to the weekly edition, 1,904 to subscribers who get the Engineering & Maintenance Edition only, 250 were provided for counter and news companies' sales, 1,101 were mailed to advertisers, exchanges and correspondents, and 93 were provided for samples and office use; that the total copies printed this year to date were 403,450, an average of 9,383 copies a week.

Volume 57 October 23, 1914 Number 17

Contents

*Illustrated.

Air Brake Instruction for Trainmen

The Canadian Northern has issued an air brake instruction book designed especially for conductors and brakemen, leaving out those intricacies which have to do with the engineman's or inspector's work, and which do not concern the trainmen back of the tender. This is a sensible idea. In the progress of developing and perfecting the air brake the equipment has been constantly becoming more complicated, until now there are few men in railway work, aside from those whose duty it is to look after its maintenance, who have more than an elementary knowledge of the details of its operation. It is even doubtful if enginemen in any great number are thoroughly acquainted with the apparatus in all its intricacies. The trainmen must, of course, know well the foundation principles of the brake, and also, in some detail, those parts with which they have to deal directly; but to obtain this knowledge it is not necessary to wade through the mass of material which generally is found in instruction books on the air brake in general. There is no need for a trainman to be such an authority on air brake matters as a general air brake inspector, or even to have as much detailed information concerning it stored away in his head as the engineman needs. The Canadian Northern's book was developed on the Toronto division, is of vest pocket size, and is made up of questions and answers. It gets away almost entirely from the complications of engine equipment and its management. It cannot be doubted that the use of similar methods would prove satisfactory on almost any road; certainly this comparatively small book, with its 28 pages and 114 questions, should prove encouraging to trainmen. A careful study of it should do away with the disheartenment that sometimes follows the poor results obtained in endeavoring to pick out the necessary information from the general instruction books. If a trainman desires a more extensive knowledge of the air brake there is, of course, nothing to prevent his obtaining it but lack of time or energy on his part.

The Lack of Operating Literature

The president of a large eastern road made the remark some time ago that while the engineering and mechanical departments of the railroads were well supplied with literature regarding their respective problems, there was very little literature available relating to the operating department. A study of railway literature confirms this statement to a surprising degree. Several papers are devoted in part or wholly to railway engineering, mechanical and signaling, while the number of books written on these subjects is large. On the other hand, with the exception of the *Railway Age Gazette*, there are almost no publications devoting any considerable space to the study of the problems of operation, and good books on these problems, such as Droege's "Freight Terminals and Trains," are few. This is surprising, in view of the fact that the main business of a railway is to operate trains and the engineering and mechanical departments are subsidiary to this. One important reason for this condition doubtless is the methods of development and the lines of promotion of the men in these various departments. Many of those in the engineering and mechanical departments have received technical educations in universities where they were taught to study their problems from a scientific standpoint and to put their information and ideas in writing. On the other hand, in the transportation department a large majority of the officers began work in the train service and similar branches. Their early work did not tend to train them to analyze their problems in the same manner or to discuss them in writing. It may be largely owing to this that there is only a small amount of railway literature dealing with the handling of cars, engines and trains. There is, however, no more important field for thorough investigation and study and for the exchange of ideas than in the conduct of railway transportation; and it is to be hoped that the next few years will see the production of more literature along this line, for it is along the lines where there is the freest exchange of ideas that the greatest develop-

ment is likely to occur. The *Railway Age Gazette* is trying to do its part in the development of a literature of this kind. The contest on the handling of cars in large classification yards, which we conducted a short time ago, and the later one on the handling of cars in large terminal yards, have called out numerous excellent discussions of some exceedingly important transportation problems; and the more discussions these problems receive the farther their solution will be advanced.

Foreign Criticism of the Rate Decision

Elsewhere in this issue is published a criticism of the Interstate Commerce Commission's recent eastern freight rate decision by the official journal of the German Railway Association, the Zeitung des Vereins Deutscher Eisenbahn-verwaltungen, which compares the commission's report to a "not too weighty scientific treatise." In a recent issue (October 2, page 611) there was also published a discussion of the decision by W. M. Acworth, the eminent English railway authority. It is somewhat remarkable that these two foreign views should so closely coincide with the most critical opinions of the commission's work that have been expressed in this country. If criticism of the attitude assumed by the commission by those most qualified to discuss the situation here may be open to the charge of not being wholly disinterested, or at least of prejudice in favor of the railways, certainly the utterances of an English economist and of an official publication from the land of the most pre-eminent example of government ownership cannot be so characterized. The German publication finds that "thorough treatment of the results of actual inquiries is conspicuous for its absence," and that "the arguments of the commission make no lasting, convincing impression," such as might have been expected from "so high and, because of its power, so very respected a body." Most thoroughly in accord with the American opinion of the decision perhaps, is the following: "Throughout there is a certain irritable tone which in a more or less judicial decision is not in place. Repeated introduction of the misdeeds of individual enterprises and the vehement rejection of suggestions made to it from outsiders were better left out." It would seem that the unanimity of the opinions expressed regarding the decision in this case by those best qualified to discuss it might well lead the members of the commission to a searching of hearts and a recognition of the fact that the commission itself has a responsibility in the matter that cannot be properly evaded, and which nobody but five members of the commission seems to think is being satisfactorily borne.

"Gilded Stairs and Marble Halls"

In a brief impromptu talk to the Chicago Engineers' Club some days ago Charles Evans, chief commissioner of the state railways of Queensland, Australia, paid a high tribute to the railways of the United States. He had traveled quite widely on the railways of Europe, he said, but he had not seen any lines equal in many ways to those of this country. He deprecated the idea of government ownership here on the ground that the task of taking over and managing such an enormous system of railways as ours would be too great for the government. But he had one criticism to offer regarding our railways. This he expressed by saying that they go in too much for "gilded stairs and marble halls"; in other words, that they spend too much money in providing the luxuries of transportation. This criticism, which applies, of course, only to passenger stations and passenger train service, is entirely valid. The railways of the United States have gone mad on the subject of providing enormous marble passenger stations with immense amounts of waste space in them, observation cars, buffet smoking cars, valets, maids, barbers and barber shops, stenographers, unnecessarily duplicated passenger train service and scores of other luxuries which cost money and which are unknown on the railways of any other country. Our railways handle freight cheaper than any other railways in the world; and then they turn around and waste more money in expenditures for elegancies and luxuries in passenger service in proportion to the amount of their passenger business than any other railways in the world. If the public were willing to pay for these things the situation would be different; but it is not willing to pay for them and does not do so. Our good sleeping car and parlor car service is far superior to the first class service of any railways in Europe; but the first class rates in Europe probably average more than our passenger rates plus our sleeping car or parlor car rates; and the European first class rate plus the sleeping car rate is far higher than the similar combination of rates in this country. The passenger service of the United States is usually unprofitable. If it is ever to be made profitable—as it clearly ought to be—it will be necessary to get the rates for it on a substantially higher basis and reduce the number of expensive and extravagant luxuries. The duplication of passenger service on competing lines ought to be reduced; the number of trains carrying observation, buffet smoking and other similar cars, and stenographers, maids and so on ought to be reduced; it ought to be made a rule to charge excess fares on trains on which such special equipment and service are provided, and the competitive rivalry in building mammoth magnificent passenger terminals should be moderated. Passenger service should be made convenient, comfortable, regular and safe; but the "gilded stairs and marble halls" business is being carried entirely too far all over the country.

WHY THE RAILWAY CASE IS UNIQUE

THERE can be no doubt that the public opinion of the nation overwhelmingly supports the appeal of the railways for permission to advance their rates. But in some quarters there is opposition, and one of the arguments made by the opposition is that all of the business interests of the country are suffering from the effects of the war in Europe, and that to allow the railways to increase their rates would be to permit them to shift their share of the burden to the shoulders of other classes of concerns.

But the case of the railways for action that will give them relief is unique. There are numerous important circumstances which differentiate it from the cases of all other classes of business concerns. In the consideration of the rate question it is vitally important that all these circumstances be given proper weight. Among these circumstances are the following:

1. During both good and bad times most other classes of concerns have been free to adjust their charges or prices according to changes in conditions. When the demand for their commodities was large they were able to raise their prices as much as the market would stand, and did so. When the demand for their commodities became relatively smaller they in many cases reduced their prices or charges; and they were comparatively able to do so because of the fact that they had been able to make relatively high prices or charges before. Even since the war began many concerns and producers have been enabled to make heavy advances in their prices. On the other hand, for years the rates of the railways have been stationary. They have not been permitted by public authorities to make any considerable advances in them, and today their average rates are lower than they have been at any time since the period of depression following the panic of 1893.

2. It may be said, as Louis D. Brandeis did say in his brief in the original rate advance case, that public utilities, like railways, have been unable to advance their rates, they also being subject to regulation. But the conditions under which public utilities have operated have been widely different in two important respects from those under which railways have operated. One of these is that each public utility usually is a monopoly, and therefore is not subject to the competition in service which has been such an important factor in increasing railway expenses, especially passenger expenses, year by year. Still more important is the fact that while the rates of

..e railways have been kept stationary by public regulation, their traffic, and therefore their earnings, have undergone the widest fluctuations. Their earnings were large in 1907, and were $300,000,000 less in 1908. They were large in 1910 and were badly off again in 1911 and 1912. They were large in 1913 and underwent a heavy slump in 1914. In consequence, while their rates have been stationary, they have been under the necessity of incessantly readjusting their expenses to their traffic and earnings. On the other hand, it is characteristic of public utilities of almost every kind that their business and earnings usually steadily increase year by year, and that if they decrease it is to such a small extent as not to render necessary any very important readjustments in operating expenses. These differences between the conditions with which railway managements and the managements of public utilities have had to deal have been very important. A concern the increase in whose earnings and expenses is uniform and predictable can adjust itself to stationary rates far better than one whose business and earnings undergo wide fluctuations.

3. The railway business has been carried on with an average percentage of return on capitalization smaller than that with which any other important class of business concerns has been carried on. It is often replied to this statement that one reason for this is that the railways have been enormously overcapitalized. Well-informed students of railway problems repeatedly have given their reasons for disputing this charge. It is true that there are many railways that are overcapitalized, but there are still more that are under-capitalized. Suppose, however, it be conceded for the sake of argument that the railways as a whole are overcapitalized to the extent of 50 per cent; what then has been their *maximum* annual net return on actual investment? Not over 6 per cent. Suppose it be conceded for the sake of argument that they are overcapitalized to the extent of 100 per cent: what then has been their *maximum* annual net return on actual investment? Less than 8 per cent. For on their total actual capitalization the railways have never earned an average in any year of more than 4 per cent. Every man who is interested in or familiar with some other line of business, will, if he be honest, concede that the average return earned by concerns in that other line far exceeds the average earned on the capitalization and actual investment represented by railways. All the talk of overcapitalization of railways comes with poor grace from the publishers, the manufacturers, the bankers, the farmers, and every other classes of business men in the United States. When it comes to the art of capitalizing business concerns in excess of original investment the railway managers of America are mere amateurs compared with the publishers, manufacturers, farmers, bankers and other business men of this country. With their narrow margin of return most railways are less able to stand such conditions as the present than most concerns in other lines.

4. The conditions with which the railways have had to deal have been unique in respect to the increases in wages paid by them. Unlike almost all other business concerns, they have been unable, because of the nature of their business and the attitude of the public towards it, to allow wage disputes with their employees to go to the length of strikes. Unlike other business concerns, they have had applied a federal law which, with the backing of public opinion, has made it almost compulsory for them to submit such disputes to arbitration by government boards. The consequence has been that while in many other lines of business the power of the labor organizations has been reduced or broken, in the railway business the power of labor organizations has increased day by day. With the increase of their power has gone an increase in their demands. In every case where a railway wage dispute has been submitted to arbitration the award has resulted in increases in wages. Consequently, practically under government compulsion the railways have made increases in the wages paid to their employees which during the last ten years probably have been greater in proportion than those made to any other classes of working men; and for the same reasons they would now find it most difficult to reduce wages.

5. Unlike most classes of business concerns, the railways have been subjected, through government regulation, to many other increases in their expenses besides the advances in wages resulting from arbitration. Among the different kinds of regulation which have caused increases in their expenses have been legislation relating to the hours of service of employees, to the number of men employed in train crews, to the kind of safety appliances to be used, to the kind of locomotive headlights to be used, to the periods at which employees should be paid their wages, and so on.

6. The railways have been subjected to an unique increase in their taxes. The taxes paid by them advanced from $57,849,000 in 1903 to $129,052,922 in 1913. No other class of property has had to bear such an enormous addition to its burden of taxes, an addition out of all proportion to the increase either in the value or in the earning capacity of the property.

7. Again, the railway situation is unique because of all the securities of American business concerns held abroad and directly affected by the present war, the securities of American railways constitute an overwhelming majority. In consequence, if, when the stock exchanges are opened, European investors begin to dump their American securities on our markets, the railways will be the first of our business enterprises to be subjected to the attack, and they will be subjected to the most severe attack of all. The effect produced upon general business in this country by this dumping process will be determined mainly by the way in which the railways stand up under it; and the way in which they will be able to stand up under it will depend largely on what action is taken by the government authorities to increase their earning capacity either by relieving them of some of the burdens now imposed upon them or by letting them increase their rates, or by both.

In view of the numerous and important conditions which make the position now occupied by the railways entirely unique, it is absurd to talk about them trying to shift their share of the burden of the war on the shoulders of other American industries. The railways were carrying such burdens as no other American industry was carrying before the European war began. That war has imposed heavier burdens in proportion on them than on perhaps any other industry in America, except the cotton-growing industry, because it has reduced their traffic without their being able to make any advances in their rates, and because a larger amount of their securities is held abroad than is true of any other class of American industries. It is because the situation of the railways is unique that they ask relief; and it is because the regulation to which they are subjected is unique that it is necessary for them to appeal to the Interstate Commerce Commission for that relief.

THE NEW ARGUMENT AGAINST THE RATE ADVANCE

THE commission refused the rate advance in 1910 because it was held that the railroads did not need increased revenues; in 1913, because although the roads did need additional revenue, there were other and better ways of obtaining it than a 5 per cent advance in rates; and now it is argued in opposition to the renewed demand that although circumstances have changed, the stockholders of the roads now paying dividends should forego a return on their investment to enable the roads to meet war conditions. The argument as it was developed in the cross-examination of Mr. Willard and Mr. Shriver on Monday has a superficial plausibleness about it that is apt to mislead. The argument appears to be this: The Baltimore & Ohio has been paying 6 per cent dividends on its stock since 1906. To enable the company to do this it has twice been necessary to pay a small part of the dividend from previously accumulated surplus. To enable the company to maintain the 6 per cent rate it was also necessary to cut down expenses to meet increased operating costs by various economies,

including the deferring of maintenance of equipment in the last year. Now there comes a time of emergency. All business men are feeling the effect of this emergency. It is being met on all sides by retrenchment and sacrifice. Why should not the railroad stockholder sacrifice his dividends as business men are sacrificing their profits? If the only change that has taken place since the 1913 rate case was decided is the change caused by the war, is it not fair for the owner of railroad stock, that is, the owner of the business, to take his loss just as other owners are doing in other lines of business?

The argument is fallacious. In the first place, not all of the 38 roads asking for relief are paying dividends; in the second place, no governmental agency is limiting the profits of business men either now or in good times; and there is the point. If the economic law of supply and demand—of charging for a commodity what some one is willing to pay for it—is to hold, there should be no limitation on the owner of a railroad property to make the profits which business conditions will permit of; but if the government is to limit these profits in this one business because the capital invested in it is engaged in public service, then by every law of equity capital invested in public service should be treated differently in a time such as this than capital invested in private business.

All this, however, is academic discussion. The railroads might have all the theoretical justice in the world on their side and still might fail to get their rate advance from the Interstate Commerce Commission, because the commission apparently feels that its duty under the law is to protect the public against the railroads. But this is really not the question that is involved in the present rate advance case. The question is so much larger, so much more momentous and so grimly practical that the one hope of a satisfactory outcome in the present case, probably, is that the commission will grasp, either through the railroads' presentation of the case or through their own study of general conditions, some comprehension of the responsibility which they are now arguing about in so theoretical a way.

Take the question of dividends alone. The savings bank laws of the various states generally contain a clause which forbids the investment of savings bank funds in mortgage bonds of railroad companies which are not paying a certain rate of dividend on their stock and which have for a series of years been paying this or a higher rate. In 1913 the savings banks of the United States held $794,000,000 railroad bonds and stocks. Imagine for a moment what would happen if dividends were to be suspended on roads like the Baltimore & Ohio, the New York Central and the Pennsylvania, necessitating not only a closing of the savings bank market for additional railroad securities, but the transfer of savings bank funds now invested in railroad bonds to other forms of investment, with the consequent dumping on the market of the great volume of securities now held at the time that Europe is demanding that this country buy back a considerable part of the enormous volume of railroad securities which have over a series of years been sold abroad by American railroads. To find a market for their holdings at a time like this the savings banks would have to accept a loss that cannot be viewed with anything but alarm.

This is one of the ways in which a blow to railroad credit would be a disaster, reacting on the community as a whole.

The commission cannot for a moment delude itself into the belief that after all the years in which it has reiterated time and again in its opinions the axiom that although it will not permit a state of affairs by which public service—a natural monopoly—will afford an opportunity for excessive profits to capital, neither will it do anything to make the investment of capital in public service securities less attractive than in other lines of business. What the commission has continually implied in its decisions is, that although the railroad stockholder cannot expect large profits which might be the reward of risk in an industrial enterprise, on the other hand investment in railroad stocks has an element of security which is lacking in the more speculative industrial business. To deny this now would be to deal an unbearable blow to railroad credit.

Letters to the Editor

ANOTHER EXAMPLE OF SAFETY LAST

Seattle, Wash., September 17, 1914.

To the Editor of the Railway Age Gazette:

In your issue of September 11 there is a short article entitled "Think of the Engineman." Cases such as that which was there described are frequent enough. Only last week our road (the Great Northern) came near having a dozen or more law suits on its hands, under the claim that "the engineman was to blame." I was pulling the "Flier" which runs from Seattle, Wash., to Vancouver, B. C. I rounded a curve at a speed of perhaps 50 miles an hour, over which was a crossing at grade—the "Pacific Highway." I always give this crossing a particularly long and loud crossing whistle for the reason that I can see the crossing but a short distance, and a driver on the highway also has a short view of a train approaching.

On the day to which I refer I whistled as usual. As I came in sight of the crossing I saw a cloud of dust rapidly approaching; I threw on the brakes and whistled again, long and loud. But an auto stage loaded with 20 or 25 people reached the crossing at the same time I did. The driver had approached the crossing at a terrific speed, either with the intention of "beating me to it" or else he did not hear my first whistle. He made an emergency stop, pulling up not more than one foot from the train, as I whisked by, my brakes not being able to bring my train to a stop under a half mile, owing to a slight down grade. The engine bell had been ringing from the time I first whistled till I had passed the crossing.

Had there been a smash up, the survivors undoubtedly would have sworn that neither did the bell ring nor the whistle sound.

F. H. George.

CRITICISM OF THE SIXTEEN HOUR LAW

Albany, N. Y., October 13, 1914.

To the Editor of the Railway Age Gazette:

The half dozen proposed new laws suggested by the locomotive firemen's union, as noticed in your issue of October 9 certainly cover a broad field. To the distant observer it looks as though the Illinois scheme must be simply a peg to be used as a convenient support for political wires. As we all know, wire pulling is the life of the politician who has no legitimate issues to promote, and as the firemen have no real need for further legislation at the present time their hired politicians naturally cook up every sort of scheme which promises to be useful in dickering with idle-minded legislators. What sense is there in the firemen's agents' proposal to stir up the legislators on the subjects of uniform signals, the proper number of cars in a train, and the other things mentioned? The legislatures will pass enough useless or harmful laws without the help of the firemen.

But what I want more particularly to call to your notice is the proposal to limit trainmen's work to ten hours a day. Is this a serious proposition, or merely a convenient postulate for use in bargaining for something else? Do they really want shorter hours, or only to get legal approval of a scheme to get more "overtime" pay? It is understood that there is always a considerable percentage of trainmen—firemen, engineers, conductors and brakemen—who are not only willing but anxious to stay on duty 12, 14, 16, or even 20 hours at a time, if only they can get good pay for it. Does this legislative committee propose to override the wishes of such an important element of its constituency? It is hard to believe that this proposal will be soberly pushed, when it comes to definite action.

But, with proper limitations and qualifications, *it ought to be pushed.* In other words, this committee, wisely or unwisely, with good intentions or otherwise, has touched a live issue. The 16-hour law is a great fraud. It has elements of good, for with-

out it men would work 18 hours, and occasionally 24 hours; but its main effect, combined with the provisions for eight hours' rest, is to foster the utterly irrational working-hour schemes which now prevail all over the United States. The arrangement of working hours of men on freight trains constitutes the most absurd, unreasonable, unhealthful scheme for the regulation of personal habits that anybody ever heard of. The plan is worse than the customs on shipboard, where men sleep only four hours at a time. To plan deliberately to make men's rest hours as irregular as it is possible to make them would be justifiable only (1) in case of dire necessity, or (2) regardless of necessity, where their work is so easy or so unimportant that it does not make any difference whether they do or do not come on duty fresh and rested. No such conditions exist on the railways of America.

The plea of the labor-union law-makers is that railroading is such a dangerous business that trainmen, with their delicate responsibilities, must take extra good care of their health. As a matter of fact the 16 hour rule, combined with the "chain gang" list—"first in first out"—is used to make the hours of freight trains as irregular as possible; to *impair* the men's health so far as rules for working hours can be made to impair it. The only reason that these very irregular hours do not do more harm than they do, is that the men can and do rest a good deal while they are on duty. For conductors and brakemen this is quite easy. For the fireman the situation generally is bearable if he is able to get the assistance of a friendly brakeman occasionally. Even the engineman can get a little relief now and then, especially when waiting on a side track, by entrusting the engine to the fireman.

The establishment of a ten-hour work day by law would be a good thing, if in connection with it, it were possible to establish a 14-hour rest day, and if proper provision were made for emergencies when longer hours were necessary, temporarily. Regulation of this matter by statute is difficult at best; but let us be rational in whatever legislation is enacted. The legitimate reason for reducing hours of labor is to increase the hours of rest. A law, however, cannot compel a man to rest when he prefers to go to the theater or to work to excess in his garden. The most useful thing that any legislature could do for the trainmen would be to enact that ordinary common sense should apply in the arrangement of their hours—as it does in the preparation of work-hour schedules in most other employments. It is reasonable for a man to work ten hours a day, six days in the week. This implies that he should rest six nights in the week. The man who works six nights should rest six days. This principle is so axiomatic that I would not use the ink and paper to state it, but for the idiotic violation of it which so widely prevails. To work 16 hours, rest 8 hours, work 10, rest 28, work 16, rest 12, and so on, never recognizing either night or day, is so absurd that we should ourselves laugh at the scheme if once we examined it soberly. Why does the government tolerate it?

The ten-hour day would be a very attractive idea if its administration were put into the hands of the right kind of men. The railroad superintendent (making proper reports to the government) should have extensive leeway to provide for unforeseen difficulties. Twelve hours a day does no harm for a week at a time, if circumstances are favorable. Sixteen hours is unobjectionable, on occasion, with proper safeguards. The main thing to keep in view is to have the matter controlled by a man—the superintendent or trainmaster—who *desires* and aims to have the men work normal, healthful hours.

A rational plan would be opposed. Some men would make less money. But regularity frequently costs money. Some would have to sleep away from home an ordinary night's rest instead of sleeping five hours (calling it eight) and rushing back home regardless of health. This would require the substitution of good sleeping rooms for many which now are so poor that a trainman is actuated by an abnormal desire to get home. But that substitution is called for, anyway.

Our present law merely sets a maximum—16 hours. In any rational rule the first element is not the maximum day but the normal day—say 10 hours. This being settled, the desideratum is to provide regulations for keeping always as close as possible to the normal. H. R.

A SIGNIFICANT PROTEST

St. Louis, Mo., October 5, 1914.

To the Editor of the Railway Age Gazette:

I have before me the October 2 issue of the *Railway Age Gazette,* and note with particular interest the editorial on page 590 protesting against the action taken by the secretary of the Illinois Commercial Men's Association.

As one member of this organization, I made an immediate protest to Mr. Cavenaugh, the secretary, and in addition to this have addressed a letter to the Interstate Commerce Commission calling their attention to the agitation that is being raised by Mr. Cavenaugh, and mentioning that this does not represent the attitude of all and probably not the majority of the members of this organization. To the writer's personal knowledge, there have been a great many protests made by members of the Illinois Commercial Men's Association to Mr. Cavenaugh, the secretary, regarding his action, and I am very glad to know that you found the subject of sufficient importance to mention it in the terms which you have on a prominent page of the *Gazette.* F. V. Roy.

THE FOLK-LORE OF ROCK ISLAND

New York, October 19, 1914.

To the Editor of the Railway Age Gazette:

"'What is truth?' said jesting Pilate, nor stayed for an answer." Such is the volatile vague vanishing volplaning conduct by Joseph W. Folk of the Interstate Commerce Commission's inquiry into Rock Island. He starts 20 trains of thought per minute, but nary a one does he despatch to destination.

James Bryce has never said, thus enabling us to beat him to it, that the trouble with democracy is that too many second-string men get into first-string places. The position of chief counsel to the commission is of the first magnitude. Of its occupant's rating, may this narrative eloquently tell!

Let us first nail the lie, repeatedly told from Washington, that this investigation was instituted by a resolution of Congress. It was not. Neither Congress nor the Senate, nor the House ever adopted the resolution proposed by Green of Audubon, Iowa—a name and habitat suggestive of the open air, not of hot air—nor did the House Committee on Interstate Commerce ever report it favorably. Instead, the committee dodged the issue by passing a "resolution" of its own, an action utterly devoid of legal status or dignity. This "resolution" its chairman mailed to the commission. The commission entered an order which mentioned the above "resolution" in its preamble. But the order rests solely upon the commission's authority to investigate "carriers," and the responsibility for making the order is squarely upon the commission. So it alone must be held blameworthy for the investigation itself and, as well, for dragging it out on the Friday and Saturday just preceding Monday's rehearing of the eastern rate case.

Here is specimen No. 1 of Folk's arithmetic and love of truth. He could hardly contain himself until witness Sharood, a fair and capable examiner, had stated that the aggregate capitalization of the two holding companies was $350,000,000, thus enabling Folk to mouth the phrase, "swimming in water five times its volume." Now, bad as is the Rock Island's corporate overhang, it is not so bad as that. Folk computes:

New Jersey Company preferred	$49,000,000
New Jersey Company common	90,000,000
Iowa Company stock	145,000,000
Iowa Company bonds	71,000,000
	$355,000,000

But he declines to admit that *all* the Iowa company stock is held by the New Jersey company, unsold and unsalable, thus reducing his total by $145,000,000, or to $210,000,000. This

method of treating stocks of subsidiaries is not only sanctioned but required by the commission's own rules of accounting. It would be fair also, we venture, to deduct some $20,000,000 of New Jersey company stock issued solely upon the acquisition of the *Frisco,* thus leaving a total of $190,000,000. There was $71,000,000 of old Railway stock exchanged, so instead of five times its volume, the "water" is less than 2¾ times its volume, or about half what Folk's question asserted.

At this point we might inquire, What is water? In the curious Rock Island structure, no one paid any money; and the very thing he surrendered was held intact to support what he took in exchange. Call it inflation of par values, if you like, but not "water." Watering, ever since Daniel Drew drove his intentionally thirsty kine to the trough, has meant that the investor paid for something that was not there, for aqueous sirloins. But the Rock Island stockholders neither paid a cent nor lost any values they possessed. If they held till today what they got in 1902, they are entitled to receive their old *railway* stock back. Indeed—and here is a really reprehensible feature, often sharply criticized—they could have sold their New Jersey company stock and still retained, through the Iowa company bonds, their rights in the old *railway* stock up to $100 per share. As events have turned out, it is worth less than par, a result presumably never dreamed of in 1902, and the Iowa company bondholders will get *all* the old *railway* stock, the New Jersey stock thus becoming valueless. It is idle to say that this result was inherent in the situation, or that bankers, brokers and financial writers invariably pointed out this possibility. The fact that the stock was created and made purchasable, so that unthinking investors could pay money for it in the belief that it controlled (as it did while the sun shone) the earning power of the old *railway,* is much to be deplored. Still more deplorable were certain restrictions in the fundamental documents of the two holding companies, notably the right of the New Jersey preferred stock to elect a majority of the New Jersey board, and the covenant in the Iowa bonds never to increase the old railway stock. This latter feature was financial hari-kari. A corporation which as late as 1912 could sell mere debentures on a 5.3 basis, could certainly have sold preferred stock in the years preceding and thus have obviated the stringency resulting from its unwisely limited annual bond issue for improvements and new property. This stock financing should have been easy for the Rock Island, as it has less than one-third as much stock outstanding as the Burlington has, or the Milwaukee or the Santa Fe, or the North Western.

Far—but not too darned far—be it from me to suggest that critic Amster and critic Folk ever confer. Indeed, there were a few minutes when patriot Folk urged that the Iowa bondholders refrain from enforcing their collateral for a few years, so that something might be left for the New Jersey stockholders, this being a paramount issue which patriot Amster has thus far overlooked. But let a plain chronicle suffice. Late Saturday afternoon, James N. Wallace was put on the stand, and quizzed about the plans of the Iowa bond committee. Folk actually read from Samuel Untermyer's brief on behalf of Amster, and used the arguments of Amster's counsel to support Folk's claim that the old railway stock ought not to be sold at the present time, despite the fact that a federal court—not Mr. Wallace's committee—has already ordered it sold. And now observe a further curious coincidence. Counsel for the Rock Island read a passage from Amster's own petition, which he swore to and from which brief-writer Untermyer deviated for devious reasons, to the effect that the *immediate* sale of the old railway stock is *imperatively necessary.* Late Saturday afternoon there was served in New York a further Amster petition amended, *inter alia,* to conform to brief-writer Untermyer's belated convictions, and on Monday morning Amster's advertisements flared forth the iniquity of early sale of the stock! I do not say that this is other than a coincidence; but do say that, if it were other, then the commission would be in pretty poor business.

The *Railway Age Gazette* said last week that Mr. Folk would not disclose a single new important fact. Nor did he. The companies themselves reported the 1909 Frisco transaction in their next ensuing annual reports in the fall of 1910, and were then and thereafter soundly castigated in the public prints. The loss, it is true, was only some $7,300,000, though Folk unblushingly endeavored to create the impression that it was $35,000,000. To do this, he used the book entry in the property account of the Iowa company, which was made up by adding together its $17,000,000 or so of "Frisco 5s," and the $18,000,000 of New Jersey common stock delivered to former Frisco stockholders. But these are obviously par values only, mere counters. The New Jersey stock cost nothing in cash, and against the $17,000,000 of Frisco 5s the Iowa company received from Yoakum and associates $10,850,000 cash, which (adding to the bonds their premium and interest paid on redemption) left the Iowa company $7,300,000 to pay to redeem its bonds, which is the sum total of the loss on Frisco. Yet Governor Folk would stamelessly foist upon the public a mere book entry, made up, as the commission requires, on the basis of par values, to lead us to believe that the Frisco loss, bad as it was, was 400 per cent bigger.

The loss on the Alton transaction has long been generally known and denounced. But it also was made to appear greater than the facts warrant. It will be recalled that the Rock Island sold most of its Alton stock to the Clover Leaf, receiving the latter's bonds. The stock cost some $9,000,000, against which Counsel Folk allows the proceeds of Clover Leaf bonds sold, but does not allow any value whatever for the unsold $5,447,000 of these bonds, beyond the value of the pledged Alton stock. Despite the fact that the Clover Leaf stock has a market quotation, the commission's witness declined to concede that its promise to pay, though senior to the stock, has any value whatsoever! He excused this by claiming that the trust agreement gives no recourse beyond the pledged stock, which is his opinion and unfortunately is mistaken.

This witness acknowledged that books had been thrown open to him and every facility afforded, and his testimony showed that he had dusted every cranny, and yet under Brother Folk's guidance we find him taking these strenuous measures to make a loss greater than it can conceivably be. What can it profit a corporation to acknowledge its fault and own that its sins are ever before it, if its penitent candor is to be abused by stretching plain figures beyond recognition?

Throughout the hearings ran the claptrap that the public is "taxed" to pay interest and dividends on the mass of watered Rock Island securities. If so, the rate of taxation has been very light. The New Jersey common has never paid a dividend, the preferred has paid none since 1905; and the Iowa bonds, par for par of the old railway stock, paid 4 per cent to and including November 1, 1913. Not heavy taxation for some 8,000 miles of railroad. In fact, the Rock Island is an excellent illustration of the circumstance that no railroad whose securities have ever been called "watered" is paying any returns whatever on the water. The Rock Island never has claimed and never could have claimed that rates should be fixed so as to allow dividends on the stock of its overlord, the New Jersey company. Yet these sessions were replete with suggestions that this capitalization is the basis for a plea for higher rates. If the commission had ever for a moment considered fixed charges in determining rates, or if the commission were not now engaged in physical valuation in order to escape from security standards and stock market values, there would be a shred of merit in these suggestions. As the facts stand today, however, they are the silliest buncombe. Railway Bondholder.

Notes from Chili.—The Howard Syndicate notified the Chilian government that it would make delivery of the Southern Longitudinal Railway on August 1. It is stated that there was danger of a general railway strike in Chili owing to the dismissal of a number of employees on the state railways.

The Rehearing on the Rate Advance Case

Daniel Willard's Opening Statement is Given in Full and a Summary of the Cross-Examination is Also Given

At the hearings in the reopened rate advance case at Washington on Monday, Mr. Willard, president of the Baltimore & Ohio, presented the following statement on behalf of the railroads:

MR. WILLARD'S STATEMENT

The railroads operating in Official Classification Territory, and parties to the so-called "Five Per Cent Case," now appear before this commission as petitioners and respectfully require that such modification be made of the report and order of July 29, 1914, as will enable the carriers to put into effect the rates which were therein directed to be canceled.

Subsequent to the filing of the report and entry of the order of the commission in the cases known as Docket No. 5860 and I. & S. Docket No. 333, facts and circumstances have arisen which could not possibly have been foreseen upon the date when the order was entered. A war of unprecedented proportions has broken out, and this, taken in connection with the facts already in the record, with such additional information as the carriers are now able to furnish, clearly indicates such a situation as your petitioners believe fully justifies the relief now prayed for.

The tariffs above referred to were originally filed by the railroads in October, 1913, and are intended to provide for a general advance, with some exceptions, of approximately 5 per cent. of all freight rates in Official Classification Territory. In support of the advanced tariffs the carriers pleaded, among other things, inadequacy of revenues and the commission in its report on July 29 used these words:

"In view of a tendency towards a diminishing net operating income as shown by the facts described, we are of opinion that the net operating income of the railroads in official classification territory, taken as a whole, is smaller than is demanded in the interest of both the general public and the railroads, and it is our duty and our purpose to aid, so far as we legally may, in the solution of the problem as to the course that the carriers may pursue to meet the situation."

It should be kept in mind that the words just quoted were written previous to the 29th of July, 1914, and before it was possible to foresee or weigh the great events which have transpired since that date. However, with such facts before it as were developed in the original record, and in furtherance of its announced purpose to aid so far as it legally might in the solution of the problem then confronting the railroads, the commission approved of certain rate advances in Central Freight Association Territory, and suggested the propriety of other advances and changes of practices which, if found practicable, would inure in varying degree to the advantage of all of the roads involved in this proceeding.

The carriers are not unmindful of the great significance of the words just quoted from the commission's report in this case, and they do not doubt that, with the assistance of the commission, additional net revenue may eventually be obtained along the lines suggested, and definite action has already been taken concerning many of the subjects referred to, and all are receiving earnest consideration, but the needs of the carriers are pressing and immediate, and the measures of relief proposed by the commission will not in our opinion adequately meet the existing situation.

In order that the commission may intelligently consider the whole subject as affected by present conditions, it would seem necessary to supplement the original record with such additional facts and figures as are now available, showing operating results of these carriers since the case was submitted on May 29. The railroads, in support of their claim of inadequate revenue, filed statements showing the result of their operations for a term of years to June 30, 1913, and in its report the commission considered also the monthly statements of the railroads up to and including the first eleven months of the year ended June 30, 1914. The carriers are now able to furnish complete reports for the entire fiscal year of 1914, and we desire to offer this additional and supplementary evidence, believing it to be essential to a proper determination of the case.

The combined statements of all the railroads involved in this proceeding for the fiscal year ended June 30, 1914, show roundly that the total operating revenues during that year were approximately $48,000,000 less than during the previous year, while the operating expenses during the same period were approximately $22,000,000 greater. The net operating income of these companies for the same period amounted to $260,000,000, or approximately $76,000,000 less than was earned during the previous year, and equal to but 3.98 per cent upon the property investment, a lower return than was shown at any time in the preceding fifteen years. The income, applicable to interest, dividends and surplus during the fiscal year just closed, was $265,700,000, or 4.06 per cent upon the total capital obligations, this return also being lower than any in fifteen years. The operating figures for July and August have been tabulated and will be presented to the commission, and they also serve to emphasize the tendency towards diminishing net income, which the commission found in the facts in the record as originally submitted.

The carriers by documentary evidence and witnesses, if desired, are prepared to support the general statements just made.

While the additional figures now submitted clearly establish a continuation of the recognized tendencies toward a diminishing net income, the actual situation which confronts the railroads today, as revealed by the information now available, and because of the unforeseen and unprecedented events which have taken place since July 29, has become extremely critical. The problem is no longer one of tendencies, but has become instead one of actual reality.

A war such as that now raging causes great and immediate disturbance to industry, commerce and finance. It causes contraction of credit and great restriction, if not the actual stoppage of international trade as well as serious disturbance to domestic commerce, and as we have seen, it has thrown the security markets of the world, first into panic and then into suspension of operations. These have in fact been the immediate, direct and clearly apparent consequences of the war which began less than three months ago; but the ultimate and more lasting consequences are almost as plainly to be seen and will certainly follow, if they do not accompany, the conditions mentioned. These are: enormous destruction of wealth, with great diversion of labor and capital to unproductive employment, thus causing a check to the world's accumulation of new capital, and a serious and prolonged rise in the rate of interest, and the effect of such higher interest rates will continue long after the present emergency has passed, because they will be reflected in the basis upon which the new securities will be issued from time to time as required for refunding and other purposes; and in so far as the war and its consequences tend, as I have just shown, to change the conditions surrounding the enlistment of new capital, they tend to change the fundamental relation between railroad and shipper.

The cost of capital is one of the important elements of the cost of transportation.

It is known that the railroads of the United States have over $520,000,000 of outstanding obligations which will mature and must be met within the next twelve months alone, and it was shown in the original record in this case that the railroads in Official Classification Territory only, had spent approximately $200,000,000 per annum upon their properties for improvements and extensions during the last ten-year period, and it will be necessary to continue such expenditures if the roads are to

maintain their standard of service and provide for the growing needs of the future. Further, as nearly as can be ascertained, there are more than $3,000,000,000 par value of American railroad securities held abroad as investments. The demands for cash in Europe, growing out of the present situation, will doubtless result in large selling of such securities when the markets or exchanges are again opened, and the possible effect of such selling upon railroad credit and related subjects is causing much concern.

With all of this in mind it will readily be seen that the available supply of and probable demand for new capital, as well as the interest rates thereon, are matters of great importance, not only to the railroads, but also to those who depend upon them for transportation, and in our opinion a proper determination of this case cannot be made unless these matters as affected by existing conditions be given full consideration. I shall not dwell further upon this important phase of the question, however, because others who are deeply interested in the subject have asked to be heard in that connection.

The case of the railroads, as so frequently pointed out, is quite unlike that of a private undertaking. The railroad, because of its public character and the terms of the charter under which it is permitted to operate at all, is subject to governmental regulation, not only as to the charges which it shall impose, but also as regards many of the details of operation, and on that account is unable, like the private enterprise, to readjust its rates and practices to meet such a situation as now exists unless and until the necessary approval is obtained.

Finally, it is respectfully submitted that whatever the outcome as concerns these railroads might have been, had there been no war, as a matter of fact there is a war and a grave emergency now exists. It is hardly necessary to suggest that if the commission in view of the present situation, should now conclude, after consideration of all the facts, to approve the tariffs as requested, and should it at any time later on appear that the situation had changed and the emergency had passed, and should it further appear that the carriers involved in this proceeding were then, taken as a whole, in such condition as to earnings, maintenance charges and return on capital obligations as to justify a reconsideration of the action now prayed for, this commission would have ample power to order at any time such reductions as might be fair and reasonable, and I am of opinion that the carriers would not oppose such action by the commission when conditions such as I have enumerated shall have been established.

Following the presentation of the above statement, Mr. Shriver, vice-president of the Baltimore & Ohio, offered a number of statistical exhibits, after which Mr. Willard returned to the stand for cross-examination.

Commissioner Clark began the cross-examination of Mr. Willard by asking him if all the roads in the case showed up like the Delaware, Lackawanna & Western; whether there would be any justification for the advance in rates.

"I would not think so," replied Mr. Willard.

Mr. Willard said that on the Baltimore & Ohio there had been a large retrenchment in expenses and he believed that a similar step had been taken on other roads both before the war and since.

Louis D. Brandeis then questioned Mr. Willard as to the necessity for additional revenue for the Baltimore & Ohio. Mr. Willard said among other things that the railroad needed additional money to meet $35,000,000 of notes which are to mature in June next. These notes bear 4½ per cent interest. He said the road had 30,000 stockholders and the last dividend was partly out of surplus, $2,000,000 being taken, which left about $32,000,000 surplus still. He added that he still adhered to the contentions made by him at the hearing of the case last spring.

"The effect of the war," said he, "has been that it has accentuated the falling off in business."

He said the Baltimore & Ohio was able to get money at 4½ per cent in June last, but that this was now changed, and he pointed to the fact that the city of New York recently paid what amounted to 7 per cent for money.

"Is not this situation an argument for a reduction of your dividend?" asked Mr. Brandeis.

Mr. Willard replied that in July last when he recommended the continuance of the 6 per cent dividend, he felt justified in the hope that conditions might get better and he intimated that the subject would receive consideration.

Mr. Brandeis then said that the figures showed that the Baltimore & Ohio and other carriers had reduced maintenance charges, equipment charges, discharged employees, but had not reduced dividends. He criticized the former connection of the Baltimore & Ohio with the Cincinnati, Hamilton & Dayton, and asked Mr. Willard if this connection had not cost the Baltimore & Ohio $22,000,000 in actual money and possibly obligations amounting to more than $20,000,000.

Mr. Willard said that the Baltimore & Ohio had a tangible surplus of more than $32,000,000 today, and he declared that on the last quotation the Baltimore & Ohio holdings of Reading showed a profit of $13,000,000 which had not been included in this surplus. He insisted there was nothing in the record to prove that the Cincinnati, Hamilton & Dayton obligations would have to be taken up.

"Is it not a fact that you are asking this commission to levy a war tax in favor of the railroads?" asked Mr. Brandeis.

"No, sir, I do not think so," replied Mr. Willard.

Mr. Willard was asked by Commissioner Clements as to the significance of his statement that $3,000,000,000 of American road securities were held abroad. He replied that it was believed that when the stock exchanges here are opened the demands for cash in Europe will result in a very large selling of these securities and make the condition of the railroads worse. Mr. Willard said that if the railroads were permitted to increase rates it would serve to reassure the holders of these securities and stabilize matters.

"If this commission will allow an increase the foreigners will get a bigger price than now," suggested Mr. Brandeis.

Mr. Willard contended that when the stock exchanges were opened if this country were obliged to take back a flood of American securities held in Europe it would be impossible for the railroads to raise money for needed improvements.

Commissioner Hall suggested that perhaps favorable action by the commission along Mr. Willard's line of thought might result in still larger dumping of securities on the market by foreigners.

"Now, I want to ask you," said Commissioner Clements, "is this application for the purpose of getting more out of the proposed rates for net revenue or for the purpose of establishing credit?"

"Replying to that question," said Mr. Willard, "I reply simply as chief executive of the Baltimore & Ohio. In my opinion the Baltimore & Ohio is a going property, is fairly capitalized, well worth its outstanding obligations and much more. If we are to judge the future by the past it will be necessary for us to spend about $15,000,000 a year for some years to come. I would like to be in a position to recommend to people who write me the purchase of securities, but I cannot conscientiously at the present time recommend to any one to purchase under present circumstances and I therefore think that we ought to have the rates advanced. I think the rates ought to be increased so we can make the necessary improvements to meet the conditions presented."

Then Commissioner Clements, addressing Mr. Willard, said:

"Many industries, large industries, well managed, are now standing still to see what is going to happen; that however bad we think our situation is, it is better than any one else's in the world. Export commodities are being stored and the cotton people are in distress. This condition applies to many lines of business and affects many industries. Is that a situation which should be left out of view when you come to consider an in-

crease of railroad rates, particularly to keep up long standing dividends?"

"The railroad is a semi-public institution," said President Willard. "It cannot close its shop; for instance, 30 per cent. of our passenger mileage does not pay for the running."

Commissioner Meyer then asked: "Do you mean that conditions since July 29, when the commission handed down its decision, have changed, or is it that you want to shift the burden from the shareholders to those who pay the freight?"

"I do not think it will have that effect," said Mr. Willard.

"You propose an increase of 5 per cent," said Commissioner McChord, "which is, roundly speaking, $50,000,000 additional revenue. Will that not be enough?"

"I do not think so," replied Mr. Willard.

"Now," continued Mr. McChord, "the idea then is that this $50,000,000 will put the railroads on their feet and improve business in the country."

"I have not spoken of the country," President Willard replied.

"The country seems arguing for this," said Mr. McChord. "I see it in petitions and in the press and from reports from different portions of the country."

President Willard quoted the commissioner's words in its recent decision: "The public interest demands not only the adequate maintenance of existing railroads but a constant increase of our transportation facilities to keep pace with the growth and requirements of our commerce."

"I simply wish to be recorded as having stated under oath," added Mr. Willard, "that in my opinion with the understanding which I have of the railroads involved in this proceeding they are not as a whole today being adequately maintained; they are not conforming to that condition which the commission set up as a desirable standard, nor are they making proper provisions for the constant growth which they may expect.

"I wish also to state that in my opinion, based upon such knowledge as I have of the business and of the conditions of these carriers, when we shall again be confronted with a condition of business activity, as we may reasonably expect in the not distant future, the railroads in this territory, unless they are in some way put in such position as to justify them to begin immediately to provide facilities, will fall short of being able to take care of the business to a much greater extent than occurred in 1907.

"It should be kept in mind all the time that if the railroads are not adding to their facilities they are going backward. It is a matter of common knowledge today that the railroads are not buying freight cars, they are not buying locomotives, they are not providing additional facilities, and that constantly locomotives and freight cars are wearing out."

Charles A. Conant was then called to the stand. He said in part:

"The cost of the war, if it lasts approximately a year, will not be materially less than $15,000,000,000. The demand for capital for purely war purposes and for the settlements which succeed the war will be so great as to absorb an amount equal to the entire savings for investment made in all civilized countries for a period of several years. The effect of this abnormal demand for capital, which is being consumed without economic profit, will be to raise the rate of interest on investment securities higher than it has been for many years.

"The fact that such enormous sums to pay the costs of the war are sought almost exclusively by means of Government loans will make it impossible to obtain capital for other purposes, except at a rate of interest considerably higher than that paid by Governments. The financial disturbances which will occur during the process of distribution of these Government loans to investors, extending over several years, will involve the sale on the American market of railway and industrial securities now outstanding to an amount which will in itself absorb so much of the new capital available in the United States that it will be extremely difficult to obtain any for new enterprises.

"If, therefore, American railways and industrial enterprises are to obtain any new capital whatever during the next few years, it will be necessary to make issues of securities very attractive, not only in respect to the rate of interest but in respect to the evidence that the interest and dividend payments are absolutely secured by adequate earnings."

Mr. Conant quoted authorities indicating that the world's new capital normally available for investment amounts to about $4,000,000,000 per year. He then concludes:

"If the cost of the war for one year has to be paid out of the amount of annual savings indicated by these figures, then every dollar of new capital for approximately four years will be absorbed in government loans, and there will not be a penny available in any financial market for building a railway spur, putting up a new station or terminal out of capital account, adding a bobbin to the equipment of woolen and cotton mills, or making a single public improvement in the city of New York or any other municipality, except out of current revenue.

"What part the railways will be able to play in wresting a portion of the world's savings from the outstretched hands of the powers which have been blowing away thousands of millions in powder and ball becomes an interesting consideration. They must come into the open market and bid against the greatest states in the world for some scanty portion of the supply of investment capital.

"Leaving aside the question of averting panic, the most important question involved in the return of American securities held abroad is the manner in which it will diminish the fund of capital which is normally available for new investments. In this direction the effect of the European war loans will be acutely felt in this country, even if not a dollar of American money appears as a bidder for the new loans.

"The newer states of the West could never have been equipped with railways, banks, grain elevators, barns and homes, if foreign capital had not been poured into them in hundreds of millions after our Civil War. What will be involved, in effect, if European investors undertake to market a large part of their holdings of American securities in New York, will be the conversion of this gigantic time loan, payable only over long terms of years, into a call loan, payable as rapidly as the securities can be sold on the New York Stock Exchange. It would hardly be within the range of the capacity of the banking system of the country to absorb the entire amount of $6,000,000,000, estimated by Sir George Paish to represent foreign investments in the United States.

"The amount in such securities which is returned to the American market will influence directly the amount of investment capital remaining in the United States available for other purposes. It is at this point that the problem comes directly home to American railway managers and their bankers.

"If the country is subjected to a severe strain, in order to take back from European holders an amount of securities representing the fund usually available for investment for one year or for several years, there will be practically no surplus left for investment in new railway issues."

Moritz Rosenthal, representing the Investment Bankers' Association of America, submitted the proposition that in fixing rates the commission take into consideration factors other than the railroads and the shipper and receivers of freight.

Mr. Rosenthal said he did not assert or propose to discuss the question as to whether the government, either Federal or state, was actually antagonistic to the railway systems. The question is, said he: Does the investor believe that the government is antagonistic to the railroads? To the extent and during the time it exists, railroad credit must pay the penalty. The argument concluded by quoting the words of President Wilson:

"We must all stand as one to see justice done and all fair assistance rendered and rendered ungrudgingly."

Frederick Strauss, of J. & W. Seligman, representing the investment bankers, was the next witness.

Questioned by Mr. Brandeis as to his apprehension over the

probable outflow of gold, Mr. Strauss pointed out that exports showed a much larger falling off than imports. In order to extend to any extent trade in Japan, China and South America, it would be necessary to advance long time credits, and, in his opinion, this country is not now ready to do that. Those who look for large increases in export trade, other than in staples and munitions of war, he thought would be disappointed. Exports of manufactured articles to belligerents are bound to decrease, because they will all try to supply their needs at home. Germany, for instance, will do everything possible to keep her own manufacturers going.

Commissioner Meyer said he had heard of no proposal to start a "buy a share of railway stock" movement. He asked Mr. Strauss if the statement of witnesses for the railway as to the prospects for railway securities were in his opinion calculated to make such a movement popular.

"Have you been accustomed," asked Commissioner Meyer, "to have the head of a great concern come to your office and offer you $20,000,000 of an issue of securities, at the same time stating he would not invest in them himself? In your opinion, how would that affect the credit of his company?"

"Undoubtedly it would tend to shake confidence," the witness replied.

Reverting to the question of dividends, Mr. Meyer asked if the witness did not believe a clientage of stockholders could be built up who would look upon property improvements as a part of their legitimate dividends. Mr. Strauss thought not.

"Then the average stockholder, in your opinion," said the commissioner, "buys income, not property?"

"He has little personal pride in the property," was the reply. "It is too remote from him. He is interested in what he gets out of his investment."

A GERMAN VIEW OF THE RATE DECISION

The Bureau of Railway News and Statistics has issued the following extract from a commentary published in Zeitung des Vereins Deutscher Eisenbahnverwaltungen, the official journal of the German Railway Association, on the recent decision of the Interstate Commerce Commission in the rate advance case:

"Thorough treatment of the results of actual inquiries is conspicuous for its absence. For months, witness after witness and expert after expert were examined. From them a mass of facts for and against the case of the railways must have been brought out. In the decision there is as good as nothing covering all this. The new statistics on capital, traffic, receipts and expenses could have been secured easily from figures already on file with the commission or from reports which could have been made in the shortest time. There was no necessity of spending many months.

"Since there is a lack of concrete foundation the arguments of the commission make no lasting, convincing impression. One would think he was reading a not too weighty scientific treatise, instead of the decision of so high and, because of its power, so very respected a body.

"The occasion surely was important enough for exceptional handling. . . . Yet there is lacking adequate grounds . . . for the sepaartion of the territory into one part where the increase was granted and another where it was refused. The few figures on average rates charged on individual roads in the affected areas are insufficient as a basis for a discrimination so seriously disturbing and cutting so deeply into the industrial structure.

"The impression is given, involuntarily, that the commission had been driven most unwillingly to a decision favoring the increase; and, to please both sides, railroads and shippers, had found no other way out than this, so to speak, local division of spoils.

"Concerning the gratuitous advice given as to how the railways may find relief, there is not much to be said beyond what railroad men have said already. But through the thoroughly impracticable proposal for an increase in passenger rates the commission has opened itself very seriously to attack. . . . The objection can be made with justice that great difficulties stand in the way of raising passenger tariffs, wholly aside from the fact that in a large number of states passenger rates for intrastate traffic are fixed by law, and that from a technical as well as an economic standpoint it is inadvisable to raise interstate fares higher than state fares.

"Throughout there is a certain irritable tone which in a more or less judicial decision is not in place. Repeated introduction of the misdeeds of individual enterprises and the vehement rejection of suggestions made to it (from outsiders) were better left out."

The review closes by contrasting the experience of German roads in a similar petition 40 years ago, when they were granted an increase of 20 per cent to offset higher costs and wages.

EDUCATING THE PUBLIC IN "SAFETY FIRST"

The Southern Pacific, during the past ten months, has given instruction in "safety first" to many thousands of people, not employees—citizens in the larger towns on its lines; and at the same time has advertised its own efforts in the same line by exhibiting models of semaphore signals, hiring rooms for the purpose and employing a regular lecturer. The visual instruction in cautiousness is conveyed by means of large photographs, about a hundred of them displayed in a booth; and whatever urging may be necessary to induce people to walk in and examine the pictures is accomplished by means of the semaphores which are so manipulated as to be an attraction even to the careless.

The pictures illustrate those accidents commonly involving the public, such as trespassing on tracks, automobile drivers approaching crossings not under control, and passengers unnecessarily assuming dangerous positions on trains in motion. In addition to these the results accomplished by the company's "safety-first" organization are illustrated by views of machinery before and after safeguarding and other well known precautions.

All of the pictures, together with statistical accident charts, are displayed in a portable booth 24 ft. long, 15 ft. wide and 14 ft. high. The booth is a counterpart of the one used for the Southern Pacific display at the International Exposition of Safety and Sanitation, held in New York last year. The exhibit travels on an itinerary similar to those of theatrical companies. Advance press notices are published, giving the date and purpose of the exhibition. After the installation of the exhibit, accounts showing accident statistics and other interesting narratives are published in the newspapers. It requires but a day to install and a half a day to dismantle the booth. Where available a vacant store in the business district of each town is selected for displaying the exhibit.

The display of the miniature model of the automatic block and interlocking signals is popular. The public generally is interested in learning the manner in which signals operate and the demonstrations attract many. At the conclusion of each signal demonstration attention is directed to the accident pictures and a brief statement of the purpose of the exhibit is made by the demonstrator in charge. Few people leave the booth without studying the pictures and descriptive data.

A chart setting forth statistics relevant to the carelessness of the great majority of people when crossing tracks at grade is also displayed. These figures, compiled from tests made last year by the Southern Pacific, show, as has been shown elsewhere, that exceedingly few persons stop and look in both directions before crossing tracks, 69 per cent of automobile drivers observed took no precautions whatever, neither stopping nor looking in either direction. Emphasis is given to the fact that the greater proportion of trespassers killed are wage earners and not hoboes, as is commonly supposed.

The exhibit has been en tour since January of this year and with the fulfilment of the itinerary it will have been displayed in all the larger towns on the Southern Pacific system, and will have been attended by 100,000 people; and approximately $5,000 will have been expended in its management.

The Design of Injector Steam Pipe Connections

Recommendations Covering the Design and Material for Brazing Rings, Beaded Rings, Coupling Nuts and Flanges

By Strickland L. Kneass

The report of the chief inspector of locomotive boilers of the Interstate Commerce Commission covering the period from August, 1911, to April, 1913, includes references to certain failures of the copper pipe connection between the turret steam valve and the injector. In the opinion of the inspectors some of these failures might have been prevented if proper care had been used in brazing, or if a better quality of material or an

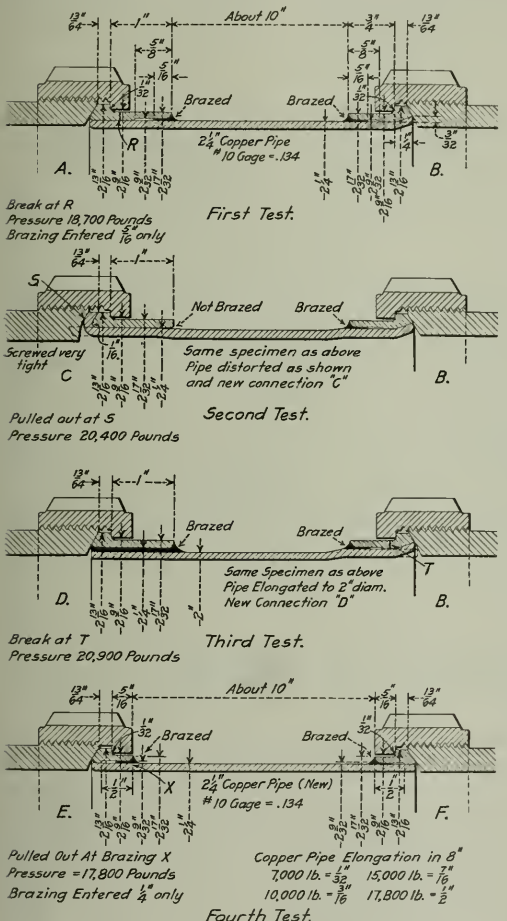


Fig. 1—Tests Made on Brazed Connections by Wm. Sellers & Company, Inc.

improved design of connection had been supplied. These questions were brought to the attention of the locomotive builders, and manufacturers of locomotive injectors were invited by Wm. Dalton, chief engineer, American Locomotive Company, to meet at Schenectady, N. Y. After an informal discussion, a subsequent meeting was called, and held at Atlantic City during the 1913 convention of the American Railway Master Mechanics' Association. A committee was there appointed, consisting of S. L. Kneass, chairman, F. L. Edwards, L. Kassander and B. T. Williston, to report on the subject. The following is taken from a report on the subject by the chairman:

The usual method of supplying steam to the injectors of locomotives is by a copper pipe brazed at each end to ball joint rings and held to the turret steam valve and to the injector branch by threaded coupling nuts. This method has been in use since the injector was introduced in this country in 1860 by Wm. Sellers & Company, and follows the general practice of the railroads and injector manufacturers of the continent; on certain foreign railroads brazed flanges are substituted for the threaded nuts. The questions to be discussed cover methods of brazing, its use, the design of coupling nuts and the advantages of other means of holding the pipe connection to terminal branches.

An investigation was made of the strength of brazed connections without change of existing design of the brazing rings. The strain to which the steam connection is subjected in service depends upon the steam pressure carried, the relative change of position of the injector and the steam valve, expansion and contraction of the copper pipe and the vibration of the locomotive when running rapidly. Tensile tests were preferred to hydrostatic pressure as approaching more closely to service strains. The actual strain due to the pressure of the steam is easily calculated, but the other elements are variable and indeterminable, depending upon the bending and fitting of the pipe and the rigidity of the attachment of the injector to the boiler bracket. The strain, due to the steam pressure on a 2¼ in. copper pipe carrying 200 lb. steam is about 600 lb., while the tensile strength of a well brazed joint is 18,000 to 20,000 lb. A brazed joint, supported by the collar of a screw coupling nut, is rigid, so that the strain of bending due to the motion of the locomotive, is borne by the unsupported part of the copper pipe; as this pipe is more or less flexible it yields without damage. Within the connection the brazing material forms a chemical weld between the copper of the pipe and the metal of the ring, and has a higher elastic limit than the copper pipe itself.

Tensile tests were made upon short lengths of 2¼ in. copper pipe with brazed connections at each end held against concave ball seats by standard coupling nuts, using a 100,000 lb. Emery testing machine at the works of Wm. Sellers & Company, Inc. The results, as well as the design of brazing ring, the location of the brazing material and the point of failure are shown in Fig. 1. These connections failed under the following tensile strains:

A	18,700 lb.
B	20,900 lb.
C	Over 19,000 lb.*
D	Over 20,900 (not broken)
E	Copper pipe broke, 17,800 lb.
F	Not broken

*Specimen consisted of the usual type of union with the copper pipe beaded over the ball joint, but without internal grooves in the ring, and not brazed to it. The specimen failed by the copper pipe pulling from ball joint even though the coupling nut was frequently tightened.

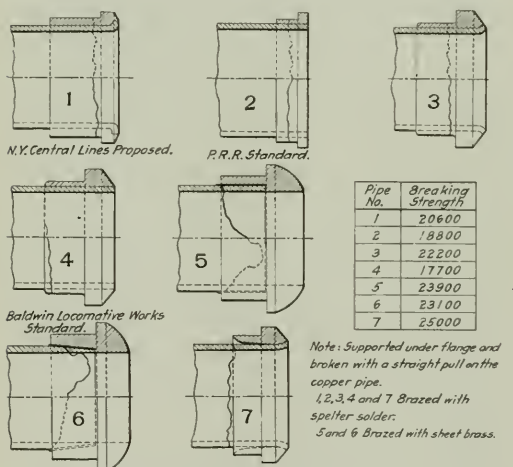
In each of the above cases the copper pipe showed a marked elongation, reducing in diameter under the tensile strain from 1/8 in. to 3/16 in. before failure of the points. Further, the failing pressure was many times in excess of the strain due to service steam pressure. The coupling nuts showed no indication of the strain to which they had been subjected.

The results of a similar series of tests, conducted by the testing department of the Baldwin Locomotive Works, are shown

in Fig. 2. A variety of joints is shown, including cylindrical and taper brazed connections, with and without beads, as well as a reduced length of ring, so that the brazing material would penetrate as far as the collar. The minimum breaking strength was 17,700 lb., and the maximum, 25,000 lb. These tests were made on a Riehle machine, the collar resting loosely on a collet, and the copper pipe held in clamping jaws. They show conclusively the strength of a properly brazed copper joint.

There is no doubt but that the method of brazing and the care with which it is done play an important part in the results. Experiments show the advantage of recessing and shortening the ring so that the strain may not come upon the lighter part of the sleeve, which in many cases is thinner than should be; the real brazed joint between the ring and the copper pipe should be at the ball joint collar, which is held by the coupling nut. The preferred method of brazing is by means of radial jets of the Bunsen type, which can be regulated so as to prevent overheating. This method is superior to the charcoal or coke fire, more easily handled and less liable to burn the metal.

Temperature tests were also conducted by Wm. Sellers & Company upon standard rings of injector manufacturers, to determine the action of these rings when subjected to the heat required to melt brazing material. Two sets of 2¼ in. rings were placed in non-oxidizing atmosphere in a steel crucible;



Pipe No.	Breaking Strength
1	20600
2	18800
3	22200
4	17700
5	23900
6	23100
7	25000

Note: Supported under flange and broken with a straight pull on the copper pipe.
1, 2, 3, 4 and 7 Brazed with spelter solder.
5 and 6 Brazed with sheet brass.

Fig. 2—Tests Made on Injector Steam Pipe Fittings by the Baldwin Locomotive Works

the crucible was then immersed in a lead bath and the temperature raised to 1,850 deg., measured by an electric pyrometer. The rings were then removed and showed no deterioration; each was flattened in a vise from 2¼ in. to 1¼ in. One of these rings fractured at the ball joint; the others stood the test without change. The melting temperature of the brazing wire was found to be 1,400 deg. to 1,450 deg. These tests proved that as now supplied the rings will stand both the melting temperature of the brazing material and the destructive service stresses to which they may be later subjected.

The Interstate Commerce Commission submitted to the committee a list of failures of injector steam connections due either to defective brazing or material covering a period of 21 months from August, 1911, to April, 1913, inclusive. In each case of brazing failure, the work had been obviously done most carelessly. The failure of the coupling nuts was due in one case to poor material, and in the second, to the thread being of too fine pitch.

Each of the 63,000 locomotives under the control of the commission is equipped with two injectors, and each injector has two terminal connections to steam valve and injector, making a total of 252,000 connections. Of these connections, 30 have been reported to have failed during a period of 21 months, an average of 18 per year; this is seven thousandths of one per cent per year, a factor so small as to be negligible compared with the more serious causes of accidents, and one which raises a doubt as to the necessity or advisability of forcing any change of method or design of connection which may destroy accepted interchangeable standards. It is considered desirable rather that more stringent regulations be adopted for methods of brazing and for the composition of the alloy used in rings and nuts. Every effort, however, should be made to reduce the chance of failure and to test any practical suggestions. It is probable that the present brazing ring may be modified so as to insure a more positive chemical weld between it and the copper pipe. Tests have shown that shortening the ring and brazing it directly to the collar of the ring make for security. These changes are shown in Fig. 3 for certain sizes.

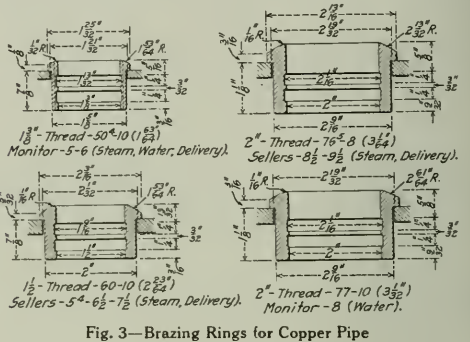


Fig. 3—Brazing Rings for Copper Pipe

A substitute for the brazed joint is a mechanical connection consisting of beading the copper pipe into internal grooves in the ring and flanging it over the lower face to form the ball joint seat. This operation presents no difficulties to locomotive builders or large railroad shops. The flange is set or rolled over the face of the ring without special tools, but care is required to form a true ball joint. The cost of the operation probably does not exceed that of brazing and from data furnished by the American Locomotive Company after using a special form of pipe beading machine the cost may be somewhat less. This form of mechanical connection has the distinct advantage of a direct joint between the copper steam pipe and the injector or valve. This method is comparatively new as applied to locomotive injectors; it is of undoubted value for stationary or fixed joints, but should be thoroughly tested in locomotive injector service before recommendation for general adoption by railroad or locomotive builders.

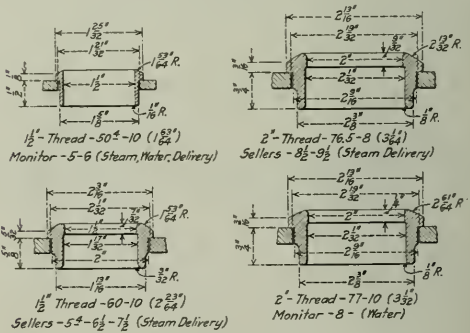


Fig. 4—Unions for Beaded and Flanged Copper Pipe

There are certain objections to this type of injector connection;

liability of damage to the ball joint during the removal or re-application of the injector; the difficulty of reaming or refacing a fixed ball copper seat without special tools; the difficulty of removing and renewing such mechanically connected ring or ball seat in case of destructive injury; the necessity of shortening or replacing the copper steam pipe in case of replacement of the ring. These several operations can be more easily handled in large shops, but the value of this type of connection can only be determined by extensive service tests on a number of railroads and under a variety of operating conditions.

This mechanical joint can be used with standard injector branches and coupling nuts, and manufacturers of locomotive injectors hold themselves in readiness to supply either form. The dimensions for four sizes are shown in Fig. 4.

The accepted practice of the railroads in the United States and most foreign countries for attaching connecting pipes to injectors and steam valves has been by threaded coupling nuts. There are

This method has an advantage over fine thread nuts in view of their occasional failure and stripping. As it is not necessary to remove the flange when detaching the injector from the locomotive there is practically no wear on the threaded branches. Designs of flanges which are applicable to standard injector connections, giving diameters of bolt circles interchangeable for the several manufacturers, are shown in Fig. 5.

The following recommendations were made by the committee:

Brazing Rings.—To be made shorter; counterbored or tapered internally to permit brazing material to form a joint with ball collar. The end of the copper pipe should be beaded tightly into bevel of ball collar. The composition of brazing rings should be within the following limits:

Copper	87 to 90 per cent
Zinc	8 to 12 per cent
Lead	1 to 1½ per cent
Tin	Not to exceed .4 per cent, and to replace zinc

Beaded Rings.—Rings may have one or more internal grooves

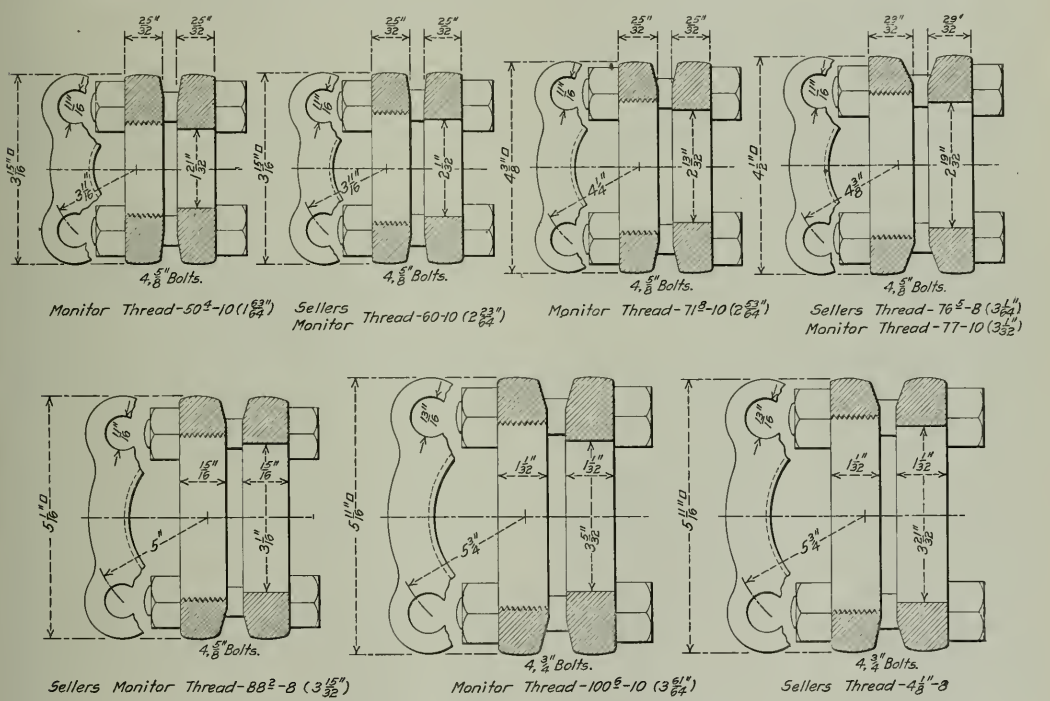


Fig. 5—Connecting Flanges for Iron and Copper Pipe

two accepted standards of injector threaded branches, their diameter and pitch, and their relative position. In view of the acknowledged advantage of retaining these standards, it would be a backward step to make any change that might affect the present interchangeability of injectors unless there were a marked gain in efficiency or in safety to the operatives. As the same ends can be obtained without such change, existing standards should not be discarded.

As a substitute for the threaded coupling nut, a method employing a pair of flanges for each connection is now being tested with lifting and non-lifting injectors, and valves. This method includes one flange screwed on the injector branch, the other bored to fit the collar or ring surrounding the connecting pipe; the two flanges are drawn together by four bolts, holding the flange of the copper pipe or its brazed ring against the ball seat of the injector branch.

about ¼ in. wide and at least 1/32 in. deep. Composition of metal may be left to choice of manufacturer. Rings should be firmly held in split collet fitting closely to outside diameter. Copper pipe may be rolled into grooves by bevel prossering tool or any special device preferred. Flanged ball joint, preferably rolled.

Coupling Nuts.—Diameter and pitch of two accepted standards, Sellers and Nathan, should be maintained. No threaded coupling nuts should be used or recommended having a pitch less than 1/10 in. for diameters over 2½ in.; or less than ⅛ in. pitch for 3 in. or over. Metal should be strong but not brittle, preferably left to choice of the manufacturer. It is considered advantageous to have a different and somewhat harder mixture than that used for the bodies.

Flanges.—It is considered advantageous to use in any future tests, style, form and dimensions of flanges now applied to

Hancock injectors, except that the diameter, pitch and thread may be varied to suit accepted standards of the manufacturer. Material of the same composition as in injector body may be used, but preferably drop forging or cast steel.

Copper Steam and Delivery Pipes.—Pipes connecting turret steam valve or operating valve with injectors should be provided with one or more easy bends of as long radius as admissible, and the total length should be much greater than the minimum distance between the terminal joints. Steam pipes should be designed so as to allow easy flexure during expansion and contraction. Bends should be made so that the outer radius is not strained or flattened and delivery pipes should be attached to the boiler with due allowance for creeping, yet sufficiently firm to prevent distortion of alinement under pressure.

ANNUAL MEETING OF THE AMERICAN ELECTRIC RAILWAY ASSOCIATION

The American Electric Railway Association held is thirty-third annual meeting at Atlantic City from October 12 to 16 inclusive. In the engineering section of the association there were a number of reports and papers presented that possessed matters of interest to the officers of steam railways though they dealt primarily with those pertaining to the electric railway. The papers were presented were as follows: Constitution and By-laws; Power Distribution; Standards; Electrolysis; Accident Prevention; Block Signals; Transportation Engineering; Equipment; Buildings and Structures; Life of Railway Physical Property; Engineering Accounting; Power Generation; Way Matters; and Heavy Electric Traction. The following is an abstract of those papers that contained matters of particular interest to steam railway officers.

BLOCK SIGNALS

The use of light signals for daylight indication on high-speed interurban lines is of comparatively recent origin; a trial of the apparatus of the General Railway Signal Company on the Michigan United Railways showed that, with the sun shining directly into the face of the signal, the red light could be seen about 1,500 ft. and the green light about 1,000 ft.

Discussion.—The discussion was limited to that pertaining to the acceptance of the various recommendations of the committee as to the adoption of standards. To this may be added the statement made that in the formulation of these recommendations it was seen that there were many things that had been successfully worked out in steam railway practice that could be successfully applied to that of electric railways, and that, before any recommendations were made in these particulars it would be well to consult with the engineers of the steam roads and adapt their results to electric railway practice. A number of these engineers had been added to the American Electric Railway Association committee membership, and it is the intention of the committee to embody their experiences in next year's report.

EQUIPMENT

In dealing with the solid wrought carbon steel wheels, the committee stated that, while the number of wheels included in the reports was not large enough to serve as a basis for any general conclusions, a surprising lack of positive evidence on this point was manifest and the figures seemed to show, so far as they showed anything, that there was not sufficient justification for a strong insistence on mating by carbon content.

In the case of air brake hose, it was found that the life was reduced to one-third the normal when oil was present.

With this in view, the committee endeavored to formulate a specification that would provide a hose of sufficient flexibility and strength to meet the severe strains imposed by the sharp curvature of track. Such hose to have also an oil resisting inner tube. It was finally decided that an oil resisting tube should be provided for service where the hose is subject to oil from a motor-driven air compressor, such as in the reservoir line of trains operated by multiple-unit control equipment, and straight air emergency line in city trailer operation. In order to obtain the oil resisting qualities of the tube, the fact was recognized that strength and flexibility of the hose must to some extent be sacrificed, and it was therefore decided that the specification should provide for two classes by grades, i. e., one for use where hose is subject to oil, and the other for general use where these conditions do not exist.

Upon investigation, however, it was found that very little data are available at the present time, with respect to an oil resisting tube on which a specification could be based, and it was, therefore, recommended that the subject be continued next year for further investigation with a special view of investigating requirements and tests for oil resisting inner tube, and to consider such changes as may be found necessary or desirable after putting the proposed specification in effect.

The treatment of car lighting in so far as it relates to the lamps used is quite as applicable to steam railway cars as to those of electric railways. The committee report on lamps says in part:

"The regulation of a carbon lamp is very poor, the intrinsic brilliancy of the filament varying considerably with slight changes in the current passing through it. With varying voltages at the lamp, the intrinsic brilliancy of the filament is constantly varying, and therefore the amount of light obtained from the lamp is also varying, as the amount of light varies directly in proportion to the brilliancy of the filament. The character of the carbon filament is such that its electrical resistance varies with its temperature. As the carbon is heated, its resistance gradually drops, permitting more current to flow through it, this change in resistance occurring only through a limited range, but sufficiently to materially affect regulation. As the voltage on the lamp drops, the current through the lamp drops also, reducing the temperature of the filament. The filament on cooling increases in resistance, and thus causes an even greater reduction in the current passing through it, which explains the fact that with a slight change in voltage there is a great change in the amount of light emitted by the lamp.

"The efficiency of the carbon lamp is low, but until the advent of the tungsten lamp, the efficiency of the carbon lamp was as good as could be obtained.

"The life of the carbon lamp is of a more or less indeterminate length, depending largely upon the definition of life. A carbon lamp will often continue burning for an indefinite period, during which the filament is undergoing changes which materially reduce the amount of light obtained from the lamp. Among other things, the carbon from the filament is gradually oxidized and deposited on the inside of the bulb in such a way as to cloud the glass and cut down the amount of light emitted to a considerable extent. After the carbon lamp has been in service from 1,000 to 1,500 hours, it has usually depreciated to such an extent as to warrant discarding.

"The Mazda lamp utilizes a tungsten filament, which does not vary in resistance with temperature changes to any such degree as does the carbon filament. In fact through a certain range of temperature, there is a slight increase in resistance with increase in temperature, consequently the light obtained from the lamp does not change as much with changes in voltage as is the case with the carbon lamp. This is a great advantage under variable voltage conditions, as the illumination of the car can be maintained more constant.

"The Mazda lamp is a more expensive article to buy than the carbon lamp, but the saving in current to be obtained may compensate for the increased cost of replacements. The life of the Mazda lamp is assumed to be 1,500 hours of burning, as after this point is reached the light produced drops below 80 per cent of normal, which value has been determined as the economical point to discard a lamp.

"There are two important reasons given for using reflectors in

car lighting work, one of which is that by means of proper design a reflector can be made to hide the lamp filament from the eyes of passengers, and the other is that the efficiency of the lamp may be increased from 50 per cent to 100 per cent, depending upon the type of reflector used. Either reason by itself appears sufficient to warrant the use of reflectors, the main requirements of which are as follows in order of importance:

1. Hiding lamp filament.
2. Correct distribution of light.
3. High efficiency.
4. Good appearance.
5. Economy.

"The principal types of reflectors are:

1. Prismatic clear glass.
2. Heavy density opal glass.
3. Medium density opal glass.
4. Light density opal glass.

"Prismatic clear glass reflectors are the most efficient, as with them it is possible to redirect the light in any direction desired, which permits of accurately meeting each lighting requirement. Their first cost is comparatively high, but is quite often justified where efficiency is of first consideration.

"Opal reflectors vary in efficiency, the heavy density being the most efficient and productive of the best light control.

"The following table shows the efficiency that may be expected from these various types of reflectors:

Table I—Efficiency of Various Types of Lighting Units

Equipment	Foot candles per watt per sq. ft.	Watts per candle
Bare carbon lamp	0.44	3.75
Bare Mazda lamp	1.43	1.16
Light density opal reflector with Mazda lamp..	2.22	....
Medium density opal reflector with Mazda lamp	2.60	....
Heavy density opal reflector with Mazda lamp.	3.16	....
Prismatic clear reflector with Mazda lamp.....	3.20	...."

Discussion.—In the matter of air brake hose the statement of the committee to the effect that the desirable feature of hose, namely, that of the resistance to oil, was emphasized. It was stated that it was a practical impossibility to avoid the presence of oil in the air system where motor-driven pumps are used, and that there was no specification that would provide a hose which was resistant to the action that followed. It was found that the best means of securing a hose that would give satisfactory service was to buy by brand, using one that gave the best results. This had been the practice on one large system for a number of years, and though the cost of hose had been high, it seemed at present to be the most satisfactory solution of the difficulty.

The detail of the report that received the greatest amount of attention was that relating to car lighting. In it the electric light was the only thing considered, and it was repeated several times that it had been found that the high wattage lamp was much more economical than the low. While photometric tests showed that the distribution of the light was fully as good with a few high wattage lamps as with a greater number of low ones.

In this distribution of the light the color of the side walls and the head lining has a great influence on the efficiency of the light. The case of the Interborough and the Brooklyn Rapid Transit railroads was cited as an example of what can be accomplished. The Interborough cars that were built several years ago were green up to the advertising line, and a light buff above it. The cars are 50 ft. long, and are lighted with 56-watt lamps on six circuits. In the case of the Interborough cars it is the present intention to have them white from the top of the seat backs upward. But, if they cannot be kept clean down as low as that, they will be white from the tops of the windows up. Elaborate photometric tests have been made, extending over several months, and it has been found that these cars can be lighted on three circuits of 56-watt lamps, and these cars are 67 ft. long and 1 ft. wider than the Interborough. The lamps are to be shaded with the Soudan globe.

As for the arrangement of the lamps, it was thought to be difficult to have a standard arrangement, but it seemed to many as though a standard would be worth while.

Another point suggested was the use of indirect lighting with which experiments are being made. It has been found that the system makes it possible to reduce the number of lamps, which reduces the power consumption and at the same time possesses the great advantage of keeping the direct rays of the light out of the eyes of the passengers.

There are indications that in some places the civic betterment societies are planning a regular campaign against the railways in the matter of better car lighting, and it was suggested that it would be advisable to forestall any action of this sort by the railways taking the matter up on their own initiative and doing all that is possible beforehand instead of being forced into it by outside action.

Among other suggestions leading to the better lighting of cars without extra expense was the use of frosted back globes, while for general economy it was recognized that the Mazda lamp was much superior to the carbon filament.

As an item contributing to a lessening of the expense of maintenance, the use of holders of larger diameter for globes and reflectors was suggested. It had been found on one road that where holders of 2¾ in. diameter had been substituted for those of 2¼ in. a considerable reduction of maintenance expenses had followed.

WAY MATTERS

The report gives a comprehensive statement of the present condition of track matters, and shows how the experience of street railways has led to the development of a roadbed that is near of kin to that used on steam railways, especially in the matter of the use of ballast. Many city roads are, however, still constructed with the ties resting directly on the subgrade. But in these cases careful attention is paid to proper drainage. A table is given of the bearing value of various soils taken from the report of the 1914 convention of the American Concrete Institute. It is as follows:

Material	Safe load in tons per sq. ft.
Quick sands and wet soils	0.1 to 1.0
Dry earth according to depth below surface	1.0 to 3.0
Moderately dry clay, confined	2.0 to 4.0
Dry, stiff clay	4.0 to 6.0
Sand, confined	2.0 to 6.0
Sand, compact and cemented	4.0 to 8.0
Gravel, cemented	8.0 to 12.0
Rock	25.0 to 200.0

As to ballast materials they vary about as they do on steam roads, and include crushed stone, gravel, cinders, slag and sand with a preference for crushed stone, which is also most extensively used.

There is one statement that differs somewhat from the published reports on the subject of rail and track deflection of steam railways. It is that neither headway nor speed has much influence on foundation excepting that where joints are poor or corrugation is present in rails the speed undoubtedly adds to the damage resulting from such conditions. Experiments with a deflectometer in Chicago show that there was no appreciable difference in deflection under car load whether the speed was constant, accelerated or retarded (Second Annual Report, Board of Supervising Engineers, Chicago Traction, 1909, page 184). The report definitely states that "only the actual weight of the car seemed to affect deflection and no wave motion in rail existed for no deflection could be discovered except when the car was actually over the point of reading."

In considering the subject of alloy steel rails, the data given were almost entirely those obtained from the steam railways. At the outset attention was called to the fact that the tonnage of alloy steel being rolled into rails of all sections has been declining for the last three years. The table on the following page shows the tonnage produced of the various kinds of steel rails in recent years and the total for each year.

TONNAGE OF STEEL RAILS ROLLED

Year	Alloys of Titanium	Alloys of Manganese copper nickel	Alloys of Total alloy	Electric	Total open-hearth	Total Bessemer	Total tons
1897...	.....	.....	.....	.....	500	1,644,520	1,647,982
1906...	.....	.....	.....	.....	186,413	3,791,459	3,977,887
1909...	35,945	13,450	49,395	.....	1,256,674	1,767,171	3,023,845
1910...	256,759	565	257,324	.....	1,751,359	1,884,442	3,636,031
1911...	152,990	999	153,989	462	1,676,923	1,053,420	2,822,790
1912...	141,773	7,494	149,267	3,455	2,105,144	1,099,926	3,327,915
1913...	47,655	11,864	59,519	2,436	2,527,710	817,591	3,502,780

The following table gives the production by processes of alloy-treated steel rails since 1903, in gross tons:

	Open-hearth and electric	Bessemer	Total
Total for 1909	13,696	35,699	49,395
Total for 1910	27,389	229,935	257,324
Total for 1911	38,539	115,450	153,989
Total for 1912	40,393	108,874	149,267
Total for 1913	33,567	25,952	59,519

These figures taken from the published records of the American Iron & Steel Institute show that the production of Bessemer steel rails has been steadily declining, while the production of open-hearth steel rails has been increasing at a nearly corresponding rate. The first separation of production records to show the amounts of alloyed steel made into rails was in 1909, and since 1910 the tonnage produced has been declining. A plat of these figures is given in the report to illustrate graphically the point that as use of open-hearth rails has increased the tonnage of alloyed steel rolled into rails has decreased until it is now quite insignificant as compared with the total tonnage of rails rolled. This condition is no doubt a natural one, for with the cost of open-hearth rails $2 per ton more than the cost of Bessemer, purchasers probably have some reluctance over having the extra prices for alloyed steels added to the already increased rate for the open-hearth. In other words, the indisputable tendency is toward the increasing use of open-hearth rails, which, from the records, indicate greater wearing qualities than Bessemer rails, and as open-hearth rails cost seven per cent more than Bessemer rails, purchasers are loath to add to this the extra cost demanded for the alloyed steel. In the case of open-hearth steel made with the usual addition of 0.1 per cent metallic titanium, the cost is roughly 12 per cent more than the cost of plain Bessemer steel, while with manganese steel at $80 per ton, the cost is 186 per cent more. The first cost of alloyed steel rails therefore may be not only prohibitive in some instances, but in others so high as to render return on the investment extremely slow, especially when a large sum is involved. These matters have doubtless militated against the production of alloyed steel rails and purchasers have contended themselves with the adoption of open-hearth steel on the reasoning that for 7 per cent greater first cost, 50 per cent longer life for the rails might follow.

Under special conditions of quick wearing track, sufficient benefits may ensue to warrant the adoption of an alloy steel rail, and for such purposes particularly the demand for alloy rails seems to emanate. The question then of what alloy to use is an important one, and eliminating matters of cost entirely the purchaser has ferro-titanium, manganese, nickel, high silicon and electric steel to choose from. The fact that rail sections are of an intricate and unbalanced character, the girder and high T-rails being especially so, is indeed unfortunate; for these odd shapes quite preclude opportunity for successful heat treatment—a process for increasing strength and wearing qualities in which direction much progress has been made in recent years on such articles as axles, rail joints, bolts and sundry automobile parts. However, some attention has been given to the heat treatment of rails, and while no results have been published, it is within reason to expect that a satisfactory method will eventually be found for overcoming the difficulties encountered.

This review is therefore confined to the experience with those alloy steels mentioned, all of which are more or less readily obtainable in any section for street and interurban railway work.

It must be appreciated that experience with alloyed steels is dependent on a number of factors in addition to the metal itself. The mere fact of adding 0.1 per cent of metallic titanium or 13 per cent of manganese, for example, to the steel will not in itself effect a panacea for the ills to which track and rails are subject, and reported results of breakage and wearing qualities therefore are inclined to show divergent results in many cases, and even average results for any particular kind of steel may be greatly exaggerated. The best tests are those of individual character where different kinds of steel are laid in line on the same type of roadway and subjected to equal conditions and maintenance. Results from such experimental track afford good comparison, but the tendency even then is to often measure the rail wear by the eye rather than by the accurate, though delicate instruments, so that misleading figures may readily follow.

The only American records published showing the results of rail failures, and in some instances wearing qualities, are those of the American Railway Engineering Association. But very little accurate data were obtained by the committee as to the efficiency of alloy rails for street railway service, other than that the wear of manganese steel rails was about one-fifth that of ordinary steel rails.

Notwithstanding this paucity of data the statement is emphasized that girder and high T-rails, as well as standard sections, can be easily rolled from the following special steels possessing the general characteristics mentioned:

Kind	Steel containing	General properties anticipated
Titanium	0.1 per cent metallic titanium.	Less segregation, cleaner metal, hence longer life.
Nickel	3.5 per cent nickel.	Increased life.
Nickel chrome	Containing varying percentages—nickel and chromium.	Increased life by being tough and hard.
Manganese	About 12 per cent manganese.	Very tough and hard, cannot be easily cut or drilled, wears slowly.
Electric	Made in electric furnace.	Very clean steel, free from impurities, thus adding life.
High silicon	About 0.35 per cent silicon.	Increased life. Much used in England.

Discussion.—The discussion was devoted almost exclusively to the movement of rails in urban tracks and in the methods of paving.

HEAVY ELECTRIC TRACTION.

This report dealt for the most part with overhead clearances, which were placd as follows, for:

Trainman with lantern	25 ft. 0 in.
Trainman without lantern	24 ft. 0 in.
Without trainman on cars	18 ft. 0 in.
High voltage wires	16 ft. 10 in.
Minimum for 600 volt overhead contact	16 ft. 0 in.

As third rail clearances it was recommended that the subject be continued for another year. The same recommendation was made in the matter of electric locomotives, because of the number of varied designs now in process of development.

No Discussion.

ELECTION OF OFFICERS

At the annual election the following officers were elected in the engineering section: President, L. P. Crecilius, electrical engineer, Cleveland Ry. Co.; first vice-president, John Lindall, superintendent rolling stock and shops. Boston Elevated; second vice-president, B. F. Wood, chief engineer, United Gas & Electric Engineering Corporation of New York; third vice-president, F. R. Phillips, superintendent equipment, East Pittsburgh Railway; secretary and treasurer, E. B. Burritt; executive committee, J. P. Barnes, general manager, Syracuse and Suburban; G. W. Palmer, electrical engineer, Bay State; H. F. Merker, engineer maintenance of way, East St. Louis & Suburban; W. G. Gore, superintendent equipment, Brooklyn Rapid Transit.

VENEZUELAN IMPORTS OF RAILWAY MATERIAL.—In 1912 Venezuela imported railroad material having a total value of $164,000, $23,000 of this representing supplies from Germany.

Mechanical Stokers for Locomotives*

Essential Features to Be Considered in Designing Machines for This Work; Increase in Tonnage Obtainable

By Clement F. Street†

The firing of a locomotive with a shovel is the most crude operation being performed on our railways to-day, as is shown by the almost continuous series of experiments which have been carried on during the past twenty years, with a view of producing a successful locomotive stoker. When these experiments were first begun, it was with the idea that the stoker would be, primarily, a fuel-saving device, and its labor-saving features were considered as secondary. With the advent of the large locomotive this view has changed, as the limit of the size of the locomotives which could be built has been fixed by the capacity of a man to shovel coal. With the advent of the successful stoker, this limit has been removed, and it is now possible to build locomotives to burn any quantity of coal which may be desirable. In addition to this, the use of the stoker has increased the capacity of many locomotives already in service. The question of capacity is to-day the first consideration, and any question of fuel saving, although important, has become secondary.

Locomotive stokers in substantial numbers, about 850, are now in regular daily successful operation and are considered an essential part of the equipment of the largest locomotives being built. The Baltimore & Ohio has just placed in service 30, and the Chicago, Burlington & Quincy 25 locomotives of the 2-10-2 type, which have a tractive effort of about 71,000 lb. and which would never have been built had it not been known that a stoker could be secured which would fire them properly. The Norfolk & Western has 105 Mallet locomotives fitted with stokers, which could not be shovel-fired in the service in which they are used.

It is not at all a difficult matter to fire a locomotive with a stoker and it does not seem to be generally known that practically every stoker ever applied to a locomotive has fired it and done a very good job. The actual firing of a locomotive is only the beginning, and a very small beginning, of the solution of the problem of producing a successful stoker. A locomotive stoker of the scatter type in order to be a successful and a commercial machine must do, if not all, at least most of the following:

It must not break down.

It must do at least 90 per cent of all manual labor in taking coal from the tender and distributing it over the grate.

It must distribute coal evenly over the grate and provide means for firing heavy on any one section or zone in case the locomotive does not burn an even fire.

It must be constructed so that the fireman can at any time inspect the fire, rake it, and do shovel-firing without shutting off the stoker.

It must have several definite and marked rates of feed, have a capacity in excess of the maximum requirements, and feed coal continuously at any definite rate at which it is set and maintain that rate regardless of variations in steam pressure or grade amount, or condition of the coal fed to it.

It must be constructed so that feeding to it bolts, spikes, rocks and any other foreign matter which may be in the coal will not result in a breakage and so that such matter or articles can be removed without taking the machine apart, in case they cause a clog.

It must have all parts easy of access for making inspection, repairs and lubrication.

The cost of inspection and running repairs must not be in excess of 75 cents per 100 locomotive miles.

It must be so simple in construction that the average fireman can understand the function of each part and be able to operate it successfully, after having received instructions during only one or two trips over a division.

It must have the opening through which coal is admitted covered with a screen which will reduce to a minimum the liability of the admission of foreign matter which will cause clogs.

It must handle wet coal.

It must keep a locomotive hot under all conditions with a lower grade of coal than is required for shovel-firing.

The first requirement of a successful stoker is reliability. The machine must not break down, and any machine which is liable to frequent break-downs is foredoomed to failure. The fire carried by a stoker is much lighter than with shovel-firing; the exhaust nozzle is larger for a stoker-fired locomotive, and a fireman who has been trained to stoker-firing, finds it very difficult indeed to take up hand-firing, or, if he has formerly been hand-firing, go back to it. Consequently, it is of vital importance that a stoker be reliable, and not subject to failure.

Very few locomotives will burn a fire evenly all over the grate and a successful stoker must, therefore, be constructed to meet this characteristic and feed continuously and steadily a larger proportion of the coal to that section where it is burning heavy than to the section where it is burning light.

A successful stoker fireman will at all times know just what condition his fire is in and he can do this only by making frequent inspections of it. If it is so hot he cannot see it he will put the hook in and feel it. With the best of machines and under the most favorable conditions it may be found that a few shovels of coal added at a certain place will help out materially, and conditions are liable at any time to arise which make this absolutely essential for securing the best operation. In order to secure the best results the fire should be thoroughly inspected at least every thirty minutes, and the stoker should be constructed so that this can be done without interfering in any way with its operation and certainly without shutting it down.

The driving engine of a stoker, under normal conditions, is working at not more than four or five horse power. A piece of slate, or large lump of coal, or some foreign substance entering the machine, will immediately double or treble the load on the stoker engine. There must be some sort of an automatic governor on this engine, which will take care of these wide fluctuations in the load. Without this, a fireman will never know the rate at which coal is entering the firebox, and is working entirely in the dark.

One of the things a stoker designer has to figure on is the fact that it is impossible to keep foreign matter out of a stoker. The properly designed machine should be able to withstand without breakage the feeding to it of an obstruction which will stop it instantly. In order to do this, all of the different parts of the machine must have more strength than the engine, and the only result of a clog of this nature must be that the machine will stop.

One of the most important characteristics of a stoker is that it shall be easy to inspect and lubricate. A machine should be built so that an inspector can start it up, inspect all its working parts and see that it is in operating condition, in not more than ten to fifteen minutes.

Some of the coal being used in stokers contains so much dirt that when it becomes wet it forms a sticky paste, which will not run and which plasters onto anything it comes in contact with, and forms a hard cake as it dries. This is about the hardest proposition the stoker has to contend with, but the successful machine *must* handle it.

One of the first things to be discovered in experimenting with the stoker, was the fact that it was possible, with it, to burn a

*Abstract of a paper read before the Western Railway Club, October 20, 1914.

†Vice-president, Locomotive Stoker Company, New York.

poorer grade of coal than could be used with shovel-firing. One of the problems which the railways are always up against is that of poor coal, and a properly designed locomotive stoker will eliminate practically all complaints of poor coal.

With a scatter type of stoker, the tendency is for a considerable proportion of the dust and finer particles to be carried out of the stack by the heavy draft, and in order to secure the best results from this type of machine, some provision should be made to prevent this. One of the methods, which has been successfully employed is to provide a screen, which takes out the dust and finer particles, and deposits them across the back end of the bridge. This is considered a very important feature of a stoker of this type, and while a machine not having it will undoubtedly fire locomotives successfully, it will certainly not give as good fuel economy as a machine having this feature. If, therefore, the best results as to fuel economy are to be obtained something of this nature must be provided.

It is very evident that in the near future all locomotives in main line train service will be fitted with stokers, but the question to-day is where to begin, and to which class should they be applied first. It can be confidently stated that, under average conditions, any locomotive, freight or passenger, which has a maximum tractive effort of 50,000 lb. or over, should be fitted with a stoker and any freight locomotive, which burns 4,000 lb. or over, of coal per hour, continuously, for periods of one hour or over, should be fitted with a stoker. In passenger service there are very few locomotives of over 50,000 lb. tractive effort which are not fitted with stokers, and they all should be, if it is expected to work them to their full capacity, as it is out of the question to do so with shovel-firing. A fireman in passenger service, however, can shovel a much larger amount of coal per hour than he can in freight service, because the length of time which he must work is so much shorter that he is not liable to become exhausted before reaching the end of a division.

The primary object of applying a stoker to a locomotive is to enable the operation of that locomotive to its full capacity at all times and under all conditions, and this object is being attained wherever stokers have been applied. On one division of a railroad, with Mikado type locomotives having a tractive effort of 54,000 lb., the tonnage rating, without superheaters, and with shovel-firing, was 4,750 tons. Superheaters were applied and the rating was made 5,000 tons. Stokers were applied and the rating was made 5,250 tons; then 5,500 tons, 5,750 tons, and it is now 6,000 tons. At the same time the rating of the shovel-fired superheater locomotives, was pushed up to 5,500 tons. It was found, however, that it was not practical to run shovel-fired and stoker-fired locomotives on the same division, as even with the less tonnage, the speed of the former was so much less than that of the latter that they could not keep out of the way, were continually delaying traffic, and now all trains on this division are being hauled by stoker-fired locomotives.

On another division of the same road, before stokers were applied, these locomotives were hauling 5,000 adjusted tons. After the stokers were applied, this tonnage was gradually increased to 6,500 tons, and at one point on the division, with a river grade, they are hauling 85 to 115 all-steel, 70-ton coal cars, giving a tonnage of from 8,600 to 8,900 tons. At another point on this same road, fast freight trains are being run over two divisions—a total distance of 187 miles—with the same engine crew. Before the stokers were applied, the firemen were always changed at an intermediate point, and sometimes the enginemen.

The reason that the increase in tonnage is possible is from the fact that the fireman can secure and maintain the maximum steam pressure on the boiler at all times and under all conditions. It is not an uncommon occurrence, on heavy freight trains hauled by the locomotives referred to above, for the engineman to work his cylinders at full stroke, with the throttle wide open, both injectors on and maintain a speed of 18 miles an hour. There is no difficulty in maintaining full steam pressure under these conditions and at this speed.

Another advantage which follows the use of stokers is in that the time required for cleaning fires, both at terminals and on the road, is very much reduced. A stoker fire clinkers much less than a shovel fire, and statistics show, as a result of this, that it requires less than one-half as much time to clean a stoker fire as it does a shovel fire.

The actual results show very clearly that, under average conditions, with an equal grade of coal, a stoker-fired locomotive will not burn any more coal than a shovel-fired, in proportion to the amount of work done. It is, however, an invariable rule, that stoker-fired locomotives are worked harder than the shovel-fired locomotives, and are also given a poorer grade of coal. On many roads using stokers, they are giving the locomotives fitted with them a grade of coal which is so poor that it cannot be used successfully for shovel-firing at all.

This same thing applies to the amount of water evaporated per pound of coal. The boiler of a stoker-fired locomotive is, as a rule, not worked at as economical a point as one which is shovel-fired, and the rate of evaporation is, therefore, not so good. I regret very much to have to say that there are no absolute figures to demonstrate this. On all roads which are using any appreciable number of stokers, the question of fuel saving has been given very little, if any, consideration, as the advantage to be gained by the increased tonnage and increased speeds is so great that any questions of fuel economy sink into insignificance in comparison with it.

It has been stated that one of the objections to a stoker on a locomotive is that it makes it too easy to waste steam through the safety valve. My reply to this is that a fireman who will waste steam through the safety valve with a stoker will do the same thing with a shovel.

In order to secure the best results from stoker-firing a locomotive with bituminous coal, the physical characteristics are more important than the chemical analysis, and better results are often secured from coal of inferior quality, in proper physical form, than from that of a better grade, in improper size. The ideal coal for stoker-firing is secured by passing run of mine coal over a screen with about two-and-one-half inch square openings. When coal of this character is spread over the grate by means of the scatter type stoker, it gives a uniform, even fire, and produces very rapid combustion. If coal is to be burned at the rate of from 100 to 150 pounds of coal per square foot of grate per hour, it is vital that it be very nearly of a uniform size, as any lumps of 3, 4, 5 or 6 inches applied to a stoker fire will result in uneven burning of that fire, and in unsatisfactory results.

In conclusion I wish to emphasize the importance of at all times maintaining a large view of the subject and not allowing any detail to acquire undue importance. Each of the points touched on has its own importance, but they are all secondary to the one large reason for applying a stoker to a locomotive.

A railroad is built for the purpose of earning money, which must be earned by its locomotives. The only reason for applying a stoker to a locomotive is to enable it to earn more money. Railroads no longer control the amount of compensation which they can receive for service performed. They are continually confronted by increased cost of operation, increased taxes and legislative requirements; in order to live they must increase the earning power of their locomotives.

Statistics show that the application of a stoker to many of the large locomotives now in use will result in increasing the earning power of those locomotives from 10 to 20 per cent. The use of the stoker makes it possible to build new locomotives having from 20 to 30 per cent more earning power than those commonly in use at the present time.

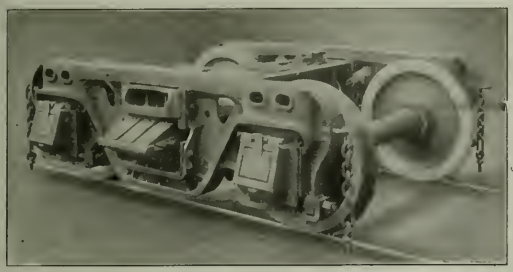
DISCUSSION

It was brought out in the discussion that there has been about $1,250,000 spent for stokers up to the present. The use of the stoker, it was stated, has lessened the maintenance cost for fireboxes and tubes. The Burlington is now using coal for stoker-

fired locomotives, which costs about 75 per cent as much as that used for hand-fired engines and has 90 per cent of the heating value of the latter. It was also stated that special men are necessary for proper inspection and repairs to the stokers and that firemen must watch the fire carefully in order to obtain the best results. A stoker will do much better work than two firemen. No trouble has been experienced from plugged tubes when a brick arch is used and by the use of the stoker a greater locomotive capacity is obtained. The use of the scoop was recommended in order to fill holes in the fire. One road has a record of 3,000,000 locomotive miles with stoker failures averaging one in 54,000 miles. It was also claimed that stoker-fired locomotives will maintain a more uniform speed over a division.

IMPROVED DESIGNS OF ENGINE AND TENDER TRUCKS

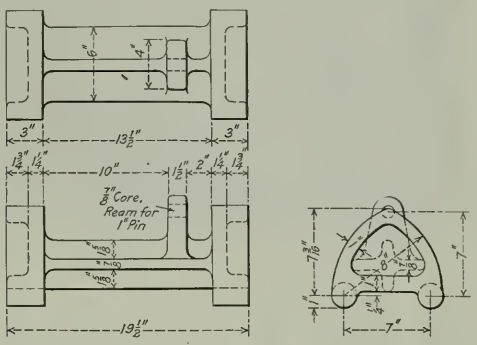
The change in wheel arrangement, together with the increased size and weight of the modern locomotive, has imposed a duty upon the leading truck of the prevailing design out of all proportion to its guiding capacity. As a consequence the work



Economy Tender Truck

which should devolve upon the truck consistent with the load carried at the centerpin has been, to a considerable extent, taken up by the leading drivers, resulting in lack of stability on tangents and excessive wear of the flanges of leading driving wheel tires.

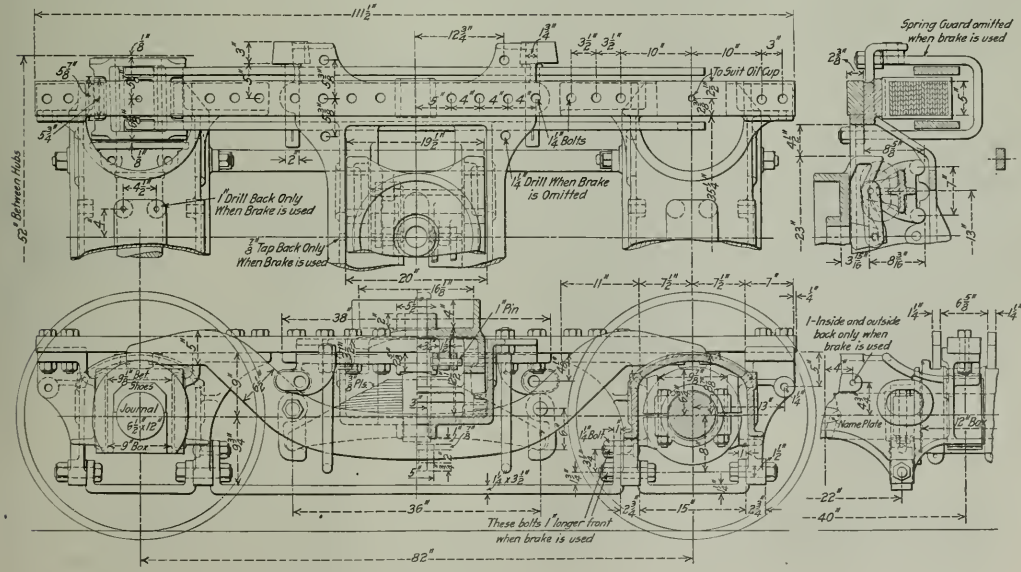
These conditions have led to the development of a lateral motion bolster device for locomotive trucks which, it is claimed, will meet these exacting requirements more fully than the three point link suspension which heretofore has been almost universally used. In principle it provides a constant resistance regardless of the lateral displacement of the bolster instead of a low initial resistance increasing with the lateral displacement, as



Rocker Used in the Engine Truck

is obtained with the three point suspension links. Variations, such as high initial resistance, with a constant resistance following a predetermined bolster movement, can be obtained by slight modification of the surfaces in contact. One of the illustrations shows the heart shaped rocker in detail. The swing bolster bears directly on these rockers which are connected to it by links to insure their remaining in the proper position.

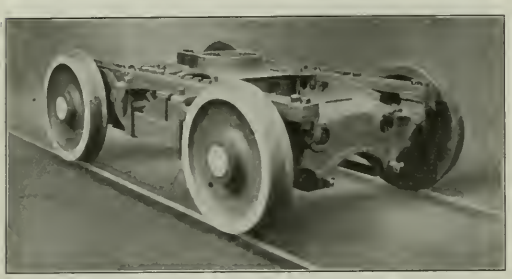
Service results with this truck show a marked reduction in the flange wear on leading drivers, a steadying action while running on straight track, an absence of jerky motion on curves and withal a better riding engine under all track conditions. This bolster arrangement, on account of its doing more work in guid-



Arrangement of the Economy Constant Resistance Engine Truck

ing the engine, requires a high duty truck frame. The design here shown eliminates the separate, bolted-on pedestals, combining the four pedestals at each end of the truck in a single cast steel transom with renewable shoes. The use of axle collars having been found desirable, this arrangement enables the cellars to be packed without removing the pedestal tie bars.

The aim in the design of the Economy tender truck, illustrations of which are also included, was to secure an easy riding truck having flexibility combined with the ability to remain square, in conjunction with either a lateral motion or rigid centering arrangement. Easy riding qualities have been obtained by the use of the pedestal type of frame with coil springs resting on an equalizer centrally located over each box, in combination with elliptic bolster springs. The coil springs arranged in the manner shown will accommodate any axle load that it is possible to utilize, with the idea of always providing surplus capacity to obviate breakage.



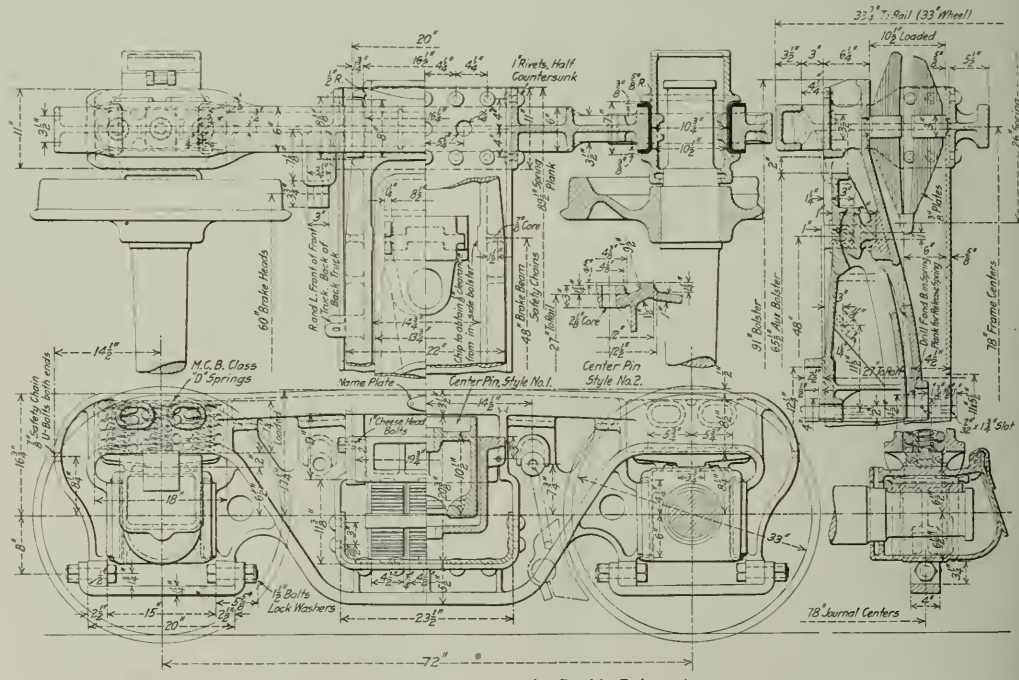
The Economy Engine Truck is Designed to Provide Constant Resistance Regardless of the Lateral Displacement of the Bolster

The spring plank arrangement provides for the flexibility that ordinarily obtains with the arch bar truck, permitting the truck to accommodate itself to uneven track conditions without causing undue stresses upon any of the coil springs, or unequal bearing pressures. The riveted connections between the truck frame and the spring plank are of such ample proportions, and the spring plank of so great a width as to insure the truck remaining square.

The bolster arrangement to provide for lateral motion consists of an auxiliary bolster located within the main bolster and resting upon three point rockers. The rocker bearing surfaces can be so arranged as to provide for a resistance curve identical with that obtained with the use of two point offset hangers. This arrangement eliminates the use of cross transoms. The curve of resistance can be changed by changing the contour of the bearing surfaces. If lateral motion arrangement is not desired a plain bolster can be substituted for the swing motion bolster without any alteration. It will be noted that few parts are used in providing for a pedestal type truck having a swing motion bolster. The side frames are designed to give ample lateral as well as vertical strength, and brake hanger bosses are arranged to use U shaped hangers, without offset.

Both these trucks are the product of the Economy Devices Corporation, 30 Church street, New York.

Adventures of a French Railway Carriage—The parlor car courteously placed by the French government at the disposal of Baron von Schoen, the German Ambassador, when he left Paris on August 3, has found its way back to France, after various vicissitudes. It reached Berlin on the morning of Wednesday, August 5, where it was seized by the authorities. After a day's arrest it was released, and sent to Munich, which it reached on the following Friday morning. Thence it was sent on to Lindau, where it was seized for the second time, and for a second time set free. From Lindau it reached Neufchatel by way of Constance, and finally, somewhat wayworn, it came to rest at a siding of the Gare de Lyon at Paris.



Economy Tender Truck, Showing the Double Bolster Arrangement

Maintenance of Way Section

Wrought Iron and Steel Pipe

Difficulty is often experienced in securing genuine wrought iron pipe, as mentioned in the committee report on Water Pipe of the Bridge & Building Association, abstracted elsewhere in this issue. In this connection it may interest users of pipe to know that 87½ per cent of all iron and steel pipe manufactured in this country is steel and only 12½ per cent wrought iron, as shown by a recent statistical bulletin of the American Iron & Steel Institute. These figures have changed from 68½ and 31½, respectively, since 1905, and it is only 27 years since the first steel pipe was made. Undoubtedly a very large part of this steel pipe is used under conditions much less severe than are common in railway work, which would render the superior qualities of wrought iron less important. But, this rapid growth and present preponderance of steel emphasize two things; first, the desirability of investigating each installation to see whether the more expensive material, wrought iron, is justified; and second, if it is found to be justified, the necessity of specifying the material very carefully and then taking steps to see that the desired quality is furnished.

Bond Strength of Reinforcing Steel

Deformed bars are used as the reinforcing material in reinforced concrete structures on 17 of the 25 important roads reporting on this point to a committee of the American Railway Bridge & Building Association. Of these 17 roads, 8 did not use any other form of reinforcement. In contrast to this showing for the deformed bars, only 8 roads allow the use of plain bars and only 1 of these 8 uses them exclusively. Further, a comparison of the values assumed for the adhesion of steel and concrete in designing the structures shows a marked difference between plain and deformed bars in favor of the latter. The A. R. E. A. manual of recommended practice gives the bond strength of a plain bar as 80 lb. per sq. in. and of a deformed bar as 100 to 150 lb. per sq. in., but the difference as shown by the tabulation of actual practice is even greater than this, for the plain rods are credited with a strength of only 50 to 80 lb. per sq. in., with the average about midway between those values, while deformed bars range all the way from 50 to 200 lb. per sq. in., with the average between 100 and 150. If recent tests, referred to in the committee's report, which show that plain bars develop a bond strength fully as great as the special shapes, are to be accepted, these assumptions in favor of deformed bars should be carefully considered with a view to revision, even though other considerations, such as resistance to vibration, may warrant the continued use of deformed bars.

Accurate Records of Construction Work

The designs of foundations for bridges, buildings, tanks, walls, etc., are always subject to modification in construction on account of unforeseen conditions affecting the work. Even when comparatively accurate information as to the nature of the material, the amount and level of the ground water, etc., has been secured before the design is made, expediency in handling the work, or limitation of available construction plant, may make advisable some changes in the plans. Ordinarily, little effort is made to record accurately the changes that are made and after the completion of the work the original plans are filed. This lack of an accurate record of the details of a structure as actually built is often responsible for unnecessary expenditures in later years when improvements or alterations are required, or when adjacent work is under way. Also, in many cases of accidents involving structures such records of construction would be very valuable in fixing the responsibility or determining the cause. A noteworthy example of practice in direct contrast to the common method was furnished recently by a large eastern trunk line in the construction of a considerable amount of concrete trestle. A record sheet was made up for each of the nearly 300 piers. As practically all of these had been built to one standard plan it was possible to reproduce the same drawing of plan, side and end elevations for all the piers of one design, filling in on the individual sheets the data referring to that particular pier. This information included the elevations of the top and bottom of the foundation masonry, of the heads and points of the supporting piles, and approximate depth that the piles sank under the weight of the hammer, the number of blows required for the last foot of penetration, and a complete record of the date of beginning and ending of each portion of the work. In addition, the names of the inspectors on the work and special notations covering any defects that appeared during construction and the method of correcting them were added. The inspectors kept the notes for these records in connection with their other duties, and a draftsman in the field construction office made the record sheet. Handling the matter in this way, the expense of preparing the record was trivial, and one occasion to use the data thus made available would more than compensate for the time and trouble of keeping it.

The Standardization of Manganese Track Construction

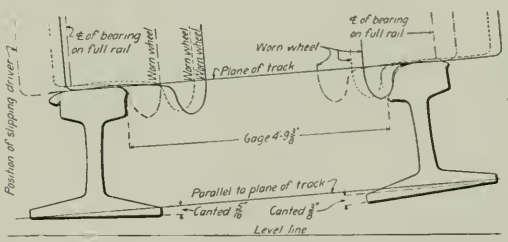
Railway engineers have been familiar in a general way with the use of manganese in frog, crossing and other special track construction for several years The first cost of manganese is considerably higher than that of standard open hearth or Bessemer construction, and this has naturally been a serious detriment to its general adoption. This objection has led to an endeavor on the part of the manufacturers to reduce the amount of manganese to the minimum consistent with the service required in order to reduce the cost. The purchasing agents of the railroads, and in most cases the engineers as well, have had no definite knowledge of the principles of design of manganese track work or of the problems connected with its manufacture. These conditions have gradually led to the partial demoralization of the manganese industry. Relying on the lack of standards on the part of the roads, some few manufacturers have reduced the amount of metal in their designs below the safe limit in order to underbid their competitors and secure the business. In most instances the railroad men have had to rely on the statements of the manufacturers, and as a result a low first cost has been the main consideration. This has forced other manufacturers to reduce the amount of manganese in their designs in order to secure any of this business, and has led to many failures of manganese track work in the past few years which have tended to prejudice engineers against its use. In an attempt to check this tendency several manufacturers of manganese track work, controlling over 80 per cent of the output, have recently organized the Manganese Track Society for the purpose of standardizing manganese track construction. This organization has already prepared standard designs for solid and rail-bound frogs and for solid crossings and is now engaged on other track work units. These standards have been submitted to the American Railway Engineering Association for investigation and approval and are now being considered by a committee of that association. Stand-

ards prepared in this way by the manufacturers and the users should be practical from the standpoint of both, and once adopted they should provide standards on which the roads can secure bids knowing that the material obtained will be in accordance with the best knowledge available. Manganese track construction is of direct economy in numerous forms of track work and this action of the manufacturers to improve and standardize their product deserves commendation.

ACCURATE MAINTENANCE OF GAGE

THE maintenance of track to accurate gage on tangents and curves is not receiving the attention from track men today that its importance deserves. While no one will intentionally allow rails to spread until there is danger of the wheels dropping onto the ties, small inequalities are not considered of sufficient importance to demand regaging the track and they are permitted to increase until considerable work is required to bring the track back to its proper condition.

This problem is of increasing importance on curves, and it is here that it is neglected to the greatest extent. In the first place, there is a wide divergence of opinion regarding the degree of curvature at which the gage should be widened. Practice in this regard is now passing through a transition, partly because of improvements in locomotive truck design providing greater flexibility, but mainly as a result of greater study of actual track conditions. Five or ten years ago it was considered good practice to begin widening the gage on curves of 4 deg. and over. Later practice has shown this to be unnecessary and the recommended practice of the American Railway Engineering Association now provides that curves of 8 deg. and under should be maintained to standard gage, while curves sharper than 8 deg. should be increased ⅛ in. for each 2 deg. or fraction thereof. Some believe



Wheel and Rail Contours on a 10-Deg. Curve with Wide Gage

that this limit is still too low and that no curve of less than 10 deg. should be widened, supporting their conclusions with considerable corroborative data. While theoretically the point at which the gage should be widened to accommodate a certain type of locomotive is capable of accurate determination, the conclusions reached by theoretical reasoning have not always been borne out in practice. Greater dependence should therefore be placed on the results which have been secured on several roads which have given this subject careful attention than on the various theoretical analyses.

The evil results of wide gage are evident in several ways. In the first place, while track in accurate gage tends to hold the trucks in their proper course, irregular or uniformly wide gage permits them to shift back and forth laterally, giving the effect of swinging or rough riding track. This has been shown strikingly by the track inspection instrument used in making periodic track inspections on the Pennsylvania Railroad, in which wide gage, with the resulting more or less pronounced lurch of the car, is indicated by the movement of a pendulum.

More important, however, is the influence of wide gage on derailments. Contrary to what might be expected, wide gage aids rather than prevents derailments. This is illustrated by an experience on the Santa Fe. Several years ago a number of new locomotives were distributed over several divisions. After a short time there were numerous complaints about the difficulty of keeping these locomotives on the track, especially on 10-deg. curves, on all divisions on which they were operated except one. Investigation showed that while the curves on all the other divisions had been laid with the increased width of gage required by the standards, the rail was laid on the one division to the standard gage of 4 ft. 8½ in. when screw spikes were inserted with the expectation that the gage would increase slightly under traffic. However, this had not occurred. Since the locomotives were passing over these curves without difficulty the curves on the other divisions were brought to this same gage, after which no further difficulty was encountered. The standard practice of this road now provides that no curves 10 deg. or under shall be widened. This seems reasonable when one considers that track laid to tight gage holds the wheels in their proper position, preventing their lateral motion and decreasing the liability to climb over the rail when striking it at a slight angle.

One phase of this problem frequently lost sight of is the increased destruction of material resulting from wide gage. The same lateral movement of the truck which gives the effect of rough riding track causes a wear on the rail and wheel flange whenever they come in contact which is more severe when the flange engages the rail at an angle. Especially on curves where rail wear is normally more severe it has been found that decreasing the extra gage allowance has had a marked effect in increasing the life of the rail. On one 10-deg. curve on the Santa Fe records showed that the life of rail was increased from 18 to 26 months by eliminating the additional width of gage. Aside from accelerating the grinding wear on the side of the gage head, wide gage contributes materially to the flowing of rail as shown by the accompanying sketch. As the wheels, and particularly the heavy engine drivers, are allowed to slide laterally over the top of the rail, they force the metal to the sides of the head, creating the lip commonly found. The effect of the false flange is also shown in this sketch which was made from actual wheel and rail contours taken on a 10-deg. curve and 1.85 per cent grade after the rail had been in service 12 months. In numerous instances where the rail has flowed badly this difficulty has been alleviated or removed by bringing the track to standard gage. This destruction of material is not confined to the rail alone. As the gage is widened the trucks are allowed more play and therefore deliver heavier lateral blows to the rail, which in turn are transmitted to the spikes and the tie, causing the wood fiber supporting the spike to crush and contributing materially to the spike killing of the tie.

NEW BOOKS

Handbook of Construction Plant. By Richard T. Dana, consulting engineer. Size 5 in. by 7 in., 702 pages, 312 illustrations. Bound in flexible leather. Published by the Myron C. Clark Publishing Company, Chicago. Price $5.

The author of this volume has set himself a difficult task in presenting complete data on the performance and cost of all types of construction plant. On account of the wide variety of equipment and devices required for special work many users of the book will undoubtedly discover shortcomings. The aim, however, is commendable and the information included will undoubtedly be of service to many contractors and engineers. The purchase prices of equipment quoted in the book are in general bona fide bids made to the author and often represent averages of many such bids. The fluctuation in the price of materials makes many of these figures subject to question, but for purposes of estimating, the accuracy is probably as great as necessary. The statements as to the capacity of plant have been carefully checked and a large part of the material contained in the book has been subject to daily use in the author's office for some time. In order to facilitate the securing of bids on material where more accurate prices are needed a list of dealers in construction plant is included in an appendix, and in most cases dealers' names are omitted through the text. The subjects are arranged alphabetically with a view to easy reference and, in addition, a very complete index is supplied.

Recent Developments in Track Construction*

A Review of the Increases in Loading of Track and the Improvements in Details of Its Construction

By Elmer T. Howson

It is frequently stated that steam railroad tracks are not sufficiently strong to carry the loads which are placed upon them with the proper factor of safety, and that the design of the track structure has not kept pace with the increase in these loads in recent years. While this is by no means the consensus of opinion, this subject is one of great importance at the present time, and the question of the relative strength of our present track construction is giving many railroad men cause for grave concern today.

INCREASE IN WHEEL LOADS AND SPEED

In discussing the present strength of the track, the first step is to determine the extent to which the service demanded of it has increased in recent years. The two most important factors affecting the stresses in the track are the weight of the trains and their speeds.

The weights of locomotives built in the past two or three years have not increased as much as in earlier periods, but this is due in very large measure to the fact that designers have been able to meet the demands for increased train loading on the part of the operating department by the adoption of the superheater, the brick arch, the mechanical stoker, and other important improvements. Developments of this nature cannot be expected to continue indefinitely, and it seems reasonable to expect that the weight of locomotives will soon increase again. The two most important developments in locomotive designing in the past year are the Atlantic type passenger engine of the Pennsylvania Railroad, weighing 240,000 lb., with 133,100 lb. on the drivers, or 66,500 lb. per axle, and the triplex type locomotive recently completed by the Baldwin Locomotive Works for the Erie, which weighs 853,050 lb. complete, with 24 drivers spaced 5 ft. 6 in. between axles and 61,900 lb. on each axle. The average weight, exclusive of tenders, of the locomotives in service in 1911 was reported by the Interstate Commerce Commission to be 150,800 lb., or 33 per cent heavier than in 1902. The average load on drivers for the more recent locomotives now ranges between 50,000 and 60,000 lb. per axle.

Of almost equal importance with the increase in the weight of motive power is the corresponding increase in the weight and capacity of freight and passenger cars. The freight car of 100,000 lb. capacity has now largely replaced those of 60,000 and 80,000 lb. capacity, which were standard a few years ago. Cars of 115,000 lb. capacity have been largely adopted by the eastern roads for coal, coke and ore traffic. Only a few months ago the Chesapeake & Ohio ordered 1,000 cars of 140,000 lb. capacity, while the Norfolk & Western built 750 gondola cars last year with a rated capacity of 180,000 lb. These cars weigh 263,000 lb. with the allowable 10 per cent overload, and although provided with six-wheel trucks, the axle loads reach 43,900 lb., or almost as much as on a locomotive. The Chesapeake & Ohio cars will weigh 210,500 lb. with overload and, as this will be distributed between four axles only, it will give axle loads of 52,625 lb. When it is considered that these cars will probably be run in solid trains, the tremendous burden on the track can be realized.

This tendency to increase the weight of equipment extends to passenger cars also, in whose construction steel is rapidly replacing wood. Although the steel passenger car has come into use only within the past seven years, practically no wooden cars are now being built, and all new equipment of this character is being built of steel or with steel underframes. On January 1, 1914, 227 roads reported to the Special Committee on Relations of Railway Operation to Legislation that they owned 58,660 passenger cars, of which 9,492 were all steel and 4,608 had steel underframes. Of the passenger cars ordered in 1913, 2,765 were of all steel construction and 171 were provided with steel underframes, while only 177 were of wood. When it is remembered that the steel cars weigh from 10 per cent to 25 per cent more than wooden cars of the same design, it can readily be seen that they will result in greater loads upon the track, especially as they are operated in solid trains and on the fastest runs. Recent extensive tests made on the Canadian Pacific and the Pennsylvania have shown that the steel passenger equipment has created as high stresses in the track as many of the locomotives.

While the weights of all classes of equipment are thus seen to be increasing, the statement is occasionally heard that we have now reached the limit of this development because of clearance conditions. It is true that on some roads the clearances now form the limitations, especially in the East. However, it is on the Pennsylvania Railroad, operating through one of the oldest and most congested parts of the country, that these new passenger locomotives with the heaviest axle loads in the country are now operating. Also the present indications are that clearance legislation of a more or less radical nature will be quite generally enacted, in which case many of these narrow clearances will be removed. It should not be assumed, therefore, that clearances will present a permanent barrier, especially in the large area of prairie country west of Chicago.

Not only have the weights of the various units of equipment increased greatly, but the amount of traffic and therefore the frequency of application of the load on the track have also multiplied. The ton-miles of freight hauled per mile of main track increased from 509,348 in 1892 to 938,313 in 1911, or 84 per cent in 19 years. The passenger service rendered has likewise increased from 77,134 passenger miles per mile of main track in 1892 to 122,756 in 1912, or 70 per cent. A more accurate comparison, however, is secured from five-year periods. Taking the five-year period ending with 1911 as compared with that of 1892-96 inclusive, the ton-miles per mile of main track increased 90 per cent. Likewise the passenger density per mile of main track increased 60 per cent.

Speed is an important factor in any discussion of the stresses in track. Here conditions are more nearly stationary. In some instances schedules for freight as well as passenger trains have been shortened. However, it is safe to say that, with the necessity for economy and retrenchment, during the past few years at least an equal number of schedules have been lengthened. The days of ruinous speed wars for passenger traffic seem to be almost over, while, with the growing realization of the economy of operation of heavy tonnage trains, freight schedules are being lengthened and more cars added wherever the traffic will permit. Thus the effect of speed has not been to increase the burden upon the track to any appreciable extent.

DEVELOPMENTS IN THE RAIL

As shown above, the weights of the motive power and equipment and the density of traffic have steadily increased while the speeds have remained practically constant. The net result has been, therefore, an increased burden on the track. The rail is the portion of the track which receives this load directly, and its function is to distribute it to the supporting ties. The rail has been materially improved within the past ten years

*Abstracted from Bulletin No. 167 of the American Railway Engineering Association.

in composition, in section, in weight and in methods of manufacture. This development has been especially pronounced during the last two years, following the deluge of broken rails during the severe winter of 1911-12.

The most important improvement has been in the character of the metal. Bessemer steel rails were first manufactured in this country about 1866 and with the rapidly increasing wheel loads they rapidly replaced the iron rails until a maximum of 3,791,459 tons were rolled in 1906. Increasing wheel loads, however, caused signs of distress and the exhaustion of the high-grade Bessemer ores made it impossible to maintain the previous standards of material. To supply this deficiency open-hearth rails were adopted. Although only appearing first in any appreciable quantity in 1903, they have already passed the Bessemer rails in point of tonnage produced and reached the high figure of 2,527,710 tons in 1913, while the production of Bessemer rails has declined until last year it was only one-third this amount. On January 1, 1912, the open-hearth rails in track were 11.43 per cent of the total as compared with 87.47 per cent of Bessemer and 1.10 per cent of special alloy rails.

Considerable attention has been given to the use of alloy rails as a substitute for Bessemer steel. Prominent among the alloy metals used are nickel-chromium, manganese and ferro-titanium. Nickel-chromium rails have been used in limited quantities on the Central Railroad of New Jersey, the Baltimore & Ohio, and other eastern roads. The tests on the Central Railroad of New Jersey did not prove entirely satisfactory, while those on the Baltimore & Ohio are still in progress. Although these rails have shown considerably increased resistance to wear, the number of breakages has been high. Without further improvement in composition, it seems probable therefore that this alloy will not meet with general adoption.

Manganese steel has come into wide use for frog, switch and crossing construction within the past ten years and to a limited extent for rails in certain locations of very heavy traffic. The advantage of manganese is its great resistance to wear. The most serious objections are its high cost, about $90 per ton, and the difficulty of drilling or cutting it in the track. It is in service in a number of places of heavy wear where it is showing considerable economy. While originally cast, it is now rolled, improving the quality and decreasing the liability of breakage.

Although not properly termed an alloy, as it does not appear in the finished product but passes out with the flux, ferro-titanium has been largely used in recent years. It acts as a scavenger in the molten steel, collecting the impurities and leaving a more sound and homogeneous metal. It met with wide adoption about 1909 when there was so much difficulty with segregation and other allied troubles and the tonnage of ferro-titanium rails reached 256,759 tons in 1910. With the change from Bessemer to open-hearth and with the more strict supervision and improved methods of rail manufacture, however, the use of titanium has decreased.

Although of doubtful value, small quantities of copper alloy rails have been rolled at intervals for different roads, the latest being an order for the Chicago, Milwaukee & St. Paul last year. The basis for the use of this alloy is the composition of some old rails imported from England many years ago which gave excellent service and which were found on analysis to contain a small quantity of copper.

Closely related to the change from Bessemer to open-hearth steel are the new specifications of the American Railway Engineering Association and of several individual railroads requiring more frequent and careful tests of the finished product as well as more careful attention to the methods of manufacture in the mills. The various measures adopted under these specifications have not brought the metal up to the highest point desirable, but they have nevertheless resulted in great improvement. It is unfortunate that defective practices may be detected frequently only after extended service and the remedies are then difficult to apply. In the same way the full benefits of recent improvements in material and in improved mill practice will not be evident for some time.

One of the most important developments in rails during the past ten years has been in section. The American Society of Civil Engineers standard sections were generally used and gave satisfaction until a few years ago, when the deterioration in the Bessemer ores combined with the heavier wheel loads resulted in a large number of base failures in these rails with their thin flanges. To increase the strength of these flanges a number of roads then designed their own sections which they are still using, while the American Railway Association designed two sections which have been adopted on many roads. One is a high section for use where great stiffness is desired, as in high-speed passenger tracks, while the other is a lower section with a heavy head for use in tracks carrying a very heavy, slow-freight traffic. Both of these sections have now been used for five or six years and have shown a great improvement over the earlier sections. There is a feeling among some engineers that the sections can be still further improved but there is at present a stronger sentiment that no more changes should be made until the American Railway Association sections have received a more thorough trial.

It would be assumed that the weight of rails has increased during the past decade with the increase in wheel loads, and an examination of the statistics shows this to be the case. In 1897, 20 per cent of the rails rolled were of 85-lb. sections and over, while 75 per cent were between 45-lb. and 85-lb. section. Five years later these percentages were 22 and 70, respectively. In 1907, 49 per cent of the rails rolled were of 85-lb. section or larger, while in 1913, 64 per cent were of 85-lb. section and over and 28 per cent were between 45-lb. and 85-lb. A summary of the weights of rail in track on January 1, 1912, shows the following percentages:

100-lb. and over	5.85 per cent
90-99-lb.	8.32 per cent
80-89-lb.	32.94 per cent
75-79-lb.	12.81 per cent
70-74-lb.	8.56 per cent
60-69-lb.	18.16 per cent
Less than 60	13.36 per cent

As shown by the percentages of the various weights of rails rolled during 1913, the proportions of the heavier sections, especially between 85-lb. and 100-lb., have increased considerably during the intervening two years so that it is safe to assert that over half the rail now in the track is 85-lb. or heavier. A recent canvass of the sentiment of railway men regarding the proper weights of rail and the advisability of adopting heavier sections showed that it was the consensus of opinion that rail lighter than 80 lb. should not be rolled, but that for the present it was not considered advisable to go to heavier sections than 100 lb. because of the frequent unfavorable results with these heavier sections.

THE TIE

Next to the rail, the tie has received the most attention in recent years. Efforts have been directed principally along the lines of timber treatment to increase the resistance to decay, of the more extended use of tie plates and of screw spikes to reduce the mechanical destruction of the timber and the development of substitute ties of steel or concrete. The greatest progress has been made with the treatment. Starting in this country about 1875 and growing slowly at first, this industry resulted in the erection of 12 treating plants by 1900. Since that time the growth has been especially rapid until now there are nearly 100 plants in operation and several under construction. The number of ties treated annually likewise increased until over 39,500,000 were thus prepared in 1913. Aside from increasing the life of any timber, the great advantage resulting from timber treatment lies in the practicability of using the so-called inferior woods which, without treatment, would not offer a resistance to decay sufficient to justify their insertion in the track.

The cost of treatment varies with the process and with the

amount of preservative injected into the timber. However, the cost of creosote treatment, injecting 10 lb. of creosote per cu. ft., averages about $0.40 per tie, of zinc chloride $0.17 and of the Card process with a combination of zinc chloride and creosote $0.25, according to Forest Service Bulletin No. 118, by Howard F. Weiss.

With the increased expenditures now being made for timber preservation, it may be assumed that more attention is being given to the selection of the treatment best adapted to the particular locality in which the ties are to be placed. Little definite and accurate information of this character is now available, but many roads are now collecting detailed information from test sections placed at representative points on the system and containing ties treated in various manners. At the present time the tendency is distinctly towards the adoption of the creosoting process. At first this did not meet with general favor because of the higher cost of treatment, and W. F. Goltra has estimated that up to 1900, only 500,000 of the 15,000,000 ties treated up to that time had received this treatment as compared with 14,500,000 treated with zinc chloride. However, in 1912 over twice as many ties were treated with creosote as with zinc chloride.

The increasing use of creosote has produced a very severe shortage of this material with a resulting rapid increase in price. The quantity of creosote consumed in the preservation of ties has increased from 56,000,000 gal. in 1908 to 108,373,359 gal. in 1913, over 62 per cent of which was imported. The shortage of high-grade creosote oil was so severe last summer as to force a number of treating plants to close down. To alleviate the shortage somewhat, a practice originating about five years ago of mixing refined coal-tar with the poorer grades of creosote oil to improve their quality, is fast gaining ground. If this is done under proper supervision and with no intention of adulteration, it appears to be justified as a commercial expedient where the high-grade oils cannot be secured.

Intimately associated with the treatment of ties as a protection against decay is the use of tie plates to protect them against mechanical wear. The adoption of tie plates has been very rapid within the past decade, owing to the increasing value of the ties, the heavier wheel loads, and the use of the softer woods. The early tie plates were of small area and only about ⅜ in. thick. As a result they soon broke or buckled, or were forced deep into the tie by the increasing wheel loads. To eliminate these conditions, the size of the plate has been increased to provide a bearing area on the tie sufficient to distribute the load without any serious breaking down of the wood fiber beneath. This has required plates up to 7 in. by 9 in. on many roads. The thickness of the plate has likewise been increased until ½ in. is now regarded as minimum good practice and ⅝ in. is standard on several roads.

The mechanical adzing of ties before insertion in the track is meeting with increasing adoption. There is secured in this way, a uniform bearing on the tie for the tie plate, and therefore, the rail. While most of the adzing is now done at the treating plants previous to treatment, some ties are adzed without treatment. This practice will undoubtedly become more common as its merit becomes evident.

Next to the rail cutting, spike killing is the most destructive mechanical agent tending to shorten the life of ties. The common chisel-pointed spike is universally recognized as being very destructive to timber. This has led to the experimental use of screw spikes, which are not only far less destructive to the fiber of the wood, but also give considerably greater rigidity and strength to the track. Many tests have been made of the relative resistance offered to displacement by cut and screw spikes, which show that the screw spike binds the rail more securely to the tie, and gives a stronger track construction. Over 800 miles of screw-spike track is now in service in this country, all of which has been installed since 1905, and 95 per cent of which has been placed within the past five years.

The principal objections raised to the use of screw spikes are the increased first cost and the greater difficulty of making track repairs and renewals requiring the removal of the spikes. On the other hand, the advantages claimed are the increased life of the ties, the decreased cost of maintenance and greater strength and stability of the track. At the present time screw-spike construction is not practical for lines of light traffic where the maintenance charges are relatively low and the economy is greatest where the maintenance expenditures are high and a higher first cost is justifiable.

In addition to these various measures for the protection of the timber tie a great deal of study is now being given to the development of substitute ties of concrete or steel, and many hundreds of such ties have been designed. Studies along this line are prompted not only by the desire to arrest the continually increasing cost, but also to secure a tie which will give greater strength to the track.

Any substitute tie must combine in large measure the elasticity of the wooden tie with the requisite strength. It must also be of such form as to be manufactured readily and must have a strong and easily-applied fastening for holding the rail and with the increase in automatic block signal mileage, it must also be readily insulated. Nearly all the ties developed so far have failed in one or more of these requirements. Concrete ties do not possess the first requirement of elasticity and break or disintegrate under the severe hammering of the moving wheels. Because of its inherent characteristics, it is doubtful if any concrete tie can be made practical, at least for high-speed main tracks.

While some of the ties now undergoing test will probably prove practical, and others will undoubtedly be designed, the only one which has stood all tests satisfactorily so far and which is being used in any considerable quantities is the Carnegie steel tie. This is an unsymmetrical I-beam section to which the rail is held by bolts and clips. Over 2,000,000 of these ties are now in service. The Bessemer & Lake Erie is the largest individual user, having over 900,000 in track. By 1915 this road expects to have its 300 miles of main tracks entirely equipped with these ties. They have been in service on the Bessemer road over nine years and the present indications are that they will have a life of over 20 years. They cost about $2.50 each, complete with fastenings and have a scrap value of about $0.75.

With the increasing attention now being given to the protection of the wooden tie and to the intelligent conservation of our forest resources, it is doubtful if the timber tie will disappear as rapidly as the conservationists would have us believe. The adoption of a substitute tie will therefore be a gradual process, brought about more by the increasing price of timber than by the absolute shortage of it, and also by the demand for a stronger track structure.

TRACK FASTENINGS

While the rail joint is a very important factor in determining the strength of the track as well as in protecting the rail from battering at the ends, there has not been a radical change in this detail of track construction in the past few years. The base-supported joints of the Continuous, Weber and similar types, which were very generally adopted for main line use about ten years ago, are still widely used. Several types of joints with depending flanges, such as the Bonzano and "100 Per Cent" are also used in large numbers. During the past two or three years, however, there has been a tendency to return to the anglebar strengthened to carry the increasing loads. The anglebar generally adopted has a heavy, reinforced head and to enable higher carbon to be used is heat-treated and oil tempered in most cases to secure the requisite strength. One condition prompting the adoption of the anglebar is the practice on a few roads of laying rail without respacing the ties in which case a non-slotted joint without base supports or depending flanges is necessary.

The track bolt has undergone no important change within the past decade except in the nature of the metal used. A track-

man with the ordinary 33-in. wrench will stretch a ⅞-in. bolt beyond its elastic limit, making it impossible to keep joints tight. To eliminate this difficulty, a bolt is meeting with wide adoption during the past three years, which is made of special steel with an elastic limit of 75,000 lb. instead of 45,000 lb. This not only eliminates the difficulty with stretching but in some instances allows a smaller bolt to be used. Vanadium is also being used experimentally in bolts, while high-carbon steel bolts oil quenched are used in large quantities. Nut locks are being generally used with joint bolts.

The increase in the density of traffic referred to above has increased the stresses developed in the track in another way, not previously mentioned. As this traffic has increased, second, third and fourth tracks have been added and the traffic on each track is all in one direction. As a result, the creeping of the rails found occasionally on heavy grades on single track, becomes severe on double track and frequently introduces very high stresses in the rails and fastenings. This condition has called for another track appliance known as the rail anchor or anti-creeper, whose adoption has received its greatest impetus during the past three or four years, one road of 2,000 miles ordering as many as 225,000 at one time and another over 600,000. Several designs are on the market, and most of which are generally efficient. Their use does not increase the strength of the track in any way, except as they prevent the addition of stresses due to rail movement. They are, however, economical in reducing maintenance expenses.

FROG, SWITCH AND CROSSING CONSTRUCTION

No other elements of track construction receive more severe wear than frogs, switches and crossings and with the rapid increase in the density of traffic there arose a demand for some form of construction which would give a longer life than the ordinary Bessemer or open-hearth construction. While these latter steels are still generally used in locations of light or medium traffic, there has been a rapid development in the manufacture and use of manganese steel at these points of heavy wear. At first considerable difficulty was encountered from the breakage of the manganese castings in service. Within the past two or three years, however, this danger has largely disappeared. As a result this material is now meeting with wide adoption wherever the life of the adjoining rails is 2 or 2½ times that of a Bessemer frog.

The Pennsylvania and several other eastern roads are using full-length switch points made of this metal. Other roads are using short points of manganese, fastened to the main switch rail and absorbing the severe wear at the point.

Another detail of track construction in which manganese is coming into use is in guard rails and within the past two years two or three different types have been introduced which are meeting with ready adoption. Considerable improvement has also been made in the design of clamps and filler blocks to hold the guard rails rigidly in position, thereby giving greater protection to the frog. The Conley frog with a raised wing to guard the wheel flanges in their proper course, thereby eliminating the necessity for a guard rail, is also being more widely used. This frog has recently been made of manganese and has also been designed as a spring frog.

BALLAST AND ROADBED

While the ballast and roadbed are more properly the foundation for the track construction than essential elements of it, the same general increase in strength is found here. As the wheel loads and the traffic have become heavier, there has been a gradual but continuous movement from the unballasted or mud section to the sand, gravel, slag, or cinder ballast and finally to crushed stone. On those roads with the heavier traffic the depth of stone ballast has been steadily increased until on the Pennsylvania it has reached a standard of 18 in. Extensive laboratory tests show that an approximate depth of 24 in. of good ballast is necessary to distribute the wheel loads evenly. Considerable attention is now being given to the feasibility of using a bottom layer of gravel, cinders or other less expensive material, covered with broken stone to secure the desired depth at less expense and to provide a more easy-riding track, while at the same time preventing the stone from cutting into the subgrade.

The same general situation exists with reference to the roadbed. With the lighter loads, banks 14 ft. and 16 ft. wide were common. Increasing maintenance charges have made it economical to widen these banks to 18 ft., 20 ft., or 22 ft., and also to give more attention to their drainage.

THE PRESENT SITUATION

From the above it can be seen that the development in all details of track construction has been marked during the past decade. In spite of all these improvements there is a prevalent impression among railway men that even more money should be spent for heavier rail, more and better ballast, wider banks, etc., to secure a still stronger track. It will be instructive to endeavor to ascertain to what extent this impression is sustained by the facts, and also to what extent the track is showing fatigue as compared with former years. Two measures by which the relative strength of the track can be estimated roughly with reference to the traffic it carries, are the trend of maintenance expenditures and the number of derailments due to defects of roadway and track.

The average annual expenditure for maintenance of way and structures per mile of line has increased from $877 for the five-year period 1892-96, inclusive, to $1,451 for the five years ending with 1911, the last year for which the complete statistics of the Interstate Commerce Commission are available, showing an increase of 66 per cent in 15 years. Since these figures are on the "per mile of main line" basis, the increase in main line mileage has already been taken into account. However, during this period the percentage of other main and side tracks has risen from 31 to 45 per cent of the first main track mileage. Therefore, while the proportion of other than first main tracks has risen 14 per cent in this time, since these tracks only require about 40 per cent of the expenditure of first main tracks, it may be assumed that 6 per cent of the increase in expenditures per mile of the line has been due to this cause.

Likewise, the growth in traffic has contributed to this increased cost of maintenance, although it is difficult to determine the exact extent. Some items such as repairs to fences and buildings are independent of the traffic. Others such as ties and ballast are affected to some extent, while still others such as rail are affected almost directly. In his monograph describing the studies made on the Union Pacific prior to its reconstruction, J. B. Berry has estimated that 37.3 per cent of the charges for maintenance were affected directly by the

Distribution of Maintenance Expenditures

Maintenance of Way and Structures	Per cent of total expenses	Per-centage affected	Net increase for traffic
Superintendence	0.963	0	0.00
Ballast	.423	25	0.106
Ties	2.992	25	0.748
Rail	.897	100	0.897
Other track material	1.021	70	0.715
Roadway and track	7.023	60	4.214
Removal of snow, sand and ice	.217	0	0.00
Tunnels	.049	0	0.00
Bridges, trestles, culverts	1.565	10	0.157
Over and under grade crossings	.068	0	0.00
Grade crossings, fences, cattle guards and signs	.348	0	0.00
Snow and sand fences and snowsheds	.021	0	0.00
Signals and interlocking plants	.550	40	0.220
Telegraph and telephone lines	.183	10	0.018
Electric power transmission	.026	0	0.00
Buildings, fixtures and grounds	1.778	0	0.00
Docks and wharves	.165	10	0.017
Roadway tools and supplies	.242	60	0.144
Injuries to persons	.104	33	0.035
Stationery and printing	.040	0	0.00
Other expenses	.024	0	0.00
Maintaining joint tracks, yards, and other facilities—Dr.	.728	40	0.292
Maintaining joint tracks, yards, and other facilities—Cr.	.555	40	0.222
	18.872		7.341

number of trains. In the accompanying table, showing the distribution of maintenance expenditures for 1911 for class A roads comprising 88 per cent of the entire mileage of the country, as reported by the Interstate Commerce Commission, together with an estimate of the extent to which each item is affected by traffic, 38.8 per cent of the expenditures for maintenance are shown to vary with the traffic.

The wear upon the track is dependent upon the tonnage and also upon the number of trains. It is evident that in view of the large increase in the average train load during the past 20 years, the wear on the track has increased more than 8 per cent, which is the increase in train miles. On the other hand, the average load per car and the percentage of revenue to dead load have so increased that the wear on the track has not increased the 98 per cent that the revenue ton-miles have, since 1892. The increased wear due to traffic lies somewhere between the 8 per cent increase in train-miles and the 98 per cent increase in ton-miles. Simply as an approximation and with a desire to be conservative, we will assume that the increase in the wear of the track is influenced two-thirds by the revenue ton-miles and one-third by the revenue train-miles. This is equivalent to an increase of 68 per cent in those maintenance charges directly affected by traffic. Upon the basis of the two analyses made above, 38 per cent of this increase will be reflected in increased maintenance charges and is equivalent to a net increase of 26 per cent in these expenditures.

The average rate paid for labor increased 18 per cent in this period. As approximately 60 per cent of all maintenance expenditures are for labor, this accounts for 11 per cent more of this total increase.

While it is impossible to determine accurately the extent to which the expenditures for maintenance materials have increased in unit costs, the increased wear having been accounted for under the increase in traffic, it will be ample to place this at 25 per cent (ties having increased perhaps 60 per cent and rails less than 10 per cent). As only 40 per cent of maintenance expenditures are for materials, this is equivalent to an increase of the total of 10 per cent.

Deducting 6 per cent for the increased proportion of secondary track mileage, 26 per cent for the increase in traffic, 11 per cent for the increased cost of labor and 10 per cent for the increased cost of material, or a total of 53 per cent from the total increase of 66 per cent, there still remains 13 per cent or practically one-fifth of the total increase unaccounted for. From the necessarily approximate nature of some of the assumptions made, it cannot be said with absolute certainty that the remaining increase of 13 per cent is due either to higher standards of track maintenance or to the necessity of spending more money to maintain the tracks to their proper standard. However, such is the natural and reasonable conclusion, especially in view of the wide margin of increase otherwise unaccounted for.

A close check upon the trend of maintenance expenditures is given by the number of men required to maintain a unit of track. The above conclusion is borne out by the fact that the number of men employed per 100 miles of line has increased 45 per cent in 15 years. Deducting the same increase of 6 per cent for increased track mileage and 26 per cent for increased traffic, we have a net increase of 13 per cent in the number of men required to maintain the tracks, checking the 13 per cent increase in expenditures.

Turning to the record of derailments due to defects of roadway and track, the quarterly accident bulletins of the Interstate Commerce Commission classify all derailments resulting in personal injuries or damages in excess of $150 under certain general heads. This record shows that those derailments due to defects of roadway and track were 257 per cent more numerous in 1913 than in 1902, when these accidents were first published in tabular form, while those due to defects of equipment increased 174 per cent and the total number increased 149 per cent in the same period. It is not fair to assume that the increase of 149 per cent in the total number of derailments in this period fairly represents the total number of derailments in these years, for undoubtedly a considerable portion of this increase is due to greater completeness and accuracy of the derailment reports as a result of increased attention to this subject on the part of the Interstate Commerce Commission and the railways. However, the relative proportions of this total due to defects of track and of equipment, with reference to each other and to the total, should not be materially affected.

Analyzing these derailments due to defects of roadway and track for the ten-year period and eliminating those due to bad ties and sun kinks, which combined form less than five per cent of the total, it is seen that those due to irregular track have increased 253 per cent, those due to soft track 215 per cent, those due to spread rail 100 per cent, and those due to broken rails 93 per cent. Thus there are three classes of derailments which are increasing faster than broken rails, all of which are due to a very large extent to lack of labor rather than material. The logical conclusion is that the track is not as strong relatively as it was 20 years ago, and that it should be strengthened in design and materials to decrease the number of failures, and to reduce the ultimate cost of maintenance.

Unlike other engineering structures, the track is capable of analytical design only to a limited degree. The only practical way by which this subject can be intelligently studied is by making an elaborate series of tests, carefully planned, to secure information under a wide variety of conditions. It is therefore highly gratifying to know that a joint committee of the American Railway Engineering Association and the American Society of Civil Engineers has been formed within the past six months to study this subject and that sufficient funds have been placed at its disposal to insure a thorough investigation. The results of this, the first elaborate study of its kind, should go a long way towards securing a track construction based on scientific principles and of sufficient strength properly to carry the loads placed upon it.

CONCLUSIONS

(1) The loads imposed on the track by locomotives and cars have materially increased within the past few years and bid fair to increase still further.

(2) Almost every part of the track has been materially strengthened or improved within the past few years.

(3) It would appear that the cost of maintenance has increased faster than the traffic, while the number of derailments due to defects of roadway has materially increased at the same time.

(4) One is therefore forced to conclude that development in the construction of track has not been and is not keeping pace with the increase in the service demanded of it.

A COMBINATION POCKET RULE AND LEVEL

The Lufkin Rule Company, Saginaw, Mich., is manufacturing a 2-ft. folding boxwood rule fitted with a spirit level on which patents are pending. The three 8-in. rule sections are each 1 in. wide, 3/16 in. thick and united by substantial brass joints. The rule is fully graduated for its entire length on both sides, one side in inches to eighths, and the other side to sixteenths. The spirit level is neatly set into and flush with the upper edge of the middle section of the rule where it is most convenient for use and securely protected by the two outer sections of the rule which fold against it on either side when closed for carrying in the pocket. Closing pins especially designed for the purpose hold the sections of the rule in proper alinement insuring a perfect bearing surface.

ABSTRACT OF ENGINEERING ARTICLES

The following articles of special interest to engineers and maintenance of way men, and to which readers of this section may wish to refer, have appeared in the *Railway Age Gazette* since September 18, 1914:

Practical Considerations in Design of Large Stations.—The features which should be studied in planning a large passenger terminal to reduce the operating costs were very carefully considered by the officers of the Kansas City Terminal Railway in designing the new union station. A discussion of these features as applicable to all large stations, written by A. H. Stone, assistant engineer, Kansas City Terminal, was published in the issue of September 25, page 555.

New Passenger Station at Pocatello, Idaho.—A short illustrated description of the passenger station which the Oregon Short Line is building at Pocatello, Idaho, was published in the issue of September 25, page 562.

Methods of Artificial Lighting for Railroad Offices.—A discussion of the requirements of artificial lighting and the advantages of indirect lighting in offices and drafting rooms by John A. Hoeveler, an illuminating engineer, was published in the issue of September 25, page 565.

New D. L. & W. Freight Station at Utica, N. Y.—An illustrated description of a modern inbound freight house recently built by the D. L. & W. at Utica, N. Y., was published in the issue of September 25, page 577.

Clearing Interchange Yard for Chicago District.—The important features of design and construction of the new clearing hump yard at Chicago, the largest gravity yard in the world, were described and illustrated in the issue of October 2, page 603.

An editorial discussion of this design was published in the same issue, page 590.

How Can Engineers Best Utilize the Technical Journals?—An abstract of a paper by John W. Alvord, consulting engineer, Chicago, containing useful suggestions as to methods of retaining for future use, data from current periodicals, was published in the issue of October 2, page 615.

New Hocking Valley Coal Dock at East Toledo, O.—An illustrated description of the new coal dock of the Hocking Valley at East Toledo, Ohio, providing two tipples, each with a capacity of 40 cars per hour, and a 3,000-car storage yard, was published in the issue of October 9, page 647.

New Algoma Central Engine House and Shops.—A rectangular engine house of steel frame construction has recently been built by the Algoma Central at Sault Ste. Marie, Ont., the design being adopted principally on account of climatic conditions. The reasons for this design and the details of construction were included in an illustrated article in the issue of October 16, page 698.

An editorial comment on this rectangular engine house was published in the same issue, page 682.

Tests of Vanadium Steel Rails.—A description of laboratory tests on the first steel rails ever rolled with vanadium alloy was published in the issue of October 16, page 704.

An editorial comment on this new development in rail manufacture appeared in the same issue, page 681.

MAINTENANCE OF WAY MASTER PAINTERS' CONVENTION

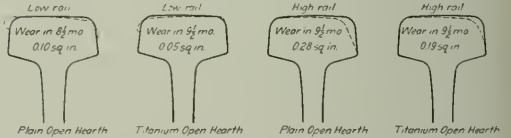
The eleventh annual convention of the Maintenance of Way Master Painters' Association will be held in the Hotel Tuller, Detroit, Mich., November 17-19, inclusive. The program includes the following papers: Proper Glazing, by Fred Rieboldt, general paint foreman, C. M. & St. P., Milwaukee, Wis.; Interior Finish and Painting of Concrete, by W. R. Parker, John Lucas & Co., Inc., Chicago; Bridge Staging, by C. H. Plummer, foreman painter, C. R. I. & P., Topeka, Kan., and H. B. Wilson, B. & L. E., Garric, Pa.; Fire Retardant Paint (illustrated by stereopticon) by H. A. Gardner, Institute of Industrial Research, Washington, D. C.; Paint Defects, Their Cause and Cure, by J. H. Wykes, National Lead Company, Chicago, and the Economy of Skilled Mechanics, by William H. Brown, Painters' Magazine, New York. In addition to the regular program the following open questions will be discussed: Does It Pay to Use Good Paint on Stations; Best Methods of Enameling Woodwork; Sanitary Conditions and Cleanliness Around Bunk Cars; Priming and Patchwork Done by Carpenter Gangs; Making Estimates on Bridge Painting; Is it Economy to Use Putty on Roundhouse Windows; Safety First as Applied to Handling Bunk Cars; Does Painting Roofs Act as Fire Protection; Is it Economy to Have Switch Stands and Targets Done by Section Forces; The officers of this association for the past year include, C. H. Plummer, president, C. R. I. & P., Topeka, Kan., and T. I. Goodwin, secretary-treasurer, C. R. I. & P., Eldon, Mo.

THE PRESENT STATUS OF FERRO-TITANIUM IN RAIL MANUFACTURE

In the widespread investigations of the rail problem during the past few years one of the defects most frequently encountered has been that of segregation. So common has this condition become that it was stated on the floor of the convention of the American Railway Engineering Association a year ago that 50 per cent of the rail failures would be eliminated by securing sound metal of comparatively even composition. As a result attention has been directed very largely toward the making of sound metal, free from segregation, and various methods have been advanced, prominent among which has been the addition of titanium to the metal in the ladle previous to pouring. When used in moderate quantities the commercial alloy, ferro-carbon titanium, is a powerful deoxidizer, which liquefies the slag and assists in removing the oxides and other impurities, passing off with the slag and leaving but slight trace of its presence in the finished product.

Titanium was first used commercially as a scavenger of steel in 1907, since which time it has been widely adopted in the manufacture of steel for a wide variety of uses. Naturally, one of its early applications was in rail steel. At the time of its introduction into this field the production of Bessemer rails had reached its high point and had started on its rapid decline, being replaced by open hearth steel. However, the tonnage of Bessemer rails produced still exceeded that of open hearth rails until 1911, so that the first applications of ferro-titanium were with Bessemer steel.

A number of difficulties were encountered here. In the first



Typical Comparisons of Rail Wear on Low Rails Selected from One Road and High Rails from Another

place, the specifications governing the use of ferro-titanium in Bessemer steel require that the steel shall be allowed to stand in the ladle three minutes after the alloy has been added before pouring, to enable the titanium to permeate the entire charge, and that the slag from the ladle shall be dumped after each pouring. As the mill men are paid on a tonnage basis, and this delay tended to decrease the output of steel, this requirement met with their opposition and they disregarded it as far as possible. Furthermore, as the application of ferro-titanium to rail steel was a new departure later developments have shown that certain errors were made by the manufacturers of the alloy in the amount of titanium recommended for use and in other details. These conditions, encountered at the time when the Bessemer ores were rapidly deteriorating, gave rise to several failures, which have seriously retarded the more general adoption of this alloy. However, numerous other orders rolled at this time have given very satisfactory results.

With the rapid substitution of open hearth for Bessemer rail steel, and the prospects that the production of Bessemer rails will continue to decrease, efforts directed toward the more general introduction of ferro-titanium have now been concentrated on open hearth steel. Here the reception has naturally been slow, although the tonnage of titanium open hearth rails in the track has been increasing steadily. With the adoption of open hearth rails with the consequent increase of about $2 per ton in cost, there was a natural hesitancy on the part of the railroads about incurring further expense for titanium until there was an opportunity to see to what extent the substitution of open hearth steel alone would accomplish the desired improvement. It was soon found that

open hearth steel presented the same problems of segregation that were present before. Accordingly, a number of roads have used titanium with open hearth rails in considerable quantities since 1910.

The advantages claimed for the ferro-titanium treatment are increased resistance to wear and a reduced number of breakages. With the desire of ascertaining to what extent these results are accompanying the addition of titanium to rail steel, the manufacturers are conducting careful and extensive investigations in the laboratory, and at the same time are watching closely the service of these rails in the track. Beginning with last year, samples of A-rails have been secured from each rolling of titanium-treated rails, accompanied, wherever possible, by similar samples of untreated rails rolled under the same specifications in the same mill order, and under as nearly as possible the same general conditions. These samples are selected by the inspectors at the mills at the time of rolling, and are sent to the laboratory, where unusually thorough investigations have been conducted. Seventeen such comparisons have already been completed and made public by the manufacturers through a series of seven rail reports. These tests include not only the ordinary chemical analyses and physical tests for elastic limit, ultimate strength, elongation and reduction of area, but in addition four special physical tests, including the Brinnel hardness test, an impact resistance test, the White-Souther test, whereby a specimen is subjected to a reversal of stresses at the rate of 2,600 reversals per minute, until failure or a maximum of 40,000,000 reversals, and the Landgraf-Turner endurance test, in which a specimen is bent backward and forward through a small angle at the rate of 400 blows per minute. As the complete results of all of these tests have already been made public through the series of rail reports, the results will not be discussed here other than to point out the more uniform character of the material and the greater endurance of the treated rail.

In actual practice the importance attached to segregation is shown by the clause inserted in the tentative specifications of one important eastern road requiring that the percentage of carbon in the web shall not exceed that in the head of the rail over 12 per cent. To determine the influence of titanium in reducing the segregation within these limits, 79 heats of plain open hearth and 31 of titanium-treated open hearth rails with the standard percentage of 0.10 per cent of titanium were rolled recently under the same conditions and with the standard discard of 9 per cent at one of the eastern steel mills for three eastern roads as a part of larger commercial orders and analyses of the A-rails were made in compliance with these proposed specifications. The average variation in the carbon content of the samples from the heads and webs of the specimens rolled from untreated steel was 17 per cent and the maximum variation 40 per cent, while only 29 of the 79 heats were under the required maximum limit of variation of 12 per cent. On the other hand, the analyses taken from the 31 heats to which 0.1 per cent of titanium had been added showed an average variation of 3.1 per cent and a maximum variation of 11.5 per cent, the one heat with this maximum being the only one which failed to comply with the specifications.

Owing to the limited time that titanium-treated open hearth rails have been in the track, no conclusive data can be secured at this time, either regarding decreased rail failures or increased wear. However, as these rails have now been in service up to a maximum of four years, considerable data are available for comparative purposes.

With reference to breakage, the records of the Chicago & Alton, while limited, are perhaps the most accurate. This road purchased 22,000 tons of 90-lb. open hearth A. R. A. type-A rail in 1913 from five different mills, 6,000 tons of which were treated with 0.1 per cent of titanium. These rails have now been in the track from 15 to 18 months and up to September 15 there have been 14 failures in the untreated rails and none in the titanium rails.

However, the greatest attention has been directed towards titanium-treated rails because of the claims made for increased wear. Wherever possible, the manufacturers have endeavored to have experimental sections of rail so laid that direct comparisons may be made with other rails rolled in the same year, under the same specifications and at the same mill and carrying the same traffic under the same conditions of grade and curvature. In most cases this has not been realized in its entirety and since the rails are laid by the railroad companies with their forces, it has been found that where titanium-treated rails have been laid on curves, the entire curves have been relaid, making a direct comparison impossible. As a result, it has been necessary to compare the wear of these rails with that on other rails on similar curves carrying similar, but not the same traffic. Measurements of the wear of the rails in these test sections in the various locations have been made from time to time by R. W. Hunt & Co., acting for the manufacturers, and the results of several such tests so far as they have now progressed are given below.

The tests of longest duration are those on the Boston & Maine, the Boston Elevated, the Delaware & Hudson and the Lehigh Valley. Although recent measurements have been made of these rails on some of these roads, the results are not yet available and since the data secured at the last previous measurement have already been published it will not be repeated here.

One of the more recent measurements is that made on the Chicago, Milwaukee & St. Paul during the past summer. Titanium rails of 90-lb. A. R. A. type-A section were laid on an 8-deg. curve and two per cent grade near Grace, Mont., in August, 1913. After 9½ months' service, measurements showed a total average loss of head of 0.0717 sq. in., or 0.018 sq. in. per million tons moving over them. The closest comparison that could be made on any curve laid with standard open hearth rail was a 10-deg. curve on a 1.7 per cent grade near Garcia, Wash., where 90-lb. open hearth A. R. A. type-A rails were laid in September, 1913. After 8½ months' service these rails showed a loss by wear of 0.14 sq. in., or 0.0639 sq. in. per million tons of traffic. This gives a ratio of wear of 1:3.55 in favor of the titanium, although the differences in the location of these curves introduce an element of inaccuracy. Similar comparisons of the wear per million tons on all 10-deg. curves on the Rocky Mountain, Columbia and Coast divisions of the St. Paul showed the following ratios: Titanium 1.00, open hearth rails on Rocky Mountain and Columbia divisions 1.52 and open hearth rails on the Coast division 2.72.

Measurements have also been taken on 10 ferro-titanium open hearth rails with 0.1 per cent of titanium, and two standard open hearth rails in the eastbound track of the Atchison, Topeka & Santa Fe between Morely, Colo., and Wootton. These rails were laid in 10-deg. curves on a 3.5 per cent compensated grade descending. The titanium rails were laid in the track in August, September and October, 1912, while the standard open hearth rails were laid in September, 1913. Calculated upon the basis of one million tons moving over the rails, the average wear of the 0.1 titanium-treated rails was 0.0335 sq. in. and of the standard open hearth rails 0.12 sq. in. Assuming the wear on the 0.1 per cent titanium-treated rails as 1.0, the relative wear on the untreated rails was 3.58.

Because of the small number of standard open hearth rails measured in the eastbound track, three rails of this same character were measured in the westbound track after having been in service from August, 1913, to March, 1914. Again assuming the loss per million tons for the 0.1 per cent titanium-treated open hearth rails as 1.0, the wear of the standard open hearth rails in the westbound track is 3.43. While the service demanded of the rails at this point on the Santa Fe is unusually severe, the small number of standard open hearth rails measured for comparison renders the result somewhat inconclusive.

CARE IN UNLOADING MATERIAL

By Chas. L. Van Auken

Consideration of the fact that the cost of handling freight at terminals is frequently greater than the cost of transportation between the terminals, and also that the demoralization to a track gang when material has to be redistributed, shows that while unloading track material cheaply and with the least amount of labor is a problem of great importance, it is of equal or greater importance that the correct quantities of materials be unloaded, and that these quantities be correctly spaced along the right-of-way. Economy in unloading track material may be very easily offset by the increased cost of track laying if there is too much or too little material, or if it is not placed conveniently. This is especially true when relaying rail, building double track or putting in new switches. If track is being laid with a track laying machine, the materials are used immediately as distributed in order to provide a track on which to move the machine forward; thus the distribution of rails and angle bars is correct, the ties are usually handled correctly by the machine, and the problem narrows itself to the proper loading of the material, and to the distribution of the finishing material behind the machine. Again, even if there is poor distribution of spikes, bolts, etc., behind a track laying machine, the "dumpy" may be used advantageously to redistribute the material, and anything lacking is easily obtained from frequently passing material trains.

When building a second track the material is usually distributed by a work train, which necessarily uses a track on which there is more or less traffic, and the problem of proper distribution of materials becomes a serious one, requiring the best of supervision. The material is generally distributed far ahead of the track gang; in fact, the work train may have been taken off the work entirely when track laying begins; then if there is a shortage of rail the track gang will be forced to transport rails by hand or "dumpy" until a work train can be procured to distribute more rails. It is better for the track laying gang if there are too many rails and ties rather than too few. However, all surplus material must afterwards be loaded, which is an unnecessary expense. Shortage of ties tends to temporarily break up the organization of the track layers, for if the men are properly placed to handle the work when the ties are properly distributed some part of the gang will be underworked or overworked when there is a shortage of ties. Also when fill-in ties arrive, after the track is laid, the organization must be broken up to go back and finish up the track.

When distributing rails with a work train on a track under regular traffic, the train is frequently run to a siding to let another train pass. In these intervals the gang should be kept busy setting up the rails end to end on the shoulder of the grade. If there is time to set up all the rails in this manner, the distribution will be absolutely correct, giving a corresponding advantage when laying or relaying track.

If just enough rails and ties are unloaded, and yet they are not properly placed, i. e., if they are unloaded in bunches, the redistribution must be made with a "dumpy" on the main track, and the "dumpy" must usually be protected by flagmen, which again means the breaking up of the rail gang organization.

All of these arguments may not be necessary to prove that track material should be properly distributed; that fact is apparent, but nevertheless it is true that many times track material is not properly distributed. Correct distribution from the main track can be obtained by noting the standard length of track rails, spotting the material train with respect to the rail joints, and unloading spikes, angle bars, ties, etc., in the proper proportion. If it is desired to keep the train in motion while distributing any material or materials (such as is frequently done in distributing bolts, spikes, angle bars, etc.), an easier method is to gage the distribution by the position of telegraph poles, which are spaced at standard distances and can be seen without trouble by the men on the cars.

It is important to have the proper amount of switch material on the work train and to see that the complete material for each switch is unloaded. While advisable, the distributing of the different parts is not so important as in track laying.

The importance of having on hand all the material required before starting a job cannot be over-estimated. Lack of material causes loss of money while a gang is being delayed, and causes a demoralization of the gang organization. The men soon find out that there is a delay, and become indolent on the work which the foreman improvises in order to kill time. Then when real work starts again, it is a hard task for the foreman to get the laborers in the habit of working.

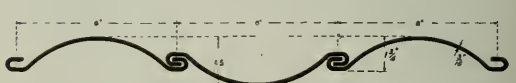
It is easy to obtain tables which show the number of spikes and track bolts per keg, and nut locks are also furnished in boxes containing a certain number. These materials and angle bars or joints can be unloaded while the train is in motion. It is necessary, of course, to exercise care on high embankments, for if a keg falls on its side, it will roll to the bottom. In general, however, it is possible to drop the keg so it will fall on end and will not roll. The writer once distributed spikes, bolts, nut locks, angle bars and joint ties for four miles of relaying, without stopping the train more than two or three times. The gang was composed of American hobos, who are more easily handled on work of this kind than foreigners.

Trainmen who have seen much construction work and who are willing to constantly assimilate new ideas, make the best men for work trains. It is advisable to keep the same crews on the same kinds of work as far as practicable. Spotting cars carefully is necessary in loading and unloading track material. For this reason the engineer should use the air consistently, so that the trainmen can estimate just when to give the stop signals. Some engineers never make two stops the same, and they are the despair of the foreman, and of the conscientious trainman. Too great emphasis cannot be laid upon the importance of spotting unloading trains systematically by reference either to rail joints or to telephone poles, and then having exactly the same amount of materials unloaded at each spot.

A NEW TYPE OF SHEET PILING

A new type of steel sheet piling which is cold rolled from steel plates has recently been placed on the market by the Lackawanna Steel Company, Buffalo, N. Y. This section has a width of eight inches between joints, the metal is 3/16 in. thick and the completed wall 2 9/16 in. thick. The weight per sq. ft. of wall is 11.5 lb., and the weight per lineal foot of section is 7.66 lb.

This sheet piling is particularly adapted to use as a cut-off



The Lackawanna Plate Sheet Piling

wall in levee construction, a core wall in an earth dam or a cut-off wall around a masonry foundation in saturated soil. The advantages under these conditions are its low weight and cost per sq. ft. of wall, the higher resistance offered to the passage of water and its immunity from attack by the teredo and natural decay which would affect timber. It is claimed that its method of manufacture insures uniformity in all sections and that the form of interlocks used gives free driving as well as great resistance against the passage of water.

Wood Preserving Industry May Suffer From War

Suggestions for Avoiding Possible Injury Resulting from a Shortage in the European Creosote Supply

By Clyde H. Teesdale

In Charge of Wood Preservation Forest Products Laboratory, Madison, Wis.

The present European situation has had a very serious effect upon the wood preservation industry in this country. At the beginning of 1914, there were 94 treating plants in the United States, with an aggregate annual capacity of over 300,000,000 cu. ft. of timber. Actually 153,613,888 cu. ft. were treated in 1913. Of this, over 106,000,000 cu. ft. were treated with creosote, 36,000,000 cu. ft. with zinc chloride, and 8,000,000 cu. ft. with a mixture of creosote and zinc chloride. A total of over 108,373,000 gal. of creosote was consumed. Of this, 41,700,000 gal. was produced in this country, and over 66,673,000 gal., or 62 per cent of the total used, was imported, principally from Germany and England. The present crisis in Europe has cut off entirely the supply of oil from Germany, and much of that from England, and consequently a very serious shortage is imminent.

It would seem possible for the United States to be wholly independent of Europe for its wood preservatives, and it should not be necessary to shut down a single treating plant, or to reduce the amount of timber now being treated because of the threatened creosote shortage. There appear to be seven possibilities of solving the question:

1. An increased use of zinc chloride.
2. The use of the so-called empty cell processes.
3. The use of mixtures of creosote and zinc chloride.
4. The use of water-gas-tar creosote.
5. Mixing creosote with crude oil.
6. The use of wood-tar creosote.
7. The use of sodium fluoride.

1. *Zinc Chloride.*—The best known preservative that could be substituted for creosote is zinc chloride. The value of this preservative has been thoroughly tested out during the past 80 years. In some situations, it does not add as much to the life of timber as creosote, and with the prices which have prevailed the annual charge against a creosoted crosstie has been less than for one treated with zinc chloride. The following table (from Forest Service Bulletin 118) gives the estimated saving due to the treatment of crossties with preservatives:

Species	Estimated life			Cost of ties			Annual charge in track			Annual saving of treated over untreated ties	
		Treated			Treated			Treated		Treated	
	Untreated	10 lb. creosote per cu. ft.	½ lb. $ZnCl_2$ per cu. ft.	Untreated*	10 lb. creosote per cu. ft.	½ lb. $ZnCl_2$ per cu. ft.	Untreated	10 lb. creosote per cu. ft.	½ lb. $ZnCl_2$ per cu. ft.	10 lb. creosote per cu. ft.	½ lb. $ZnCl_2$ per cu. ft.
	Yrs.	Yrs.	Yrs.								
Black locust	20	..	..	†$0.60	..	..	$0.080	...	...	...	...
Redwood	12	..	..	.53	..	..	.104	...	...	...	...
Cedar	11	..	..	.46	..	..	.103	...	...	...	...
Cypress	10	..	..	.41	..	..	.104	...	...	...	...
White oaks	8	..	..	†.60	..	..	.155	...	...	...	...
Longleaf pine	7	20	..	†.52	$0.89	..	.159	$0.103	..	$0.056	..
Chestnut	7	14	11	.44	.81	$0.61	.145	.122	$0.121	.023	$0.024
Douglas fir	6	15	11	.41	.78	.58	.160	.114	.118	.046	.042
Spruce	6	14	11	.49	.86	.66	.175	.127	.127	.048	.048
Western pine	5	17	12	.53	.90	.70	.215	.115	.123	.100	.092
White pine	5	14	10	.43	.80	.60	.192	.121	.129	.071	.063
Lodgepole pine	5	16	11	.46	.83	.63	.199	.113	.124	.086	.075
Tamarack	5	15	11	.41	.78	.58	.187	.114	.118	.073	.069
Hemlock	5	15	11	.33	.70	.50	.169	.106	.108	.063	.061
Red oaks	4	20	12	†.45	.82	.62	.240	.098	.114	.142	.126
Beech	4	20	12	.36	.73	.53	.214	.090	.104	.124	.110
Maple	4	18	12	†.45	.82	.62	.240	.104	.114	.136	.126
Gum	3	16	11	.52	.89	.69	.338	.119	.131	.219	.207

* In most cases, prices quoted were taken from report on "Crossties Purchased 1909," Bureau of Census.
† Prices quoted based on general observations..

In this table, creosote was assumed to cost about 8 cents a gallon, placement in the track 15 cents a tie, and tie plates 25 cents a tie with interest charges at .5 per cent. Should the present situation result in a material increase in the price of creosote, it is obvious that the annual charge for ties treated with zinc chloride would become the lower, and its substitution for creosote, to a large degree, would be warranted on the basis of cost.

2. *Empty Cell Treatments.*—A large amount of timber has been treated with creosote by the so-called empty cell processes. Usually ties, bridge timbers, etc., are treated with 10 or 12 lb. of creosote per cu. ft. By the empty cell process, however, this can be reduced to 5 or 7 lb. per cu. ft.

3. *Mixtures of Creosote and Zinc Chloride.*—In 1913, 8,000,000 cu. ft. of timber was treated with a mixture of creosote and zinc chloride. In this case, about 3 lb. of creosote is usually injected into each cu. ft. of timber. Both of the above processes possess merits, and in the last few years have been used widely. It seems likely that the present situation can be partially relieved by an increased use of such methods, in which a smaller amount of creosote is required to treat a given volume of timber.

4. *Water-gas-tar Creosote.*—Further relief could also be had by utilizing creosote from water-gas-tar. A large amount of the water-gas-tar produced is now burned or thrown away. Much has been used for treating timber, usually in mixtures with coal-tar creosote. In composition it is very similar to the latter, but probably has less value in preventing decay. In experiments now being made by the Forest Products Laboratory, untreated specimens of southern pine were destroyed, after nine months' exposure in the Gulf of Mexico. Specimens treated with water-gas-tar creosote and coal-tar creosote were practically sound, however, after two years and are still in service. A pile was removed from Pensacola bay, Florida, after 33 years of service and was in fairly good condition. An analysis of the oil in this pile showed that it was very similar in composition to much of the water-gas-tar creosote now being made. It seems possible, therefore, that piling for service in salt water could be treated with water-gas-tar creosote with excellent results. Certainly it would pay much better to use this product than to drive piling that has not been protected from the borers.

5. *Creosote and Crude Oil Mixture.*—One of the important qualities of a wood preservative is its toxic property, or its power to poison the food supply of the organism that causes decay. In experiments made at the Forest Products Laboratory by the so-called "Petri dish" method, 0.55 per cent of a coal-

tar creosote prevented the growth of *Fomes annosus,* and 0.225 per cent prevented the growth of *Fomes pinicola,* both of which are wood-destroying fungi. If these figures could be applied directly to the case of treated wood, only 0.343 and 0.140 lb. of creosote per cu. ft. respectively would be required to prevent attack. These data indicate that the amount usually injected into wood is from 20 to 50 times greater than the amount actually required to prevent attack. In the case of zinc chloride, 0.50 per cent was required to prevent the growth of *Fomes annosus,* and 0.75 per cent for *Fomes pinicola.* This corresponds to 0.312 and 0.468 lb. per cu. ft. respectively. Usually 0.5 lb. of zinc chloride is injected into the wood, and excellent service results have been obtained. It would seem obvious, therefore, that in comparison with zinc chloride, much more creosote is being introduced into timber than is required to prevent decay.

Petroleum oils tested by the petri dish method appear to be without toxic properties. They have been used to some extent in timber preservation, and with a certain degree of success, because of their property of excluding water from the timber, water being essential to the growth of fungi. In view of the highly toxic properties of coal-tar creosote why could this not be mixed with petroleum oils and still successfully preserve the timber? If the above toxic limits of these preservatives would hold when applied to treated timber, 0.5 lb. of creosote per cu. ft. of timber should preserve it better than a similar amount of zinc chloride. Why should not, therefore, a mixture of high grade coal-tar creosote and crude oil be used, in proportions even as low as 10 per cent of the former, with excellent assurances of success?

Had all of the timber treated with creosote in the United States in 1913 been treated with a mixture of 10 per cent creosote and 90 per cent crude oil, the consumption of creosote would have been 10,837,000 gal. Since 41,700,000 gal. of domestic oil was used, there would have been a surplus of over 30,000,000 gal. There are, of course, many situations where the use of such a mixture should not be considered, for example, the treatment of piling for salt water, or the brush treatment of telephone poles. Should such a mixture be used for ties alone, however, this country could produce a large surplus of creosote oil.

6. *Wood-tar Creosote.*—A further source of wood preservatives in this country may be found in the tars produced by the destructive distillation of wood. These are of two kinds, those from hardwoods and those from coniferous woods. At present, these tars are a nuisance to the plants producing them, and are either burned or thrown away. In the crude state they are absolutely unsuited for wood preservation. It is possible, however, to refine them and produce oils comparing very favorably with coal-tar creosote. One sample of creosote produced from hardwood tar was submitted to the Forest Products Laboratory that was more toxic than the coal-tar creosote mentioned above. Its toxic limit in the case of the fungus *Fomes annosus* was between 0.12 per cent and 0.24 per cent. Its specific gravity, range of distillation, specific viscosity, ease of penetration into wood, and volatilization from wood were about the same as the creosote used for comparison, the latter being a commercial product of good quality. It was much more corrosive in its action on flange steel than the coal-tar creosote, although this was but little greater than the corrosive action of a 3 per cent zinc chloride solution. It would seem possible to further refine this oil, and remove this objection.

Several concerns are now prepared to manufacture refined hardwood creosotes, and it seems likely that at least 10,000,000 gal. could be placed on the market annually.

7. *Sodium Fluoride.*—One of the most promising of the new preservatives that are now being experimented with is sodium fluoride. This is a water soluble salt, and can be produced very cheaply in this country. At least one company is now prepared to produce it in large quantities. Its principal advantage compared with zinc chloride is its high toxic properties, and its low solubility in water. In the petri dish experiments at the Forest Products Laboratory, 0.225 per cent prevented the growth of *Fomes annosus,* and 0.15 per cent prevented the growth of *Fomes pinicola.* In these cases it was from 2 to 5 times as toxic as zinc chloride, and about the same as the coal-tar creosote. Zinc chloride is soluble in water in all proportions, while only 3½ to 4 per cent of sodium fluoride can be dissolved in water. Furthermore, it is only about 10 per cent as corrosive in its action on flange steel as zinc chloride.

Very good results have been obtained from the use of fluorides in Europe, especially in Austria, where several thousand telephone poles have been treated. The excellent prospects of the successful application of this preservative led the Forest Products Laboratory to institute service tests of timber treated with it. Several hundred mine ties treated with fluorides were installed in January, 1914, in the Birmingham, Ala., district, and 300 ties treated with sodium fluoride are about to be installed in a test track on the Baltimore & Ohio.

Many preservatives have been tested by the Forest Products Laboratory, and the results of these experiments will be published as a bulletin of the Department of Agriculture about January 1, 1915.

TRACK INSPECTION ON THE PENNSYLVANIA

The annual award of premiums for the maintenance of roadbed on the Pennsylvania Railroad, amounting to $5,400, was made on September 22 after an annual inspection made by General Manager S. C. Long and a party of about 300 operating officers.

As in the past, these awards are based on monthly inspections made by a committee of maintenance of way officers consisting of W. G. Coughlin, engineer maintenance of way, chairman; A. B. Clark, assistant engineer maintenance of way, in charge of roadway and track; J. J. Rhoads, superintendent of the Media division, and E. J. Cleave, superintendent of the Cresson division. The prizes were awarded as follows:

The first premium, that of $1,200, of which $800 goes to the supervisor and $400 to the assistant supervisor having the best line and surface between New York and Pittsburgh and Philadelphia and Washington, was awarded to C. M. Wisman, supervisor, and H. M. Grimm, assistant supervisor, who have charge of the track between Tullytown, Pa., and Deans, N. J. The other prizes were:

Four premiums of $800 each, $600 for the supervisor and $200 for the assistant for the best line and surface on a main line superintendent's division between New York and Pittsburgh and Philadelphia and Washington, awarded as follows: C. Z. Moore, supervisor, C. L. P. Russell, assistant supervisor, in charge of track between Dillerville and Harrisburg, Pa. W. T. Hanley, supervisor, J. B. Baker, assistant supervisor, in charge of track from west of Rockville bridge to Thompsontown, Pa. W. S. Wilson, supervisor, C. W. Barwis, assistant supervisor, in charge of track between Altoona and Portage, Pa., including the Horseshoe Curve. G. H. B. English, supervisor, C. M. Hursh, assistant supervisor, in charge of track between Wilmington, Del., and Perryville, Md.

A special improvement premium of $1,000, $700 to the supervisor and $300 to the assistant, for the greatest improvement made in line and surface on the main line between New York and Pittsburgh and Philadelphia and Washington, was awarded to A. W. McClellan, former supervisor, and H. L. Pierce, assistant supervisor, for the section of track between Donohue and Wilmerding, Pa.

Through Train Service Between Argentina and Chile Suspended.—In view of the fact that no passenger trains had been able to pass over the Chilian section of the Transandine Railways since the end of May, the National Direction of Railways Office has authorized the suspension of the international train to and from Buenos Ayres until further notice.

FATIGUE OF RAILS

By Paul Kreuzpointner*

In recent issues of the *Railway Age Gazette* the phenomena of transverse fissures in rails and their causes have been ably discussed by high authorities, the conclusion being drawn that their origin must be sought in improper mill work rather than in the overloading of rails due to the rails being too light for the present weight of rolling stock and speed of trains. If the origin of these interior transverse fissures, with subsequent fracture of the rail, or rails, is due to mill work then the cause would be either slag inclosure, segregation with the resulting lack of homogeneity of structure, or internal strains due to irregular cooling. Upon the other hand, if overloading of the rails produces transverse fissures, breakage of rails would be due to fatigue of the metal with all the characteristics of fatigue fractures.

The peculiarities of the fractured surfaces of broken rails would then materially help us to draw safe conclusions as to whether the cause was improper mill practice or fatigue due to overloading of the broken rails. During all the discussions on the subject of transverse fissures the writer has

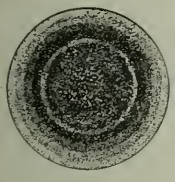


Fig. 1

Fig. 2

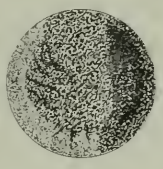


Fig. 3

not seen any mention of the difference in appearance of fractures of structural material due to improper mill practice alone, or to improper heat treatment and fatigue, or to fatigue alone with an otherwise properly treated metal of uniform structure. Frequent comparisons of fractures of the same class of structure, and subject to the same forces of destruction, will furnish us with sufficient proof that there are characteristic differences in the appearance of fractures of structural material indicative of the physical condition of the metal when it went into service, thus strengthening the observations made in other directions.

If we claim that overloading of the rails is the cause of present vexatious troubles in railroading we then assume that the metal was in a normal physical condition, free from the disturbing influences of segregation or internal stresses and therefore the fracture of the rail, broken in service, should exhibit all the characteristics of a detail fracture due to fatigue induced by overloading.

Leaving out of consideration the possibility of the design of the rail being so faulty and weak as to cause sudden fracture under overloading without fatigue, we should find the fracture of a rail broken through overloading exhibiting two or more elliptically-shaped lines of greater or less distinction, either in the head or in the foot, and, beginning at the surface, the texture or grain of the broken area included between each two lines, varying from very fine in the first of these areas to the well known coarseness of a sudden fracture, the texture being uniform without being marred or broken by slight or heavy creases. In Fig. 1 we have an example of the characteristic fracture of an overloaded structure, in this case the detailed fracture of an axle.

It must be remarked here that the shape or outline of the structure does not influence the characteristic feature of a fatigue or detail fracture. The shape may, and often does, influence the configuration of the lines of individual breaks, but it does not alter the character of the break, hence the appearance of the fracture in Fig. 1 is as representative of a detail fracture of an overloaded structure of wrought iron or steel as may be found. Nor is this appearance influenced much by the degree of hardness of steel below the hardness of tool steel; there may be no distinct lines indicative of individual breaks with a slightly different texture of the break from lower grade steel, but the character remains the same. Neither does the speed at which the structure is broken seemingly change the general character of the fracture caused by fatigue. The general character of the detailed fracture of a firebox sheet, ruptured by the slow pulsations of the sheet, does not differ from the general character of a fatigue fracture of a fast running axle. Any deviation then from these general and uniform characteristics of a fatigue fracture of a physically sound steel structure indicates a disturbed physical condition of the metal, producing a variety of results destructive in their nature and due to improper treatment of the steel in its fluid or subsequent solid state.

How mill practice affects the nature of the fracture of a steel structure as revealed by its appearance is shown in the following illustrations. Fig. 1 is an ideal detail, or fatigue, fracture with a number of well-defined concentric rings, the axle breaking little by little and the journal having dropped off into the box without doing any damage. Fig. 2 illustrates the influence of a mechanical defect upon the nature of the fracture, the break starting at a seam or elongated blowhole and the metal being good otherwise. Fig. 3 started to break in detail, but was interrupted by segregation, producing sudden fracture of two different types, the segregated portion coarse and open with a closer grain for the rest. Fig. 4 shows a seam formed by a succession of blowholes joining each other and their walls, tearing on being stretched under the forging process, united into one continuous seam. In Fig. 5 we have a combination of seam and internal transverse fissure, extending outward with segregated spots in the center. Fig. 6 presents a well-defined internal fissure due to internal stresses caused by improper heat treatment. That the shape of the fissure is round and not oval as in a rail may be accounted for by the shape of the structure and the uniform

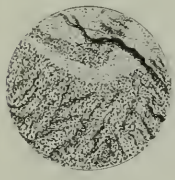


Fig. 4

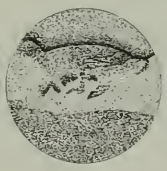


Fig. 5

Fig. 6

distribution of the vibrations caused by shocks and vibrations. The "creases" are indicative of internal stresses due to improper heat treatment. "Creases" of this kind are always a sign of a disturbed condition of the steel, acting wedge-like in forcing the steel apart.

Causes of difference in fractures

In the foregoing we have seen how an overloaded steel structure breaks slowly in detail due to fatigue without showing transverse fissures, provided the physical condition of the metal is good, that is, free from the admixture of impurities from too much segregation, from spongy center, and is of uniform texture and without internal stresses due to incomplete heat treatment. We find the causes for this difference in fractures of structural steel in good condition or disturbed by defective treatment in the plastic and elastic properties of iron and steel, the former permitting the metal to flow under the application of extraneous forces and the latter allowing it to recover from the destructive influences

*Mr. Kreuzpointner was connected with the physical laboratory of the Pennsylvania Railroad for 31 years, and was in charge of the physical testing of materials during that time.

of shocks, vibrations or excessive strains. This ability to recover is greater in structural steel than in wrought iron and is the reason for steel being given the preference over wrought iron for structural purposes. Elasticity, which is inherent in all metals, and varies in degree only, but not in kind, possesses the peculiar quality of recovering, at least partly, the ground it loses when the metal is subjected to strains and stresses, producing the so-called elastic reaction in metals, this elastic reaction being more pronounced and of longer duration in steel than in iron. This elastic reaction tries to establish an equilibrium when the limit of strength and of elasticity has been lowered by overstrains, establishing new limits of strength and elasticity. If forces deforming a metal act quickly and are released quickly, the elastic reaction is slight. If, however, the forces act slowly, reaction then becomes effective, trying to counteract the effects of the destructive forces by establishing a new equilibrium. Hence large forces acting quickly are less destructive than many small forces acting more or less continuously, the reaction in the latter case not having completed its cycle before its effects are required in another direction, as it were. In other words the metal has not had time to come to rest, the first reaction being diminished by the second one following. If, then, the metal is in good structural and thermal condition the plasticity will permit uniformity of flow, while the uniformity of the structure, uniformity as to size of crystals and uniformity of the nature of each individual crystal, will permit uninterrupted transmission of the elasticity throughout the mass of crystals with consequent uniform reaction producing a detail fracture, if fracture does take place, of the kind shown in Figs. 1 and 2.

If, however, slag inclosures prevent close cohesion of the crystals in any part of the cross-section of the structure, or if the center of the ingot is spongy, producing similar effects, or if segregation should produce a variety of physical conditions of the crystals in size and chemical composition, or if thermal conditions have induced internal stresses with consequent unstableness and unpreparedness for resisting extraneous destructive forces, there will be different degrees of plasticity in different parts of the structure, the flow of the metal caused by shock and pressure will be irregular and jerky, as a consequence of which there will be impaired transmission of the elastic wave, and the intensity of elasticity will vary in different parts of the metal counteracting each other, while elastic reaction can assert itself but imperfectly, if at all. It is obvious that under such circumstances and conditions the separation of the crystals will take place in a variety of form and manners, altered, or modified by the nature of the forces trying to destroy the structure, with any chance condition influencing the final result. Thus we perceive why and how the appearance of the fracture is an indication of the treatment of the steel in the mill, the frequency of internal fissures in rails and their similarity in form pointing to an unstable thermal condition and not to overloading. If overloaded with good conditions of steel a true detail fracture would result.

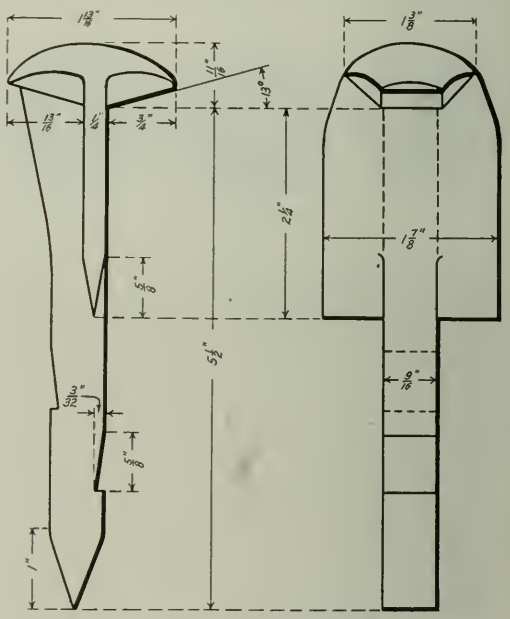
Argentine Railway Employees' Pensions.—A press report states that the Argentine Chamber of Deputies now has under consideration legislation relating to pensions for railway employees. The nature of this legislation is not given out in the report, but it is stated that representatives of the Great Southern, the Buenos Ayres Western, the Argentine, the Central Argentine and the Pacific Railway companies have visited the vice-president of the republic to present a petition asking the government to withhold its immediate sanction to the law. The railway representatives referred to the unsatisfactory economic situation now prevailing, and to the heavy decline in freight receipts experienced by most of the companies. The vice-president has replied that the government has already communicated its favorable opinion as to the proposed law, but he has promised to consult with the minister of public works regarding the present petition.

A NEW TRACK SPIKE

The "safety" track spike, designed to present a greater resistance to side thrust and vertical pull than the ordinary spike, has received a maximum test of nearly one year and is now being tried by a number of important roads, including the Chesapeake & Ohio, the Richmond, Fredericksburg & Potomac, the Seaboard Air Line, the Carolina, Clinchfield & Ohio, and the New York, New Haven & Hartford.

The distinguishing features of this spike are the two projecting wings on the sides of the body to increase its resisting power to the lateral movement of the rail, and the notches on the front and back edges below the wings to increase its resistance to an upward pull. It is stated that the displacement of fiber by this spike is only .012 cu. in. greater than that of the ordinary track spike, and that the resistance to lateral movement is increased more than 300 per cent.

The new spike is made of low carbon steel, ranging from .12 to .20 per cent of carbon, and having a tensile strength of 5,500 to 6,500 lb. per sq. in. The spikes are made by the drop forge process, giving uniform strength, particularly at the throat where the common spike is apt to be weak on account of its manufacture by the upsetting process. The throat is reinforced by additional metal on the back just under the head, giving it added strength when reversed to be used in the slot of an anglebar.



A Sketch of the Safety Track Spike

It is thought that the advantages of the new spike will be most fully realized on curves and at switches where rail spreading is most common. It is declared that the use of these spikes will allow rail-braces to be eliminated at such points, saving the cost of these devices and reducing the number of spikes about 60 per cent. The spike can be applied with a maul and pulled with a clawbar, in the same manner as an ordinary spike.

A special tie plate has been designed, also, by the Railway Safety Spike Company, Richmond, Va., which is placing the new spike on the market, for use with those spikes if tie plates are desired on curves. The punching in this plate is designed

to allow the use of the new spikes with five different sections of rails between 80 lb. and 100 lb.

The Richmond, Fredericksburg & Potomac placed a keg of these spikes in its track on a 4 deg. curve with a grade of 0.5 per cent, on its James River branch, in September, 1913. The track is laid with 85-lb. rail and carries a heavy traffic. With rail-braces on this curve, it had previously been necessary to regage the track once or twice a year. Up to the present time the new spikes have held the track to true gage without special attention from the maintenance force. The test on the Seaboard Air Line is being made in the Brown street yard, in Richmond, Va., on a 7 deg. curve near a water tank, where the ties are wet and the rails are therefore more likely to spread. Although tie plates and three ordinary spikes have failed to hold this track to gage, the two safety spikes have held the rails to proper gage for seven months. Tests on other roads are also proving satisfactory, although they are not of sufficient length to furnish absolute proof as yet.

A COMPLICATED CROSSING RENEWAL

It was recently necessary to renew a set of crossings known as the Chattanooga Belt Railway crossings at the East End avenue entrance to the Chattanooga passenger station without interference with a very heavy and almost continuous movement over these crossings. Because of a back-up movement, all passenger trains of the Alabama Great Southern and of the Memphis division of the Southern approaching or leaving the station, pass over these crossings twice. The passenger trains of the N. C. & St. L., the C. N. O. & T. P., the Chattanooga Southern, and the Knoxville and Atlanta divisions of the Southern also pass over these crossings in going to or from the station, while all passenger locomotives have two additional movements over these crossings in going to or from their respective engine houses. With the additional freight and switching business there is an average of 400 movements over these crossings daily.

The Four Crossings (in the Foreground) After Renewal

The renewal of this crossing was made by the C. N. O. & T. P., on which road considerable study has been given to the subject of the drainage and proper foundations for crossings. The method of procedure in this regard at this point conforms to the general practice of this road.

In renewing the crossings the foundation was first removed around the old ties, and they were blocked up just enough to insure safety to trains operating under slow orders. The old ties were then replaced with new ones, one at a time, and spiked sufficiently to maintain the correct gage of the track. The four crossings were then replaced, one at a time, with 85 lb. solid manganese crossings. After the new crossings were in place and were surfaced up on blocks, a foundation consisting of iron borings mixed with sal-ammoniac, was placed under and around the new ties and well tamped. This "rust bed," as this foundation is termed, extends 6 in. below the base of the ties, and is brought up to about the level of their upper surfaces, giving a solid block 14 in. in thickness, and extending to the ends of the ties for the full length of the crossing.

This type of foundation eliminates water pockets and reduces the noise, while at the same time it does not give as rigid a foundation as concrete, thereby decreasing the impact of wheels, and increasing the life of the crossing. Actual experience at other crossings has shown that the frog points do not wear down any more rapidly here than on ballasted foundations. When it becomes necessary to renew a crossing on this foundation, all that is required is to loosen and remove the "rust bed" sufficiently so that the tie can be turned at a slight angle and lifted out, the track having, of course, first been raised slightly on track jacks. By inserting ties of the same dimensions the "rust bed" proper is then left undisturbed.

OPERATION OF A GRAVEL PIT*

By H. O. Whitney

Roadmaster, Canadian Pacific, Medicine Hat, Alta.

There is no way that money can be wasted or saved faster in the maintenance of way department than in work train service. The high wages paid train and engine men, the mechanical charges and fuel and other expenses connected with the present day work train, all contribute to the opportunity for efficient management. Where in service for any length of time, the principal uses of work trains are in gravel or dirt moving service, and such work affords a greater opportunity for proper planning and organization than where work trains are put on for a short period to do odd jobs.

Before work trains are started the roadmaster usually knows just what work he is to do, the amount of money allowed and the equipment he can expect to receive. If traffic is heavy he cannot expect to secure the best power and he has to be satisfied with what he can get. However, this can be overcome to a certain extent by a little personal talk with the master mechanic. An explanation of the conditions and length of haul, the class of equipment to be used and other details will help him to assign the best available power for those conditions. And last, but not least, he should confer with the master mechanic about assigning good engineers, firemen and watchmen to these positions. An engineer who can keep his engine in shape for a week or two without seeing the roundhouse and who is always ready to go when he receives signals or orders and a willing fireman contribute a large share to successful work.

It is a practice on some roads to appoint a trainmaster to work train service exclusively where there are a number of these trains in service, but on the average work this does not apply. If there is no work train trainmaster appointed it is well to confer with the regular trainmaster regarding the assignment of crews and it is a good practice to ask him to come out on the work for a few days when starting. A good conductor in charge of each train is absolutely necessary. I have found that it works out well to appoint the oldest experienced conductor pit foreman with full charge over all crews in the pit and giving him a small gang of men in charge of a good foreman to look after pit tracks, coal engines, assist car repairers and do any odd jobs around the pit.

Never start work trains until the equipment is collected and in shape for service unless it is absolutely unavoidable. To start with half enough cars not properly equipped not only means high cost on the start but often will be the cause of poor equip-

*Received in the contest on The Proper Handling of Work Trains which closed December 27, 1913.

ment for the whole season. Cars, plows, Lidgerwoods, spreaders and other equipment should be collected and put in condition before the work starts. With a plant in first class shape good work can be done from the start and running repairs can be kept up.

The pit staff should have two or more car repairers, one of whom should act as inspector and all equipment should be kept in good repair, to save long delays on the road. I have always kept a blacksmith and a forge in a pit and have found plenty of work to keep them busy. The foreman in charge of tracks should have a sufficient gang to keep the tracks and switches in condition, as a derailment in a pit means delays, not only to the pit train but to all trains dependent on its output. I have always made it a practice to lay tracks behind a steam shovel, instead of throwing the old loading track, when the shovel is ready to move back, thereby avoiding all delays to work trains and also always having a strong track. The ordinary gang in the pit lays this track each day as the shovel moves ahead, thereby making it unnecessary to move in an extra gang for this work.

Besides loading tracks pits should have a long storage track for loads and one for empties to avoid any delays to hauling crews. Considerable delay is often caused through coaling engines in districts where no coal shutes are available. I have made it a point to build a short depressed track in pits and stand engines there at night when tied up giving them a full tank of coal. Keeping a car or two of coal at convenient points on the road where engines can fill up while waiting to meet trains or while engine crews are eating will practically avoid delays from this cause.

If a cable gang is necessary the best foreman available should be in charge and his gang should be picked men. A foreman must see that his unloading equipment is always in shape and must be ready to unload day or night. He should know beforehand just where ballast or dirt is wanted and in what quantities, leaving his finishing work for daylight unloading. A good foreman can save many delays by watching trains and not allowing them to become bunched up.

THE LAWRENCE SNOW AND ICE FLANGER AND BALLAST SPREADER

As its name indicates, the Lawrence snow and ice flanger and ballast spreader is designed for use either as a flanger for removing snow and ice from the track in the winter or for widening the shoulder of the roadbed and spreading ballast in the summer. It consists of two blades designed to remove the snow or ballast to the desired level and by means of the side wings to push it out onto the shoulder. Although only one set of wings is shown in the accompanying photograph, the cars are now built with two complete sets of wings so that they may be operated in either direction.

The Lawrence Snow Flanger and Ballast Spreader with Blades Lowered Ready for Action

The flanger blades with their raising and lowering mechanism can be mounted on any car of suitable construction, either open or closed. The flanger blades are curved similar to an ordinary plow so that when lowered in position for operation the edges project under the snow or ballast, lifting it and crowding it outside the track. The blades are provided with removable flanger tips which can be renewed when worn. They are so designed that they are free to recede backward and upward if they should strike a frog, crossing or other obstruction, dropping back to the normal position after passing the obstruction. When flanging ice or leveling heavy ballast material, the blades can be held rigidly in their lower operating position by the application of air through a four-way valve if desired. It is claimed for this device that it is cheap in construction while it is durable and the cost of maintenance is small; its combined use enables it to be used throughout the entire year; it can be run in either direction and it is operated by air taken from the train line without interference with the brakes, thereby eliminating extra connections on the engine.

View Showing the Condition of the Track After Leveling Heavy Ballast with the Lawrence Spreader

This car has been used on the South Buffalo Railway for the past three years, during which time it has been given severe tests. It has not been necessary to use a snow plow on the tracks of this road at any time during this interval. It has also cleared the ash pit tracks of ice and frozen cinders, while it has spread five cars of heavy ballast on a track in less than five minutes. One of the accompanying photographs shows a track cleared of heavy brickbats with this spreader. It has been designed by the B. F. Lawrence Co., Buffalo, N. Y.

A METALLIC TAPE THREADER

The Lufkin Rule Company, Saginaw, Mich., has just put out a patented measuring tape attachment known as a "threader," which will hereafter be furnished with its "metallic" woven tapes without extra charge.

The "threader" is a loop and stud arrangement, by means of which the tape, though securely fastened to the winding drum of the case when in use, can be readily detached from it and a new tape as readily attached, without manipulation of the case, case screw or drum.

Woven tapes are sometimes torn by accident or through long use often become soiled and worn in such a way that they must be replaced while the case is yet in very fair condition. As the case represents approximately half the value of the outfit it is of considerable importance that it be possible for any one to insert a new tape in the old case as often as necessary, and thus get the fullest measure of use out of the case as well as the tape. Metallic tapes without cases are quite generally kept in stock by hardware stores, etc., and can always be easily obtained.

Convention of Bridge and Building Association

Abstract of Committee Reports and Discussions at Twenty-fourth Annual Meeting at Los Angeles, Cal.

The twenty-fourth annual convention of the American Railway Bridge and Building Association was held at the hotel Alexandria, Los Angeles, Cal., October 20-22. A special train was run over the Santa Fe from Chicago to Los Angeles to carry members and guests to the convention. This train brought nearly 100 and the total registration was 140 members. The officers for the past year were: President, J. N. Penwell, Lake Erie & Western, Tipton, Ind.; first vice-president, L. D. Hadwen, Chicago, Milwaukee & St. Paul, Chicago; second vice-president, G. Aldrich, New York, New Haven & Hartford, Boston, Mass.; third vice-president, G. W. Rear, Southern Pacific, San Francisco, Cal.; fourth vice-president, C. E. Smith, Missouri Pacific, St. Louis, Mo.; secretary, C. A. Lichty, Chicago & North Western, Chicago; treasurer, J. P. Canty, Boston & Maine, Boston, Mass.

OPENING BUSINESS.

President Penwell called the convention to order at 10 o'clock Tuesday morning.

Reverend Charles Edward Locke opened the sessions with prayer. The convention was welcomed to Los Angeles by H. V. Platt, assistant general manager of the Southern Pacific, and W. H. Whalen, division superintendent of the Southern Pacific; and Vice-President Hadwen responded for the association. The reports of the secretary and treasurer were then read and showed a balance of $1,100 and a membership of over 600. The secretary, in addition, reported 38 new members.

The committee reports and discussions presented at the business sessions follow:

ICE HOUSES

The type of construction that can economically be adopted for ice houses depends on the cost of construction, maintenance and operation of the house and on the loss suffered through shrinkage of the ice. The percentage of shrinkage in stored ice is dependent on the efficiency of the insulation of the house and can be reduced, but not entirely eliminated. In some cases it has been considered sufficient to store ice directly on the ground and build four walls and a roof over it, decreasing the shrinkage by covering the ice with hay, sawdust, or similar material. The loss suffered by such practice depends on the cost and supply of ice and the condition of its use. The cheapest type of construction may suffice at northerly points immediately adjoining large lakes that freeze over every winter where the cost of ice is very small, while in hot southern countries where natural ice must be hauled in during the winter or artificial ice manufactured at all times, very expensive types of construction are justified.

The problem of providing better insulation cannot be solved by merely changing from a wood frame to brick or concrete construction, for in either case insulation must be provided. When it is considered that brick and concrete houses cost from $4 to $6 per ton of ice storage capacity, as compared with $2 to $3 per ton for well constructed and insulated wooden houses, it is questionable if under all conditions the more expensive type of construction is justified. At the present time the wood frame house is used almost universally.

A feature that has been given but slight consideration is the insulation of the floor. A great majority of designers have thought that it would be sufficient to level off the ground and place the ice directly upon it, sometimes covering the surface with cinders, boards or concrete. Heavy losses due to shrinkage at the floor line in a number of houses indicate that the stored ice will not overcome the ground heat which continually rises to the surface and melts the ice. In more recent houses the shrinkage from this cause has been largely reduced by providing air spaces between the ice and the ground usually by placing joists and covering them with a slat floor for the support of the ice. These air spaces are from 6 in. to 12 in. deep.

The foundation for the walls can be of the usual types, including concrete, brick, wood blocking, posts, and pile studs. Especially where masonry foundations are used, care must be taken to secure proper insulation. In porous soil the water from the melted ice is permitted to go directly into the ground, but at other points drains must be installed. Such drains must be trapped to prevent air currents entering the house through them. The air entering a room through a 4-in. pipe can easily melt 1,000 tons of ice in a single season.

Ice storage rooms vary in capacity from 50 to 1,500 tons, the average being about 1,000 tons. The usual dimensions are 30 ft. wide, 40 ft. deep and 30 ft. high. Although many different arrangements, thicknesses and designs of wall construction are used, the general trend is towards vertical studs 6 in. to 12 in. wide, covered on both sides with wood sheeting, building paper, etc. The best construction requires double sheeting inside and out, with waterproof building paper between the layers, the spaces between the sheeting from stud to stud being filled with insulating material.

Air spaces have been considered to afford excellent insulation, but it is necessary to prevent circulation in the air space to secure the best results. This can be done by proper framing to cut such spaces into smaller spaces or by filling them with suitable porous insulating material which will fill the space but yet leave the greater part of it, consisting of pores in the material, full of air so separated as to prevent circulation. The sawdust and ground cork which have been largely used to fill these spaces decay rapidly on account of the continual dampness and start decay in the timber walls. At present various materials are used which are specially treated and manufactured for this purpose, principally from flax, cork and limestone. Flax is made up into blankets enclosed by sheets of waterproof paper. Cork is made up into cakes pressed together and cemented with asphaltum or other waterproof cement. Limestone is heated to 3,500 deg. and when liquefied is blown into shreds, making a sort of rock wool, enclosing a large percentage of air bubbles. Partitions are insulated somewhat similar to the walls, but, as the difference in temperature on the two sizes is not so great, the same care is not justified.

The two principal objections to wood frame ice houses are the danger of fire and the decay of the timber. As timber lends itself well to ice house construction, safety against fire can be obtained by covering the exterior walls with expanded metal and stucco and covering the roof with a fireproof material. Any openings into which birds might enter and build their nests should be covered with a galvanized iron mesh. Decay can be postponed for many years by treating the timber.

There is very little difference in the types of roofs used. Steel trusses are seldom or never used on account of the rapid corrosion that would result from the dampness. Wooden trusses are usually so built that the roof covering can be applied to the top chords, while the ceiling for the ice chambers can be applied to the bottom chords. This affords an air chamber between the roof and the ceiling of the house through which air can circulate, resulting in a good insulating air cushion. The height of this attic space is usually not less than 3 ft. and varies up to 8 or 10 ft., as in some cases machinery is located in this space. The insulation of the ceiling must be just as effective as that of the walls and practically the same type of construction is used. Great care must be taken at the connections of the walls

to the foundation, and also of the ceiling to the walls and partitions in order that no opening will be left through which air can enter.

The doors are usually of ordinary refrigerator construction with several sections separated by air spaces which are sometimes filled with insulating material. In some houses the doors extend vertically from the top to the bottom of the house in each chamber, although in such construction there is more likelihood of the entrance of warm air and greater difficulty in keeping the joints between the doors tight.

In storing the ice the individual rooms should be filled entirely between walls with ice laid in contact and filled up as close to the ceiling as possible. It is necessary to use some means to keep the ice apart in order that the cakes will not melt together. The former practice of using sawdust to fill all crevices has practically been abandoned on account of the shrinkage resulting when the ice is washed. Recent experiments have been tried in the use of waterproof paper to separate the layers of ice, which effectually prevent the cakes from freezing together and also prevent the circulation of air between layers. When ice must be stored for many months for rapid use when demand arises, it is well to cover it with a thick layer of some insulating material such as hay or straw.

The length and width of the platform for handling ice between the cars and the house depend upon the requirements, but as a rule when conveyors are not used and ice is handled in buggies, a platform 16 ft. wide will be found very convenient, although narrower platforms have been successfully operated. Where a comparatively small number of cars are iced, short platforms are sometimes built in front of the house, long enough to accommodate 5 to 10 cars, a switch engine being required to handle the cars when there are more than can be placed at one time. Where many trains require icing, it is of considerable advantage to have an icing platform the full length of the train, so that it can be iced at one spotting, especially at engine terminals where such trains do not need to be broken up otherwise. Where many trains have to be iced and the platforms are long, it is of advantage to use continuous platform conveyors to carry the ice from in front of the house to the point where it is put in the cars. The report included abstracts from replies received from a number of railways, detailing at considerable length, the practice in the construction and operation of ice houses.

Committee: C. E. Smith (Mo. Pac.), chairman; A. Ridgway (D. & R. G.), W. A. Pettis (N. Y. C. & H. R.), G. A. Manthey (M. St. P. & S. S. M.), G. S. Kibbey (M. & St. L.), and J. F. Parker (A. T. & S. F.).

This report was accepted without discussion.

WARNINGS FOR OVERHEAD AND SIDE OBSTRUCTIONS

There is no doubt as to the necessity and value of giving warning to men on the top and sides of cars when a train is approaching some structure or tunnel with less than the requisite clearance. In general, some appliance is suspended or swung across the track near the obstruction so as to strike the man a light blow and thereby warn him. Different systems are employed to accomplish this end. The one in most extensive use, known as the vertical rope system, consists of light ropes or wires known as tell-tales, whipcords, ticklers or danglers, suspended over the track from a rigid horizontal wooden or iron bar, or a flexible wire or cable, the latter being suitably supported on the outside of the track by upright posts set in the ground and properly braced and back-stayed. For single track an arm is extended from a counterweighted or braced post and the same style of warning can be used. The ropes are generally spaced from 3 to 10 in. apart for a distance of 5 to 8 ft. across each track, the lower end being about 6 in. below the lowest point of the overhead structures for which they are to give warning.

One of the important essentials is to prevent the rope from becoming entangled or thrown over the support by the wind, engine exhaust, or more particularly, by the trainmen when a car is temporarily stopped under the warning. The warning should not be too far from the structure, certainly not more than 200 ft., and in yards where much switching is done immediately under the structure, the location should be closer, probably 100 to 150 ft. The warnings should be used at all overhead obstructions with clearance less than 21 ft. The advantage of using a cable is that it can span a number of tracks, but it has the disadvantage that it is liable to sag and require a good truss cable with turnbuckles so that it can be tightened up from the ground. The post requires good back-staying or else must be made strong enough to avoid the necessity of a back-stay. In many locations there is not sufficient room to use stays.

It is also important from a maintenance standpoint to arrange the drops so that they can be repaired easily if torn off, tied up or otherwise damaged. A number of roads use galvanized wire screens from which are suspended wire or rope drops. Although this is a good warning, it is expensive to maintain on account of the rusting of the screen. Wire drops are sometimes used, but are very easily bent, making them dangerous. Iron rods are also used, to which rope drops are attached, the latter being not longer than the rods to prevent their catching and hanging over the top of the cable or crossarm.

The committee believes the vertical rope system to be the best under most circumstances and recommends its adoption for general use. Where two or more tracks are to be spanned, steel poles not less than 8 in. in diameter at the bottom and 5 in. at the top, set in a concrete base, should be used. The supporting cable of ⅜-in. solid copper, copper covered pliable steel (six-strand) or galvanized wire rope, should span between these poles at a height of not less than 21 ft. Wooden heads should be fastened to the cable with hanger clamps. On the lower side of these heads, dished washers should be provided, held in place by eye-bolts, to which are attached ¼-in. rods. The washers prevent the drops from being thrown over the top of the truss cable. To the lower end of the rods can be fastened ½-in. or ⅝-in. manila rope drops, the length of which is governed by the least clearance of the obstruction. The truss cable should be supported by saddle caps on top of the poles and should extend down the back side of the pole to a point about 5 ft. above the ground and there attached to a turnbuckle fastened to the pole by means of a clamp. This allows the truss cable to be tightened while standing on the ground.

The approximate cost of a warning for one approach over four tracks is $127 for material, $48 for labor, or a total of $175. For single track the same style of pole may be used by having a longer wooden head and a 2-in. wrought iron pipe for a brace. The approximate cost of such a warning for one approach is $58 for material, $28 for labor, or a total of $86.

For side clearance warnings, several roads use an iron post to which are fastened a number of wooden blades with rubber ticklers on the ends. These blades are fastened to a rod which is operated by springs on both sides so that when struck it will swing either way and come back to the proper position. Another style of side warning consists of an iron post around which is fastened several rings of rubber garden hose, forming a cylinder about 3 ft. in diameter which is free to revolve when it is hit.

The report included detailed descriptions of the warnings used on a number of roads, with drawings and prices.

Committee: E. G. Storck (P. & R.), chairman; F. E. Schall (L. V.), T. E. Thomas (B. & O.), M. M. Barton (P. R. R.).

Discussion

G. Aldrich (N. Y., N. H. & H.) stated that his road used tarred rope instead of plain manila rope for telltales, as it lasted longer. F. A. Taylor (B. & O.) urged the placing of the turnbuckle up out of reach of mischievous boys. E. G. Storck (P. & R.) stated that he places turnbuckles in reach of men on the ground and sends two men to tighten them every two weeks. He also said that he finds low turnbuckles more convenient and has had no trouble. F. E. Schall (L. V.) suggested placing a

small sheet iron box with a key over the turnbuckle. C. W. Richey (Penn.) stated that he has several hundred such warnings and likewise has found no trouble. He criticised the side warning proposed in the report as being almost as dangerous as an obstruction. A. S. Markley (C. & E. I.) has tried rattan strips, but was unable to keep them from warping. The committee was continued another year and instructed to pay special attention to side clearances and to tabulate the present requirements of the various states.

REINFORCED CONCRETE BRIDGES

The committee canvassed the railways of the United States and Canada to determine to what extent reinforced concrete is used for bridges, the types developed and in most general use and the practice of different roads regarding standard types and specifications for designs. The accompanying table shows a brief summary of the results of this canvass. It is likely that if full information could be had an even larger proportion of roads would be found on which reinforced concrete is not in use, as some of the roads failed to send in reports because they had no structures of this kind.

The two types of structure most in favor are the box culvert and the deck slab. On two large systems the deck slab is the only type of reinforced structure in use. Following these are the retaining wall and the trestle. These four leading types are far ahead of any of the others in the number of roads on which they are used and in the mileage of those roads. If measured by the total aggregate of structures, their lead over the other

	TYPES OF REINFORCED CONCRETE STRUCTURES IN USE									
	ARCHES BARREL TYPE	CULVERTS (RECT. BOX TYPE)	CULVERTS (ARCH TYPE)	ABUTMENTS SOLID	ABUTMENTS (OPEN BENT)	PIERS	TRESTLES	DECK SLABS	RETAINING WALLS	CITY SUBWAYS
Number of Roads on which type is reported in use	16	30	15	18	13	15	17	28	23	15
Mileage of Roads on which type is reported in use	61270	106972	48559	67580	52992	55932	76808	104776	81120	10864
Total number of Roads reported										54
Total mileage of Roads reported										163 449
Number of Roads reporting no reinforced concrete structures										13
Mileage of Roads reporting no reinforced concrete structures										24664

Tabulation Showing Use of Reinforced Concrete Structures

types would probably be even greater. For instance, the C. M. & St. P. alone has approximately seven miles of the deck slab on a single track basis.

There is a considerable diversity among the roads in specifications, design and details of practically every type in use. On only a few points is there anything like uniformity. A 1:2:4 mixture and a moduli ratio of 15 appear to be quite generally accepted as correct for fully reinforced structures.

Three types of reinforcing bars are in quite general use, plain round bars, square bars straight and twisted, and deformed bars. Many roads use all three types, the latter two being generally preferred to the plain round bars. Unit systems of reinforcement appear to be very little used for railroad bridge work as none of the reports showed this type in use. There are marked differences in the arrangement of the bars in the structures and this is apparently due more to methods of construction than design. Some roads use only straight bars, or bars simply with short bends at the end, while others do not hesitate to use bars with four to six bends. It is quite generally accepted that bent bars if made true to form and properly placed in the structure will fulfil the requirements of design better than a combination of straight bars. There are, however, other considerations that enter into the selection of reinforcement, such as methods of handling, shipping and placing bars, facilities for bending bars in the field and the skill and training of the men on the work. Manifestly a road with a good organization of well trained foremen and men and ample facilities for bending and handling bars would be less restricted in the type of reinforcement than a road dependent on contractors or with a less effective organization of its own. Only one road reported that it includes re-rolled deformed bars in its specifications and added that none has been used because they have never yet been available.

A considerable variation exists in the allowable working stresses of both steel and concrete which cannot be fully accounted for by the differences in the materials used in the concrete and to the impact allowances in the load. They must be attributed in part to the confidence, or lack of it, that designing engineers have in the strength of the material and in their ability to analyze the conditions of the structure under load. It is not to be expected that the working stresses for reinforced concrete can be brought even near the uniformity that obtains in the working stresses specified for steel structures and the uncertainties in both analysis and construction can best be covered by a liberal excess of strength in the design.

Tests recently conducted at the Engineering Experiment Station of the University of Illinois, and published in Bulletin No. 71, covering the strength of the bond between concrete and steel, show a very creditable record for the plain round bars. The bond resistance per unit of surface for square twisted bars was only 88 per cent of that developed by plain round bars. If the cross section of the bar be made the basis of comparison, it will be found that the square twisted bars developed practically the same bond resistance as round bars of the equivalent section. In the light of these tests it is concluded that, "the results found with the twisted square bar does not justify its present popularity as a reinforcing material." These tests also prove that under ordinary laboratory conditions the deformed bar is no more efficient in developing bond resistance than the plain round bar. However, the fact should not be overlooked that vibration, which is so large an element in working conditions, could not enter into the results of these laboratory tests. The designing engineers may feel that the deformed bar offers a security against vibration and against initial failures that fully justifies its use in spite of the excellent showing made by the plain round bar in the laboratory test.

Committee: O. F. Dalstrom (C. & N. W.), chairman; I. L. Simmons (C. R. I. & P.), L. D. Hadwen (C. M. & St. P.), J. A. Bohland (G. N.), A. Montzheimer (E. J. & E.), C. J. Scribner (C. B. & Q.), and D. C. Zook (P. L. W.).

Discussion

In a letter O. F. Dalstrom (C. & N. W.) called attention to the wide variation in the specifications for reinforcing steel ranging from soft rivet steel to high carbon steel.

CARE OF HIGHWAY TRAFFIC WHILE CONSTRUCTING BRIDGES TO ELIMINATE GRADE CROSSINGS.

When the volume of traffic on a railway requires more than two tracks, the ordinary safeguards at grade crossings are inadequate and in order to reduce the menace to safety it is necessary to eliminate the grade crossing. In many cases early railroad promoters and locating engineers selected lines which would allow grade crossings in preference to over or under crossings. As much as such locations may be regretted at present when contemplating the cost for eliminating grade crossings, it must be recognized that such construction was necessary in the start in order to secure a development of traffic which will today produce income sufficient to pay for the elimination of these grade crossings.

The high value of land in cities is in the majority of cases the ruling consideration in the method to be adopted when planning to eliminate grade crossings. Under such circumstances it is frequently necessary to build trestles or retaining walls with solid filling between the walls in addition to the bridges required at street crossings. The performance of construction work and the maintenance of traffic within such restricted limits create involved problems for the solution of which it is necessary to have an intelligent plan well studied and worked out in advance and a well organized and properly directed working force equipped with all necessary machinery

and appliances. The continuance of regular traffic necessarily increases the difficulties of accomplishing the work and it should be considered in planning such work that sufficient money must be provided to pay for the increases above ordinary unit costs.

As an illustration of the method used in handling traffic in a complicated problem of eliminating grade crossings, the chairman describes the work on the Boston division of the New York, New Haven & Hartford, performed in 1910-11, with which he was familiar. This work consisted of eliminating 10 crossings in a thickly populated section of Boston on the Third district between Savin Hill and Neponset on the main line and between Harrison Square and Field's Corner on the Shawmut branch. The train service on these lines was very frequent, the main line handling as many as 133 passenger trains and 9 freight trains in each direction in 24 hours with occasional extras. The construction service required the following trains: One train for shifting and delivering of material to contractors, one for the extra gang on track work and three gravel trains for hauling filling material for a distance of about 11.5 miles. Two of these gravel trains were worked day and night for a period of about three months, hauling a total of 611,000 cu. yd. of filling.

The control of all gravel and construction trains was placed in the hands of a traveling yardmaster who assigned their work and saw to it that all work trains were properly employed and also were kept within safe limits. Engineers, contractors, supervisors and construction foremen explained their needs to this traveling yardmaster when switching service was desired. Work trains were not allowed on the main track at the scheduled time of any first-class train. On this account no work trains could use the northbound main track from 7 to 9 a. m., nor the southbound main track from 4 to 6 p. m., the period when trains to and from the city were most frequent. Work trains were given rights on the main track up to the scheduled time of second-class trains by faithful and proper protection with flags or lanterns, according to the book of rules.

A complete set of standard signals was installed for all tracks used as main track in each temporary location as well as for permanent tracks and all switches in main line track were protected by mechanical interlocking plants.

On the main line the general plan adopted was to keep two main tracks for regular traffic at all times. In the first temporary position the two tracks were laid on the original low grade as near the west property line as practicable, leaving the east portion of the right of way available for the construction of one new track at the new elevated grade and for the widening of the elevated roadbed for a second track, the building of one-half of the length of each of the masonry bridge abutments and the placing of the steel work of bridges for two tracks on these abutments. As the bridges were plate girders in all cases, the second half of these bridges could be added with economy and convenience. The steel bridge work on the main line was erected on tracks which did not have regular traffic on them at the time, an advantage of no mean importance in the cost of the work. When the two tracks on the new high grade were available, regular main line traffic was turned over them and the two tracks in the first temporary position on the low grade were abandoned to allow filling, masonry and bridge work to be completed at the new high grade on the west side, completing the work for a four-track permanent roadbed for the entire distance.

On the branch line, regular traffic in both directions was handled over a single track during construction work. At the first temporary move the northerly track was continued in service at the original level, making the southerly part of the right of way available for the construction of one track on the new high level. A timber trestle was required to support this track for a considerable length, as the right of way width was too narrow to allow earth filling to be made at first. The narrowest width, 30 ft., was near the street which had the greatest volume of traffic, and as the adjoining property was so closely built over and so valuable that it was not economical to purchase land for widening the right of way, it was necessary to place niches in the back of the south retaining wall to receive bents of the temporary trestle which supported the track at a high grade.

The highways which were crossed at grade by any of the tracks, temporary or permanent, were protected at all times by lawful safety appliances. The crossing signs and gates were maintained and the latter operated for the full 24 hours. At the passenger stations, proper platforms were always kept available for the use of patrons. It was necessary at times to have temporary platforms at different stages of the work, and while the temporary buildings were not always up to the track level, they were safely accessible to the platforms, and none of them remained below grade for any great length of time.

W. F. Strouse, assistant engineer, Baltimore & Ohio, presented a discussion of the method used on that road for handling such work. In building a 30-ft. concrete arch, the tracks were carried on pile bents until the excavation was finished and the masonry work completed to the elevation of the springing line of the arch. The bents were then cut down, and plate girder spans of 64 and 66 ft., respectively, were substituted for the purpose of carrying the traffic while building the arch proper. As soon as the masonry was finished the space below the girders was back filled with cinders and other suitable material to approximately the under side of the girders. Cinders were then dragged out upon the track, filling the space to approximately the base of the rails. When the concrete was sufficiently hard, the girders were lifted out with wrecking cranes, one at each end, after which the track was restored and additional cinders added. Both girders were removed the same day, the traffic on each track being cut out for a period of about two hours.

In constructing abutments for supporting steel girders, the piles are driven first, then the street is depressed, bracing being applied as this work progresses. This method, of course, cannot be utilized where rock is encountered above the foundation line. In cases of this kind it is customary to support the tracks by excavating trenches to the elevation of rock, in which timber bents are placed with the necessary stringers to carry traffic while removing the rock to a lower level. The new timber bents are then placed before the removal of the other bents for the purpose of removing the rock under the same. This process is repeated until the material is removed to the proper elevation. When possible, of course, detour lines are built to avoid the necessity of expensive trestle work.

Committee: G. T. Sampson (N. Y., N. H., & H.), chairman; R. H. Reid (L. S. & M. S.), J. P. Canty (B. & M.), W. F. Strouse (B. & O.), F. E. King (C. M. & St. P.), W. H. Wilkinson (Erie), H. V. Smith (W. & L. E.), and E. N. Layfield.

The report was accepted without discussion.

WATER PIPE.

Cast iron pipe is preferable to either wrought iron or steel pipe for underground water mains because of its greater resistance to corrosion. There are considerable data which go to show that cast iron pipe is good for 100 years when properly coated under almost any soil conditions. The following table gives the approximate cost of laying pipe, as determined by actual railroad practice:

Diameter of pipe.....	4 in.	6 in.	8 in.	10 in.	12 in.	14 in.
Pipe at $30 per ton.....	$0.36	$0.54	$0.78	$1.06	$1.38	$1.53
Yarn at $0.07 per lb....	.0012	.002	.003	.0035	.004	.005
Lead at $0.05 per lb....	.031	.0425	.05	.07	.08	.09
Loading and handling...	.01	.015	.02	.025	.03	.04
Trenching and refilling (4 ft. cover).....	.11	.15	.16	.18	.20	.22
Laying, caulking, etc....	.05	.07	.10	.12	.15	.17
Total per lin. ft....	$0.56	$0.82	$1.11	$1.46	$1.84	$2.06

The above figures are based on class "C" pipe for a 300-ft. head and 130-lb. pressure, with the exception of the 14-in. pipe, which is class "B" for a 200-ft. head and 86-lb. pressure. Pipe of this size is usually installed only for penstock lines with a comparatively low head.

Joints in cast iron pipe may be made with lead, cement, lead-

ite, lead wool, or rust. In making a lead joint the packing should be twisted to form a rope a trifle larger than the joint space and cut so that the ends will meet when driven home. Care should be taken that the packing is driven up evenly so that a uniform lead space of about one-third the length of the bell is left. Tarred jute can be driven tighter than plain packing, but as it is much harder to handle, the latter is usually given the preference. The lead roll should be carefully placed around the pipe so that it fits firmly against the hub to avoid leakage of the lead. A break in the pouring to stop a leak usually leaves a seam in the joint where the lead has cooled so that it is never as good a joint as one continuously poured. The bottom of the joint should be caulked first, working up each side of the pipe, leaving the top for the last. The joint should be driven up until the caulking tool rebounds slightly from the lead.

A cement joint is much cheaper than lead and more rigid. A pipe laid with cement joints will not come and go as much as one using lead joints under excessive expansion and contraction, vibration or settling. Settling of the pipe will cause a fracture when cement joints are used, and for that reason they cannot be recommended for general use. A cement joint is made with neat Portland cement by driving a roll of dry jute tightly to the bottom of the bell, then filling evenly with cement to a point about half the depth of the bell and then adding another roll of jute driven against the cement until the moisture shows on the jute. The bell should then be filled evenly with cement to the face of the hub.

Leadite is a composition in the form of a black powder, the base of which is sulphur, and which is used in the same manner as lead with the exception that no caulking is required. Great care is necessary in handling it, as too high a temperature thickens it so that it cannot be run into the joint and the sulphur will ignite if allowed to get too hot. Leadite is 25 to 30 per cent cheaper than lead. A small leak in a leadite joint will soon be filled by rust, as part of the composition is iron.

Lead wool is used in the same manner as jute and is useful in water and where it would not be convenient to pour a joint. It is also useful in making repairs to leaking or blown out lead joints. The cost is about 25 per cent greater than joints made with pig lead.

Rust joints made of iron chips, sal ammoniac and water are seldom used now, although in former years they were used frequently for low pressure cast iron steam and hot water lines.

Wood stave pipe is constructed of staves, machined to a circle and held together with a flat, soft steel band wound spirally around the pipe, the finished pipe being coated with asphaltum and rolled in sawdust or wood shavings. The use of this pipe developed very rapidly on the Pacific coast where the cost of transportation of cast iron pipe made its use almost prohibitive and an abundance of suitable timber was close at hand. For many installations wood stave pipe will not answer the purpose as well as cast iron, although where the pressure is constant or the water is highly charged with acid, it should give satisfaction.

The term "wrought iron pipe" as generally used designates both wrought iron and steel pipe, while as a matter of fact there is a wide distinction between the two. Genuine wrought iron pipe is rarely furnished unless so specified and purchased on analysis. The advantage of genuine wrought iron pipe is chiefly in its greater resistance to corrosion, although it will be found to cut and thread more easily than steel pipe. Its cost is about 20 per cent more than steel. As in many instances the cost of the pipe is a comparatively small item in the total cost of conduit, wrought iron pipe would seem to be justified regardless of the first cost. One of the most severe usages to which pipe may be put is roundhouse service, either for overhead steam, water, or air line, or for heater pipes in pits, since the coal gases quickly attack the overhead lines and the moisture corrodes the pipes in the pits. Wrought iron pipes will easily last 50 per cent longer than steel under these conditions.

Steel pipe is stronger than wrought iron, and where the pipe is not subject to excessive corrosion, common merchantable steel pipe will answer for general service above ground, but wrought iron pipe is preferable for underground work. A cheap and effective method of protecting pipe laid underground is to coat it with asphaltum or pitch and wrap it with burlap. Where the water is used for drinking or other sanitary purposes, galvanized or tin-lined pipe should be used as certain waters are affected by contact with iron. Suction lines for pumps are subject to more or less vibration and the importance of keeping such lines tight necessitates the use of a threaded pipe, which should be wrought iron in preference to steel. Steel well casings are subject to rapid decay and the increased life of wrought iron pipe would justify its use for this purpose. Aside from suction lines and well casing the use of either steel or wrought iron pipe larger than three inches would not be justified for underground service.

In laying underground water pipes it is necessary to consider the soil conditions as affecting the life of the pipe as well as the quality of the pipe itself. It is well known that clay forms the best possible covering for underground pipe, and cinders the worst. When laying pipe through cinders, an effective protection can be secured at a small expense by flooring the ditch and covering the pipe with clay. Although it is not always possible to find favorable soil conditions, in many cases slight changes in the location of the pipe line may double the life of the pipe through securing a better soil. In preparing the trench, the bottom should be uniform so that the joints will not be cramped. Pipe laid along the right of way or near tracks should be as far from the tracks as possible on account of the effect of vibration from passing trains and the possibility of track changes throwing the pipe under the tracks. The trench should be deep enough to permit laying the pipe below the frost line.

All leaks in water mains may be classed under one of the following causes; settling of the pipe; expansion and contraction; deterioration through corrosion; electrolysis, and poor joints. In general, little trouble will be experienced from settling unless the pipe is laid in new-made fill or very soft ground. Whenever it is possible to avoid it, pipe should never be laid in a new fill until it has had time to settle thoroughly. Where pipe is laid through soft soil the ditch should be well floored or piling driven. Little trouble will be experienced with underground mains from expansion and contraction where cold water is used, but where hot and cold water are alternately pumped through the line, as is the case at some mechanical terminals, trouble from leaks due to expansion and contraction of the pipe is unavoidable. Leakage in mains laid under or near tracks may be reduced by burying the pipe to the maximum depth and placing as few joints as possible under the track. The trouble may sometimes be eliminated by bridging over the pipe with heavy timbers to support the ties.

Leakage from corrosion in a cast iron pipe is very remote and is hardly worth considering, except that caused by electrolysis. Electrolysis caused by the passage of stray current from power lines or electric railways along the underground pipe occurs only at the points where the current leaves the pipe. At such points corrosion of the iron from electrolysis will take place, which, theoretically, will amount to a loss of 20 lb. of iron per year for every ampere of electric current leaving the iron. Experiments have shown that this theoretical corrosion is at least equalled and sometimes exceeded. For a given current leaving the pipe there is practically no difference in the amount of iron destroyed between cast iron, wrought iron and steel. The electrical resistivity of cast iron is, however, about 10 times as great as that of wrought iron or steel, and the usual lead joint cast iron pipe also has a resistance 20 times greater than the screw coupling joints usual with wrought iron and steel pipes. For these reasons a given voltage drop will cause a much smaller current to flow on a cast iron pipe than on a wrought iron or steel pipe, thus making cast iron pipe practically much less subject to electrolysis than wrought iron or steel.

The principal cause of leaks is poor joints. Proper attention to joints will always pay, the only safe course when leaks develop being to stop them at once. Wherever possible, joints

should be tested to the maximum pressure before being covered.

Incrustations and deposits in water pipe seriously affect the carrying capacity of the pipe and by increasing the friction very materially increase the cost of pumping. The frictional loss in dirty water mains is far in excess of the actual reduction in area due to the roughness of the pipe. As a matter of fact, the interior coating of new pipe may affect the carrying capacity as much as 20 per cent due to the care and smoothness with which it is applied.

The question of water hammer caused by stopping the flow in a water pipe is of great practical importance, as the shocks frequently bursts the pipe. The simplest method of protecting pipes from water hammer is to use slow closing gates. The duration of closure should be proportional to the length of the pipe line. Air chambers of adequate size placed near the valves and gates eliminate almost entirely the hydraulic shock and do not allow the pressure wave to pass through them, but they must be very large and it is difficult to keep them supplied with air. Safety valves allow pressure waves with only such intensity as correspond to the elasticity of the springs of the safety valves to pass through them.

Committee: C. R. Knowles (I. C.), chairman; J. B. White (C. & N. W.), James Dupree (C. T. H. & S. E.), John Ewart (B. & M.), C. F. Warcup (G. T.), and M. G. Manning (C. G. W.).

Discussion

The figures relative to the cost of laying pipe aroused considerable discussion. James Dupree (C. T. H. & S. E. Ry.) expressed the opinion that the figures were too low, especially those in reference to leading joints. He said that he used two pounds of lead per inch diameter of pipe. Several members thought that there was practically no difference in the cost of excavating for pipe from four to twelve inches in diameter. In discussing cemented joints for steel pipe Mr. Dupree said that he always found them unsatisfactory. A. H. King (O. S. L.) reported the same experience. J. B. Sheldon (N. Y. N. H. & H.) said that he overcame the difficulty in maintaining tight joints in water pipes subject to water hammer by the substitution of flanged joints for leaded joints. J. S. Robinson (C. &. N. W.) said that he had found the gaskets wearing in the flanged joints thereby causing leaks. A. A. Wolf (C. M. & St. P.) said that he overcame this difficulty by using metal gaskets. R. Henderson (B. & O.) reported that he had laid three miles of pipe with flanged joints satisfactorily by placing a wood block under each joint. In discussing the water hammer several members reported satisfactory results following the installation of air chambers or slow closing valves, while others reported these practices ineffective. W. C. Frazier (S. P. L. A. & St. L.) described an installation of wood stave pipe lines ranging from four to eighteen inches in diameter at Las Vegas, Nev., with redwood staves one inch thick which proved unsatisfactory because of the difficulty in keeping the bands on. He stated that it requires three or four men working continuously to replace the bands and that galvanized iron bands were found but little better than common iron bands. J. F. Fisher (S. P.) reported trouble with root growths in wood pipe. A. H. King (O. S. L.) said that he had had difficulty with alfalfa and other roots entering at joints and that it was necessary to take the pipe apart to clean it. He never found any mossy growth inside. A. A. Wolf (C. M. & St. P.) on the other hand, said that he had had to remove pipe clogged by moss. In laying iron pipe under tracks he has placed the pipe in a larger conduit of concrete culvert pipe, thereby eliminating leaky joints.

CONCRETE POSTS AND POLES

Concrete Posts.—At the present time wooden posts are as cheap and in many instances cheaper in first cost than any substitute which has been brought forward, but because of their short life and liability to destruction by fire, there is a question whether any wooden post with the exception of one or two kinds of wood, is as cheap as a well designed and well manufactured concrete post. Many persons have studied concrete as a suitable substitute for wood in posts, and naturally some errors in design have been made, many posts have been poorly manufactured, and a good many failures have resulted. Also, as is usual in a new field, there have been some whose enthusiasm outran their judgment and extravagant claims which could not be backed up were made. The posts were found to be difficult to handle on account of their weight and were easily broken. Considerable difficulty was experienced in finding a satisfactory method of fastening the fence to the post, especially as many of the earlier designs were straight or had a very slight taper. Notwithstanding these drawbacks, concrete posts have established themselves permanently and as the supply of wooden posts continues to diminish, their use will rapidly increase.

Any fence post, to secure extended use, must fulfil the requirements of stability, durability, efficiency and economy. Experience has shown that the concrete post is as stable as the wooden one. The very quality, weight, which makes it difficult to handle during manufacture and while being distributed, is a marked advantage in securing stability after it has been set. Again, when used in low, wet places and in localities subject to overflow, the advantages of the concrete post are apparent.

Concrete posts have not been in use a sufficient length of time to enable accurate data to be secured as to their life, but judging by the performance of concrete under other circumstances it is felt that a life of 40 years may be safely predicted for a properly designed and manufactured post.

Experience shows that the concrete post is as efficient as the wooden one. It has the further advantage of not being subject to destruction by fire. As to economy, the weight of evidence is in favor of the concrete post. Wooden posts cost from $0.10 to $0.30, depending on the kind of wood used and the locality. The average for those most commonly in use is conservatively $0.16 to $0.17 and their average life from 12 to 15 years. Concrete posts cost from $0.16 to $0.20, with the average for the heavier posts about $0.18. It therefore requires no complicated calculation to determine the relative economy of wooden and concrete posts. They have the further advantage that they can be made near the point where they are to be used.

Many ideas as to the best designs of concrete posts have been advanced. The shapes vary from square and rectangular to round or triangular. There are also T-shaped posts and semi-circular, or rather semi-elliptical and rectangular sections with one end semi-circular. In size they vary from 3 in. to 6 in. at the top and from 4 in. to 8 in. at the bottom. In some instances the posts are spread at the bottom. Many of the early posts were made straight or with a very light batter. The committee believes that in general those sections having the smaller perimeter for any given section will prove more satisfactory.

Experience has shown that straight posts or those with a very slight batter are apt to heave with the frost. In these designs it is also difficult to prevent the fence slipping down on the posts. For these reasons posts are now generally made with a decided batter, and the committee believes the taper should be uniform from top to bottom. It has been found that the lighter posts could not always be depended on to resist the strain to which they are subjected, especially in those sections of the country where stock is plentiful, and the recent tendency seems to be toward the use of a heavier post. The advantages of the lighter post are the small decrease in cost due to less material used and the lighter weight of the post, which is some advantage in handling and shipping. The latter advantage is offset somewhat by the fact that greater care must be used to prevent breakage. The committee recommends that the minimum diameter at the top should be 4 in. and at the bottom 5½ in.

The methods of reinforcing are nearly as numerous as the shapes of the sections. They can be divided into two general

classes those reinforced with core reinforcing and those in which the reinforcing is placed near the circumference. Reinforcing material consists of plain round or square rods, hoop steel, steel wire, sheet steel cut and pressed into required shapes, twisted or corrugated bars, and in some instances a combination of two of the above. In some instances the rods are wound with wire and in others crimped wires are used. The committee believes that reinforcement should be placed near the circumference of the post where the greatest stresses are likely to occur and where it is reasonable to expect the tendency to crack is the greatest. The critical section of the post is near the surface of the ground and frequently extra reinforcing is placed at this point. The committee does not believe that this is called for, but it may be found desirable under special conditions where posts are subjected to unusually hard service.

In general, concrete for posts is made of crushed rock or screened gravel, though bank gravel is frequently used. The latter material usually is not as clean as the screened gravel and under these conditions as good results cannot be expected. Better proportioning of the materials can also be obtained with the stone or screened gravel and sand. The concrete should be as dense as possible. This adds somewhat to the strength of the post, since by decreasing the amount of absorption it decreases the chances of corrosion of the reinforcing and to a considerable extent prevents deterioration of the posts due to the action of frost. For this reason posts should be made of a comparatively rich mixture. The cost of the cement is a small proportion of the total cost of the post and the cost of the additional cement which makes the difference between a lean and a rich mixture is negligible.

On account of the comparatively small section of a fence post and the placing of the reinforcement, it is undesirable that the coarser aggregate should be of a large size. Experience has shown that the gravel or crushed rock should not exceed ½ in., nor be less than ¼ in. in size. The committee recommends a mixture consisting of one part of cement, two parts of clean, sharp sand and four parts of broken stone or screened gravel. When bank gravel is used, a mixture of one part cement and four parts of gravel is recommended.

While reinforcement should be placed near the outer surface it is necessary that it be protected by the concrete. On this account it is recommended that it be placed ½ in. below the surface. It is also recommended that the reinforcing material be long enough to permit turning it down at the end. Recent experiments develop the fact that slightly rusted reinforcement gives a decidedly stronger bond with the concrete than does the clean, bright metal, or metal with the mill scale on.

Wherever possible, concrete for posts should be mixed in a batch mixer. Machine mixed concrete is recognized as superior to hand mixed, as the cement is more thoroughly incorporated with the sand and stone and the stone itself is more uniformly distributed. All materials should be measured. The amount of water added should produce a quaking mixture. This consistency will be wet enough to cause the concrete to settle around the reinforcing and produce a smooth surface. If it is made wetter there is danger of part of the cement being washed off the sand and stone and rising to the top. This results in an inferior product which will give a larger percentage of breakage and a shorter life.

Posts should never be made during freezing weather. On account of the small volume of a post it is more easily affected by low temperatures than concrete in large volumes. For the same reason the concrete in posts is apt to dry out rapidly in hot or very dry weather. It is therefore essential that they be kept moist for the first week or ten days and during this time they should not be exposed to the sun. Posts should be retained in the mold for three days after it is cast and it is better to allow four days. As soon as the concrete is set, water should be poured over it and the post kept thoroughly wet until removed from the molds. After removal it should be stored under cover and in such manner that it can be kept moist for the period specified. Great care must be exercised in handling the posts at this period as they are very easily broken. They should be stored upright with the larger end down. Concrete gains rapidly in strength and the bond between the concrete and reinforcing increases rapidly up to 30 days and only slightly less rapidly during the next 30. At the end of 90 days this strength has developed so that the post can safely be used if care is taken in handling. No post should be used earlier than 90 days after it is made. Difficulty is frequently experienced in casting posts on account of the concrete sticking to the molds. For this reason it is customary to oil the surface of the mold or to brush it with a solution of soap. Either oil or soap should be used sparingly. The molds should be scrubbed and cleaned with a stiff broom frequently. In general, it is desirable to have a plant equipment sufficient for a daily output of at least 400 posts. This will require molds for 1,200 to 1,600 posts, depending on whether they are left in the molds three or four days.

The handling and shipping of concrete posts are fully as important as the actual manufacture. Wooden posts can be thrown about, piled in cars or on the ground and handled very roughly without impairing their value. This cannot be done with concrete posts. When shipped, the posts should be carefully packed in straw or sawdust. In unloading, they should not be thrown on the ground, particularly if it is hard or uneven.

Concrete posts are set in the same manner as wooden ones and under normal conditions a man can set as many concrete as wooden posts. Many methods of fastening the fence to the posts have been devised. Small holes were made through the posts at stated intervals and nails or wire run through them to be bent around the fence wires. Wooden blocks were inserted and anchored in the posts during manufacture. In some instances staples were placed in the posts while the concrete was green. None of these methods proved satisfactory. Holes or staples could not be located where the fence wire would come, as it is seldom possible to set the posts at exactly the same depth. Irregularities in the ground also caused difficulties with this type of fastening. Again, this type of fastening sooner or later rusts out and cannot be replaced. Holes and wooden inserts weaken the posts and are in every way unsatisfactory. The most satisfactory method of attaching the fence is to use tie wires around the posts, attaching them to the fence wire by means of the "Western Union twist." Care must be exercised to have the tie wires tight and the fence wire drawn up snug to the fence post, otherwise the fence will slip down on the post and stock running against it or trying to get through will raise or press the fence down. This method of fastening the fence to the post will be most satisfactory where the post is made with a taper.

Concrete Poles.—In considering concrete as a substitute for wooden poles, a quite different situation is found. While the concrete posts can be easily manufactured and handled substantially the same as the wooden posts, the concrete pole is expensive, the handling of the forms is troublesome, and the erection of the pole requires radically different methods from the wooden one on account of its great weight. In spite of these drawbacks there are a number of points in favor of these poles. A number of telegraph lines have been put in service with concrete poles, notably on the Pennsylvania, where it is understood that they proved very satisfactory during the unprecedented winter of 1913-14. The extra expenditure for a concrete pole may be justified in order to safeguard heavy and important lines, but the committee does not believe it can be justified for lighter and less important lines.

Committee: George E. Boyd (D. L. & W.), chairman; A. S. Markley (C. & E. I.), C. W. Wright (L. I.), F. J. Conn (C. N. O. & T. P.), and W. E. Elder (C. B. & Q.).

Discussion

A. S. Markley (C. & E. I.) thought it unnecessary to hold posts 90 days before using them. He also thought the prices

given in the report were too low. He has found reinforcing separators detrimental to the strength of the posts.

CLOSING BUSINESS

At the closing business session the following officers were elected for the coming year: President, L. D. Hadwen, engineer of masonry construction, Chicago, Milwaukee & St. Paul, Chicago; first vice-president, G. Aldrich, bridge supervisor, New York, New Haven & Hartford, Boston, Mass.; second vice-president, G. W. Rear, general inspector, Southern Pacific, San Francisco, Cal.; third vice-president, C. E. Smith, assistant chief engineer, Missouri Pacific, St. Louis, Mo.; fourth vice-president, E. B. Ashby, chief engineer, Lehigh Valley, New York; secretary, C. A. Lichty, general inspector, Chicago & North Western, Chicago; treasurer, F. E. Weise, chief clerk, engineering department, Chicago, Milwaukee & St. Paul, Chicago.

Detroit was selected as the place for next year's convention. The subjects selected for next year's committee work include: (1) Locomotive Cranes in Construction Work and Handling Material; (2) Conditions Under Which Pile and Timber Bridges Should Be Repaired, Reinforced, Renewed or Replaced; (3) Railway Water Tanks; (4) Coaling Plants for Small Stations; (5) Compilation, Analysis and Value of Cost Data; (6) Efficient Methods for Handling Work. The following committees for this year also were continued: (2) Warning for Overhead and Side Obstructions; (4) Reinforced Concrete Bridge Work; (5) Station Buildings for Passenger Service Only, and (9) Concrete Culvert Pipe and Concrete Piles.

On Tuesday evening, 234 members and guests attended a banquet in the Alexandria Hotel. G. W. Rear (S. P.) was toastmaster, and the speakers included W. H. Whalen, division superintendent of the Southern Pacific at Los Angeles; E. A. Baley, who described the Los Angeles aqueduct; H. B. Titcomb, engineer maintenance of way of the Southern Pacific; President Penwell and others. Late Wednesday afternoon there was a trip to Ocean Park, where the party remained for the evening. On Thursday evening there was a trip up Mount Lowe. There were also various other rides arranged for the ladies.

SUPPLY ASSOCIATION

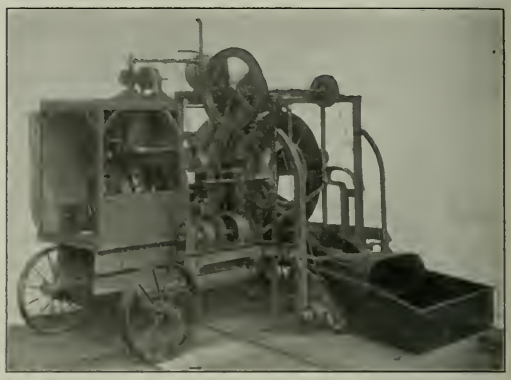
On account of the excessive cost of sending exhibits and representatives to Los Angeles, very few of the supply firms that hold membership in the Bridge and Building Supply Men's Association were represented at the convention. It was agreed before the convention that no meeting would be held at the convention and that the existing officers would continue their duties for another year. These officers are: President, J. A. Meaden, Paul Dickinson, Inc.; vice-president, D. A. Bonitz, National Roofing Company; treasurer, H. A. Neally, Joseph Dixon Crucible Company; secretary, L. D. Mitchell, Detroit Graphite Company; members of the executive committee, C. E. Ward, U. S. Wind Engine & Pump Company, and W. A. Hemenway, Asphalt Ready Roofing Company.

THE SMITH-CHICAGO CONCRETE MIXER

An improved type of the Chicago mixer formerly sold by the Chicago Concrete Machinery Company, Chicago, will be handled in the future under the name of the Smith-Chicago mixer by the T. L. Smith Company, Milwaukee, Wis. In distinction to the other Smith mixers, the new type has a non-tilting discharge.

The cylindrical drum has a centrally located ring encircling it, which combines the main driving gear and the main roller track in one substantial casting, the rollers being protected by the overhanging drum heads. No movable parts are located in the drum where they can come in contact with the mix. The mixing action is secured by large scoop blades with deep converging sides which pour the batch to the center of the drum. The action of these blades combined with the action of the drum itself, produces a movement in the mass which distributes the loads evenly and produces an efficient mixture without splashing.

The external discharge chute is pivoted above the discharge opening, projecting two-thirds of the way through the drum. The length and steep angle of this chute are made possible by the concave face of the drum. This discharge chute can be used to measure small quantities of concrete with accuracy or to discharge the entire batch rapidly. When the discharge chute is not in the discharging position, it



The Smith-Chicago Mixer with Gasolene Engine, Power Charger and Enclosed Water Tank

swings out and up, draining back into the drum. In this position it does not interfere with the wheelbarrows or hoisting buckets. On self-loading machines this spout can be operated either from the feed or discharge side of the machine.

The new type of mixer can be equipped with a standard feed chute, a vertical acting power charger, or a gated batch

The Smith-Chicago Mixer with Steam Engine, Boiler, Power Charger and Enclosed Water Tank. The Chute is Shown in Discharging Position

hopper. The power charger consists of a skip carried by four rollers traveling on curved guides. The skip is hoisted by cables, the wide nose projecting well into the drum in the discharging position. These chargers are equipped with a device automatically to disengage the clutch when the skip has reached its highest position, forming an effectual safeguard against accidents.

General News Department

The new union station of the Illinois Central, the Yazoo & Mississippi Valley, the Chicago, Rock Island & Pacific, and the St. Louis & San Francisco, at Memphis, Tenn., was opened on October 21.

The freight house of the Northern Pacific at Duluth, Minn., sustained considerable damage from fire on the night of October 11. The loaded cars in the shed were all saved. The damage is estimated at $20,000.

November 9 has been set as the date for the beginning of hearings at Chicago in the arbitration proceedings on the demands of the enginemen and firemen of the western railways, although the board of arbitration is not yet complete. The two arbitrators representing the employees and the two representing the railroads have been selected, but they have not yet agreed upon the two neutral members.

The Interstate Commerce Commission has postponed to March 31, 1915, the date on which carriers must have complied with its order under the transportation-of-explosives act, requiring gas cylinders to be supplied with certain safety devices. Owners of such cylinders placed orders in Europe for the required devices, but now have informed the commission that their orders cannot be filled within the time limit fixed.

The voters of Roseburg, Ore., last week voted to authorize a $500,000 bond issue to assist in the construction of a proposed railroad from Roseburg to Coos Bay, Ore., in order to secure rail communication with the Pacific ocean, which has been projected for nearly 40 years. The town elected a railroad commission of 10 members to represent the people's interest in the matter. The money is not to be expended until the people are assured by a sufficient bond that a standard gage road will be constructed between Roseburg and Coos Bay to be operated for a term of years under conditions satisfactory to the members of the commission. In that case the $500,000 will be appropriated to assist in the work. The proposed line has been surveyed and a part of the grading has been completed under a former project.

J. W. Everman, general manager of the St. Louis Southwestern, who took that position on July 1, after 33 years' service with the Texas & Pacific, was presented with a silver service of 186 pieces, costing $1,200, by a committee representing the 10,000 employees of the Texas & Pacific, at a luncheon at Dallas on October 13. The committee was composed of 40 of the Texas & Pacific employees, and the presentation was made by George Thompson, general attorney for the Texas & Pacific. In addition to the Texas & Pacific men the principal officers of the St. Louis Southwestern were present at the luncheon, including President F. H. Britton, Vice-president H. E. Farrell, General Solicitor S. H. West, Chief Engineer C. D. Purdon, Purchasing Agent Ernest Baxter, General Attorney E. B. Perkins, Superintendent F. J. Hawn and W. C. Connor, president of the Dallas Terminal Railway & Union Depot Company.

The Baltimore & Ohio, in order to "see itself as others see it," has ordered W. E. Lowes, assistant general passenger agent, to make a tour of its lines on an inspector's gasolene tricycle to collect first-hand information. Accompanied by a photographer and a supervisor of track, Mr. Lowes has already covered a portion of the main line and some of the branches of the eastern divisions. In the Shenandoah Valley, along the south branch of the Potomac river and in eastern Ohio, a number of exquisite photographs of historical interest and scenic beauty have been taken and will be used in advertising. Up to this time Mr. Lowes has traveled from fifty to sixty miles a day, stopping to talk over business conditions with agents at small stations, as well as with farmers in the fields and workmen in industries along the route. From farmers he obtains information concerning the fertility of soil and its adaptability to particular phases of farming, learns the yield per acre in the community and the amount of fertilizer, farming machinery and articles shipped in, and gives and receives information about markets.

Disastrous Collision in France

A press despatch from Pas-de Calais, France, October 19, says that between forty and fifty passengers were killed and eighty injured in a butting collision on the 17th at Marquise, between Calais and Boulogne. The trains carried soldiers and refugees. The cause of the collision is given as a broken signal wire, which allowed a signal to change from "stop" to "proceed."

Repeal the "Full-Crew" Laws!

The following appeal, issued by the Pennsylvania Railroad, has been posted in all the stations along the company's lines, and also on trainmen's bulletins:

"It is in the interest of the public—whose chief concern is good service and safety—that the extra crew law now on the statute books of Pennsylvania, New Jersey and New York be repealed. This law causes a waste of $1,100,000 annually in the employment of unnecessary men on the Pennsylvania system alone. No one is more concerned than the Pennsylvania Railroad Company in securing maximum safety on its lines. Every train on this railroad has a full crew, and this extra expenditure adds nothing to safety or public convenience. The same money had much better be spent to remove grade crossings, improve tracks, signals and bridges and buy steel cars.

"This extra crew law, which compels unnecessary expenditures, is one of the factors which menaces the ability of this company to pay present rates of wages to that great body of employees whose activities are needed. The Public Service Commission should see to it that all trains are properly manned. Such action would amply protect employees and the public. We appeal to the people in their own interest, we appeal to our employees in their best interest, to ask their representatives in the next Pennsylvania, New Jersey and New York legislatures to repeal the extra crew law."

Trespassing Reduced*

In New York state we have a definite law prohibiting trespassing on railroads and making it a punishable offense. We have within the past year employed a special man to personally visit the judges of all courts having jurisdiction in trespassing cases along the entire road, to obtain their co-operation in the enforcement of the law. Not only in New York but all other states through which our lines run the editors of newspapers were personally visited and their aid procured in giving wide publicity to our campaign. We posted at frequent intervals warning notices in various languages along the entire right-of-way, warning the public that arrest or injury would be the probable penalty for track walking. We prepared graphic maps indicating the number and location of trespass, death and injury cases, which we displayed in prominent store windows in important cities along our lines. We distributed pamphlets and circulars to the superintendents of schools and heads of industrial plants, enlightening them and obtaining their co-operation. And, because we did all of these things in a persistent manner, thereby educating and warning the public against the dangers of trespassing, there were during the year ending June 30, 1914, on the four principal roads of the New York Central Lines 109 fewer trespassers killed and 83 fewer trespassers injured than during the previous twelve months.

Let us, then, make education our watchword as well as safety our creed. Let us light the torch of prudence and hold it aloft that its rays may penetrate the remotest corners of the land, eradicating the darkness of ignorance which cloaks the chance

*Extract from an address by Marcus A. Dow, general safety agent of the New York Central, before the annual convention of the National Council for Industrial Safety, at Chicago, October 15.

REVENUES AND EXPENSES OF RAILWAYS

Month of July, 1914

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses							Net operating revenue (or deficit).	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
					Maintenance										
		Freight.	Passenger.	Total. inc. misc.	Way and structures.	Of equipment.	Traffic.	Transportation.	Miscellaneous.	General.	Total.				
Ann Arbor	292	$119,810	$56,987	$191,112	$20,442	$24,805	$5,140	$72,268	$549	$6,642	$129,845	$61,267	$13,880	$47,387	$3,806
Chicago, Indianapolis & Louisville	618	394,518	153,292	596,067	72,317	108,041	18,569	211,720	226	19,326	429,773	166,294	26,645	139,649	942
Month of August, 1914															
Alabama & Vicksburg	143	$79,164	$44,571	$136,255	$22,398	$33,413	$3,722	$48,003	$3,292	$5,255	$116,084	$20,171	$7,240	$12,931	—$10,719
Alabama Great Southern	309	311,483	116,028	465,394	50,825	120,417	13,915	155,557	4,150	8,607	353,472	111,923	15,493	96,399	—4,659
Atchison, Topeka & Santa Fe	8,470	5,736,359	2,071,599	8,421,750	1,185,026	1,428,424	156,487	2,269,571	.....	150,813	5,185,405	3,236,345	397,420	2,837,930	372,968
Atlanta & West Point	93	48,020	46,077	107,251	19,072	27,373	5,646	33,554	2,389	4,292	92,326	14,925	7,125	7,783	—7,680
Atlanta, Birmingham & Atlantic	646	156,365	67,409	243,735	35,964	44,591	13,494	101,565	.....	10,275	205,889	37,846	14,337	23,488	1,605
Atlantic & St. Lawrence	167	82,760	37,418	130,308	20,027	15,421	3,812	49,037	.....	2,570	90,867	39,441	10,800	28,641	10,947
Atlantic City	170	78,521	324,431	417,429	28,253	30,381	5,984	155,842	50	1,362	221,871	195,557	13,500	182,039	—45,347
Atlantic Coast Line	4,664	1,349,430	675,396	2,213,766	423,552	505,207	53,106	917,644	6,510	75,890	1,972,238	241,528	138,000	103,522	—73,999
Baltimore & Ohio—System	4,516	6,507,131	1,604,011	8,700,376	873,944	1,575,243	166,274	3,108,681	36,348	172,566	5,933,057	2,767,319	257,655	2,509,275	—231,459
Baltimore & Ohio Chicago Terminal	79	.....	786	147,371	18,941	21,199	857	56,922	4,578	4,860	107,357	40,014	19,021	20,992	—2,506
Bangor & Aroostook	631	151,329	68,155	234,267	51,539	48,684	2,885	79,644	1,938	9,116	193,805	40,462	8,750	31,708	—7,617
Belt Ry. Co. of Chicago	24	.....	.....	291,236	22,922	24,643	776	90,403	.....	6,096	144,841	146,396	12,113	134,282	48,388
Bessemer & Lake Erie	204	1,077,912	56,256	1,150,608	60,581	159,752	9,357	204,567	2,492	10,439	446,999	703,609	18,000	685,608	173,395
Bingham & Garfield	27	102,598	4,954	108,431	9,031	15,517	849	17,558	125	1,350	44,430	64,001	1,509	62,492	—16,237
Birmingham Southern	43	44,411	1,237	84,038	18,607	14,031	435	30,925	.....	3,370	66,469	17,570	1,719	15,851	—23,565
Boston & Maine	2,252	2,336,137	1,698,366	4,384,001	721,307	696,748	30,713	1,727,671	21,819	93,065	3,291,323	1,092,678	171,070	921,608	—329,181
Buffalo & Susquehanna R. R. Corporation	253	132,596	8,442	143,936	27,342	37,743	1,167	39,859	.....	5,300	111,411	32,525	2,600	29,925	.....
Buffalo & Susquehanna Ry	91	15,642	10,610	29,167	7,132	10,531	539	12,710	57	2,933	33,903	—4,736	1,600	—6,336	—1,562
Buffalo, Rochester & Pittsburgh	586	880,107	127,129	1,040,683	164,998	254,501	11,344	287,363	1,370	17,181	736,756	303,926	20,000	283,919	—60,346
Canadian Pacific Lines in Maine	233	42,209	20,558	68,886	22,785	17,028	6,691	32,897	.....	3,853	83,255	—14,369	12,000	—26,369	—495
Carolina, Clinchfield & Ohio	248	155,574	21,215	182,103	18,678	21,876	6,754	34,789	.....	8,285	88,732	93,370	14,250	79,085	—58,055
Carolina, Clinchfield & Ohio of S. C.	18	8,817	2,048	11,168	1,141	104	1,917	2,104	.....	704	5,970	5,198	750	4,448	—3,798
Central of Georgia	1,924	597,554	335,972	1,031,504	153,356	215,465	34,164	372,177	1,509	33,601	810,228	221,276	52,360	168,939	79,700
Central of New Jersey	678	1,792,986	740,932	2,683,788	233,338	431,672	29,897	879,237	16,158	48,027	1,638,247	1,045,540	112,376	933,165	—131,902
Central New England	304	254,055	47,605	314,877	85,874	35,682	983	101,731	.....	4,165	248,405	86,471	11,000	75,471	—54,714
Central Vermont	411	224,624	105,926	361,957	76,118	54,691	8,300	145,302	3,053	5,874	293,338	68,620	15,760	52,859	7,722
Charleston & Western Carolina	341	99,781	38,628	146,022	31,982	30,399	3,743	57,045	.....	4,126	127,295	18,727	5,000	13,727	—11,217
Chesapeake & Ohio Lines	2,367	2,708,839	617,389	3,519,057	394,042	742,148	55,613	1,077,424	21,430	71,901	2,362,557	1,156,500	109,922	1,046,578	—33,284
Chicago & Eastern Illinois	1,282	987,402	295,209	1,385,512	152,738	280,973	21,481	467,712	8,181	36,436	967,522	417,990	56,900	361,029	153,538
Chicago & Erie	270	414,154	61,218	521,247	87,841	113,223	19,366	233,338	2,065	15,228	471,061	50,186	12,895	37,291	78,288
Chicago & North Western	8,108	4,748,395	2,254,794	7,768,873	1,389,868	1,173,119	112,169	2,475,717	56,552	139,021	5,346,446	2,422,428	375,000	2,047,186	—32,745
Chicago, Burlington & Quincy	9,264	5,871,384	2,163,915	8,742,382	1,020,824	1,389,088	152,648	2,425,581	67,930	171,815	5,227,887	3,514,495	332,528	3,181,967	—51,953
Chicago, Detroit & Can. Gd. Trunk Jctn.	60	47,107	19,562	79,638	12,935	9,412	1,802	43,244	.....	1,199	68,591	11,047	2,870	8,177	—15,218
Chicago Great Western	1,427	884,095	319,492	1,309,309	186,989	194,536	57,361	407,470	6,750	35,064	886,573	422,736	48,668	373,077	—20,965
Chicago, Indiana & Southern	359	304,748	31,617	349,680	53,498	83,491	5,902	117,082	1,519	10,131	271,622	78,057	18,700	59,350	35,276
Chicago Junction	12	.....	.....	163,649	21,887	19,098	992	82,663	.....	4,449	129,090	34,559	2,104	32,440	—27,386
Chicago, Milwaukee & St. Paul	9,987	5,456,401	1,898,329	8,189,201	1,155,705	1,150,657	160,676	3,080,780	68,980	136,696	5,592,937	2,596,265	438,577	2,149,240	247,387
Chicago, Peoria & St. Louis	255	119,603	32,468	160,126	26,100	26,495	5,537	57,831	.....	5,216	121,180	38,946	5,700	33,246	33,721
Chicago, Rock Island & Gulf	477	174,845	55,954	247,747	33,345	37,517	9,388	96,006	1,576	8,391	186,223	61,524	8,815	52,663	—12,063
Chicago, Rock Island & Pacific	7,852	4,187,117	1,804,472	6,420,284	911,708	1,063,347	143,833	2,342,342	45,089	132,921	4,632,558	1,787,726	231,660	1,555,620	203,484
Chicago, St. Paul, Minneapolis & Omaha	1,753	1,009,930	547,423	1,678,617	250,620	206,930	28,393	543,313	16,307	34,004	1,079,567	599,050	91,799	507,166	212,744
Chicago, Terre Haute & Southeastern	375	172,907	19,749	198,631	31,408	35,479	2,911	54,299	846	10,155	135,099	63,532	11,500	52,032	19,993
Cincinnati, Hamilton & Dayton	1,015	721,371	160,391	977,456	136,380	159,837	20,437	399,379	.....	18,960	734,993	242,463	40,042	202,307	28,437
Cincinnati, New Orleans & Texas Pacific	337	629,529	157,091	828,788	89,374	234,801	24,410	249,407	1,042	21,114	620,149	208,639	31,000	177,639	—55,615
Cincinnati Northern	246	118,684	31,777	157,402	22,469	25,983	2,509	48,295	.....	3,459	102,715	54,687	6,000	48,687	45,447
Cleveland, Cincinnati, Chic. & St. Louis	2,361	2,190,428	893,579	3,367,001	426,246	642,996	70,993	1,197,744	27,491	59,162	2,420,838	946,163	130,000	815,925	282,945
Colorado Midland	338	144,561	39,522	201,686	34,955	37,986	8,329	74,193	3,057	5,476	163,997	37,689	7,060	30,630	23,739
Colorado & Southern	1,127	444,477	189,579	680,028	107,363	151,589	11,149	207,711	5,471	18,632	501,916	178,112	35,625	142,487	—107,695
Cumberland Valley	164	200,230	67,523	282,482	51,666	32,078	3,794	93,621	787	6,925	188,871	93,611	5,910	87,701	5,801
Delaware, Lackawanna & Western	960	2,499,853	856,993	3,715,617	516,241	618,678	71,697	1,112,060	35,400	73,542	2,405,832	1,309,785	185,000	1,124,765	—128,802
Denver & Rio Grande	2,562	1,455,454	491,880	2,089,857	397,643	384,140	43,610	587,756	36,335	50,083	1,499,125	590,733	90,000	500,709	—82,971
Denver & Salt Lake	255	109,226	57,232	177,057	17,276	29,397	3,168	49,852	.....	5,541	104,787	72,269	4,500	67,769	—12,165
Detroit & Mackinac	400	56,132	37,317	102,057	12,827	15,635	1,935	33,804	439	2,598	67,238	34,819	9,108	25,711	—14,530
Detroit & Toledo Shore Line	79	114,769	.....	115,158	21,138	8,580	1,534	29,997	.....	2,417	63,666	51,493	5,900	45,593	—13,016
Detroit, Grand Haven & Milwaukee	191	138,000	64,000	230,413	36,710	33,664	7,229	101,239	1,189	4,878	184,909	45,504	3,360	42,144	7,966
Detroit, Toledo & Ironton	441	147,598	21,411	177,878	26,610	17,168	3,436	81,883	.....	6,217	135,314	42,564	6,000	36,564	87,729
Duluth & Iron Range	292	643,444	19,669	685,698	96,247	71,552	1,002	128,556	2,666	8,679	308,702	376,996	36,605	340,391	—393,230
Duluth, Missabe & Northern	364	781,935	32,355	835,661	79,296	79,781	2,410	129,800	3,846	9,756	304,889	530,772	41,906	488,865	—355,397
Duluth, South Shore & Atlantic	628	166,451	104,369	301,087	62,034	40,206	8,548	97,590	4,493	11,150	224,021	77,066	19,000	58,052	—24,384
Duluth, Winnipeg & Pacific	181	79,638	19,715	101,579	31,717	23,041	3,139	40,953	681	7,472	107,004	—5,425	5,079	—10,504	—43,428
El Paso & Southwestern Co	1,029	523,673	113,127	704,910	84,893	98,273	18,176	185,769	6,193	22,162	415,466	289,444	38,211	251,158	59,155
Elgin, Joliet & Eastern	777	784,187	4	831,572	78,106	142,580	5,204	222,192	.....	17,442	465,411	366,161	32,833	333,328	—33,074
Erie	1,988	3,582,510	975,643	4,967,519	558,366	929,992	94,339	1,664,860	36,350	96,980	3,365,944	1,601,575	138,547	1,462,836	70,243
Florence & Cripple Creek	87	83,128	29,096	113,940	14,584	9,739	1,804	32,054	.....	4,792	62,973	50,967	5,677	45,291	—24,442
Florida East Coast	696	150,132	111,801	299,293	57,284	47,318	5,696	127,335	.....	9,636	239,279	60,015	20,000	40,015	73,926
Fort Worth & Denver City	454	256,995	158,029	440,051	42,595	58,636	8,150	161,618	3,923	13,983	288,905	151,145	12,920	138,226	27,055

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF AUGUST, 1914—CONTINUED

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses						Net operating revenue (or deficit).	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
					Maintenance									
		Freight.	Passenger.	Total, inc. misc.	Way and structures.	Of equipment.	Traffic.	Transportation.	Miscellaneous.	General.	Total.				
Galveston, Harrisburg & San Antonio	1,338	$695,723	$269,751	$1,049,329	$144,917	$191,817	$28,113	$416,040	$9,091	$33,448	$823,253	$226,076	$39,425	$186,553	—$99,744
Georgia	307	144,943	88,760	251,226	32,335	53,115	12,594	120,185	.....	7,250	225,479	25,747	3,789	21,958	6,089
Georgia, Southern & Florida	395	99,581	65,936	188,182	26,498	46,711	7,331	78,012	.....	9,239	167,791	20,391	10,943	9,388	5,893
Grand Rapids & Indiana	575	254,671	258,083	560,140	58,320	67,322	9,102	195,829	3,974	13,605	348,152	211,988	24,221	187,767	45,497
Grand Trunk Western	347	444,000	197,000	681,770	93,729	120,144	20,394	239,712	9,083	13,823	496,883	184,887	35,920	148,967	99,130
Great Northern	8,038	4,750,157	1,490,599	6,916,656	720,508	639,309	100,710	1,670,212	83,570	117,685	3,324,522	3,592,133	369,015	3,223,000	688,214
Gulf & Ship Island	308	109,381	32,500	150,765	19,301	29,481	2,332	35,531	195	7,304	94,145	56,621	7,395	49,226	—18,530
Gulf, Colorado & Santa Fe	1,937	992,617	322,610	1,383,388	162,680	187,706	29,607	454,873	.....	35,559	870,424	512,963	51,055	461,908	198,211
Hocking Valley	353	570,793	89,165	711,035	92,924	115,887	8,135	194,212	.....	12,469	423,627	287,409	38,800	248,609	—39,442
Houston & Texas Central	857	369,258	167,952	577,713	93,083	81,038	15,807	232,040	1,814	16,017	439,627	138,086	24,043	113,981	—10
Houston, East & West Texas	191	78,275	37,422	121,053	23,249	13,621	2,029	45,901	.....	2,861	87,626	33,428	4,249	29,146	3,735
Illinois Central	4,769	4,097,901	1,286,002	5,845,351	839,672	1,294,968	97,774	1,941,588	29,951	119,011	4,305,198	1,540,153	275,000	1,260,264	268,459
Indiana Harbor Belt	105	.....	.....	281,269	41,771	28,216	2,355	108,159	.....	7,330	187,831	93,438	7,785	85,649	16,262
International & Great Northern	1,160	477,722	196,381	727,346	147,183	117,538	24,384	327,733	2,938	26,002	645,778	81,569	25,000	56,552	—168,211
Kanawha & Michigan	177	284,602	34,313	325,488	40,213	70,510	2,455	85,715	8	6,936	205,838	119,651	11,889	107,761	5,994
Kansas City Southern	827	651,047	152,539	885,643	105,780	105,016	26,315	289,165	.....	42,705	567,602	318,041	49,082	268,706	—67,181
Lake Erie & Western	906	448,564	93,775	566,604	68,766	84,981	11,493	190,004	.....	11,272	366,517	200,087	24,500	175,587	93,448
Lake Shore & Michigan Southern	1,852	2,905,408	1,307,316	4,800,087	515,733	840,159	75,523	1,569,929	56,131	91,704	3,149,179	1,650,909	196,500	1,454,099	25,257
Lehigh & Hudson River	97	143,145	12,084	157,878	26,583	19,203	1,356	51,000	.....	3,368	101,509	56,369	4,150	52,219	24,233
Lehigh & New England	296	214,073	1,605	225,263	30,101	30,720	1,953	53,580	.....	6,139	122,493	102,770	5,670	97,100	43,018
Lehigh Valley	1,444	3,050,623	503,571	3,770,347	395,739	728,898	74,698	1,205,054	15,371	66,666	2,486,425	1,283,922	140,000	1,142,913	—36,838
Long Island	398	313,599	1,015,194	1,505,277	123,880	123,731	9,794	499,336	6,043	27,056	789,840	715,437	65,362	649,516	90,880
Louisiana & Arkansas	279	148,721	23,774	176,965	30,612	24,262	2,595	41,778	.....	4,473	103,719	73,246	6,450	66,796	10,732
Louisiana Ry. & Navigation	351	137,633	26,415	174,491	35,961	15,471	5,217	62,849	.....	4,923	124,421	50,070	8,500	41,570	559
Louisville & Nashville	5,034	3,295,952	1,100,022	4,705,215	783,388	967,395	107,306	1,567,238	14,997	95,003	3,535,326	1,169,889	184,275	985,199	54,067
Maine Central	1,209	551,698	439,932	1,066,624	141,454	139,186	9,052	378,118	8,993	24,815	701,617	365,007	52,129	312,878	55,009
Michigan Central	1,800	1,705,409	984,655	3,021,357	303,551	426,527	61,633	1,109,318	49,317	52,313	2,002,659	1,018,698	134,000	884,405	348,571
Midland Valley	380	80,364	38,518	125,783	29,346	26,971	2,072	40,830	.....	5,698	104,917	20,866	6,582	14,263	—1,008
Minneapolis & St. Louis	1,646	652,974	205,068	904,698	103,723	136,844	17,903	311,777	.....	19,609	589,855	314,843	37,320	277,523	53,000
Minn., St. Paul & Sault Ste. Marie	4,102	1,609,508	650,797	2,460,556	367,698	401,168	46,899	774,501	17,023	53,507	1,659,599	800,957	107,846	693,112	—93,260
Missouri & North Arkansas	365	61,689	42,982	111,333	30,009	21,071	3,407	52,856	.....	6,797	114,140	—2,807	6,000	—8,835	—28,538
Missouri, Kansas & Texas System	3,865	1,704,693	806,243	2,699,334	383,675	429,159	55,397	933,031	28,305	100,437	1,892,663	806,670	114,515	691,749	—69,462
Missouri, Oklahoma & Gulf	332	84,063	23,219	112,867	20,077	13,331	3,996	39,646	110	5,195	82,354	30,513	6,469	23,965	13,715
Missouri, Oklahoma & Gulf Ry. of Tex	19	10,387	1,111	11,135	1,126	1,721	240	3,726	.....	448	7,260	3,875	1,037	3,658	2,558
Missouri Pacific	3,920	1,936,259	477,901	2,618,106	328,395	508,556	64,483	908,757	9,413	69,609	1,889,213	728,892	98,590	629,702	141,089
Mobile & Ohio	1,122	846,598	139,319	1,034,442	128,878	227,120	40,912	389,199	2,797	28,272	817,179	217,263	33,245	184,000	—52,952
Monongahela	67	90,470	2,336	95,216	14,565	8,188	470	22,451	.....	1,974	47,647	47,569	2,100	45,469	—38,303
Nashville, Chattanooga & St. Louis	1,231	637,704	264,029	985,872	136,408	216,200	45,496	386,548	13,225	28,273	826,150	159,722	27,213	132,458	—38,308
New Orleans & North Eastern	204	233,746	51,469	311,126	37,198	72,390	9,981	109,619	5,865	10,832	245,886	65,240	14,500	50,740	—34,247
New Orleans Great Northern	283	97,730	30,660	141,759	19,460	21,310	2,622	41,580	170	6,467	91,609	50,150	3,167	46,983	—14,394
New Orleans, Mobile & Chicago	403	119,717	32,042	160,765	26,063	25,712	4,046	51,670	—16	6,672	114,146	46,619	6,190	40,408	—20,157
New Orleans, Texas & Mexico	286	104,092	22,721	133,451	28,252	13,501	3,691	47,078	.....	8,013	100,536	32,915	1,621	31,294	2,884
New York Central & Hudson River	3,692	5,276,305	3,465,213	10,178,390	1,132,616	1,732,135	146,991	3,483,282	186,499	204,909	6,886,432	3,291,958	500,260	2,791,487	271,717
New York, Chicago & St. Louis	567	765,907	155,125	967,115	137,564	103,946	43,411	408,021	6,009	18,502	717,453	249,662	42,000	207,661	20,114
New York, New Haven & Hartford	2,003	2,608,446	2,583,152	5,756,909	785,240	819,010	38,714	2,082,169	47,309	132,623	3,904,412	1,852,498	220,000	1,632,239	—143,185
New York, Ontario & Western	568	554,266	317,298	1,000,730	134,906	137,182	9,403	322,794	.....	15,183	619,468	381,262	19,583	361,655	5,090
New York, Philadelphia & Norfolk	112	266,986	61,322	363,123	37,595	76,395	5,739	144,584	4,930	9,212	278,455	84,669	8,700	75,969	—13,013
New York, Susquehanna & Western	140	182,651	49,593	257,324	28,346	27,207	2,327	103,521	.....	5,304	166,705	90,619	12,583	66,640	21,477
Norfolk & Western	2,037	3,372,832	478,061	3,990,541	633,191	718,535	56,382	1,124,329	8,312	63,863	2,550,777	1,440,463	140,000	1,300,463	138,758
Norfolk Southern	860	175,023	95,059	294,802	52,354	47,395	6,189	107,184	.....	19,016	232,137	62,665	11,500	51,165	—37,956
Northern Pacific	6,409	4,036,615	1,482,049	6,075,933	1,028,985	880,394	103,681	1,791,022	95,698	87,744	3,902,995	2,172,938	401,076	1,771,762	—74,885
Northwestern Pacific	401	159,403	205,893	404,445	57,890	41,257	5,451	124,736	.....	8,954	233,500	170,945	15,985	154,960	—26,708
Oahu Ry. & Land Co	109	146,932	23,535	175,688	10,260	9,991	615	24,025	.....	3,197	48,088	127,600	7,250	120,350	45,369
Oregon Short Line	2,163	1,397,658	465,279	2,003,113	292,739	223,876	30,792	454,346	31,063	56,446	1,070,894	932,220	116,500	815,659	49,856
Panhandle & Santa Fe	668	251,853	65,519	333,677	55,094	64,705	3,962	104,393	.....	8,469	236,624	97,053	9,234	87,763	53,022
Pennsylvania *Company*	1,750	4,018,022	977,436	5,496,066	728,752	890,374	76,756	1,770,074	38,407	108,258	3,612,621	1,883,446	275,837	1,607,415	—213,989
Pennsylvania *Railroad*	4,519	11,546,048	3,853,587	17,001,207	2,116,656	3,034,159	174,036	5,779,377	246,742	396,312	11,747,283	5,253,924	653,469	4,600,455	510,394
Pere Marquette	2,322	1,020,692	472,390	1,624,690	152,687	305,468	31,767	565,107	6,176	52,858	1,113,394	511,296	53,477	457,313	273,561
Philadelphia & Reading	1,120	3,248,971	635,409	4,069,789	468,699	753,838	51,894	1,375,118	15,089	64,591	2,729,228	1,340,561	101,492	1,238,381	—177,210
Philadelphia, Baltimore & Washington	717	955,377	760,111	1,905,048	276,583	343,566	24,539	783,104	12	40,791	1,468,595	436,453	56,230	380,223	55,249
Pittsburgh & Lake Erie	224	1,282,611	177,378	1,518,103	172,186	335,103	13,359	359,649	3,866	27,298	911,459	606,643	51,550	555,093	—171,145
Pittsburgh, Cincinnati, Chic. & St. Louis	1,472	2,420,459	793,617	3,585,260	475,428	619,574	64,552	1,203,472	25,136	75,883	2,464,045	1,121,215	164,551	956,544	40,839
Pittsburg, Shawmut & Northern	294	137,447	14,500	154,080	56,919	46,892	1,724	49,493	.....	3,924	158,952	—4,872	1,665	—6,537	—22,803
Port Reading	21	96,142	.....	115,357	23,145	9,800	38	36,306	.....	101	69,390	45,967	12,000	33,967	—2,046
Richmond, Fredericksburg & Potomac	88	111,485	72,753	207,916	20,559	31,473	3,665	81,308	292	7,087	144,384	63,532	7,637	55,873	—6,553
Rutland	468	167,337	119,216	325,279	44,829	56,509	8,891	115,569	1,362	4,983	232,143	93,137	17,088	76,049	—32,062
St. Joseph & Grand Island	319	95,992	32,793	140,171	38,198	22,638	4,930	53,019	.....	5,296	124,081	16,090	7,048	9,042	—8,210
St. Louis & San Francisco	4,746	2,368,287	1,088,661	3,667,529	491,525	562,094	63,525	1,214,393	.....	84,868	2,416,405	1,251,124	117,039	1,132,382	—90,891
St. Louis, Brownsville & Mexico	548	129,361	80,271	226,616	40,847	19,287	5,361	80,008	.....	10,745	154,113	72,502	6,750	65,752	—19,721
St. Louis, Iron Mountain & Southern	3,365	2,006,878	543,529	2,735,464	374,771	512,527	57,382	845,639	9,958	59,713	1,859,991	875,473	112,832	761,909	—91,917
St. Louis Merchants' Bridge Terminal	9	.....	290	165,731	18,954	6,845	753	76,633	.....	6,419	109,605	56,127	8,080	48,047	24,584

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF AUGUST, 1914—CONTINUED

Name of road.	Average mileage operated during period.	Operating revenues			Maintenance		Operating expenses					Net operating revenue (or deficit).	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
		Freight.	Passenger.	Total. inc. misc.	Way and structures.	Of equipment.	Traffic.	Trans-portation.	Miscel-laneous.	General.	Total.				
St. Louis, San Francisco & Texas	244	$67,426	$29,640	$105,024	$33,269	$16,417	$2,510	$53,644	.....	$5,316	$111,157	—$6,133	$1,327	—$7,460	—$51,037
St. Louis Southwestern	943	477,515	124,958	636,948	72,369	107,070	24,543	165,157	$3,907	23,395	396,717	240,231	29,626	210,600	—95,512
St. Louis Southwestern of Texas	811	187,629	104,661	317,019	83,780	81,030	10,946	142,492	958	15,427	333,561	—16,542	13,500	—30,045	—18,445
San Antonio & Aransas Pass	724	211,541	127,443	360,988	65,199	69,258	6,691	163,394	.....	11,294	315,835	45,153	12,000	33,153	—161,051
San Pedro, Los Angeles & Salt Lake	1,132	473,824	231,488	770,009	83,326	136,265	32,572	248,592	13,678	17,608	532,040	237,968	40,712	197,166	—37,149
Seaboard	3,098	1,069,816	442,781	1,690,828	202,169	281,162	63,741	628,742	6,838	54,095	1,236,747	454,081	91,000	363,018	—51,327
Southern	7,036	3,398,839	1,833,047	5,688,044	824,967	1,086,515	197,553	2,068,216	34,412	165,706	4,361,761	1,326,284	220,195	1,105,153	—292,287
Southern in Mississippi	281	46,552	36,670	90,613	24,013	8,951	2,120	41,887	.....	3,528	80,500	10,113	7,750	2,314	2,695
Southern Pacific	6,492	5,434,907	2,545,643	8,709,348	958,856	1,293,928	153,979	2,699,373	141,167	234,250	5,471,743	3,237,606	425,541	2,810,468	—365,049
Spokane International	163	68,279	18,541	90,776	11,984	4,950	2,477	23,531	.....	4,013	46,955	43,821	4,604	39,217	3,181
Spokane, Portland & Seattle	556	240,611	172,259	461,246	49,177	34,020	9,410	94,143	3,988	13,516	204,254	256,992	53,400	203,548	2,980
Tennessee Central	294	93,493	39,049	140,625	31,058	16,014	5,404	53,137	.....	6,658	112,271	28,354	4,480	23,868	—13,437
Terminal R. R. Ass'n of St. Louis	35	.....	169	242,748	13,975	9,759	897	77,429	.....	4,562	106,623	136,126	28,309	107,817	50,867
Texas & New Orleans	463	219,799	107,046	365,345	62,084	77,220	7,764	149,156	15,510	10,033	321,686	43,660	15,793	27,535	—15,762
Texas & Pacific	1,886	917,149	420,046	1,448,540	166,912	253,442	37,346	599,538	14,949	36,622	1,108,632	339,908	68,700	271,186	—5,309
Toledo & Ohio Central	446	449,212	64,235	544,932	55,362	78,641	6,690	170,799	1,759	10,843	324,094	220,838	21,348	199,491	86,922
Toledo, St. Louis & Western	451	340,917	42,079	410,997	46,973	66,442	15,827	138,992	.....	7,879	276,114	134,884	20,500	114,384	—36,330
Toledo, Peoria & Western	248	68,449	42,968	116,977	18,301	22,744	2,373	43,854	.....	3,639	90,909	26,067	6,100	19,967	11,093
Trinity & Brazos Valley	315	55,291	21,015	83,193	14,305	3,756	2,954	41,639	.....	7,936	70,591	12,603	4,900	7,703	7,156
Ulster & Delaware	129	50,237	67,614	135,028	20,939	12,082	2,074	53,380	50	2,740	91,264	43,763	3,300	40,463	—7,288
Union Pacific	3,615	3,501,722	972,711	4,929,305	651,891	615,578	81,940	1,104,631	76,614	121,838	2,648,886	2,280,419	182,119	2,097,755	32,376
Union R. R. of Baltimore	9	108,972	23,588	134,358	14,185	.....	.....	4,386	.....	2,234	20,804	113,554	6,180	107,374	—8,818
Union R. R. of Pennsylvania	31	.....	.....	406,263	67,724	99,961	100	141,842	.....	2,713	312,340	93,923	2,700	91,223	—54,252
Vandalia	910	677,034	229,187	1,004,976	137,447	192,876	23,243	359,123	11,954	20,601	745,244	259,732	32,291	227,441	—7,369
Vicksburg, Shreveport & Pacific	171	64,551	55,467	132,528	24,293	29,487	3,693	46,469	2,707	4,837	111,487	21,042	7,200	13,842	—14,056
Virginia & Southwestern	240	156,530	16,515	178,076	26,068	39,251	2,465	48,239	.....	3,737	119,760	58,315	6,250	52,065	—1,356
Virginian	503	477,097	42,906	554,342	66,865	88,834	5,921	121,017	12,608	9,867	299,772	254,570	22,500	232,070	—5,912
Washington Southern	36	35,808	36,389	95,941	12,203	15,206	1,440	39,450	118	2,896	71,314	24,627	3,320	21,303	10
West Jersey & Seashore	356	185,781	745,086	1,010,298	108,486	104,940	12,449	281,541	3,379	12,550	523,345	486,953	26,959	459,931	—28,283
Western Maryland	661	603,721	123,214	763,128	104,081	124,552	21,200	266,677	3,094	19,105	537,209	225,919	24,500	201,419	53,175
Western Ry. of Alabama	133	55,383	40,519	105,950	20,447	28,476	6,136	32,784	2,362	4,268	94,473	11,477	5,008	6,436	—6,906
Yazoo & Mississippi Valley	1,372	639,077	230,918	925,111	156,039	155,013	18,068	356,071	871	21,806	704,803	220,309	50,000	170,220	30,325
Wabash	2,518	1,875,097	686,694	2,792,630	330,589	445,946	85,731	1,011,894	15,929	59,709	1,944,966	847,664	83,657	763,828	20,356
Western Pacific	943	390,507	129,233	553,804	143,661	62,400	24,866	164,636	12,815	20,671	429,048	124,756	30,009	94,743	—81,880
Wheeling & Lake Erie	459	404,566	67,596	516,541	73,536	85,355	9,606	181,966	1,566	15,059	367,088	149,453	32,232	117,221	—91,026
TWO MONTHS OF FISCAL YEAR ENDING JUNE 30, 1915															
Alabama & Vicksburg	143	$156,899	$86,399	$268,036	$44,230	$68,225	$7,341	$95,512	$6,315	$11,013	$232,635	$35,400	$14,480	$20,920	—$19,945
Alabama Great Southern	309	575,106	231,284	879,011	101,188	220,840	26,799	291,759	7,593	18,002	666,180	212,831	30,986	181,814	—68
Atchison, Topeka & Santa Fe	8,405	10,760,520	4,315,123	16,307,296	2,377,224	2,783,164	328,596	4,495,067	.....	292,383	10,271,475	6,035,821	798,274	5,235,797	592,168
Atlanta & West Point	93	93,966	89,236	206,823	35,398	51,423	10,744	64,478	2,983	8,713	173,739	33,084	14,250	18,811	—4,738
Atlanta, Birmingham & Atlantic	646	330,425	133,029	504,406	78,685	84,329	27,920	203,578	.....	20,883	415,395	89,011	28,674	60,116	13,639
Atlantic & St. Lawrence	167	154,300	71,518	244,694	42,575	32,006	7,901	105,882	.....	5,836	194,200	50,494	21,600	28,894	23,911
Atlantic City	170	156,273	595,367	778,232	51,846	56,974	8,356	306,009	119	4,970	428,274	349,958	27,000	322,940	—61,201
Atlantic Coast Line	4,664	2,968,096	1,385,292	4,751,905	893,490	999,713	104,020	1,996,814	13,182	153,566	4,055,986	695,920	276,000	417,371	—95,477
Baltimore & Ohio—System	4,516	12,593,452	3,066,349	16,847,064	1,689,340	3,166,560	328,965	6,184,617	92,487	345,756	11,807,725	5,039,340	528,926	4,510,025	—613,108
Baltimore & Ohio Chicago Terminal	79	.....	1,640	286,032	33,389	38,827	1,890	113,698	8,319	9,856	205,979	80,053	38,042	42,010	—7,329
Bangor & Aroostook	631	321,682	124,603	477,565	104,889	93,659	5,623	162,051	3,064	18,744	388,030	89,536	17,500	72,032	5,589
Belt Ry. Co. of Chicago	24	.....	.....	559,752	43,204	46,577	2,068	176,690	.....	11,885	280,424	279,328	24,227	255,102	83,171
Bessemer & Lake Erie	204	2,139,624	98,111	2,269,071	156,772	354,070	18,484	410,628	4,702	22,467	966,934	1,302,137	36,000	1,266,134	196,050
Bingham & Garfield	27	260,628	10,035	272,382	27,412	37,401	1,768	44,841	211	3,839	115,471	156,910	4,500	152,410	—4,682
Birmingham Southern	43	94,430	2,477	174,696	35,089	30,946	915	60,714	.....	6,678	134,343	40,353	3,437	36,915	—47,770
Boston & Maine	2,252	4,606,226	3,271,432	8,606,988	1,355,763	1,488,670	92,879	3,504,750	40,880	189,223	6,672,165	1,934,823	342,140	1,592,683	—576,859
Buffalo & Susquehanna R. R. Corporation	253	237,630	16,121	259,521	52,573	75,385	2,252	76,398	.....	10,710	217,319	42,202	5,200	37,002	.....
Buffalo & Susquehanna Ry	91	31,224	19,112	55,640	14,114	20,296	1,028	24,845	141	5,219	65,642	—10,002	3,200	—13,202	—1,155
Buffalo, Rochester & Pittsburgh	586	1,608,133	241,781	1,922,137	308,662	452,663	23,498	545,236	2,837	35,836	1,368,731	553,406	40,000	513,395	—139,003
Canadian Pacific Lines in Maine	233	81,406	40,124	134,989	49,963	30,760	13,345	64,454	.....	7,407	165,930	—30,941	24,000	—54,941	15,998
Carolina, Clinchfield & Ohio	248	326,695	42,385	379,069	37,700	48,054	13,879	93,041	.....	17,267	186,099	192,971	28,500	164,435	—94,696
Carolina, Clinchfield & Ohio of S. C.	18	17,753	3,819	22,097	1,933	201	3,616	4,219	.....	1,116	11,085	11,012	1,500	9,512	—6,028
Central of Georgia	1,924	1,313,878	685,028	2,197,875	314,515	432,694	73,211	774,987	2,962	67,952	1,666,275	531,600	104,720	426,865	219,098
Central of New Jersey	678	3,453,057	1,460,899	5,196,715	478,982	860,579	59,701	1,714,363	26,517	98,861	3,238,921	1,957,795	224,752	1,733,018	—288,888
Central New England	304	471,914	92,107	591,870	165,782	72,757	2,166	198,520	.....	7,828	447,023	144,846	22,000	122,846	—117,292
Central Vermont	411	453,840	186,821	698,057	119,959	108,320	17,614	301,539	5,982	13,153	566,567	131,490	31,520	99,970	26,140
Charleston & Western Carolina	341	200,822	73,148	289,084	65,076	57,193	9,024	114,023	.....	8,433	253,749	35,335	10,000	25,335	—19,370
Chesapeake & Ohio Lines	2,367	5,184,659	1,204,736	6,783,155	818,756	1,454,865	113,629	2,117,197	44,972	142,216	4,691,635	2,091,519	219,844	1,871,675	25,652
Chicago & Eastern Illinois	1,282	1,937,153	561,020	2,700,965	293,952	524,424	44,099	912,769	15,901	69,755	1,860,900	840,065	113,800	726,182	262,991
Chicago & Erie	270	754,421	121,752	961,004	171,586	239,193	40,233	472,318	4,210	27,317	954,857	6,147	25,790	—19,685	41,988
Chicago & Northwestern	8,108	9,092,850	4,453,498	15,078,959	2,626,180	2,246,973	231,708	4,916,986	115,370	281,294	10,418,511	4,660,448	750,000	3,909,976	152,809
Chicago, Burlington & Quincy	9,264	10,939,282	4,283,167	16,603,955	2,018,587	2,779,252	280,952	4,782,401	135,999	340,550	10,337,741	6,266,214	665,056	5,601,158	80,343
Chicago, Detroit & Can. Gd. Trunk Jctn.	60	90,932	40,954	161,837	21,957	20,437	3,480	76,449	509	2,568	125,401	36,436	5,740	30,696	—300
Chicago Great Western	1,427	1,578,521	607,590	2,391,866	373,474	391,675	101,647	808,772	13,758	68,882	1,755,991	635,876	97,337	537,354	—140,032

REVENUES AND EXPENSES OF RAILWAYS

TWO MONTHS OF FISCAL YEAR ENDING JUNE 30, 1915—CONTINUED

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses						Net operating revenue (or deficit).	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
					Maintenance									
		Freight.	Passenger.	Total. inc. misc.	Way and structures.	Of equipment.	Traffic.	Trans-portation.	Miscel-laneous.	General.	Total.				
Chicago, Indiana & Southern	359	$594,003	$61,358	$681,433	$105,615	$181,549	$12,712	$226,469	$3,330	$27,276	$557,451	$123,982	$37,300	$86,580	$28,572
Chicago Junction	12	.....	.....	318,766	42,283	36,145	1,945	164,099	.....	9,389	253,861	64,905	4,428	60,426	—54,246
Chicago, Milwaukee & St. Paul	9,987	10,625,972	3,741,568	16,014,187	2,223,954	2,201,948	309,983	5,904,577	142,085	277,348	10,638,851	5,375,336	833,750	4,531,091	398,969
*Chicago, Peoria & St. Louis	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Chicago, Rock Island & Gulf	477	336,333	111,769	481,994	74,021	66,767	19,024	193,331	3,708	14,816	371,668	110,327	17,629	92,651	—7,655
Chicago, Rock Island & Pacific	7,852	7,839,294	3,535,601	12,221,794	1,870,996	2,129,007	291,435	4,588,913	92,330	272,930	9,232,245	2,989,550	462,861	2,526,005	293,951
Chicago, St. Paul, Minn. & Omaha	1,753	1,916,374	1,081,573	3,235,897	466,657	424,563	59,550	1,067,758	33,682	70,609	2,123,819	1,113,078	178,368	934,395	337,907
Chicago, Terre Haute & Southeastern	375	338,136	39,075	388,944	62,752	72,927	5,738	105,058	1,626	18,951	267,051	121,893	23,000	98,893	47,742
Cincinnati, Hamilton & Dayton	1,015	1,403,530	316,047	1,916,194	263,727	313,347	39,071	796,371	.....	36,728	1,449,243	466,950	75,453	390,535	102,777
Cincinnati, New Orleans & Texas Pacific	337	1,274,833	297,753	1,660,287	172,917	453,406	49,549	508,195	5,401	41,157	1,230,626	429,661	62,000	367,661	—83,215
Cincinnati Northern	246	218,462	55,978	287,622	41,802	51,484	5,131	90,637	.....	6,603	195,657	91,965	12,000	79,852	91,410
Cleveland, Cincinnati, Chic. & St. Louis	2,361	4,216,775	1,734,494	6,514,148	723,049	1,287,402	149,572	2,380,579	54,125	126,993	4,712,438	1,801,710	254,500	1,546,379	910,478
Colorado Midland	338	226,521	74,750	336,710	73,041	78,520	17,000	135,465	5,129	11,580	320,734	15,976	17,060	—1,084	25,045
Colorado & Southern	1,127	834,396	358,494	1,286,171	220,188	318,855	23,537	404,448	11,239	38,029	1,016,296	269,874	71,250	198,507	—220,410
Cumberland Valley	164	367,664	127,412	522,736	104,381	61,227	8,713	169,540	1,598	14,201	359,660	163,076	11,821	151,255	—22,798
Delaware, Lackawanna & Western	960	5,026,375	1,710,974	7,467,622	1,097,283	1,170,276	144,739	2,254,881	72,859	143,023	4,845,615	2,622,007	370,000	2,251,744	—129,805
Denver & Rio Grande	2,562	2,840,496	978,067	4,093,487	808,151	756,060	82,678	1,149,534	71,781	109,080	2,975,997	1,117,490	180,000	937,373	—28,986
Denver & Salt Lake	255	199,368	109,890	328,136	39,245	55,094	6,313	96,507	.....	11,942	208,495	119,641	9,000	110,641	—9,146
Detroit & Mackinac	400	115,765	72,348	205,715	25,889	32,344	4,163	69,012	778	5,227	137,415	68,301	18,297	50,003	—18,994
Detroit & Toledo Shore Line	79	206,465	.....	207,132	29,661	18,654	3,005	62,542	.....	5,128	118,989	88,143	11,800	76,343	—34,850
Detroit, Grand Haven & Milwaukee	191	268,000	129,000	453,319	83,285	64,640	14,159	208,964	2,483	9,260	382,791	69,528	6,720	62,808	—20,170
Detroit, Toledo & Ironton	441	268,750	38,666	327,722	47,353	40,117	6,454	159,416	.....	12,570	265,910	61,812	12,000	49,812	147,090
Duluth & Iron Range	292	1,404,627	41,387	1,497,952	204,247	152,365	2,998	268,983	6,838	17,006	652,437	845,515	79,936	765,579	—661,309
Duluth, Missabe & Northern	364	1,586,258	64,312	1,691,831	180,159	164,740	4,452	257,980	7,654	18,914	633,899	1,057,933	84,868	973,065	—643,420
Duluth, South Shore & Atlantic	627	327,398	207,096	594,444	124,999	76,819	16,189	202,794	8,920	26,201	455,923	138,521	38,000	100,507	—37,668
Duluth, Winnipeg & Pacific	181	187,544	39,474	231,644	68,142	47,020	5,716	85,476	775	13,020	220,149	11,495	11,582	—87	—73,636
El Paso & Southwestern Co	1,029	1,107,501	229,915	1,445,069	180,552	199,257	36,674	389,046	11,913	44,464	861,906	583,163	76,421	506,462	118,188
Elgin, Joliet & Eastern	777	1,536,521	11	1,631,920	184,873	290,832	10,167	437,937	.....	34,537	958,233	673,687	65,666	608,021	—138,351
Erie	1,988	7,137,160	1,973,287	9,947,343	1,103,054	2,027,631	185,501	3,322,309	72,660	196,140	6,892,154	3,055,190	277,093	2,777,746	—88,219
Florence & Cripple Creek	87	152,872	50,215	206,477	27,001	19,467	4,053	67,188	.....	8,937	126,646	79,830	11,353	68,477	—50,261
Florida East Coast	696	287,837	225,594	591,159	128,749	99,429	11,746	247,432	2,937	25,388	505,027	86,133	40,000	46,109	109,126
Fort Worth & Denver City	454	523,195	301,191	873,810	87,277	138,092	19,826	329,751	7,152	27,890	609,989	263,821	25,839	237,982	51,586
Galveston, Harrisburg & San Antonio	1,338	1,319,980	550,050	2,011,013	289,834	356,561	55,598	817,983	18,656	67,004	1,603,704	407,310	78,851	328,217	—13,234
Georgia	307	296,511	168,900	506,652	62,164	102,034	25,720	228,212	.....	15,832	443,961	72,691	6,878	65,813	34,654
Georgia, Southern & Florida	395	222,894	134,051	405,434	52,798	90,742	15,352	161,140	.....	18,081	338,120	67,314	21,885	45,360	20,666
Grand Rapids & Indiana	575	493,306	468,923	1,049,719	113,654	132,241	19,540	395,896	6,871	26,798	695,000	354,719	48,442	306,277	87,039
Grand Trunk Western	347	826,000	395,000	1,292,208	197,185	239,403	39,894	489,660	22,153	29,613	1,017,907	274,301	71,840	202,461	33,375
Great Northern	8,016	9,467,017	2,942,768	13,757,102	1,631,901	1,342,958	221,683	3,314,062	165,055	218,366	6,884,831	6,872,272	752,897	6,119,029	459,602
Gulf & Ship Island	308	215,530	66,481	300,446	38,808	58,035	5,169	76,936	557	14,665	194,171	106,274	14,670	91,559	—48,533
Gulf, Colorado & Santa Fe	1,937	2,016,499	636,463	2,792,551	345,490	416,131	55,930	941,271	.....	67,037	1,825,859	966,692	102,111	864,582	423,332
Hocking Valley	353	900,103	168,947	1,162,450	171,735	198,278	16,492	354,548	.....	25,503	766,555	395,895	77,600	318,295	—173,448
Houston, East & West Texas	191	155,399	74,092	240,624	46,498	27,242	4,012	85,912	.....	5,692	169,144	71,480	8,498	62,949	20,858
Houston & Texas Central	852	734,263	332,566	1,143,579	186,167	162,076	31,109	453,991	3,214	32,894	869,012	274,567	48,094	226,210	43,786
Illinois Central	4,769	7,879,040	2,500,501	11,241,473	1,746,655	2,605,229	196,450	3,887,716	60,431	241,133	8,719,847	2,521,626	550,000	1,966,605	206,320
Indiana Harbor Belt	105	.....	.....	565,981	89,170	70,746	5,040	222,087	.....	15,551	402,594	163,387	15,570	147,725	23,671
International & Great Northern	1,160	975,120	384,711	1,466,283	277,112	258,046	51,821	779,094	5,717	66,394	1,438,183	28,101	50,000	—22,055	—348,220
Kanawha & Michigan	177	526,009	65,779	604,881	73,694	131,172	4,938	160,972	9	13,264	384,049	220,832	23,662	197,171	485
Kansas City Southern	827	1,365,575	302,662	1,830,909	205,551	219,306	52,796	577,165	.....	83,538	1,136,977	693,932	93,833	599,734	22,515
Lake Erie & Western	906	853,506	170,647	1,074,560	142,690	147,068	26,540	383,034	.....	23,356	722,689	351,870	48,500	302,438	163,693
Lake Shore & Michigan Southern	1,852	5,562,124	2,611,934	9,392,327	1,057,846	1,805,015	146,431	3,057,861	112,170	180,621	6,359,944	3,032,383	393,000	2,637,848	—263,192
Lehigh & Hudson River	97	270,211	21,740	296,480	46,028	39,290	2,667	102,216	.....	7,116	197,318	99,162	8,300	90,862	37,836
Lehigh & New England	296	435,595	2,824	459,606	61,740	63,563	3,653	108,467	.....	12,191	249,613	208,992	11,340	197,653	93,743
Lehigh Valley	1,444	5,972,380	960,913	7,352,428	817,828	1,451,325	154,611	2,421,699	29,964	137,673	5,013,099	2,339,329	277,000	2,061,010	—127,931
Long Island	398	613,405	2,045,734	3,025,083	241,905	249,153	31,896	993,190	12,059	56,372	1,584,575	1,440,508	130,724	1,309,154	123,572
Louisiana & Arkansas	279	272,016	48,202	329,116	61,328	50,432	5,189	79,566	.....	8,461	204,976	124,140	12,500	111,640	8,313
Louisiana Ry. & Navigation	351	270,323	51,631	342,382	69,202	31,527	11,090	125,284	.....	9,805	246,908	95,474	17,000	78,474	19,938
Louisville & Nashville	5,013	6,697,007	2,195,572	9,508,858	1,504,183	1,952,926	221,528	3,169,260	30,847	205,171	7,083,916	2,424,942	368,550	2,055,536	180,438
Maine Central	1,209	1,094,346	829,760	2,081,493	303,472	277,799	20,186	748,781	18,711	50,953	1,420,902	660,591	104,259	556,332	97,219
Michigan Central	1,800	3,273,976	1,928,694	5,859,699	640,150	878,849	125,497	2,188,251	96,594	106,205	4,035,546	1,824,152	268,000	1,555,860	472,832
Midland Valley	380	148,036	80,753	242,050	56,338	53,529	4,018	82,742	.....	11,239	207,866	34,184	13,164	186	20,834
Minneapolis & St. Louis	1,646	1,204,859	387,107	1,689,445	207,323	261,175	37,131	594,887	76	36,635	1,137,227	552,219	74,160	478,059	56,921
Minn., St. Paul & Sault Ste. Marie	4,102	3,249,062	1,296,716	4,946,058	730,277	766,627	97,440	1,527,577	35,051	100,425	3,251,942	1,694,116	219,425	1,474,690	—115,529
Missouri & North Arkansas	365	126,912	83,170	223,373	60,453	43,146	8,431	95,961	.....	12,412	220,403	2,970	12,000	—9,196	—40,392
Missouri, Kansas & Texas System	3,865	3,449,633	1,582,094	5,416,034	751,758	836,416	112,737	1,965,570	58,371	189,272	3,866,330	1,549,705	227,448	1,321,448	—55,562
Missouri, Oklahoma & Gulf	332	157,811	46,446	213,823	38,762	30,358	8,320	84,539	181	10,860	173,020	40,804	12,931	27,746	9,919
Missouri, Oklahoma & Gulf Ry. of Tex.	19	19,819	931	21,336	2,813	4,445	437	8,438	.....	1,124	17,258	4,078	394	3,685	2,637
Missouri Pacific	3,920	3,769,536	954,801	5,136,010	635,094	964,595	121,280	1,806,902	18,935	139,756	3,676,562	1,459,449	197,180	1,261,536	258,206
Mobile & Ohio	1,122	1,755,936	269,175	2,133,048	256,658	453,385	83,443	797,822	6,127	57,601	1,655,037	478,012	66,490	411,501	—60,287

*Receivers took charge of property August 1, 1914—no figures shown for the two months.

taker, and those who are careless, thoughtless or indifferent to safety. Let us spread the gospel of safety broadcast and train our citizens, both present and future, to think before they act and not go mechanically and irresistibly into certain danger where danger is known to exist.

American Association of Railway Surgeons

The eleventh annual meeting of the American Association of Railway Surgeons was held at the Hotel Sherman, Chicago, on October 14, 15, and 16. In addition to a large number of technical medical and surgical papers the following were presented: "Lighting as a Preventive of Accidents in Car Shops," by J. R. Cravath, consulting engineer, Chicago; Lantern demonstration of special qualities of glass used in railway signaling and worn for protection of employees, by Dr. Nelson Miles Black, of Milwaukee, Wis.; "Why a Railway Surgeon," by M. C. Murphy (I. C.) Morgantown, Ind.; "The Company Surgeon," by Charles Blickensderfer (C. R. I. & P.) Shawnee, Okla.; "Ethics of the Railway Surgeon," by William Reid (M. St. P. & S. S. M.) Deerwood, Minn.; "The Railway Surgeon at Terminal Points," James M. Miller (C. & E. I.) Villa Grove, Ind.; "Prevention as Applied to Railway Surgery," M. J. Kenefick (C. M. & St. P.) Algona, Iowa; "Advisability of Repeated Examinations of Employees Connected with the Operating Department of a Railway System," by F. M. Crain (C. & N. W.) Redfield, S. D.; "Railway Sanitation," D. J. McGurren (M. St. P. & S. S. M.) Devil's Lake, N. D.; "Psychology of Railway Accidents," by J. H. Sealy (C. & N. W.) Freeport, Ill. At the concluding session Dr. John B. Murphy of Chicago, consulting surgeon of the Soo Line and Illinois Central, presented a paper on "Management of Joint Injuries in Railway Accidents," and the safety first movement was discussed by R. C. Richards, general claim agent of the Chicago & North Western; Peter M. Hoffman, coroner of Cook county; L. F. Shedd, safety supervisor, Rock Island Lines, and H. L. Brownell, safety inspector, Chicago surface lines.

Officers were elected as follows: President, Dr. G. F. Beasley, surgeon for the Chicago, Indianapolis & Louisville and the Cleveland, Cincinnati, Chicago & St. Louis at Lafayette, Ind.; vice-president, Dr. J. P. Kaster, Toledo, Ohio; secretary-treasurer, Louis J. Mitchell, Chicago.

Association of Railway Electrical Engineers

The annual convention of the Association of Railway Electrical Engineers is to be held at the Hotel La Salle, Chicago, on October 26-30. An exhibit of supplies will be held on the nineteenth floor of the hotel in connection with the convention. At the first session on Tuesday morning President C. R. Gilman, illuminating engineer of the Chicago, Milwaukee & St. Paul, will present the opening address, which will be followed by reports of the committee on Loose Leaf Binders for Filing Specifications and to Keep Specification Standards to Date, the committee on Reciprocal Relations, the committee on Specifications for Wire Crossings for Potentials above 100 Volts, and the committee on Data and Information. On Wednesday reports will be presented by the committees on Standards, Electric Headlights, Industrial Trucks, Electric Traction and Wire Specifications, and at the morning session Dr. F. H. Milner, experimental engineer of the Union Pacific, will present a paper on "Communication to and between Trains by Telegraph Wireless, Telephone Wireless and Telephone." At the session on Thursday reports will be presented by the committees on Axle Equipment, Head End Equipment and Standard Rules for Car Wiring, Outside Construction and Yard Lighting, Illumination and Shop Practice, and Yard Facilities. At the Friday session reports will be presented by the committee on Yard Facilities for Charging.

National Council for Industrial Safety

At the third annual safety congress of the National Council for Industrial Safety held at the Hotel LaSalle, Chicago, on October 13, 14 and 15, one session on Thursday afternoon was devoted to transportation and public service. Martin J. Insull, vice-president of the Middle West Utilities Company, Chicago, acted as chairman of the session and presented an address on "Safety as a Means of Bettering the Relation Between the Public and Public Service Corporations." W. B. Spaulding, chairman of the central safety committee of the St. Louis & San Francisco, St. Louis, Mo., also presented an address on "The Safety Problem of the Railroads." This was discussed by R. H. Newbern, superintendent of the insurance department of the Pennsylvania Lines, who described the methods of keeping accident statistics on the Pennsylvania, and by M. A. Dow, general safety agent, New York Central Lines, who explained the necessity for the education of the public concerning the danger of careless habits, particularly in connection with highway crossing accidents. He said that out of observations of 7,779 persons crossing the tracks at various places on the lines of the New York Central during one day last December, only 359, or less than 5 per cent, looked in both directions before crossing.

MEETINGS AND CONVENTIONS

The following list gives names of secretaries, dates of next or regular meetings, and places of meeting.

Air Brake Association.—F. M. Nellis, 53 State St., Boston, Mass. Next convention, May 4-7, 1915, Hotel Sherman, Chicago.

American Association of Demurrage Officers.—A. G. Thomason, Demurrage Commissioner, Boston, Mass. Annual convention in April.

American Association of Dining Car Superintendents.—H. C. Boardman, D. L. & W., Hoboken, N. J. Next convention, October 22-24, Washington, D. C.

American Association of Freight Agents.—R. O. Wells, Illinois Central, East St. Louis, Ill. Annual meeting, May 21-24, 1915, Richmond, Va.

American Association of General Passenger and Ticket Agents.—W. C. Hope, C. R. R. of N. J., 143 Liberty St., New York.

American Association of Railroad Superintendents.—E. H. Harman, Room 101, Union Station, St. Louis, Mo. Next meeting, May 20-21, 1915, San Francisco, Cal.

American Electric Railway Association.—E. B. Burritt, 29 W. 39th St., New York.

American Electric Railway Manufacturers' Association.—H. C. McConnaughy, 165 Broadway, New York. Meetings with American Electric Railway Association.

American Railway Association.—W. F. Allen, 75 Church St., New York. Semi-annual meeting, November 18, Chicago.

American Railway Bridge and Building Association.—C. A. Lichty, C. & N. W., Chicago.

American Railway Engineering Association.—E. H. Fritch, 900 S. Michigan Ave., Chicago. Next convention, March 16-18, 1915, Chicago.

American Railway Master Mechanics' Association.—J. W. Taylor, 1112 Karpen Bldg., Chicago. Annual meeting, June, 1915.

American Railway Safety Association.—L. F. Shedd, C. R. I. & P., Chicago. Next meeting, November, Chicago.

American Railway Tool Foremen's Association.—A. R. Davis, Central of Georgia, Macon, Ga. Annual meeting, July, 1915.

American Society for Testing Materials.—Prof. E. Marburg, University of Pennsylvania, Philadelphia, Pa.

American Society of Civil Engineers.—Chas. W. Hunt, 220 W. 57th St., New York. Regular meetings, 1st and 3d Wednesday in month, except June, July and August, 220 W. 57th St., New York.

American Society of Engineering Contractors.—J. R. Wemlinger, 11 Broadway, New York. Regular meetings, 2d Thursday in month, at 2 P. M., 11 Broadway, New York.

American Society of Mechanical Engineers.—Calvin W. Rice, 29 W. 39th St., New York. Annual meeting, December 1-4, 1914, New York.

American Wood Preservers' Association.—F. J. Angier, B. & O., Mt. Royal Sta., Baltimore, Md. Next convention, January 19-21, 1915, Chicago.

Association of American Railway Accounting Officers.—E. R. Woodson, 1300 Pennsylvania Ave., N. W., Washington, D. C. Annual convention, April 28, 1915, Atlanta, Ga.

Association of Manufacturers of Chilled Car Wheels.—George W. Lyndon, 1214 McCormick Bldg., Chicago. Annual meeting, second Tuesday in October, New York.

Association of Railway Claim Agents.—C. W. Egan, B. & O., Baltimore, Md. Annual meeting, 3d week in May, 1915, Galveston, Tex.

Association of Railway Electrical Engineers.—Jos. A. Andreucetti, C. & N. W., Room 411, C. & N. W. Sta., Chicago. Annual convention October 26-30, 1914, Chicago.

Association of Railway Telegraph Superintendents.—P. W. Drew, Soo Line, 112 West Adams St., Chicago. Annual meeting, June 22-25, 1915, Rochester, N. Y.

Association of Transportation and Car Accounting Officers.—G. P. Conard, 75 Church St., New York. Next morning, December 8-9, 1914, Richond, Va.

Bridge and Building Suffly Men's Association.—L. D. Mitchell, Detroit Graphite Co., Chicago, Ill. Meetings with American Railway Bridge and Building Association.

Canadian Railway Club.—James Powell, Grand Trunk, P. O. Box 7, St. Lambert (near Montreal), Que. Regular meetings, 2d Tuesday in month, except June, July and August, Windsor Hotel, Montreal, Que.

Canadian Society of Civil Engineers.—Clement H. McLeod, 176 Mansfield St., Montreal, Que. Regular meetings, 1st Thursday in October, November, December, February, March and April. Annual meeting, January, Montreal.

Car Foremen's Association of Chicago.—Aaron Kline, 841 Lawler Ave., Chicago. Regular meetings, 2d Monday in month, except July and August, Lytton Bldg., Chicago.

Central Railway Club.—H. D. Vought, 95 Liberty St., New York. Regular meetings, 2d Friday in January, May, September and November. Annual meetings, 2d Thursday in March, Hotel Statler, Buffalo, N. Y.

Engineers' Society of Western Pennsylvania.—Elmer K. Hiles, 2511 Oliver Bldg., Pittsburgh, Pa. Regular meetings, 1st and 3d Tuesday, Pittsburgh.

Freight Claim Association.—Warren P. Taylor, R. F. & P., Richmond, Va. Annual meeting, June 16, 1915, Chicago.

General Superintendents' Association of Chicago.—A. M. Hunter, 321 Grand Central Station, Chicago. Regular meetings, Wednesday, preceding 3d Thursday in month, Room 1856, Transportation Bldg., Chicago.

International Railway Congress.—Executive Committee, 11, Rue de Louvain, Brussels, Belgium. Next convention, June 23 to July 6, 1915, Berlin.

International Railway Fuel Association.—C. G. Hall, C. & E. I., 922 McCormick Bldg., Chicago. Annual meeting, May 17-20, 1915, Chicago.

International Railway General Foremen's Association.—Wm. Hall, 829 W. Broadway, Winona, Minn. Next convention, July 14-17, 1915, Sherman House, Chicago.

International Railroad Master Blacksmiths' Association.—A. L. Woodworth, C. H. & D., Lima, Ohio.

Maintenance of Way and Master Painters' Association of the United States and Canada.—T. I. Goodwin, C. R. I. & P., Eldon, Mo. Next convention, November 17-19, 1914, Detroit, Mich.

Master Boiler Makers' Association.—Harry D. Vought, 95 Liberty St., New York. Annual convention, May, 1915.

Master Car and Locomotive Painters' Association of the United States and Canada.—A. P. Dane, B. & M., Reading, Mass.

Master Car Builders' Association.—J. W. Taylor, 1112 Karpen Bldg., Chicago. Annual meeting, June, 1915.

National Railway Appliances Association.—Bruce V. Crandall, 537 So. Dearborn St., Chicago. Next convention, March 15-19, 1915, Chicago.

New England Railroad Club.—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass. Regular meetings, 2d Tuesday in month, except June, July, August and September, Boston.

New York Railroad Club.—Harry D. Vought, 95 Liberty St., New York. Regular meetings, 3d Friday in month, except June, July and August, 29 W. 39th St., New York.

Niagara Frontier Car Men's Association.—E. Frankenberger, 623 Brisbane Bldg., Buffalo, N. Y. Meetings monthly.

Peoria Association of Railroad Officers.—M. W. Rotchford, Union Station, Peoria, Ill. Regular meetings, 2d Thursday in month, Jefferson Hotel, Peoria.

Railroad Club of Kansas City.—C. Manlove, 1008 Walnut St., Kansas City, Mo. Regular meetings, 3d Friday in month, Kansas City.

Railroad Master Tinners, Coppersmiths and Pipefitters' Association.—U. G. Thompson, C. & E. I., Danville, Ill. Annual meeting, May, 1915.

Railway Business Association.—Frank W. Noxon, 30 Church St., New York. Annual meeting, December 10, 1914, Waldorf-Astoria Hotel, New York.

Railway Club of Pittsburgh.—J. B. Anderson, Room 207, P. R. R. Sta., Pittsburgh, Pa. Regular meetings, 4th Friday in month, except June, July and August, Monongahela House, Pittsburgh.

Railway Electrical Supply Manufacturers' Association.—J. Scribner, 1021 Monadnock Block, Chicago. Meetings with Association of Railway Electrical Engineers.

Railway Fire Protection Association.—C. B. Edwards, Fire Ins. Agt., Mobile & Ohio, Mobile, Ala.

Railway Signal Association.—C. C. Rosenberg, Times Bldg., Bethlehem, Pa.

Railway Storekeepers' Association.—J. P. Murphy, L. S. & M. S., Box C, Collinwood, Ohio. Annual meeting, May, 1915.

Railway Supply Manufacturers' Association.—J. D. Conway, 2136 Oliver Bldg., Pittsburgh, Pa. Meetings with Master Car Builders and Master Mechanics Associations.

Railway Telegraph and Telephone Appliance Association.—G. A. Nelson, 50 Church St., New York. Meetings with Association of Railway Telegraph Superintendents.

Richmond Railroad Club.—F. O. Robinson, C. & O., Richmond, Va. Regular meetings, 2d Monday in month, except June, July and August.

Roadmasters' and Maintenance of Way Association.—L. C. Ryan, C. & N. W., Sterling, Ill.

St Louis Railway Club.—B. W. Frauenthal, Union Station, St. Louis, Mo. Regular meetings, 2d Friday in month, except June, July and August, St. Louis.

Salt Lake Transportation Club.—R. E. Rowland, Hotel Utah Bldg., Salt Lake City, Utah. Regular meetings, 1st Saturday of each month, Salt Lake City.

Signal Appliance Association.—F. W. Edmunds, 3868 Park Ave., New York. Meeting with annual convention Railway Signal Association.

Society of Railway Financial Officers.—Carl Nyquist, C. R. I. & P., La Salle St. Sta., Chicago.

Southern Association of Car Service Officers.—E. W. Sandwich, A. & W. P. Ry., Atlanta, Ga.

Southern and Southwestern Railway Club.—A. J. Merrill, Grant Bldg., Atlanta, Ga. Regular meetings, 3d Thursday, January, March, May, July, September, November, 10 A. M., Candler Bldg., Atlanta.

Toledo Transportation Club.—Harry S. Fox, Toledo, Ohio. Regular meetings, 1st Saturday in month, Boody House, Toledo.

Track Supply Association.—W. C. Kidd, Ramapo Iron Works, Hillburn, N. Y. Meetings with Roadmasters' and Maintenance of Way Association.

Traffic Club of Chicago.—W. H. Wharton, La Salle Hotel, Chicago.

Traffic Club of New York.—C. A. Swope, 291 Broadway, New York. Regular meetings last Tuesday in month, except June, July and August, Waldorf-Astoria, New York.

Traffic Club of Pittsburgh.—D. L. Wells, Erie R. R., Pittsburgh, Pa. Meetings bimonthly, Pittsburgh. Annual meeting, 2d Monday in June.

Traffic Club of St. Louis.—A. F. Versen, Mercantile Library Bldg., St. Louis, Mo. Annual meeting in November. Noonday meetings October to May.

Train Despatchers' Association of America.—J. F. Mackie, 7122 Stewart Ave., Chicago. Annual meeting June 15, 1915, Minneapolis, Minn.

Transportation Club of Detroit.—W. R. Hurley, Superintendent's office, L. S. & M. S., Detroit, Mich. Meetings monthly, Normandie Hotel, Detroit.

Traveling Engineers' Association.—W. O. Thompson, N. Y. C. & H. R., East Buffalo, N. Y.

Western Canada Railway Club.—W. H. Rosevear, P. O. Box 1707, Winnipeg, Man. Regular meetings, 2d Monday, except June, July and August, Winnipeg.

Western Railway Club.—J. W. Taylor, 1112 Karpen Bldg., Chicago. Regular meetings, 3d Tuesday in month, except June, July and August, Karpen Bldg., Chicago.

Western Society of Engineers.—J. H. Warder, 1735 Monadnock Block, Chicago. Regular meetings, 1st Monday in month, except January, July and August, Chicago. Extra meetings, except in July and August, generally on other Monday evenings.

Traffic News

The Illinois railways on October 16 filed tariffs with the Illinois Public Utilities Commission increasing freight rates in the state by 5 per cent, effective on November 15.

Plans are being made by the Atchison, Topeka & Santa Fe for establishing through passenger train service between Galveston and California points about November 1, via the Texico-Coleman cutoff.

The Panama Canal was closed to traffic five days, October 15-20, by a landslide in Culebra Cut. Fifteen ships were detained one or more days each, and will have claims on the government for demurrage.

Agents of the Grand Trunk Pacific are taking measures to get Belgian settlers for the territory opened by the company's lines in western Canada. It is expected that the European war will result in a rush of settlers to Canada. Belgian farmers are very thrifty people. It is hoped to settle a large tract in the Stuart river district.

The Boston & Maine has notified the governor of New Hampshire that it will enter suit in the Federal Court to resist the enforcement of the law of New Hampshire requiring the railroad to sell 500 mile books of tickets for $10. The Public Service Commission of that state has refused to approve the proposed increase of the mileage rate of 2¼ cents a mile.

The executives of the principal Missouri railroads held a conference on Monday, at Jefferson City, with Governor Major on the financial condition of the railroads in connection with the application of the roads for increases in rates. Among those present were President B. F. Bush of the Missouri Pacific, E. B. Pryor, receiver of the Wabash; W. C. Nixon, receiver of the St. Louis & San Francisco; F. H. Britton, president of the St. Louis Southwestern, and C. E. Schaff of the Missouri, Kansas & Texas.

For the first time in several years the railroads of Texas are able to take care of the autumn traffic without experiencing blockades of loaded cars of cotton at Galveston and at interior concentrating points. There is no complaint of car shortage. The traffic departments of the principal railroads of the state report that notwithstanding the absence of any general cotton movement a good business is being done. The marketing of this year's cotton crop will be so gradual and cover such a long period that, it is expected, there will be no burden on general traffic.

The production of explosives in the United States during the calendar year 1913, as reported by the United States Bureau of Mines, on the basis of figures received from manufacturers, was 231,757 tons, as compared with 244,696 tons in 1912. The total for 1913 is made up as follows: Black powder, 194,146,747 lb.; "high" explosives other than permissible explosives, 241,682,364 lb., and permissible explosives, 27,685,770 lb. How much of this enormous quantity of dangerous stuff was transported by railroad is not stated. The total amount of explosives used for the production of coal in 1913 was 209,352,938 lb.

Railroads leading from Richmond and Norfolk, Va., into North Carolina have reduced their interstate rates on potatoes and other vegetables. This reduction was made at the combined request of the Chambers of Commerce of Richmond, Norfolk and Petersburg. The former rates are restored. Two months ago the roads increased the rate by nearly 50 per cent. Producers and commission merchants immediately began to complain. The green vegetables particularly included are cabbage, potatoes, onions and turnips. The former rate from Richmond to Raleigh was 21 cents per 100 lb., and this was increased to 32 cents. Other changes were of similar character.

At the convention of the American Bankers' Association held at Richmond, Va., last week, a resolution was adopted declaring: "A prompt and liberal increase in railroad rates throughout the United States is essential in order to enable the railroads

to finance their maturing obligations. Such increase in rates must be made before we can hope to secure the confidence of the investing public both at home and abroad in railroad securities." The Interstate Commerce Commission was urged to act promptly and favorably upon pending applications for an increase of railroad rates, and to take such action as may produce a general and adequate increase in railroad revenues of this country.

The Illinois Manufacturers' Association has adopted resolutions to be placed before the Interstate Commerce Commission, endorsing the principle that the transcontinental railways should be allowed to put into effect such freight rates to the Pacific coast as will enable the central western territory to do business with the coast by rail, in competition with the industries of the eastern states. The resolution says: "The opening of the Panama canal has largely reduced the all-water rates between the [Atlantic] seaboard and adjacent territories and Pacific coast terminals. The Panama canal was built by public taxation, borne equally by all parts of the country. All parts of the country should therefore share equally in the benefits of the canal."

The Southern Pacific reports that during the period of colonist rates to California this year, from September 24 to October 8, over 10,000 people took advantage of the low rates. The tickets were all one-way tickets, which means that in the majority of cases the newcomers remained in California and had gone with the intention of remaining. That the newcomer may not be at a loss as to which way to turn upon arrival the company maintains a colonization bureau where information about every locality on the Pacific coast and the various agricultural, industrial and commercial opportunities is dispensed. The company's record of the colonist movement shows that the greatest travel was through the Ogden gateway.

Many complaints are being received by the North Carolina Corporation Commission that the intrastate freight rates recently put into effect in that state in accordance with the legislative action following the passage of the "Justice act" have worked serious disturbances in freight routes because of the rigidity of the long and short haul clause of the act. A number of short railroads are said to have been deprived of so much business that they will have difficulty in earning operating expenses. Following the adoption of the new class rates as agreed to under the Justice act, which agreement covers interstate rates, the principal roads filed tariffs discontinuing a large number of intrastate commodity rates; but the Corporation Commission refused to allow these new tariffs to go into effect.

Beginning November 1, shippers of grease, tallow and certain other inedible animal products who do an interstate or export business, must file certain declarations with the Secretary of Agriculture in Washington, and must furnish transportation companies with a shipper's certificate. The blanks for filing the required declarations may be procured from the Chief of the Bureau of Animal Industry in Washington. The regulations apply to grease-rendering establishments which prepare products unfit for human food, which are derived from cattle, sheep, swine or goats. Many of these products, though intended only for industrial use, cannot be denatured. In such cases the regulations provide that they may be transported in interstate or foreign commerce if both ends of the containers are painted white and conspicuously stenciled or burned with the true name of the product and the word "Inedible" in letters not less than two inches high.

California wine shippers will be saved thousands of dollars annually as the result of a new San Francisco-New York wine rate just announced by the Southern Pacific to go into effect November 15. The new rate gives the shipper a barreling-in-transit privilege that will enable him to ship in bulk in large tank cars to New Orleans, there transferring the wine into barrels for further shipment to New York by the Southern Pacific steamers. Under the old way, the shipper either sent the wine through by rail all the way in tank cars at 75 cents per 100 lb., or by rail and steamer in barrels at 55 cents per 100 lb. But to take advantage of the lower rate he had to pay the cost of transporting his cooperage products from the Middle West states to San Francisco. The new rate, which is also 55 cents per 100 lb., enables him to make use of the all-wood or steel and glass lined tank cars to New Orleans, at which point the shipment is transferred to barrels.

The transportation committee of the Cleveland Chamber of Commerce, through Traffic Commissioner D. F. Hurd, has submitted a report making an analysis of the Interstate Commerce Commission's decision allowing a 5 per cent advance in rates in Central Freight Association territory, as it affects Cleveland shippers. The report states that "the commercial relationships heretofore existing between Cleveland and many competing markets will be disturbed in a manner which it is quite evident will be unfavorable, if not detrimental, to Cleveland and other cities similarly affected." It is also stated that the carriers have construed the decision as giving permission to increase rates in Central Freight Association territory to apply in traffic destined to and from points west of the Mississippi river to the gulf of Mexico and the Great Lakes, exclusive of points covered by transcontinental tariffs, and that if rates to and from the western territory are made on the combination of locals based on Chicago and Mississippi river, or other established points, any increase in the rates from Cleveland and the other Central Freight Association points to those basing points will increase the total transportation cost. The report, therefore, objects to the increase in rates from Cleveland to Central Freight Association territory points while there are no increases from trunk line territory to those points.

American Association of Traveling Passenger Agents

The annual convention of the American Association of Traveling Passenger Agents was held on October 12, 13 and 14, at the Palace hotel in San Francisco, with over 300 members in attendance, the record for any convention of this association. Eighty-eight new members had been received during the past year. The principal topics of discussion at the meeting were: "Of what value will the Panama-Pacific International Exposition and the opening of the Panama Canal be to the world," and "Why is the traveling passenger agent of more importance today than he was during the old days of rate-cutting, rebating, etc." Thornwell Mullally addressed the meeting on behalf of the Panama-Pacific International Exposition, and Charles S. Fee, passenger traffic manager of the Southern Pacific, also addressed the meeting. On Tuesday afternoon a trip was made to Mount Tamalpais, and one day was spent inspecting the terminals on the bay and in going through the exposition grounds. On Friday the party left on special trains for a tour of southern California, stopping at Del Monte, Monterey, Los Angeles and San Diego. Those returning east planned to spend a day inspecting the new Union station at Kansas City. Officers were elected as follows: President, S. W. Manning, general New England agent, Atchison, Topeka & Santa Fe, Boston, Mass.; vice-president, W. D. Wood, traveling passenger agent, Wabash, St. Louis; secretary and treasurer, Elliott Monett, general western passenger agent, New York, Ontario & Western, Chicago (re-elected). Next year's convention will be held in Boston.

Railway Development Association

The annual convention of the Railway Development Association will be held in Chicago on November 10 and 11. The program includes an address of welcome by Mayor Harrison of Chicago, with a response by F. H. LaBaume, president of the association. "Personal Work with Farmers" will be discussed by M. V. Richards of the Southern, and H. M. Rainer of the Atchison, Topeka & Santa Fe. "Diversified Farming and Its Relation to the Cotton Grower" will be discussed by J. C. Clair of the Illinois Central, and J. F. Jackson of the Central of Georgia. H. B. Fullerton of the Long Island will present an address on plans for increasing the tonnage of agriculture for railroad transportation, illustrated with lantern slides. F. A. Spink, traffic manager of the Chicago & Western Indiana and the Belt Railway of Chicago, will discuss "The Relation of Railway Terminals to Industrial Development," and R. W. Cook of the Pennsylvania Lines West will discuss the "Advertising and Exploiting of Industrial Advantages." The semi-annual dinner of the association will be held on Tuesday evening, November 10, at which addresses will be made by W. L. Park, vice-president of the Illinois Central; George A. Blair, assistant freight traffic manager of the Chicago, Milwaukee & St. Paul, and Samuel O. Dunn, editor of the *Railway Age Gazette*.

Commission and Court News

INTERSTATE COMMERCE COMMISSION

Special Examiner George N. Brown, of the Interstate Commerce Commission, held a hearing at Kansas City on October 14, on rates on iron and steel products from Pittsburgh and Chicago and Missouri river points to Kansas, Oklahoma, Arkansas, Colorado and Utah.

On the petition of the Shreveport, La., Chamber of Commerce, Commissioner Hall, of the Interstate Commerce Commisison, will hold a hearing at Shreveport on October 27, on details of the Shreveport rate case which have not proved entirely satisfactory. One purpose of the hearing is to obtain a supplemental ruling to the original order to make it apply to all lines, instead of only to the Texas & Pacific and the Houston, East & West Texas.

Refrigeration Rates from New Orleans

Opinion by Commissioner McChord:

The commission finds that the carriers were justified in making a proposed increase in less than carload refrigeration charges from New Orleans and other points on the Illinois Central and Yazoo & Mississippi Valley to Chicago of 5 cents per 100 lb., minimum weight 10,000 lb., the service in this case being in charge of the Central Fruit Dispatch, a private car line, owned by the Illinois Central and furnishing refrigeration cars and service over the lines of the two defendants. (31 I. C. C., 637.)

Rice Rates from Helena, Ark.

Opinion by Commissioner Clark:

The commission finds that the carriers have justified proposed increases in rates on rice and rice products from Helena, Ark., to New Orleans and Vidalia, La., and Natchez, Miss., from 10 cents to 20 cents per 100 lb. in carloads, and from 15 cents to 25 cents per 100 lb. in less than carloads. For a number of years the carriers have maintained blanket rates on rice from points in the rice producing section of Arkansas, limited substantially in the territory extending about 140 miles north of Helena, and about the same distance south and west, of 20 cents per 100 lb. on carload and 25 cents on less than carload lots; there seems to be no reason why the rate from Helena should not be the same as the blanket rate. (31 I. C. C., 614.)

Hide Rates to Los Angeles, Cal.

Opinion by Commissioner Clark:

The commission finds that the carriers are justified in increasing to $1.20 a rate of 80 cents on hides to Los Angeles, Cal., from Lordsburg, N. Mex., and Southern Pacific main-line points west thereof; and also from Phoenix, Ariz., and points intermediate on the Arizona Eastern; and a rate of $1 from points on the main line of the Southern Pacific east of Lordsburg to and including El Paso, Tex., and from Nogales, Ariz., and points between Benson and Nogales. These rates were established to permit or facilitate concentration of hides at Los Angeles, from which shipments of that commodity are made to eastern manufacturing points. It was found, however, that competition at El Paso and Phoenix was put at a disadvantage by comparison. (31 I. C. C., 633.)

Rates on Flour from the Valley of Virginia

Stuarts Draft Milling Company et al. v. Southern Railway et al. Opinion by Commissioner Clark:

The commission finds that the present rates on flour and other grain products from mills at points on the Southern, Baltimore & Ohio, Chesapeake Western and Norfolk & Western in the valley of Virginia to Carolina territory, are not unreasonable, it being of the opinion that the present rate adjustments which are of long standing are apparently fairly adapted to the needs of the communities and interests affected. The commission likewise holds that the higher rates applying on flour than on wheat are not discriminatory to the former commodity. It being held that the present rates are reasonable, it is found inadvisable to sanction the establishment of carload and less than carload rates in place of the any-quantity rates, because the result would be increased less than carload rates. The commission is also of the opinion that the any-quantity rates are entirely suited to the traffic on which they apply. (31 I. C. C., 623.)

Export Rates on Grain from Kansas City

Re expart rates on grain and grain products from Kansas City, Mo., and Kansas City, Kan., to Port Arthur, Tex. Opinion by Commissioner Clark:

The Kansas City Southern, operating a direct line from Kansas City to Port Arthur, Tex., now maintains proportional rates on export grain and grain products from the former to the latter city of 18½ cents per 100 lb. on wheat and products of wheat, and 17½ cents on corn and products of corn regardless of point of origin. The commission finds that the carrier would be justified in establishing varying proportional rates, ranging from 13.6 to 18 cents on wheat, and from 12.1 to 17.72 cents on corn, dependent upon the point of origin on traffic originating at named points north of, but not including, the main line of the Union Pacific extending west from Kansas City. The tariff proposed, in reality, to establish through combination rates from the points of origin named to Port Arthur, which are equal to available through rates from the same points to Galveston, Tex., via other lines, whether the rates via the latter were jointly or were made on combinations. The commission finds, however, that certain unlawful features contained in the present tariff must not be permitted to become effective. It is ordered that certain violations of the fourth section contained must be avoided and that the tariff should contain a statement that the rates therein shall not be applicable to grain or grain products other than that which moves from point of origin subsequent to its effective date. The tariff should also specifically state that grain and grain products transported under the rates shall be governed by the rules and regulations prescribed in transit and reconsigning circulars of the Kansas City Southern. The tariff under consideration is to be cancelled, but another fulfilling the above requirements filed within three months of October 6 will be allowed to become effective upon not less than five days' notice. (31 I. C. C., 616.)

STATE COMMISSIONS

The Illinois Public Utilities Commission held a hearing at Chicago on October 20, on complaint from shippers at Granite City and East St. Louis that the railways have established a spotting charge of $2 per car at those points in addition to the usual switching charge.

At the request of the railways the Missouri Public Service Commission has changed from October 27 to December 1 the date for its hearing on the carriers' application for authority to increase freight, passenger and excess baggage rates throughout the state. The postponement was granted to give the roads more time in which to prepare data in support of their application.

The Arkansas Railroad Commission has issued a decision that claims for the payment of money under the commission's order providing a penalty of $5 per day for failure of railroads to transport freight at least 50 miles every 24 hours, must be prosecuted by the complainants in the courts and not before the commission. The ruling of the commission was handed down over the protest of Chairman McKnight, who contended that the commission had the power to hear such complaints and to assess the penalties.

The State Corporation Commission of Virginia has ordered the adoption, November 1, by the express companies, of a new tariff and classification for the transportation of merchandise. A "block system" of dividing the territory of the state has been adopted. It is like that of the Interstate Commerce Commission, but with modifications. The new tariff will make considerable reductions from the rates now in effect. On large packages of food products the rates are made in many instances considerably less than are those of the Interstate Commerce Commission for equal distances.

The California Railroad Commission has rendered a decision denying the application of the Southern Pacific to advance the trans-bay commutation fares between San Francisco and Oakland, Berkeley, Alameda and other Alameda county points. The commission stated, however, that the Southern Pacific should not be compelled to further extend the present 10-cent single fare and $3 commutation zone. The commission held that the company's apportionment of its investment and expenses as between main line service and suburban service was erroneous, taking the view that the suburban trans-bay service was in the nature of an auxiliary service, and that the commutation rates must necessarily be in the nature of wholesale rates. "Suburban traffic," said the commission, "is essentially a wholesale traffic; therefore, it is violative of fundamental rules of rate-making to apply units of expense and enforce divisions of property on an equality with a service which is essentially different and essentially retail." The commission also held that many of the Southern Pacific lines were built for competitive purposes and that where unnecessary duplication of investment has been made the burden should fall upon the Southern Pacific and not upon the patrons. "We do not think," said the commission, "that under the circumstances under which certain suburban lines were constructed in Oakland and Berkeley, this company has any right to impose upon its patrons a rate sufficient to return it the amount which otherwise should be returned on the ground that it has constructed facilities in excess of the necessity of the patrons." The case was originally instituted by the residents of one of the suburban communities, who filed a complaint for the purpose of compelling a reduction in the fares from San Francisco. The company presented evidence showing that on the 877 suburban trains operated daily out of the Oakland and Alameda moles in connection with the trans-bay ferry service, carrying nearly 14,000,000 passengers per year, the loss for the fiscal year ended June 30, 1913, approximated $364,000, without taking into consideration interest on the investment, the valuation of which was placed at $46,209,560.

PERSONNEL OF COMMISSIONS

A. J. Cunningham, general foreman of the Atchison, Topeka & Santa Fe at Barstow, Cal., has been appointed inspector of motive power for the Pacific district, division of valuation, Interstate Commerce Commission, with headquarters at San Francisco, Cal.

W. J. Thomas has been appointed inspector of car equipment for the Pacific district, division of valuation, Interstate Commerce Commission, with headquarters at San Francisco, Cal. Mr. Thomas recently has been employed in the United States Interior Department at Los Angeles, and formerly was in railway service.

COURT NEWS

Charles J. Spencer, of Elizabeth, N. J., filed suit in the United States Court of Appeals at Cincinnati, on October 1, to enjoin the proposed consolidation of the Lake Shore & Michigan Southern and New York Central & Hudson River.

The Ann Arbor Railroad has applied to the United States District Court at Detroit for an injunction restraining the state authorities from interfering with the road in case it advances its passenger fare from 2 cents to 3 cents a mile.

Judge Dyer of the United States District Court at St. Louis, Mo., has rendered a decision that the federal courts have no jurisdiction in the cases of the state against the Atchison, Topeka & Santa Fe and the Chicago, Burlington & Quincy, involving the return of alleged overcharges on state freight and passenger rates for the time during which the state rates were under injunction. The decision sustained the contention of the Attorney-General of Missouri, that the cases be remanded to the state courts, from which they had been taken by the railroads.

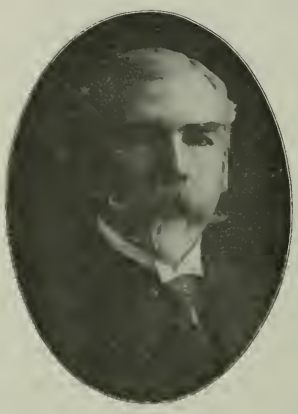
RAILWAY EXTENSION IN ARGENTINA.—The government of the Argentine province of Entre Rios has given its sanction to a project for the construction of a light railway between the port of Parana and the irrigated zone of the Las Conchas river.

Railway Officers

Executive, Financial, Legal and Accounting

A. R. Wood has been appointed assistant auditor of the San Antonio & Aransas Pass, with headquarters at San Antonio, Tex.

Thomas John Kennedy, whose election as president and general manager of the Algoma Central & Hudson Bay, and the Algoma Eastern, with headquarters at Sault Ste. Marie, Ont., has already been announced in these columns, was born at Campbellford, Ont., and was educated in the high school at Port Hope. He began railway work in 1874, on the engineering staff of the Canadian Pacific, and in 1881, became engineer for contractors at work on a section of the same road. In 1885 he was appointed roadmaster on the Lake Superior division of the Canadian Pacific; in 1892 he was appointed superintendent at Chapleau, Ont., and in 1899 was transferred as superintendent to the North Bay division of the same road. He was then consecutively general superintendent and traffic manager of the Algoma Central & Hudson Bay and the Algoma Eastern; manager of the International Transit Company and the Trans.-St. Mary's Traction Company, with headquarters at Sault Ste. Marie, Ont., and was president of the Superior Construction Company, Ltd., at Sudbury, Ont., at the time of his recent election as president of the Algoma Central & Hudson Bay, and the Algoma Eastern as above noted.



T. J. Kennedy

Thomas A. Clarkson, for the past seven years secretary to E. C. Lewis, chairman of the board of directors of the Nashville, Chattanooga & St. Louis, has been elected secretary of that company, with headquarters at Nashville, Tenn. Mr. Clarkson has been in railway service for 26 years, having begun railway work as a clerk in the accounting department.

T. A. Clarkson

W. N. Jones has been appointed claim agent of the Western division of the Chicago & Alton at Mexico, Mo., succeeding B. A. Sturdevant, who has been transferred to Bloomington, Ill., as claim agent of the Northern division, in place of H. S. Simpson, resigned.

Arthur S. Pierce, assistant treasurer and assistant secretary of the Chicago & North Western at New York, has been elected treasurer and assistant secretary, succeeding Milton B. Van Zandt, deceased. The following appointments have also been announced: T. W. Arundel, assistant treasurer and secretary, and H. W. Rush, assistant treasurer and assistant secretary. All will have their headquarters at New York.

J. W. Everman, general manager of the St. Louis Southwestern of Texas, has been elected first vice-president and general manager, and first vice-president of the Stephensville North & South Texas, with headquarters at Tyler, Tex.

Fred Zimmerman, general freight agent of the Lake Shore & Michigan Southern at Cleveland, Ohio, has been elected vice-president in charge of traffic of the Chicago, Indianapolis & Louisville, with headquarters at Chicago, effective November 1. A photograph of Mr. Zimmerman and a sketch of his railway career were published in the *Railway Age Gazette* of March 20, 1914, page 700.

Operating

T. E. Coyle has resigned as superintendent of the Pasco division of the Northern Pacific at Pasco, Wash.

R. M. Johnson has been appointed superintendent of transportation of the Coal & Coke, with headquarters at Gassaway, W. Va., succeeding C. S. Wilkins, resigned.

L. M. Dooley, inspector of transportation of the Texas & Pacific, has been appointed superintendent of the Rio Grande division, with headquarters at Big Spring, Tex., succeeding W. M. Lynch, who has been transferred to the New Orleans division as superintendent, with office at New Orleans, in place of T. S. Mahoney, transferred. R. B. Ayres, superintendent of the Trans-Continental division at Texarkana, Tex., who has been assigned to other duties, is succeeded by T. S. Mahoney.

Traffic

A. D. Pinkerton has been appointed commercial agent of the International & Great Northern at Galveston, Tex.

Frank Koch has been appointed general agent, freight department, of the International & Great Northern at New Orleans, La.

Logan A. Mizener, commercial agent of the Chicago, St. Paul, Minneapolis & Omaha at Minneapolis, Minn., has been appointed general agent at Sioux City, Iowa, succeeding H. G. Wiringer.

W. T. Webster, whose appointment as general freight agent of the Chicago, Indianapolis & Louisville, with headquarters at Chicago, has already been announced in these columns, was born August 21, 1872, at Jackson, Mich., and was educated in the public schools at Jackson and Kalamazoo. He began railway service in 1886 with the Chicago, Kalamazoo & Saginaw, and for four years was employed in the accounting and traffic departments of that road at Kalamazoo. From 1890 to May, 1896, he occupied various positions in the freight departments of the Grand Trunk, the Michigan Central and the Pere Marquette, including that of chief rate clerk in the general freight department of the latter road at Grand Rapids, Mich. Mr. Webster then went to the Chicago, Indianapolis & Louisville as Michigan representative, and subsequently was for 15 years commercial agent at Grand Rapids. In July, 1911, he was appointed general agent at Chicago, and one year later became division freight agent at Bedford, Ind., from which position he was promoted to general freight agent on October 1, as above noted.

W. T. Webster

E. P. Vernia, agent of the Chicago, Indianapolis & Louisville at New Albany, Ind., has been appointed division freight agent, with office at Bedford, Ind., succeeding W. T. Webster, promoted.

G. M. Schaefer, traveling freight and passenger agent of the Wabash, with headquarters at Portland, Ore., has been appointed general agent at that place, succeeding C. A. Pettibone, deceased.

C. D. Thompson has been appointed general agent of the Great Northern at Spokane, Wash., in place of D. G. Black, who has been transferred to St. Louis, Mo., succeeding R. K. Pretty, who has been appointed agent at Seattle, Wash.

Frank B. Humston, city passenger and ticket agent of the Chicago, Indianapolis & Louisville at Bloomington, Ind., has been appointed district passenger agent at Indianapolis, Ind., succeeding H. G. Alexander, resigned to engage in other business.

H. F. Harden, traveling freight agent of the Cincinnati, New Orleans & Texas Pacific and the Alabama Great Southern at Jacksonville, Fla., has been appointed commercial agent of both roads, with headquarters at Indianapolis, Ind., succeeding S. A. Williams, resigned.

C. E. Stone, president of the Kaslo & Slocan Railway, Land Grant Development Company, Limited, of St. Paul, Minn., and formerly general passenger agent of the Great Northern, has been appointed general traffic manager of the Great Northern Pacific Steamship Line, with headquarters at San Francisco, Cal.

E. P. Cockrell, assistant general passenger agent of the Chicago, Indianapolis & Louisville at Chicago, has been appointed general passenger agent, with office at Chicago, succeeding Frank J. Reed, who requested relief from the responsibilities of that position on account of illness, after 29 years' service, and has been appointed a special representative of the passenger department. Charles M. Woodman, chief clerk in the passenger department, succeeds Mr. Cockrell. Effective January 1.

Engineering and Rolling Stock

The statement published in our issue of September 25, announcing the resignation of W. D. Minton, master car builder of the Texas & Pacific at Marshall, Tex., was in error. Mr. Minton still retains the position mentioned.

J. D. Lovell, supervisor of the Pennsylvania Railroad at Tyrone, Pa., has been transferred as supervisor to East Brady, succeeding W. S. Johns, Jr., transferred. R. R. Nace, supervisor at Buffalo, N. Y., has been transferred as supervisor to the office of the valuation engineer at Philadelphia, Pa. J. S. Considine, supervisor at Driftwood, Pa., succeeds Mr. Nace. H. S. Trimble, supervisor at Irvona succeeds Mr. Considine, and R. A. Klein, supervisor of the Camden Terminal division and the West Jersey & Seashore at Camden, N. J., succeeds Mr. Pitcairn. A. E. Preble, supervisor of the Cumberland Valley at Chambersburg, Pa., succeeds Mr. Klein, and N. B. Pitcairn, supervisor at Verona succeeds Mr. Preble.

Joseph Billingham, whose appointment as superintendent of motive power of the Grand Trunk Pacific, with headquarters at Transcona, Man., has already been announced in these columns, began railway work as machinist apprentice on the Great Northern Railway of England, and subsequently was a machinist in the shops of the Chicago & North Western. He served later as a locomotive engineer and road foreman of engines on the Chicago, Milwaukee & St. Paul. In December, 1890, he was appointed road foreman of engines of the Gulf, Colorado & Santa Fe. He was subsequently master mechanic and general master mechanic on the same road, and the division master mechanic on the Baltimore & Ohio. In January, 1904, he was appointed representative of the Galena Signal Oil Company at London, Eng., and at the time of his recent appointment as superintendent of motive power of the Grand Trunk Pacific, was general inspector of the American Locomotive Company at Schenectady, N. Y.

OBITUARY

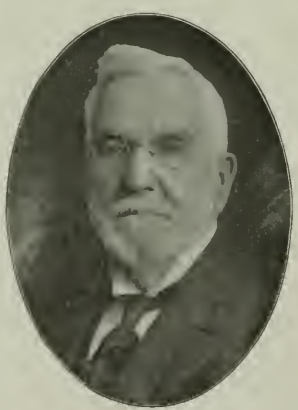
Stephen W. White, formerly assistant secretary of the Pennsylvania Lines West of Pittsburgh and secretary of the Northern Central at Philadelphia, Pa., died on October 16, at his home in Philadelphia, at the age of 74. He entered the service of the Northern Central in 1875 as assistant secretary; two years later he was appointed secretary of the same road, and from 1881 was also assistant secretary of the Pennsylvania Lines West until his retirement in 1910 under the pension rules.

Charles Otey Gwatkin, who in recent years had been engaged in special work for the Northern Navigation Company and the Grand Trunk Railway, died at Sarnia, Ont., October 9, at the

age of 64 years. He was born at Lynchburg, Va., November 9, 1850, and began railway work in 1880 as agent for the Great Western Despatch Fast Freight Line at Binghamton, N. Y. In October, 1885, he was made traveling freight agent of that line at Boston, Mass., and subsequently was with the Wisconsin Central Lines as New England agent, commercial agent at Boston, and general eastern agent at New York, until May, 1900. Later for a period of two years he was general manager of the Guatemala government railways, and previous to his connection with the Grand Trunk and the Northern Navigation Company he was employed as traffic manager for an industrial concern in the east.

Charles J. Drury, master mechanic of the Atchison, Topeka & Santa Fe, whose death was noted in our issue of October 16, was 36 years of age. He was born at Chicago Junction, Ohio, and began railway work in July, 1895, as machinist apprentice for the Atchison, Topeka & Santa Fe. After completing his apprenticeship in July, 1899, he was employed as machinist for that road, the Southern Pacific, the Kansas City Southern, the El Paso & Southwestern, the Chicago, Rock Island & Pacific and other roads for seven years, becoming roundhouse foreman for the Santa Fe at La Junta, Colo., in July, 1906. He remained with the Santa Fe until February, 1913, filling the positions of general foreman at Albuquerque, N. M.; bonus supervisor of the Western Grand division; master mechanic of the Oklahoma division at Arkansas City, Kan., and master mechanic of the Plains division at Amarillo, Tex. He then became master mechanic of the St. Louis & San Francisco at Ft. Smith, Ark., and the following February was appointed superintendent of shops at Springfield, Mo. Mr. Drury was promoted to division master mechanic at Sapulpa, Okla., on September 1, just prior to his illness of typhoid fever, from which he died on September 30. Mr. Drury's father, M. J. Drury, is superintendent of shops of the Santa Fe at Topeka, Kan.

Oliver S. Lyford, vice-president of the Chicago & Eastern Illinois, who died on October 12, after 68 years of railroad service, as mentioned in our issue of last week, was born June 19, 1823, at Mount Vernon, Maine. His record is one of the most remarkable in railroad history. He began work in January, 1846, with the Boston & Lowell, remaining with that road until February, 1851, successively as watchman, assistant baggage man, ticket agent and extra passenger conductor. He then went to the Erie as shop clerk at Dunkirk, N. Y., and from November, 1851, to October, 1855, was a passenger conductor. In October, 1860, he became joint station agent of the Erie and the Atlantic & Great Western at Salamanca, N. Y.; from November, 1863, to April, 1869, was division superintendent of the latter road, and then until November, 1871, was assistant general superintendent. The following eight months he was superintendent of the Buffalo and Rochester divisions of the Erie, leaving that road in July, 1872, to become general superintendent of the Hannibal & St. Joseph, where he remained until November, 1873. From December, 1874, to November, 1876, Mr. Lyford was general superintendent of the Kansas Pacific, and in January, 1878, he became connected with the Chicago & Eastern Illinois as superintendent. He was appointed general manager in February, 1886, and in November of the following year became vice-president and general manager. He relinquished the duties of general manager in February, 1890, but retained the office of vice-president until he was formally retired on July 1, 1913. Of recent years he had not been active in railroad service, but went to his office nearly every day until his retirement and occasionally afterward.



O. S. Lyford

Equipment and Supplies

LOCOMOTIVE BUILDING

The Union Pacific has ordered one snow plow 12 ft. cut, from the American Locomotive Company.

The Minneapolis & St. Louis has ordered 15 Mikado type locomotives from the American Locomotive Company.

CAR BUILDING

Atlantic Coast Line.—A report in the Advance Sheet of October 7 to the effect that this company was in the market for 500 freight cars, has been denied.

The Northern Pacific is in the market for 47 coaches and 18 combination mail and express, 4 combination mail and baggage, 17 baggage, 6 dining and 3 tourist cars.

The Louisville & Nashville, reported in the *Railway Age Gazette* of last week as having purchased 1,000 underframes, will use part of these underframes for the following cars to be built in its own shops: 450 50-ton drop bottom gondola cars; 200 40-ton box cars and 75 40-ton refrigerator cars. The underframes for 250 of the gondola cars were purchased from the American Car & Foundry Company, and the remainder from the Mount Vernon Car Manufacturing Company.

IRON AND STEEL

The Minneapolis & St. Louis has ordered 1,500 tons of 85-lb. steel rails from the Illinois Steel Company.

The Chicago, Milwaukee & St Paul has ordered 238 tons of steel for five 90-ft. deck girder spans, from the Wisconsin Bridge & Iron Company.

The International & Great Northern has ordered 852 tons of steel for bridges at Riverside and Long Lake, Tex., from the Wisconsin Bridge & Iron Company.

SIGNALING

The Buffalo, Rochester & Pittsburgh has put in service automatic block signals on its line between Buffalo and East Salamanca, about 63 miles. With this addition the company now has 215 miles of road equipped with automatic block signals.

The Central of Georgia has awarded the Union Switch & Signal Company the contract for installing an electro-pneumatic push-button switch apparatus at its classification yard, at West Macon, Ga.; also a mechanical interlocking plant at the west end of the receiving yard at Macon, and automatic block signals between Macon Junction and Terra Cotta. The semaphores will be style "S." The push-button machine will have 22 buttons.

A Russo-Persian Railway.—A party of Russian engineers which late in June reached Enseli for the purpose of surveying for the proposed railway route from Enseli to Resht and thence to Kasvin, must by this time have made considerable headway. The survey is being conducted under the guidance of the engineer Yarosh. The proposed line is to serve as an extension of that already selected from the station of Alyat, near Baku, to Astara, and thence along the shore of the sea to Resht. The Enseli-Resht-Kasvin route, the total length of which is 228 miles, will follow the existing paved road crossing the high Elburg mountain range near Kuin. The projected railway from Alyat station to Kasvin, about 400 miles long, is to connect Central Persia with Russia. There is a good paved road from Kasvin to Teheran—distance, 90 miles. The most important section is that connecting Enseli and Kasvin, as this gives an outlet to the sea from the richest provinces of Persia—Chamse, Kasvin and Hamadan. This line also will facilitate the transport of Russian goods into Persia.

Supply Trade News

The Q. & C. Company, New York, has taken over the exclusive license and control of the Ross-Schofield system of water circulation for locomotive boilers for the United States and Canada.

At the annual meeting of the American Locomotive Company in New York on October 20, retiring directors W. H. Marshall, A. H. Wiggin and A. W. Mellon were re-elected to serve for three years. The present officers of the company were likewise re-elected to serve for the following year.

Henry H. Westinghouse, brother of the late George Westinghouse, was elected president of the Westinghouse Air Brake Company at the annual meeting on October 15. Mr. Westinghouse has been associated with the company for over 40 years. He was born at Central Bridge, Schoharie county, N. Y., on November 16, 1853. He received his early education at Union High School, Schenectady, graduating in 1870. In 1871 he entered Cornell University to take up the study of mechanical engineering. In 1872 he went to Pittsburgh and became identified with the business of the Westinghouse Air Brake Company. He worked successively in the foundry, machine shop and drafting room, and occupied the positions of general agent, general manager, vice-president and acting president. He was also one of the founders of the firm of Westinghouse, Church Kerr & Company, and for many years was the guiding spirit in its management. Mr. Westinghouse is a man of quiet tastes and unostentatious manner. He is a member of the Grolier, Century, Engineers' and Cornell clubs of New York, and the American Society of Mechanical Engineers. He is also a trustee of Cornell University.

H. H. Westinghouse

John Steele Patterson, for the past 24 years resident manager of the Galena Signal Oil Company, Franklin, Pa., at Cincinnati, Ohio, died at his home in that city on October 13. Mr. Steele was born in Baltimore, Md., on February 13, 1839. He served his term as machinist's apprentice in the shops of the Baltimore & Ohio at Cumberland, Md., and was later general foreman in the Baltimore & Ohio shops at Portsmouth, Ohio. When he was 24 years of age he was appointed master mechanic of the Cincinnati, Indianapolis, St. Louis & Chicago, now the Big Four, at Cincinnati, and served in that position for 25 years. For the past 24 years he had been connected with the Galena Signal Oil Company as noted above.

TRADE PUBLICATIONS

Automatic Stokers.—The Sanford Riley Stoker Company, Ltd., Worcester, Mass., has recently issued a well illustrated catalog descriptive of the Riley Self-Dumping Underfeed Stoker, and showing some of the installations that have been made. This stoker is an improvement on many, in that there is a continuous movement of the fuel bearing surfaces, together with a continuous automatic cleaning. The reciprocating movement of the fuel bearing surfaces in it automatically gives a slicing effect in the fuel bed and tends to prevent the formation of clinker.

Enlistments of English Railway Employees.—The October number of the Great Western Railway's magazine states that the company has 7,595 of its men with the colors.

Railway Construction

Arizona Roads.—Announcement is made that the Gunn-Thompson Company will build a railroad from a connection with the Arizona Eastern at Webster, Ariz., northeast to its mines at Superior, about 20 miles.

Athabasca Valley.—Application is being made to the Alberta legislature for an extension of time in which to build this projected line from near Independence, Alta., on the Edmonton, Dunvegan & British Columbia northwest to Fort Assiniboine, about 75 miles. J. D. McArthur, Winnipeg, Man., is the principal promoter.

Canadian Northern.—A contract is reported let to the Northern Construction Company to build south from Macleod, Alta., and a contract has been given to the McArthur Construction Company to build a section of about 25 miles on a line to St. Paul de Metis.

Carmack Railway & Power Company.—Plans are being made to build a 7-mile line, it is said, from Opelika, Ala., southwest to Auburn, as soon as financial arrangements can be made. H. A. Bedell, president; W. L. Carmack, vice-president and general manager, and F. Pace, chief engineer, Opelika.

Horse Creek Land & Mining Company's Line.—We are told that this company is planning to build a line along Peter Cave Fork, in Lincoln county, W. Va., and that the work includes cuts and fills on about 2.2 miles. When completed the line is to be operated by the Chesapeake & Ohio. A report says that the line may be extended an additional 10 miles. L. E. Poteet, general manager, Charleston, W. Va.

Kinston Carolina Railroad & Lumber Company.—It is said that this company, which now operates a 20-mile line from Kinston, N. C., south to Pink Hill, will build an extension as soon as financial arrangements can be made. The projected route is from Pink Hill south to either Chinquapin, 20 miles, or to Maple Hill, 35 miles.

Lake Huron & Northern Ontario.—An officer writes that the contract has been let to the Ontario Northern Construction Company, with headquarters at Bruce Mines, Ont., on a percentage basis to build a 325-mile extension from Bruce Mines northerly. Work may be started in January on the heavier sections of the line, and the company expects that about 50 miles will be completed, by July or August of next year. The maximum grade north will be 1 per cent, and south 0.6 per cent, and the heaviest curves will be 6 deg. The principal commodity to be carried on the line for the first few years will be timber. G. P. McCallum, president; H. Appleton, vice-president and general manager, Bruce Mines. (October 9, p. 670.)

Mexican Roads.—Colonel Federico Montes, governor of the state of Queretaro, has adopted plans, it is said, for the construction of several hundred miles of railroad, in order to give employment to the many idle men in that state. Surveys are now being made for a line to be built from Queretaro, Mex., northeast to the port of Tampico, also for a line from Queretaro southwest to Acambaro.

Norfolk, Yorktown & Washington.—Surveys are now being made, it is said, to build the line projected last year from a point in Gloucester county, Va., north via Fairfax, about 160 miles. W. H. Edwards, Newport News, Va.; C. T. Hobart and W. W. Terry, of Norfolk, may be addressed.

Oregon Roads.—We are told that residents of Roseburg, Ore., on October 5, voted to issue $500,000 of bonds in aid of a projected railway from Roseburg west to a point on the Pacific coast, probably at Coos Bay, about 90 miles. The Roseburg Railroad Commission has been created to carry out the construction of the line and to sell the bonds. W. H. Richardson, secretary, Roseburg. (May 29, p. 1215.)

Orleans-Kenner Electric Interurban.—This company is building a line from New Orleans, La., west to Kenner, about 14 miles, and on completion of the work will build an extension, it is said, from Kenner, northwest. H. K. Johnson, president, New Orleans.

Pacific Great Eastern.—This company, which is building from Vancouver, B. C., north to Prince George, 480 miles, has been authorized to open for traffic the section from Lonsdale avenue, North Vancouver, to Horse Shoe Bay or Whitecliffe, 12.7 miles. The line is under construction from this point to Squamish, at the head of Howe Sound, and is in operation north of Squamish via Cheakamus on about 20 miles. The grading work is finished to Lillooet, 100 miles from Vancouver, and track laying is now under way. It is expected that track laying and ballasting on this section will be finished this year. The remaining section from Lillooet north to Prince George on the Grand Trunk Pacific is all under contract. (July 10, p. 80.)

Princeton Power Company's Line.—Construction work has been started at Princeton, W. Va., it is said, on an electric railway to be built to Bluefield, 12 miles. Walton & Company, Falls Mills, Va., are the contractors.

Swift Lumber Company's Line.—This company has under consideration the question of building a line, it is said, from Meigs, Ga., southeast via Coolidge to Pavo.

Van Horn Valley Land & Railway Company.—This company has awarded a contract to King & Runquist, Duluth, Minn., for the construction of a standard gage railway extending from Van Horn, Tex., up through the Van Horn Valley to a point near the New Mexico boundary. This line, when completed, will be 90 miles long and will tap a 350,000 acre tract of land owned by this company in the Van Horn valley in El Paso and Culberson counties, Tex. Construction work is to begin immediately.

West Penn Traction Company.—An officer writes that all the material has been bought to carry out work on an extension of its Oakdale and McDonald branch to Burgettstown, Pa.

Wilmington & Carolina Beach (Electric).—Residents of Wilmington, N. C., recently voted to grant a franchise to this company which proposes to build from Wilmington to Carolina Beach, 13 miles. In addition the company plans to build 11 miles of city lines. C. C. Chadbourn, president, and J. F. Heyward, chief engineer. (August 21, p. 370.)

RAILWAY STRUCTURES

Ludlow, Ky.—Plans have been made for building a new concrete viaduct at Elm street, it is said, over the tracks of the Queen & Crescent in Ludlow at an estimated cost of $34,600.

Louisa, Ky.—A contract has been given by the Chesapeake & Ohio, to the Virginia Concrete Company, Roanoke, Va., it is said, to build a bridge over the Levisa Fork of the Big Sandy river, about three miles from Louisa.

New York.—The contract for building the post office, express and office building for the New York Central & Hudson River in the Grand Central Terminal has been let to the John Peirce Co., New York, and the work will be started at once. The structure will cover an area of about 52,230 sq. ft., between Forty-fifth and Forty-sixth streets, Lexington avenue and Depew place, and will harmonize in architectural features with the adjacent terminal buildings. At the present time the building will not be erected above the fourth floor, though provision is made for future erection of eight additional floors. The floor at the Lexington avenue level will be arranged to accommodate increased express business handled at the terminal, and wagon-loading space, also drives to street and connections to the track level will be provided. The two next floors above will be occupied by the railway mail service and the New York post office in handling second class and parcel post matter. Wagon-loading space will be provided along the private street at the west side of the building, and a comprehensive system of mail conveying equipment will be installed to distribute the mail within the building and to and from the trains beneath. (September 4, p. 453.)

Ogden, Utah.—A contract has been given to C. F. Dinsmore, Ogden, Utah, it is said, for putting up a union station to be used by the Ogden Rapid Transit Company and the Salt Lake & Ogden Railway. The proposed structure is to be built on Twenty-fourth street, and will be 50 ft. wide by 270 ft. long. The cost of the work is about $25,000.

Railway Financial News

Cincinnati, Hamilton & Dayton.—Gordon Abbott, a director of the Old Colony Trust Company, Boston, has been added to the protective committee of the Cincinnati, Hamilton & Dayton, which consists of Charles H. Sabin, Harry Bronner, S. L. Fuller and J. H. McClement.

Baltimore & Ohio.—The Quemahoning branch, a subsidiary of the Baltimore & Ohio, has filed a notice with the Pennsylvania Public Service Commission of an increase in funded debt of $5,000,000.

Chesapeake & Ohio.—Frank Vanderlip has resigned as a director and as a member of the executive committee.

Denver & Rio Grande.—Edwin Gould has resigned as a director.

Hocking Valley.—This company has made arrangements through Kuhn, Loeb & Company and the National City bank, both of New York, for the refunding of $4,000,000 5 per cent notes, maturing November 1, 1914, through the sale of $4,000,000 one-year 6 per cent notes, due November 1, 1915.

New York Central & Hudson River.—The suit brought by minority stockholders to prevent the carrying out of the merger plans of the Lake Shore & Michigan Southern and the New York Central & Hudson River has been dropped by the consent of both parties and by consent of the United States district judge, before whom the suit was brought.

New York, New Haven & Hartford.—The final decree in the dissolution suit proceedings, the form of which was worked out by the various interests, has been signed by Judge Mayer, in the United States district court.

William Skinner and Morton F. Plant have resigned as directors

Wabash.—The organization committee last week notified the state public service commissions of Illinois and Missouri of the withdrawal of the plan of reorganization submitted last May, with the explanation that it is useless to attempt to carry it out. The committee explained the situation in part as follows:

"In reaching its decision to take the course now indicated the committee has not treated as a decisive condition of this matter the unparalleled catastrophe of the war which now devastates Europe."

"With the largest volume of business and the largest amount of gross earnings realized in any year, except one, in the history of the property, with completed expenditures of $10,500,000 in improvement and equipment, the operating income of the property was for the fiscal year just closed the smallest realized in any year, save two, during the period of 10 years last past.

"Increased operating costs, increased taxes and reduced rates have produced the result that for this year of large business the earnings of the property applicable to the payment of fixed charges fell over $375,000 short of providing for the interest on underlying mortgages, and provided no return whatever on the large capital expenditures made during the receivership.

"Since 1908 the taxes on the property have increased 44 per cent.

"Passengers are now carried on the Wabash Railroad at the rate of one-tenth of a cent per mile less than it costs the railroad to run its passenger service; freight is carried at a revenue of only a little over one-tenth of a cent per ton per mile over the cost of carrying it.

"There can be but one of two outcomes—disaster to the railways and all the railways represent in their relations to investments, savings, insurance and to general business, as well as to public requirements and convenience; or an intelligent reversal of the policy which has been carried so far beyond the interests and demands of the people and so far beyond the remedy for evils sought to be corrected."

Judge Mayer, in the United States district court, refused to grant a stay in the proceedings looking to the foreclosure of the mortgage, of which the Central Trust Company is trustee.

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Volume 57 October 30, 1914 Number 18

Contents

*Illustrated.

In the rate advance hearing before the Interstate Commerce Commission last week Commissioner Clark asked Daniel Willard whether if all the railways in the case showed up like the Delaware, Lackawanna & Western there would be any justification for an advance in rates. Commissioner Clements asked him whether the application was for the purpose of getting more out of the proposed rates for net revenue or for the purpose of establishing credit. Commissioner Meyer asked Mr. Strauss what effect he thought it would have on the credit of a great concern for its head to come to Mr. Strauss' office and offer him $20,000,000 of an issue of securities while at the same time stating that he would not invest in them himself? Commissioner Meyer also asked Mr. Willard whether he thought that conditions had changed since July 29, when the commission handed down its decision, or whether he simply wanted to shift the burden from the shareholders of the railways to those who paid the freight. The members of the Interstate Commerce Commission have been, presumably, appointed to their present positions on the assumption that they are peculiarly qualified for them by reason of their expert knowledge, their fairness of mind and their ability. How can the course of commissioners in asking such questions as the foregoing be reconciled with any such assumption? Were they joking, or are these questions to be taken seriously? If they were joking, their jokes were in very poor taste under existing conditions. If they were serious, what has got the matter with some members of the commission? They were hearing a case of the utmost seriousness, and therefore we must suppose they were serious. If they were serious these questions do no credit to their intelligence, fairness or dignity. They are such questions as we expect to emanate from the Clifford Thornes, the Charles Edward Russells and gentlemen of that stripe, but not from members of the Interstate Commerce Commission.

How Can They Ask Such Questions?

The feelings of disgust and desperation which the present system of regulation is arousing in the minds of railway men are illustrated by the address which President Ripley, of the Santa Fe, made at the dinner of the Knife and Fork Club in Kansas City on October 24. The address is published elsewhere in this issue. Mr. Ripley makes the interesting suggestions that steps shall be taken to reduce the wastes of railway competition, to have the government guarantee a minimum on investments in railways and to give it representation on their boards of directors. The main criticism of our present system of regulation is that it seeks to stimulate rather than to prevent wasteful competition and that it gives public officials great authority to regulate railways without imposing on them or the public any responsibility for the results. Mr. Ripley would eliminate the wasteful competition by combining various groups of competitive railways. He would give representatives of the government authority by putting them on the boards of directors where they would become active and influential in the direct management of the properties; and he would cause them and the public to feel responsibility for the results by the system of guarantees of profits which he suggests. Mr. Ripley's great reputation as an able, public spirited and eminently successful railway manager, together with the shock that the suggestion of such a scheme by a prominent railway man will give, will cause his plan to be widely discussed. A plan similar in some important respects has been proposed by W. W. Cook, the eminent authority on the law of corporations. Such expressions from men of such prominence show that many who are most competent to judge do not believe that our present system of regulation is bearing up under the crucial test of navigation in foul weather as well as in fair. A vessel which threatens to go to the bottom

President Ripley's Novel Proposals

in every storm can hardly be regarded as one in which it is safe to go to sea. Our present system of regulation must be improved or it is doomed.

The Personnel of Commissions

Numerous citizens of Maine have made a vigorous protest against the appointment of three lawyers as the three members of the new public utilities commission of that state. The story is told elsewhere in this issue. Lawyers should make the most capable public servants in many lines of governmental work. Their education and experience teach them what has been and is being done by governments; and this should aid them in forming sound opinions as to what governments ought to do. But the ordinary lawyer does not have much actual business experience. His relationship to business is usually that of one who advises what legally may or may not be done, rather than that of one who undertakes to solve practical problems of administration, and who has the opportunity of making profits if he solves them correctly, while taking the risk of incurring losses if he solves them incorrectly. Many lawyers have made successful administrators and business men; but this has been because they have had qualities not developed by the ordinary education and experience of the lawyer. Now, the problems presented to public utility commissions are partly legal, but preponderantly business problems. Therefore, the public utility commissioners should contain some lawyers, but they should also have some members with the knowledge, the experience and the point of view of business men and of public utility experts. The objectors to the appointment of three lawyers to the Maine commission demand the appointment of a lawyer, a business man and a practical railroad man. This is so obviously a reasonable and sensible demand that it is difficult to understand how anyone can fail to endorse it. In this connection, however, it should, of course, be borne in mind that even more depends on the character and ability of the men appointed than on their previous experience. Many men very successful in their own line of professional or business activity are yet extremely narrow and wholly unfit for public utility commissionerships. We need for public office above all things men who are high-souled and broad-minded, studious and energetic, public-spirited, courageous and foresighted. These things are of fundamental importance, however much we may and should strive to get men who are also acquainted with railroading, gas-making, telephones, trolley cars or tax laws.

THE YARDMASTER AND THE FREIGHT SOLICITOR

WITH the exception of the word efficiency, no term has been more abused in railroad parlance during the past few years than co-operation. In the universal endeavor to improve the standard of railway operation, emphasis has very properly been placed on the necessity for hearty co-operation between all departments. With the high degree of specialization of the modern railway organization, all departments are more or less inter-dependent, but it is probable that no officer comes in intimate contact with more branches of the service in the daily routine of his duties than the terminal yardmaster or superintendent. In reality, his activities are related directly to the traffic as well as the operating department, for in spite of all the arguments the traffic department can present, in the final analysis, service counts with the shipper. It is the yardmaster and his force who come in contact with the shipper in giving this service and who aid in securing or holding the traffic.

It might be said that if a yardmaster did not provide proper service for the industries within his jurisdiction, he would soon be replaced by another. This is true, but there is a wide zone between the maximum service and the low limit of efficiency resulting in discharge. It is to men within these limits that we emphasize the importance of this relation. In some cases a yardmaster may not be the means of losing any traffic or creating complaints, but he may be losing an opportunity of bringing more traffic to his road by giving service above the average. He should, therefore, acquaint himself fully with the needs of present and prospective shippers, and then endeavor to meet them.

On the other hand, the freight solicitor can further the interests of his road by exercising care in making promises or acceding to requests for special or expensive services. In the endeavor to secure traffic under highly competitive conditions, requirements are often imposed which are expensive and burdensome for the operating department. Traffic which cannot be handled at a fair profit had usually better be allowed to move over the other road. Within the category of these uneconomical services are frequent special services out of regular schedule, the "hold" or "reconsignment" privileges, etc. If the officers of the freight traffic department would familiarize themselves with the cost of such services and thus see that in many cases the evident gain is a final loss, they would not solicit such traffic so actively or insist on the operating department rendering such service. In the end, the interests of the yardmaster and traffic agent are identical and are best served when the revenues of the company are best conserved. A knowledge of each other's problems is the first and most important step towards this result.

LICENSES FOR ENGINEERS

ACCORDING to the terms of a bill approved in July, 1913, by the governor of the state of Pennsylvania, an act is being prepared by a commission provided for in the bill, to require the licensing of professional engineers. Although this is by no means the first time such a measure has been discussed, nor the first case in which the objections to such a measure have been set forth, it seems that the futility and disadvantages of such a law have been summed up as clearly and concisely as possible by D. F. Crawford, general superintendent of motive power, Pennsylvania Lines West. In a letter addressed to the members of the commission, Mr. Crawford shows, first, that the bill is unnecessary, and second, that it would result in hardship to large organizations, to the engineering profession and to individual engineers.

Two reasons are stated why the bill is unnecessary, first, since the capability of any engineer depends on his experience and common sense, it cannot be adequately judged by his ability to solve catch problems in an examination, and further, the tagging of a man as a professional engineer could not insure his use of correct judgment and the public would be much less secure than would be the case if proper laws were passed regulating details of construction affecting the safety and life of the people. Second, since a man's capability is measured entirely by the results of his work, and consulting engineers are employed or regular employees promoted according to the results secured, incapable engineers are automatically eliminated with greater accuracy than would be possible with any commission.

Three specific hardships are enumerated by Mr. Crawford that would result if such an act were put in force. First, since the bill includes specifically men engaged in the general supervision of the operation and maintenance of public and private works, it would prevent corporations from employing men of excellent business ability and no professional training, who have shown themselves capable of picking the proper men for handling various engineering problems incident to the work and securing results as good as, and in some cases better than, professional engineers. Second, the law would deprive large organizations of the services of capable and experienced men thoroughly competent to meet the specific requirements of the work in which they are engaged, but unable to satisfy a commission of nine men as to their professional ability. Third, since the members of the commission would be appointed by the governor and three of the nine would retire every two years, the commission would of necessity become a political body, and would be in position to refuse or withdraw certificates to satisfy petty grievances, or for political pull reasons having no reference to the merits of the case.

The above arguments are so clear and conclusive as to need no comment.

GOVERNMENT REGULATION ON TRIAL

IT is a question of great importance what effect the decision of the Interstate Commerce Commission in the pending rate advance case will have on the railway situation, and more especially on the general business situation. Of hardly less importance is the question what effect it will have on the future of government regulation of railways.

The nation is in the midst of a crisis. The railways are, of all industries, except the cotton-growing industry, the most acutely and directly affected. The present system of government regulation was not adopted merely to give some body, or bodies, authority to control railways. It was adopted as a means to an end, and that end was the promotion of the general welfare. The line taken by certain attorneys and members of the Interstate Commerce Commission in questioning witnesses who appeared at the hearings in Washington last week strongly suggests that they have confused the means employed with the end which it was adopted to accomplish.

Certain questions were asked of the witnesses for the railways which might be interpreted to imply that those asking them do not believe that the commission has any power to permit an advance in rates for the purpose of so increasing the revenues of the railways as to enable them successfully to meet the present emergency. The inference which might be drawn is that they hold that the commission is empowered only to regulate railway *rates* and not railway *earnings,* and that when the commission restricts the railways to reasonable rates it may not legally concern itself with the results, directly to the railways, or indirectly to the nation.

It surely is astounding that at this late day such a theory should be suggested by persons opposing an advance in rates and even, apparently, by members of the commission. From the inception of the present system of government regulation two theories as to the way rates should be regulated have been advanced. Railway men and others who concur in their point of view have contended that the sole function of the commission in the regulation of rates is, or should be, to see that rates are not made unreasonably high, and they have argued that the main criterion of what is reasonable should be the value of the service rendered—in other words, "what the traffic will bear." They have argued that the cost of the service and the net earnings received are factors to be considered, but that after all, the main factor is the value of the service—that if the rates exceed this they are unreasonable, even though the carrier make no profit at all, and that, on the other hand, if they do not exceed this, the fact that some or all railways make large profits is by no means conclusive proof that the rates are unreasonable.

Many persons have contended, on the other hand, that the chief measure of the reasonableness of rates is the net return on their investment received by the railways, and that if their net return becomes very large the rates should be reduced, no matter how low they may appear when tested by other standards.

This latter theory, in spite of all the efforts of those who have criticized and opposed it, has tended to prevail. It has been accepted by the commission to such an extent that that body has advocated a physical valuation as a basis for the regulation of rates, and by Congress and the public to such an extent that a law providing for such a valuation has been passed. Is it possible that, after having been accepted, when railway net earnings were relatively substantial the theory that net earnings are the main test of the reasonableness of rates and used it as a ground for causing reductions or refusing advances in rates, the commission is going to entirely abandon it now, because railway net earnings have reached the lowest ebb in years and in consequence the theory has become an argument for wholesale advances in rates? Such a reversal of attitude could be construed to mean only one thing, and that is that certain members of the commission are willing to act without any regard whatever to justice or consistency if by so doing they can find what may appeal to themselves or others as a defensible reason for denying the railways needed relief.

As a matter of fact, under present conditions railways are entitled on either theory, if correctly understood and applied, to general increases in their rates. The past 15 years have been a period of advancing wages and prices. Consequently, throughout this time it would have been possible for railway traffic to bear higher rates. At present the prices of some commodities, such as cotton, are relatively depressed, but on the other hand, the general level of prices and wages is much higher, compared with the general level of railway rates, than it was a decade ago. Therefore, on the value of the service theory the railways might make substantial advances in the rates on most of their traffic without rendering the rates unreasonable.

As to the other theory, the net return of the railways is the smallest now that it has been in years, while the demands on their net earnings are the greatest that they have been in years. Therefore, on that theory also, the railways are clearly entitled to make general advances in their rates. In fact, their net return has been heavily reduced while the current rate of interest has been heavily increased, so that even though we accepted the theory that they are entitled to earn only the current rate of interest, even on that theory they are entitled to make subsantial advances in their rates.

But it is said the present situation is an emergency, and the Interstate Commerce Commission has no authority to deal with emergencies. In other words, we have adopted a system of regulation which so ties the hands of the railway managers that they cannot meet emergencies, and which at the same time gives no one else the power to deal with them. What this means apparently, is, that every time anything out of the ordinary happens the Interstate Commerce Commission should placidly fold its hands over its diaphragm, lift its eyes to heaven, sit pat and pass the buck to Congress. And, of course, Congress will take such action at the time, not as business exigencies demand, but as the political exigencies of its members demand.

This is certainly a lovely theory. If it is correct it means that we have adopted a system of government regulation which is admirably adapted to preventing the railways from prospering when the rest of the country prospers, but which is incapable of giving them any aid or relief when they need it and which, therefore, in both good times and bad times, is a drag on the wheels of progress and a menace to the public welfare. It is the theory of a narrow, academic, hairsplitting, bureaucratic and imbecile system of regulation. It is a theory of ignorant meddlesomeness and not of helpfulness. It is a theory of cranky interference and not of progress. It is a theory of destruction and not of construction. If it is correct, those who have adopted the present system of regulation merit nothing but the curses and kicks of the public, and the sooner the system itself is cast into the scrap heap the better. If the theory is not correct, anybody who propounds it is utterly lacking in the qualifications for contributing toward the solution of a great question of public policy.

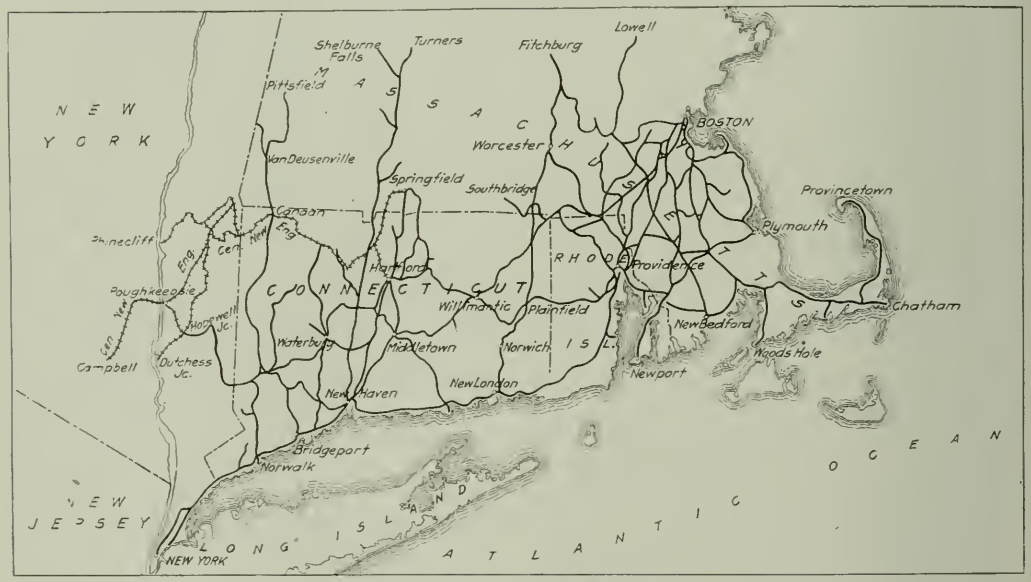
We do not believe that the public will accept the doctrine that the present system of regulation is merely a system for cranky, bureaucratic, wasteful, destructive meddling with business, and is not intended or adapted to be of any use in promoting the public welfare when the public welfare most needs promoting. We do not believe that the public will accept the doctrine that the theory on which railway rates are regulated should be constantly juggled about so as always to prevent them from being so changed as to maintain or increase railway net earnings. Furthermore, we still hope, in spite of certain questions asked by certain commissioners at the recent hearing, that the Interstate Commerce Commission will not accept any such doctrine.

One thing is certain, however, and that is, that while the acceptance by the commission of such a baneful and detestable principle would do great immediate harm to the railway and business interests, it would do still greater harm to government regulation of railways. The expressions of newspapers and business men all over the country show that the public is informed and aroused regarding the railway situation as it never has been before. Everywhere the question is being raised

whether the present system of regulation is not doing more harm than good. The Interstate Commerce Commission probably was astonished at the way in which its original decision in the 5 per cent case was received. If it acts in the present case on any such theory as the one we have been discussing it will be still more astonished at the way in which its decision in this case will be received. In the former case the railways were on trial. Probably the commission thinks the same thing is true now. If so, it is mistaken. This time regulation and the commission itself as at present constituted are before the bar of public opinion!

NEW YORK, NEW HAVEN & HARTFORD

NEVER, probably, in the history of American railroading has there developed quite so complicated a problem as that which faces the management of the New York, New Haven & Hartford. In the fiscal year ended June 30, 1914, the company earned gross $66,618,000, which is less than the earnings in 1913 by $1,996,000. Expenses amounted to $48,515,000, an increase of $1,288,000; and the net result of the year's operation was a profit to the owners of the property—the stockholders—of but $269,000 as against $8,654,000 in the previous year. It is only, however, was so easy for two or three of the directors to carry out, without opposition or advice, the vast plan of development in which the company was involved when Mr. Morgan died. The great majority of the stockholders of the New Haven neither have the means nor the knowledge of financial affairs to support their company in a time of very great financial stress. As long as the Morgan firm was the director of the policy of the New Haven, this mattered very little, since new capital for the refunding of maturing obligations was hardly a concern of the operating management, the bankers taking care of this end of the company's affairs. Now, however, the management of the company, instead of being able to rely on unlimited financial support from the greatest banking house in the country, is thrown completely on its own resources. Its credit and not that of the bankers must be used to sell securities to refund maturing obligations and to raise new capital; but its credit has been the subject of an extraordinarily bitter attack, and to add to this almost insurmountable difficulty, the company is forced to divest itself of its assets under governmental pressure. The stockholders, therefore, are a tremendous responsibility to the management without being a help. No wonder the widow, part of whose funds were invested in New Haven stock at 175, feels



The New York, New Haven & Hartford

in the light of the knowledge of the full situation that any intelligent study of the company's annual report for 1914 can be made.

The New Haven operates 2,046 miles of road. Only very slightly over half of its revenue is derived from freight, the remainder coming from the operation of passenger trains. The peculiar nature of the New Haven's business and its vulnerable position in regard to competition for both freight and passengers, have been pointed out before in the *Railway Age Gazette*. It was, of course, the desire to protect the business of the steam railroad that led the late J. P. Morgan and Charles S. Mellen, as his active agent, to use the New Haven's credit to buy trolley roads and steamship lines.

The stock of the New York, New Haven & Hartford is very widely distributed and a very large proportion of it is owned by small investors in New England, the great majority of whom, of course, are quite incapable of voting from their own knowledge on any question of railroad policy. This was one reason why it abused and bewildered under present circumstances; and there can be no doubt that the interests of this class of stockholder weigh as a fearfully heavy responsibility on the present management, despite the fact that it is in no way to blame for what has taken place.

The operation of the New Haven under the Mellen régime was left to subordinate officers. There was, however, at that time no imperative need for drastic economy. Now the most rigid economy is absolutely essential. Economy is always unpopular. To put it into effect now on the New Haven is particularly difficult and stirs up resentment both among the company's forces that feel the effect of this retrenchment and among the community served. The taking off of unprofitable passenger trains raises a storm of protest, all the louder because the company is in a bad strategic position to defend itself.

The management finds itself, therefore, without adequate financial support, with credit seriously impaired, without the backing of "big interests," with an organization which if it is not dis-

organized was at least on the verge of it, and has only been saved by the courage and skill of the present management, and with the grave responsibility of the small stockholder.

The 1914 annual report, therefore, is a record of housecleaning, of clearing the decks for action, and as such is particularly interesting. It must be remembered, however, that in setting forth so frankly the difficulties which the management of the New Haven now has to face it is not meant to imply by any means that their task is either hopeless or without possibilities of being rewarded in time by great success. Some of the English railways carry a very large proportion of passenger business; they are capitalized far higher than is the New Haven, and in many respects the fundamental conditions, not the particular problems just mentioned, are much like those of the New Haven, and they are notably successful both in giving satisfaction to the public served and returning a profit to their stockholders. The New Haven has what they have—a very dense business. The New Haven is, moreover, an originating road insofar as freight is concerned, and as such gets now and should continue to be able to get a high ton-mile rate, due to a good division of the through rate.

The company operates 2,046 miles, of which 841 miles has second-track and about 130 miles third and fourth-track. The total tonnage of freight carried in 1914 amounted to 24,997,000, a decrease of 1,269,000, as compared with 1913, the average haul being 92 miles, a decrease of 4.63 miles. This meant a falling off of ton-mileage in 1914, as compared with 1913 of 9 per cent. The freight density in 1914 was 1,152,000 ton-miles per mile of road, which means a very heavy density when we take into consideration the fact that there are a good many hundred miles of line on which there is no through freight business and only a small local freight business, and also bearing in mind the passenger density. Of the total tonnage carried in 1914, 31.23 per cent was products of mines, and of this about half was furnished by bituminous coal. The tonnage of manufactures furnished 20.18 per cent. of the total tonnage; merchandise, 16.29 per cent; lumber only about 5 per cent, and products of agriculture only about 9 per cent. An extraordinarily large proportion of l. c. l. freight adds very much to the expenses of handling the freight business, and also, of course, gives the New Haven a high average ton-mile rate. In 1914 this was 1.415 cents.

The total number of passengers carried was 87,184,000, an increase of 370,000 over 1913, and the average passenger journey was 18.36 miles. In part this very low average trip is due to the large commutation business which the New Haven does. In 1914 there were 13,025,000 commutation passengers carried, an increase of 686,000. The passenger density is 803,000 passengers carried one mile per mile of road. With this very dense passenger business the New Haven is able to get a high average number of passengers per train—96 in 1914, an increase of one over the year before.

Handling 9 per cent less freight business measured in ton-miles, the company reduced its freight-train mileage by 15 per cent, the total freight-train mileage in 1914 being 7,378,000. Handling a fraction of one per cent less passenger business measured in passenger miles, the company reduced its passenger-train mileage by a little over one per cent.

The average trainload in 1914 was 304 tons. This is low, but is a gain over 1913 of nearly 4 per cent, and there are particular circumstances in regard to the New Haven conditions which explain the light trainload. The large proportion of l. c. l. freight already mentioned is one; the small proportion of coal already mentioned is another; the very heavy passenger density is another and very important factor. Freight trains have to be run at high schedule speed to keep out of the way of passenger trains, and therefore cannot be very heavily loaded. It may well be on the New Haven that experience will show that gains in economy can be made without materially increasing the revenue freight-train load. When W. G. Besler went to the Central of New Jersey he inaugurated a program which resulted in smaller train-loads, but in more efficient and economical operation, and in some ways the density of traffic and frequency of passenger-train service on the New Haven is like that on the Central of New Jersey. Another important factor is the economies in handling this kind of business that may follow from complete electrification to New Haven.

Total operating expenses in 1914 amounted to $48,515,000, an increase of $1,288,000. All of the increase, however, was in maintenance expenses, maintenance of way costing $8,831,000, or $938,000 more than in 1913, and maintenance of equipment $10,389,000, or $789,000 more than in 1913. On the other hand, transportation expenses amounted to $26,869,000, a decrease of $335,000. With the large amount of passenger business and the fast freight service, it is of the utmost importance that maintenance of way expenditures on the New Haven should be liberal, and the substantial reduction in transportation expenses is a clear indication of effective economies.

The decrease in revenues and the more liberal expenditures for maintenance resulted in a net income amounting to $14,620,000, which is less by $3,697,000 than in 1913. This is not at all a bad showing. The remainder of the loss to the company in 1914 as compared with 1913 came as the result of a smaller return on the company's outside investments. There was but $3,522,000 dividends received on stock owned, a decrease of $2,966,000. The company's profit and loss surplus has now been reduced to $1,822,000. At the beginning of the year it was $7,916,000. The dividend paid on September 30 from profit and loss called for $2,357,000; the loss on the sale of the Merchants' and Miners' Transportation amounted to $3,595,000, and the unamortized loss on the New York, Westchester & Boston bond sale prior to 1914 was $1,265,000. At the end of 1914 the company had on hand $6,067,000 cash, or $6,208,000 less than at the beginning of the year. On the other hand, it had but $4,252,000 loans and bills payable, which is a reduction in this current liability of $38,347,000 from the 1913 figures. The net increase in the funded debt was $33,976,000. During the year the company spent $3,291,000 for additions and betterments.

The relations of the company to the government have been commented on at length in these columns at various times previously. It is to be hoped that with the signing of the dissolution decree a short time since, the worst of the New Haven's troubles in this respect are at an end.

There is a very interesting statement in President Elliott's report this year, showing the number of stockholders, their residences, etc. The total number of stockholders in 1914 was 26,386, as against 22,716 in 1913. Of the total in 1914, 46 per cent lived in Massachusetts, 22 per cent in Connecticut and 16 per cent in New York. Of the total number, 12,127 held 10 shares or less and 9,651 from 11 to 50 shares. Of the total, 10,920 were women, 3,551 trustees and guardianships, and 802 insurance companies and other corporations. President Elliott says: "Stockholders are urged most earnestly to inform themselves about the situation of the company, to explain the difficulties in their respective communities and to use their active influence to help the management in its efforts to reduce expenses and to increase rates slightly, and to obtain favorable consideration for the company at this time, when the help of everyone interested in the welfare of New England is needed in order to maintain efficiently the transportation system that is so closely interwoven with the industrial, financial and social life of this part of the country."

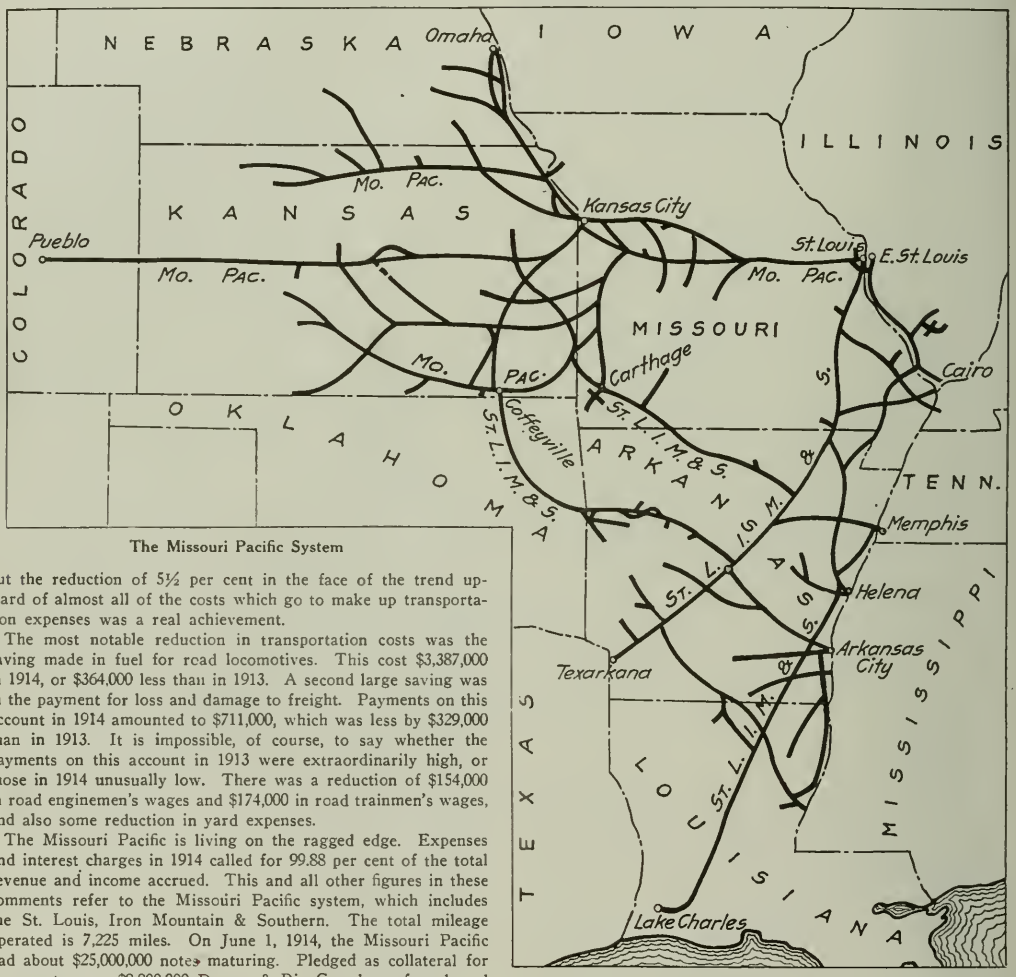
The following table shows the principal figures for operation in 1914 as compared with 1913:

	1914.	1913.
Mileage operated	2,046	2,092
Freight revenue	$32,476,373	$34,071,975
Passenger revenue	27,400,673	27,896,300
Total operating revenues	66,617,693	68,613,503
Maint. of way and structures	8,831,064	7,893,090
Maint. of equipment	10,389,458	9,600,669
Traffic expenses	502,020	582,310
Transportation expenses	26,868,688	27,203,271
General expenses	1,924,130	1,947,999
Total operating expenses	48,515,350	47,227,339
Taxes	3,568,219	3,714,756
Operating income	14,619,604	18,316,855
Gross income	21,867,594	28,380,640
Net income	268,663	8,922,238
Dividends	.....	13,486,563
[illegible]	268,663	4,564,325*

*Deficit.

MISSOURI PACIFIC

THE Missouri Pacific's financial condition and the results being obtained by the operating department are almost diametrically opposite. On the one hand the company escaped receivership last year only by the narrowest possible margin; on the other hand, with a very slightly smaller volume of business and with the full-crew law in effect for the whole year as compared with part of the previous year, the management was able to actually reduce transportation expenses by 5.49 per cent. Of course transportation expenses in the fiscal year ended June 30, 1914, might be expected to show some of the results of expenditures for additions and betterments in 1911, 1912 and 1913; but the reduction of 5½ per cent in the face of the trend upward of almost all of the costs which go to make up transportation expenses was a real achievement.



The Missouri Pacific System

The most notable reduction in transportation costs was the saving made in fuel for road locomotives. This cost $3,387,000 in 1914, or $364,000 less than in 1913. A second large saving was in the payment for loss and damage to freight. Payments on this account in 1914 amounted to $711,000, which was less by $329,000 than in 1913. It is impossible, of course, to say whether the payments on this account in 1913 were extraordinarily high, or those in 1914 unusually low. There was a reduction of $154,000 in road enginemen's wages and $174,000 in road trainmen's wages, and also some reduction in yard expenses.

The Missouri Pacific is living on the ragged edge. Expenses and interest charges in 1914 called for 99.88 per cent of the total revenue and income accrued. This and all other figures in these comments refer to the Missouri Pacific system, which includes the St. Louis, Iron Mountain & Southern. The total mileage operated is 7,225 miles. On June 1, 1914, the Missouri Pacific had about $25,000,000 notes maturing. Pledged as collateral for these notes was $9,800,000 Denver & Rio Grande preferred, and $15,000,000 Denver & Rio Grande common, besides $22,000,000 St. Louis, Iron Mountain & Southern 6 per cent series A bonds and various other collateral. The Denver & Rio Grande stock, although not of great market value, is an important factor in the Gould control of that company and of the Western Pacific. After prolonged negotiations the bankers finally consented to the renewal of these notes for one year at 6 per cent on the deposit of $3,000,000 additional Iron Mountain bonds as collateral. This arrangement amounted, of course, to a postponement of the company's financial difficulties rather than a solution of them. On June 30 the combined companies had $1,164,000 cash, with loans and bills payable of $825,000. The cash on hand was about the same as at the beginning of the year, but the loans and bills payable were increased by $400,000, and in addition the audited vouchers and wages unpaid amounted to $5,188,000, an increase of $411,000. This is not an abnormally high amount of audited vouchers and wages unpaid, nor would the increase of $400,000 in loans and bills payable be anything at all remarkable if the company had a strong working capital or any arrangement by which its extended notes which mature June 1 next could be met; but $1,164,000 is a very much smaller working capital than a company operating more than 7,000 miles of line needs.

In 1914 a total of $1,932,000 was spent for additions and betterments, including additions to equipment. No securities were sold by the Missouri Pacific, and although the St. Louis, Iron Mountain & Southern issued $4,144,000 series A bonds, these were not sold to the public, so that the total system funded debt, including equipment trust certificates outstanding in the hands of the public, was less at the end of the 1914 fiscal year by $500,000 than at the beginning of the year.

In the year ended June 30, 1914, the system earned $59,794,000, which is less by $2,362,000, or 3.80 per cent, than the gross earn-

ings in 1913. The falling off in freight earnings equaled 3.83 per cent, and in passenger earnings, 4.02 per cent. Of the total revenue about 74 per cent comes from freight and 19 per cent from passengers. There was very little falling off in the tonnage of freight, but, on the other hand, the average haul was shorter, so that the total ton mileage handled in 1914 was 5,505,000,000 ton-miles, which is less by 2.88 per cent than the ton-mileage in 1913. This, it will be noticed, compares with a falling off in freight revenue of 3.83 per cent, the average ton-mile rate received in 1914 being 7.99 mills as against 8.07 mills. The rate reductions which were held legal by the Supreme Court in the Missouri river rate case were put into effect in July, 1913. The effect on freight revenue does not appear to be very great, possibly because of changes in the proportion of the various commodities carried, which offset what would have otherwise been a larger reduction in the average ton-mile rate. In passenger business, however, the effect of the decision is striking. The total number of passengers carried one mile was 548,800,000 in 1914 as against 502,100,000 in 1913, an increase of 9.31 per cent in passenger business, while the revenue from passengers amounted to $11,160,000, a decrease of $468,000, or over 4 per cent.

Of the total tonnage of revenue freight, amounting to 23,281,000 in 1914, 35.59 per cent was furnished by products of mines, and 22.34 per cent by lumber and lumber products. Products of agriculture furnished 17.36 per cent, and manufactures 14.01 per cent.

Traffic statistics explain in part the decrease in transportation expenses. The average trainload in 1914 was 389 tons as against 373 tons the year before, an increase of over 4 per cent. The average carloading per loaded car was very slightly less in 1914 than in 1913, 17.99 tons as against 18.06 tons. The gain in average trainload is more of a gain than would appear from the percentage because of the very large increase in empty car mileage. Traffic conditions largely determine the proportion of empty to loaded car mileage, and, of course, last year the empty car mileage was very much increased by the general movement of cars returning to their home lines, the Missouri Pacific feeling the effect of this to a marked extent because it is an intermediary road. The total mileage of loaded freight cars on the system in 1914 was 305,900,000; in 1913, 313,900,000. The mileage of empty cars was 127,800,000 as against 103,400,000 in the previous year. In other words, loaded car mileage decreased 2.52 per cent, while empty car mileage increased 23.60 per cent. To show a gain in trainloading under such conditions is noteworthy.

The Missouri Pacific has been immensely improved in the last three years; but in 1914 there was, as already noted, comparatively little money available for additions and betterments, with no prospect of any more in 1915. It was, therefore, important that a liberal policy should be adopted in regard to maintenance. The amount spent for maintenance of way and structures in 1914 was $8,536,000, which was less by $727,000 than in 1913; but the amount spent on maintenance of equipment was $10,252,000, or $392,000 more than in 1913. In 1914, however, there were no extraordinary expenditures, President Bush says, for flood repairs or other adverse conditions, and nearly all of the smaller expenditure on maintenance of way is accounted for by a large decrease in the amount spent for track labor and for grade crossings, fences, cattle guards and signs, an extraordinarily large sum having been spent on this latter account in 1913.

From all this it would appear that if the company could get its financial difficulties adjusted, as well as its operating problems are being met, its security holders should feel much encouraged.

The table shows the figures for operation in 1914 and 1913:

	1914.	1913.
Mileage operated	7,285	7,257
Freight revenue	$43,995,027	$45,748,269
Passenger revenue	11,159,634	11,627,481
Total operating revenue	59,793,900	62,155,506
Maint. of way and structures	8,536,046	9,263,360
Maint. of equipment	10,252,256	9,860,188
Traffic expenses	1,330,087	1,425,168
Transportation expenses	21,292,357	22,528,447
General expenses	1,711,627	1,621,834
Total operating expenses	43,122,373	44,698,997
Taxes	2,513,432	2,314,349
Operating income	14,084,731	15,049,156
Gross income	16,532,511	17,512,255
Net income	74,692	1,562,734

ST. LOUIS SOUTHWESTERN

THE St. Louis Southwestern is a carrier largely of lumber and agricultural products and as such suffered severely in earnings in the fiscal year ended June 30, 1914, because, on the one hand, of the very poor market for lumber from the Southwest and, on the other, because of the extraordinarily bad weather conditions, especially in Texas. Not only would revenues suffer under these conditions, but transportation expenses were higher per unit of business handled, but not by any means to the extent that might be expected under the conditions which prevailed. In 1914 the company earned about half a million dollars less than in 1913 and its expenses were about half a million dollars greater; but almost the entire additional expense was for maintenance of equipment.

Total operating revenues in 1914 amounted to $12,745,000 as against $13,297,000 in 1913. This is an average on the 1,735 miles operated in 1914 of $7,346 per mile and on the 1,609 miles operated in 1913 the earnings in that year averaged $8,263 per mile. All of the falling off in revenue was due to a decrease of 4.44 per cent in the tonnage of freight carried and a decrease of a little less than one per cent in the ton-mile rate. The average length of haul of freight remained about the same in 1914 as in 1913 and is quite long—237 miles. The total ton mileage carried in 1914 was 830,000,000 tons, a decrease of 42,000,000 tons, or 4.81 per cent. Passenger revenue amounted to $2,662,000, an increase of 1.66 per cent over 1913. The number of passengers carried one mile was 113,600,000, an increase of 13,400,000, or 13.38 per cent; but the average receipts per passenger per mile fell to 2.34 cents from the 1913 average of 2.61 cents. This was the result of the Supreme Court's decision in the Missouri and Arkansas rate cases, which became effective in July, 1913. The company estimates that the loss in passenger revenue due to these decisions was $340,000, or enough to have in considerable part offset the effect of the adverse weather conditions and trade conditions on freight revenues.

It is a great pity that the people of the Southwest fail to appreciate their own railroad situation. In most of the sections served by the St. Louis Southwestern the people are prosperous; they are fond of travel, like luxury and good service when traveling, demand it and are able to pay for it. The St. Louis Southwestern passenger service is very good indeed. Its dining car service is excellent, and this dining car service is carried on at a dead loss for each diner served, simply as a part of the expense of giving good passenger service. If the Interstate Commerce Commission's conclusions in regard to the undue burden which passenger service puts on freight service in eastern territory where passenger density is heavy are correct, how much more true this is on a road like the St. Louis Southwestern where passenger density is light?

The St. Louis Southwestern has for some years tried wholeheartedly and intelligently to co-operate with the people whom it serves in building up the prosperity of the country. The road now needs the co-operation of its patrons to take the next step forward in its own development, and the reduction made in passenger fares in Missouri and Arkansas was a stupid and short-sighted failure to extend this co-operation.

There is another point analogous to this question of passenger rates. Texas laws are such as to very seriously discourage the expenditure by a railroad of any money at all for additions and betterments. It is so obvious that a road like the St. Louis Southwestern cannot sell securities bearing any reasonable rate of interest at par, that it seems almost unnecessary to mention the fact. Nevertheless, the discount on new securities, which is as much a cost of the additions and betterments which are paid for from the sale of these securities as is the salary of the engineer in charge of the improvements, cannot be charged to property account. In other words, all additions and betterments must be paid for, at least in part, from the earnings of the railroad company. If

the St. Louis Southwestern is successful in its efforts to materially increase the prosperity of its territory, it will, to a certain extent, share in increased earnings from this prosperity; but with the increase in prosperity of the people served will come new demands on the transportation plant. It is quite proper that some part of the additional earnings which would come under these conditions should be devoted to the payment of interest on an improved and more adequate plant. The people in the Southwest, prosperous as they are, are continually reinvesting their own capital in their own businesses and in improvement of their land. From their own point of view it is very desirable that outside capital should be invested in their transportation facilities; but the way in which such investment can be induced is to make it attractive.

After the payment of expenses and taxes the St. Louis Southwestern in 1914 had net income of $336,000. This compared with net income at the end of the 1913 fiscal year of $1,886,000; but 2½ per cent was paid on the preferred stock in 1914 as against 5 per cent in 1913; but even so, the 2½ per cent called for $497,000, which left, of course, a slight deficit as compared with a substantial surplus for the previous year after the payment of the full 5 per cent dividends.

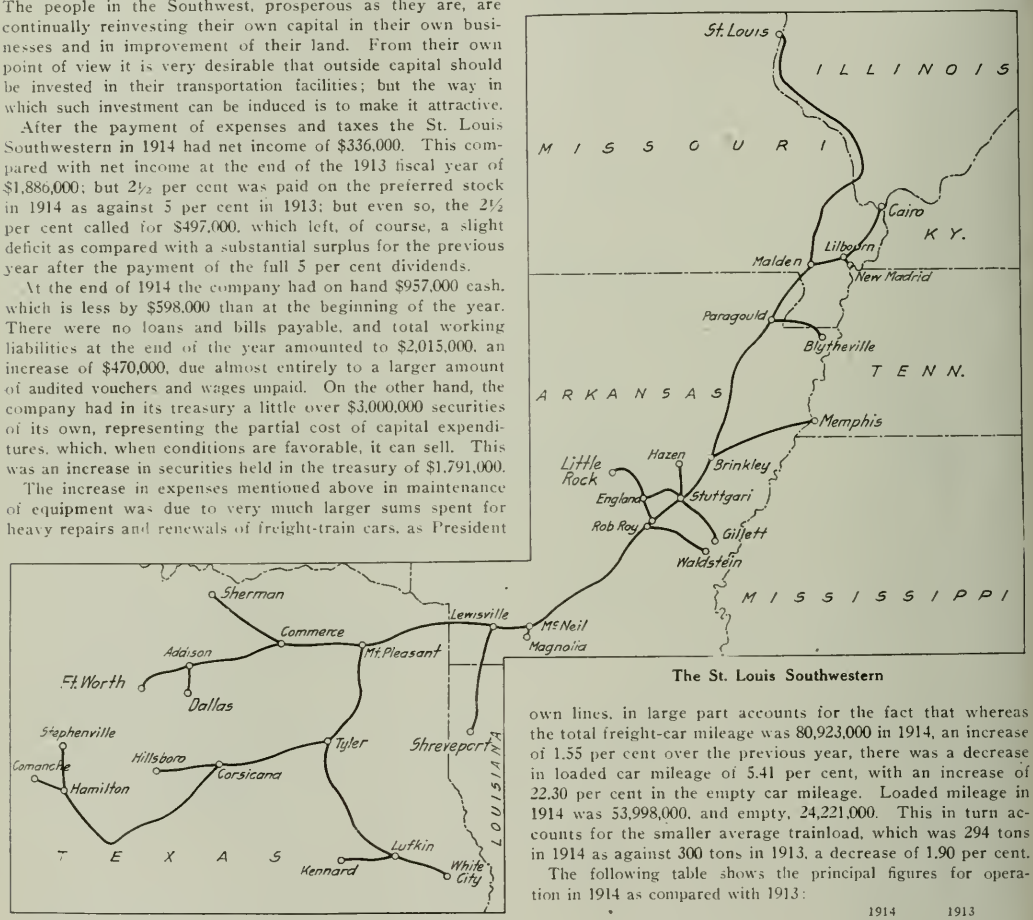
At the end of 1914 the company had on hand $957,000 cash, which is less by $598,000 than at the beginning of the year. There were no loans and bills payable, and total working liabilities at the end of the year amounted to $2,015,000, an increase of $470,000, due almost entirely to a larger amount of audited vouchers and wages unpaid. On the other hand, the company had in its treasury a little over $3,000,000 securities of its own, representing the partial cost of capital expenditures, which, when conditions are favorable, it can sell. This was an increase in securities held in the treasury of $1,791,000.

The increase in expenses mentioned above in maintenance of equipment was due to very much larger sums spent for heavy repairs and renewals of freight-train cars, as President Britton says, made necessary in a large measure by the age of such cars. Since June 30, however, the company has been receiving under the equipment trust of April 1, 1914, 1,500 steel underframe box cars, 400 steel underframe flat cars and 100 steel underframe and steel coal cars, and arrangements have been concluded for the rebuilding of all freight cars acquired under equipment trust agreements which were destroyed up to June 30, 1914. This means that the heavy expenditures for maintenance of equipment will continue, probably up to November 30, at which time it is expected that all of the replacements will be completed.

The following table shows the percentage of each class of expenses to total operating revenues in 1914 and 1913:

	1914	1913
Maintenance of way and structures	15.07	14.29
Maintenance of equipment	20.68	16.69
Traffic expenses	3.97	3.83
Transportation expenses	32.30	30.38
General expenses	4.62	4.12
Total	76.64	69.31

Of the total tonnage—3,496,000 tons—of freight carried by the St. Louis Southwestern in 1914, 37.06 per cent was furnished by lumber and lumber products, 21.75 per cent by products of agriculture and 25.06 per cent by manufactures and miscellaneous. The tonnage of lumber in 1914 was 1,295,000 tons, a decrease, as compared with 1913, of 168,000 tons, or 11.47 per cent. This falling off in lumber, combined with the very marked improvement of cars returning empty to their own lines, in large part accounts for the fact that whereas the total freight-car mileage was 80,923,000 in 1914, an increase of 1.55 per cent over the previous year, there was a decrease in loaded car mileage of 5.41 per cent, with an increase of 22.30 per cent in the empty car mileage. Loaded mileage in 1914 was 53,998,000, and empty, 24,221,000. This in turn accounts for the smaller average trainload, which was 294 tons in 1914 as against 300 tons in 1913, a decrease of 1.90 per cent.



The St. Louis Southwestern

The following table shows the principal figures for operation in 1914 as compared with 1913:

	1914	1913
Average mileage operated	1,735	1,609
Freight revenue	$9,295,143	$9,864,490
Passenger revenue	2,661,551	2,618,176
Total operating revenue	12,744,555	13,296,950
Maint. of way and structures	1,920,035	1,899,484
Maint. of equipment	2,633,700	2,219,390
Traffic expenses	505,802	508,894
Transportation expenses	4,116,729	4,039,413
General expenses	589,451	548,616
Total operating expenses	9,767,717	9,215,797
Taxes	601,886	468,697
Operating income	2,356,217	3,599,816
Gross income	3,354,886	4,644,141
Net income	335,771	1,886,191
Dividends	497,341	994,682
Appropriated for additions and betterments	.....	163,111
Surplus	161,570*	728,398

*Deficit.

MINNEAPOLIS, ST. PAUL & SAULT STE. MARIE

PRESIDENT PENNINGTON, in his annual report for the Minneapolis, St. Paul & Sault Ste. Marie, expresses admirably the feeling of the majority, probably, of railroad presidents in the United States when he says, ". . . under the present gen-

eral financial and political complications prevalent throughout the world, superhuman wisdom and courage would be required to predict the business possibilities of the current year." Almost every railroad president is living from day to day and from hand to mouth. The Soo is in much better shape than a great many other roads, although it experienced a rather unprosperous year in 1914 as compared with 1913. The surplus after the payment of 7 per cent dividends on both preferred and common stock was $207,000 in 1914 as against $2,881,000 in 1913. The company had on hand, however, at the end of 1914, $4,479,000 cash, with no loans or bills payable, and with total working liabilities of but $4,784,000, and with no bonds or notes falling due, except installments on equipment trust certificates, before 1926.*

The Minneapolis, St. Paul & Sault Ste. Marie is a subsidiary of the Canadian Pacific, and itself owns and operates as its Chicago division the Wisconsin Central. The Soo proper operates 2,982 miles of road, and the Wisconsin Central 1,120. The table at the end of these comments gives the income account for the Soo only, the income which the Soo derives from the Wisconsin Central being included, of course, in gross income, but not in operating income. It will be seen that the Soo is a line of comparatively light traffic, the gross earnings per mile in 1914 being $6,276. The Wisconsin Central earned, in 1914, $9,425 per mile, but its operating ratio was 67.5 as against the Soo's 65.2 per cent. Furthermore, the Soo's operating ratio in 1914 was extraordinarily high for reasons mentioned later, whereas the Wisconsin Central's was only about normal.

The Soo carried, in 1914, 7,203,000 tons of freight as against 7,761,000 in 1913. The average length of haul was 225 miles last year as against 267 miles in the previous year, so that freight density, ton-miles per mile of road, was 543,000 in 1914 as against 711,000 in 1913. Of the total tonnage carried 31 per cent was lumber in 1914, and 27 per cent in 1913, and 20 per cent was grain in 1914, and 23 per cent in 1913. In 1914 10 per cent of the total tonnage was ores, and in 1913 about 8 per cent was ores. The average ton-mile rate in 1914 was 7.87 mills, and in 1913 7.40 mills.

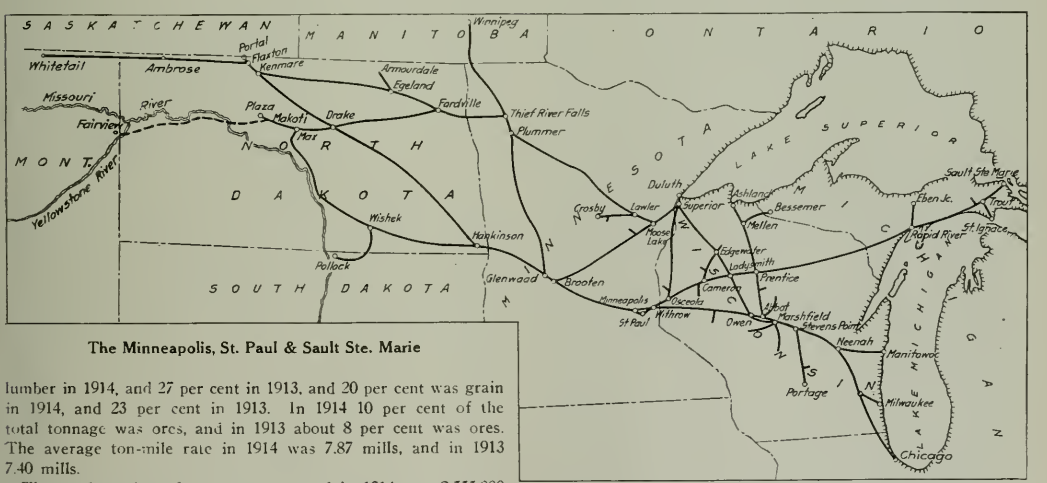
The total number of passengers carried in 1914 was 2,555,300 as against 2,249,000 in the previous year, and the average length of journey was 82 miles as against 88 miles the year before, the passenger density being 70,649 in 1914 and 67,978 in 1913. The average passenger-mile rate was 2.106 cents in 1914 as against 2.303 cents in 1913. With as low a ton-mile rate as the Soo gets, and with its comparatively light traffic and small proportion of coal and ore, its operation ratio in 1913—56.5 per cent—was remarkably low. The increase to 65.2 per cent in 1914 is not hard to explain. Apparently the refunds necessitated by the Minnesota rate case were debited to 1914 freight revenue and passenger revenue. This of itself would explain a bookkeeping higher operating ratio in part, although it would not mean more expensive operation to handle the same amount of business.

Expenses, however, were higher actually in 1914 than in 1913, but only for maintenance. Transportation expenses amounted to $5,664,000 as against $6,090,000 the year before. The average trainload in 1914 was 404 tons as against 422 tons in 1913, the falling off in trainloading being due, apparently, to a greater empty car mileage, the average number of empty cars per train being 7.18 in 1914 as against 6.67 in 1913. There was also some falling off in carloading, the average number of tons per loaded car-mile being 18.29 as against 19.23.

In 1914 the Soo spent $2,384,000 for maintenance of way as against $2,293,000 in 1913, and $3,071,000 for maintenance of equipment as against $2,604,000 in 1913. The principal increases in maintenance of way expenses were in the amounts appropriated for buildings, for bridges, for ties and for rails. President Pennington explains in part that these larger charges were due to the amounts chargeable to operating expenses for structures which were renewed with modern or more permanent structures. In 1914 the company spent a total of $3,229,000 on poperty account, which included $1,198,000 on the Ambrose extension and $1,465,000 for additions and betterments.

The company sold during the year $4,638,000 first consolidated mortgage bonds and $1,280,000 equipment trust notes, and $1,011,000 equipment trust notes were retired. At the beginning of the year there was carried on the balance sheet $372,000 unextinguished discount on securities. During the year $29,736 was charged to profit and loss for the extinguishment of discount, and at the end of the year there was $679,000 unextinguished discount carried on the balance sheet.

The Wisconsin Central had a net corporate income, after the payment of expenses and interest, of $518,000. Its 4 per cent dividend on the preferred stock called for $450,000, so that there was a slight surplus for the year.



The Minneapolis, St. Paul & Sault Ste. Marie

The table shows the figures for operation in 1914 and 1913.

	1914.	1913.
Mileage operated	2,982	2,915
Freight revenue	$12,748,506	$15,330,648
Passenger revenue	4,436,911	4,564,257
Total operating revenues	18,717,689	21,410,672
Maint. of way and structures	2,383,740	2,292,993
Maint. of equipment	3,070,671	2,603,669
Traffic expenses	375,815	357,518
Transportation expenses	5,664,285	6,090,411
General expenses	427,715	458,418
Total operating expenses	11,922,226	11,803,009
Taxes	1,182,367	1,298,968
Operating income	5,326,095	8,015,490
Gross income	6,409,338	8,886,540
Net income	2,853,502	5,537,415
Dividends	2,646,714	2,646,714
Surplus	206,788	2,880,701

*The Wisconsin Central has $776,000 divisional mortgage falling due in March, 1916.

Terminal Yard Operation Papers—Third Series

Four Papers Which Discuss System, Order of Placing Cars, Organization and Discipline in the Terminal Yard

EVERY CAR IN ITS PLACE ON TIME

By W. T. Sutphen

General Yardmaster, Southern Ry., Macon, Ga.

Among the problems and difficulties encountered in the operation of a terminal yard, the matter of handling cars for freight houses, team tracks, etc., is of primary importance. Perhaps the most important essential in the handling of such cars is that of having sufficient tracks upon which to classify them when they are first shoved over the hump (if a hump yard), or switched out from the trains and transfers in which they are received, thus reducing to a minimum the cost and work of classifying them into trains or cuts for the different routes or districts each outside engine works.

The freight houses should be "pulled" and "spotted" by the night crews, and nothing put in or taken out of the house during the day except that which is absolutely necessary. Trying to switch cars at the local house or transfer platforms that are only party loaded, causes trouble and confusion. Also nothing is more exasperating or discouraging to an agent than for him to go down in the morning and find his house not "spotted," and a big gang of men idle on this account. The freight houses should be "pulled" on a regular schedule, except where special package cars have to be gotten out to go on certain trains before the regular closing time of the house, and these package cars should be loaded in the head of one or more tracks, so that they may be taken out without moving the balance of the cars on such tracks. Team tracks should be worked, as far as possible, by the "house" engine, and handled in the same manner as "house" work. Where such tracks are isolated from the "house" yard, then they should be handled and worked the same as private industries.

As far as possible, a regular schedule should be maintained for working all industries. All cars for each of the outside runs should be assembled in the classification or train yard, so as to get each engine started as early as possible after the crew comes on duty, instead of having them go into the multifarious tracks and try to switch up their own trains, with the probability of blocking each other while doing so.

Each engine foreman should have a specific territory assigned to him. This tends not only to familiarize him with his work and increase his efficiency, but is a means of minimizing complaints. He should not have more work assigned to him than he is able to clean up each day, but he should be made to understand that when the work on his particular territory is finished, he is to come in and help out in some other place, if needed. Good assistants will insure the enforcement of such instructions. The foremen should also be instructed to telephone the chief clerk occasionally, while on their outside runs, to see if any special orders have come in which will be necessary for them to take care of. Each foreman should be required to book all cars put in or taken out of private sidings, showing the time the service was performed, and turn in the book, at the completion of each day's work, so that it can be copied into a permanent record.

The engines assigned to outside work should gather up all outbound loads and empties, and deliver them into the receiving yard, properly tagged, so that the foreman working that yard will know what to do with them. All cars received in trains or transfers should be tagged with a good, substantial tag, securely fastened, showing the date received, contents, consignee and home route of car; and if "order notify," it should be so stated on the tag. All "order notify" shipments should be kept in a "hold" track until the agent authorizes such cars to be delivered.

Where possible, there should always be a "roustabout" engine, that can go anywhere to take care of emergency and accommodation work, and also to help out any other engine which, for any reason, has gotten behind with its work. What all shippers want is prompt and dependable service, and if the railroads expect to keep down complaints, it is absolutely necessary to furnish such service.

A daily and systematic check of the entire terminal is absolutely essential, with a view of determining, at any time, if any of the cars are getting old or are being unnecessarily delayed. It is especially important to constantly scrutinize the "no-bill" list, and to keep after the agent for bills.

The chief clerk is a very important factor in a terminal organization, and can make himself almost invaluable, as he is, necessarily, the principal representative and reliance of the general yardmaster or terminal head in the handling of the office and answering the majority of the calls on the telephone. The head of the terminal, or his assistants, should endeavor to cover all of his territory daily, and see all of his foremen at least once a day, with view of satisfying himself that they are keeping up with the work. It is important, also, for him to get acquainted with all the shippers or heads of industries located on the terminal, and where possible, they should be personally visited every few days, or called over the telephone, with a view of ascertaining if their work is being properly taken care of, and if they are satisfied.

No organization is perfect, and the only way to have it anywhere nearly so is by constantly watching and trying to correct the mistakes that come up from day to day. Every man, of course, is expected to be loyal to the company and its officers, and any man found wanting in this respect should be dropped from the service.

Last, but of not least importance, is the feature of cost of operation, which the head of the terminal should closely watch each day, and make such changes, from time to time, as may be necessary to keep the expenses and cost per car down to a minimum. He should have, every morning, a complete report showing the number of cars handled on the terminal the previous 24 hours, ending at midnight, the number of men and engines worked, and the total money expended, including office expense, as well as the average cost per car; and thus be fully informed, at all times, as to what he is doing, and what it is costing him every day.

Summarized, terminal yard operation consists in having a place for every car, and putting every car in its place when one first takes hold of it.

SYSTEM IN YARD OPERATION

By W. L. Derr

Division Superintendent, Chicago Great Western, Clarion, Ia.

A modern yard has its receiving tracks, classification tracks, sorting tracks, and advance tracks, and any yard not so arranged must have certain tracks set apart for each of these functions. It may be that your yard consists of a set of parallel tracks only; if so, certain of them must be set aside as receiving tracks, others as classification tracks, and still others as advance tracks.

The modern development of railroading has rendered it necessary for a yardmaster to acquire an ever increasing burden of knowledge, so that to-day he is one of the hardest worked officers on a railroad. Whatever may have been his earlier training, the best training for yard men is yard work.

Every yard should contain a fair number of seasoned men who have had actual experience in yard work. Military experts understand the inestimable moral effect which the presence of vet-

erans has on untried recruits, and this condition holds good in railroading generally, and yard work in particular.

A yard cannot be handled successfully without a most complete record of each car entering the yard, its moves while in the yard, and its departure from the yard. There are numerous methods of keeping such records, but any method which does not show who had charge of the car and was responsible for its movements every minute of the period during which the car was in the yard, is defective.

The reason for putting a train into a yard is to classify the cars into lots for various points, and sometimes, but rarely, to classify the various commodities. To start with, the train must be received on certain tracks. Ahead of the receiving tracks are the classification tracks, and ahead means in the direction which the car lading is moving, for nothing so much indicates bad yard design as an arrangement of tracks making a backward car movement necessary. The blocking of even one classification track blocks the entire classification system of a yard, hence the necessity for promptly relieving a filled classification track. This can best be done by having a series of tracks in advance of the classification tracks—advance tracks—in which the classified cars can be placed, and from there sent onward in trains.

On a railroad the engine holds about the same position as the artillery does in an army—with plenty of it, you win, without it, you lose; therefore, the quick handling of engines is one of the most important functions in yard working. Yardmasters should keep in close touch with the roundhouse foreman and aid him in every way, especially seeing to it that engine coal is promptly placed at the pockets; and that cinder cars are handled quickly, for the cinder pit is the critical point in the locomotive terminal, especially during severe weather.

In closing, just a few words to the yard designer: Always provide a track holding eight to ten cars, at the outgoing end of a yard, upon which disabled cars can be placed. Keep in mind that some defect may be found in a car after it is placed on an advance track, or a drawbar may be pulled out just as a train is leaving the yard, making it necessary to set out the car and do it quickly. If left on the advance track the car often has to be handled over and over while waiting to be taken to a repair track.

THE ORGANIZATION OF INDUSTRIAL SWITCHING

By Fred P. Grossman

General Yardmaster, C. St. P. M. & O., Minneapolis, Minn.

The methods to be employed in taking care of the business in a terminal are, and have been, a live issue. The hardest problem is to perfect an organization which will run smoothly under all conditions, and when this has been done—to preserve it. This is specially difficult during a rush of business, when one is putting on more engines, and the old helpers are placed in charge with new crews.

The next important problem is the placing of cars at freight houses, team tracks, industries and for connecting lines. All cars containing perishable freight are given first preference, as the delivery of freight at the house is just as important as that for the team track, this rule also applying to such traffic for the industries, as well as the meat houses. A very important part in the handling of such traffic rests with the traffic department, as well as with the agent, and when those departments work in harmony with the general yardmaster, and give him the necessary information, there should be no fall-down. We are advised directly by our traffic department and solicitors, as well as by the agent, regarding promises which have been made in order to secure the business, and the prompt switching service required to hold it; we are given the car numbers and are told in what train the cars will arrive. The time of arrival is given us by the chief despatcher.

Should a car come in bad order, it is promptly removed to the repair track if heavy repairs are necessary. In this connection, where team track cars come in and are placed before inspection, especially fruit, our car repairers make the repairs on the team track, so as not to delay any car that may be diverted to a connecting line at the last moment, or re-consigned to some point on our line. These diversions are always made after 4 p. m., and the cars are delivered to the connecting line by 6 p. m. Team tracks are pulled twice every 24 hours, and kept free from all empties and diverted cars, giving us room for all inbound freight.

In the fall when receiving a rush of apples or other fruits and vegetables, the agent should make special arrangements with the consignor to warehouse them in private storehouses, after a reasonable length of time has elapsed, in order to release the cars and also to provide more room for other team track cars. This serves a double purpose by giving room on the team track, and also obviates the necessity of "round-housing" cars containing perishable freight to prevent damage by frost, while no additional help is required on team track to take care of the heaters for these cars.

The icing of refrigerator cars on team tracks must not be overlooked, and is attended to by our fruit inspector on the arrival of the cars. Therefore, when there is a diversion we know immediately if the car must be iced or not. As iced refrigerators are run in special schedule at the outbound freight house, we pay no further attention other than to keep a supply of refrigerators on hand to fill the demand.

We have regular hours for the handling of connecting line business, at which time all orders for empties are filled. As our business is principally the hauling of flour and grain, we furnish the empties. Inspection of flour and grain empties is made during the daylight hours, as the sun will shine through cracks that cannot be found by using a torch at night. Marks left by rain leaking through the side or roof of a car are also easily detected during the day.

In the fall when business is heavy, we call upon connecting line yardmasters and exchange orders. For instance, if we have an order for so many foreign cars for grain loading, and we have that number of cars being unloaded at one of our elevators, we call up the yardmaster and advise him that the order can be filled from cars being unloaded, which avoids handling cars unnecessarily, and keeps the yard free from surplus box cars. Every assistant yardmaster receives a copy of the empty order to be filled, and by keeping a careful check of his yard, can so handle his loads as to enable him to get the cars to fill the empty order. The chief clerk in the general yardmaster's office is kept posted by the assistant yardmasters regarding everything going on, and he in turn gives them the information which it is necessary for them to have, facilitating the handling of the business.

Engines must be assigned to each class of work, and the extra foremen are required to have a working knowledge of all parts of the yard. A meeting of our yardmasters is held every two weeks for the purpose of bettering our organization in every possible way. Each switch engine is worked but ten hours, thus cutting out the overtime.

During the fall when business is heaviest, our grain comes in between 8 p. m. and 8 a. m., which gives us the use of receiving tracks which would otherwise have to be held open. No grain is inspected after 8 a. m., as the inspectors have to get the samples to the Chamber of Commerce before 10 a. m. This also avoids any congestion that might be created by connecting lines pulling their transfers in during the day, and allows the switch engines to work more freely on account of not being blocked by trains pulling in at all hours. The grain business is the slowest moving of any handled in a terminal, as it changes hands more frequently than other commodities. This results in a large number of cars being held up, but this has been overcome to a great extent by pressing demurrage charges.

When possible to do so, all grain should be set for unloading in the opposite direction from the loading, which avoids the double handling of empty cars out of an elevator. Thus if you unload thirty cars of grain, you can immediately pick up these empties and set them on the loading track as they are already

coopered and do not need much attention, whereas new empties must be inspected and perhaps re-coopered. This also makes it possible to place just the kind of cars for unloading that the elevator wishes to load in most cases.

Our industries are all set during the night, consequently we only give them a switch at noon to offset the morning's unloading. All the day men are educated to line up all cars themselves; in fact, every man from the helper to the office man can tell any time of the day on just which track to look for any car, as we never deviate from the assigned tracks. Just as soon as disposition is given, the hold cars are carded. The hold tracks are pulled at 6 p. m. and at 12 noon.

Each foreman has been assigned to a certain territory and works on schedule time. Our patrons understand this, and if they are not ready when the engines come to do their work, they agree to wait until his schedule has been carried out before doing their switching. Our team tracks are seldom pulled during the day, as when one disturbs the unloading, the engine is idle while teams drive away from the cars, and freight is left in the cars in such shape that it is liable to fall and become damaged.

THE IMPORTANCE OF DISCIPLINE IN TERMINAL YARDS

By V. R. C. King

Division Superintendent, Atlantic Coast Line, Wilmington, N. C.

In a classification yard the yardmaster in immediate charge has a certain degree of visual supervision. In an industrial yard the yardmaster in charge of a specific territory is largely limited to checking the service rendered, after it has been performed. This difference in supervision is a very important feature which is not always grasped by superior officers. If it be fully recognized it will call for a careful organization, rigid discipline, and an even more careful selection of every class of yard employee, both office and field, than in the case of classification yards.

Any organization naturally starts from the head. The question of title depends largely upon the importance of a terminal yard, and it, and, incidentally the pay, should be commensurate with the responsibility. Regardless of title, the head of the yard should be given absolutely free rein, and made to feel that the fullest confidence is reposed in his ability. Besides being an exceptionally well qualified yard man, with ability to handle men, he must be a diplomat, as he has to deal directly with the public. His organization should be left free and untrammeled, subject only to the general policy of the road toward specific questions and discipline.

There is a wide difference between a disciplinarian and a martinet. It is possible to maintain high class discipline and yet meet the vagaries of human nature. All discipline should be firm and unbending, but it should be absolutely fair. When an organization has been outlined, and proper rules promulgated, the slightest deviation should be handled to a conclusion, and the case decided and closed to prevent recurrence. Punishment in some cases of error will do more harm than good, as they may possibly be due to lack of understanding, or even training, where advice would be better than discipline. The proper disposition of all cases, however, should rest upon the judgment of the head of the yard organization, and his wisdom in such matters will help make him a success or a failure. It is a grave mistake to ever discipline a yardmaster, particularly in these days of reluctant submission to authority upon the part of the yard man, as they must control other men, and should not be humiliated. If yardmasters make too many errors, or maintain poor supervision, they should be entirely removed, or reduced to yard conductors, if they are otherwise good men.

When every member of the organization of an industrial yard has been carefully selected for fitness, a long step has been taken toward successful operation. No member is too insignificant to be slighted, for even the call boy or messenger may be sent upon some errand which may bring him into contact with some patron. In a classification yard, conditions may be unsatisfactory to the management but not felt by the public. In an industrial yard a railroad makes the largest part of its true reputation with the very best section of the public. By reason of this intimate contact with the public the demeanor of each and every employee is of the very highest importance. The finest kind of service will be nullified by discourtesy. As a matter of fact, an industrial yard where discourtesy exists will almost invariably have other weaknesses which will prevent good service as a possible offset to discourtesy.

When the best fitted man has been chosen for each position, no opportunity should be neglected to constantly train and educate him in his special duties, and for promotion. Nothing is more destructive to the esprit-de-corps and personal interest in the company's work than the introduction of an outsider to fill a position which means a promotion. An industrial yard demands the personal interest of each member of the force, as it is a traffic proposition from a broad point of view, and an unlimited means of bringing additional business to the company.

The records in an industrial yard must be promptly and carefully made, and accurately filed for future reference. There is no failure for which a yard conductor should be more quickly and thoroughly disciplined, after he has once been instructed, than the keeping of inaccurate records in regard to the seals and placement of loaded cars. Any yardmaster who knowingly permits slackness of this kind should himself be removed. Yard conductors should not only keep a careful record of empty cars placed for loading, but also of loaded cars moved from industries. A glance at these records will readily disclose the amount of work being performed by any particular yard engine, but, if there is any complaint about the car supply, the yard conductor should turn in a summary of the car situation at any, or even all, industries which he serves, if the work does not warrant the record being taken by a clerk.

An industrial yard requires so many records and so much knowledge of the fundamental relations which should exist between shipper and carrier, and of the rules of track rental, car service, per diem, terminal warehouse, and interchange, that the head of such a yard must be well informed upon these practical matters, in addition to his other qualifications, in order that he may accurately transmit his own knowledge to every member of his force.

Local conditions govern the amount of work which each yard engine can perform, and the route which it can properly serve. It is clearly the duty of the executive, or general yardmaster, to apportion the work of the entire terminal in such a way that the various yard engine routes will produce a maximum efficiency for a minimum of crews, and consequently of cost. His personal grasp of the daily situation should be such that he should never be afraid of not being able to explain why he had to work an additional yard crew. He should be equally well informed to avoid cutting off a yard crew to the detriment of the service.

Overtime is excusable when made for a definite purpose. Two yard crews doubling up on an abandoned route, with a total of four hours' overtime, is cheaper than the cost of the crew formerly assigned. If the dinner hour coincides with that of a large steamer or industry, which may need a mid-day shift, it is inexcusable not to pay the yard crew for their dinner hour and make the shift, instead of keeping forty or fifty truckers idle for an hour later in the day.

One vital principle of organization applying to all industrial yards, regardless of their size or local conditions, is the relation between the agency and the yard. The yard force owes its existence to the agency, and is simply the humble servant of the agency. With the exception of placing and handling empty cars, strictly speaking, no service whatsoever should be performed unless by specific authority of the agency. Any well-regulated yard will have some simple system of acting upon all agency instructions, which should be in duplicate, and of acknowledging same by endorsing thereon the completion of the service when it has been rendered.

The car supply for vessels, industries, and storage warehouses requires a careful daily check for the car distributor or chief despatcher. That for the package warehouse is fairly constant, and the general business can usually be well estimated. Each loaded car being unloaded is a potential empty. A competent yard conductor will see that all cars on his route are kept moving, and will place all empty cars to the best advantage. He will also keep the yardmaster fully posted as to the car supply on his route. This prompt placing of empty cars, however, which have not passed an inspection force is a prolific cause of bad order loaded cars for movement, and hence delayed cars and business. The yard conductor, therefore, should use the utmost care in observing, as far as he can possibly do so, the condition of all cars which he places for loading. Whenever possible inspectors should make light accessible repairs while the car is placed for loading.

The larger the terminal, the greater the chance of higher money value of each facility. Delayed or slow moving cars mean larger per diem bills and loss of equipment. Ordinary car service does not pay for the use of valuable track space. The congestion on the storage tracks of other loaded cars waiting for track space for delivery slows down the yard work, and acts as a drag, in addition to increasing the risk of errors and possibly serious trouble.

To secure the most efficient use of terminal facilities, the question of demurrage must be given vigorous attention, and be closely followed up by the agency force. The question of track space is often more important on a terminal than the prompt handling of equipment. An energetic and business-like terminal force, both yard and agency, will have its effect upon the patrons. The principal objective of a railroad is to move freight, and not to store it. Not only the agency, but the central yard office should be conveniently located for the patrons.

Not much industrial service can be performed at night, unless the plants are working, but it naturally follows that whatever work can be done to advantage should be done. Rapid mobilization at the close of the day's work plays no small part in attaining the goal of quick, accurate yard service, but damaged cars or contents mean delays and claims so that a happy medium must be found between excessive speed and slovenly movement.

If the interchange business be heavy there should be sufficient adjacent trackage upon which to digest the receipts. It is simply impossible to handle a heavy interchange upon one track and there should be separate tracks for receipt and delivery. Bad interchange facilities are apt to lead to sharp practices between the respective local yard forces to the detriment of the interchange business and the ultimate disadvantage of each line interested. The clerical feature of interchange warrants careful organization and accurate records. A joint force is probably the most satisfactory solution when it is justified by the volume of business.

Chinese Railway Extension.—A recent British consular report states that the projected line from Kochiu to Pishihchai on the French railway continues to be the subject of negotiations; but neither the officials, nor the people are in favor of it, as the traffic is not considered to be sufficient to justify its construction. An agreement has recently been made with the Banque Industrielle of Tientsin, a Franco-Chinese institution, for a loan to build a railway from Ch'in Chou, west of Pakhoi in Kuangtung, to Yunnanfu; and, according to the Chinese press, the line will pass through Nanning, Poseh, Singyi and Lo ping. At Singyi it will, presumably, link up with the line from Shashih, the contract for which has been awarded to a British firm. The construction of these two lines, which will place Yunnanfu in railway communication with the Yangtze on the north and the ocean on the south, will be of great benefit to the trade of this province as well as that of Kweichow, for not only will the monopoly now held by the existing line be broken, but, as both these lines will be entirely in Chinese territory, the heavy transit dues in Tonkin will be avoided.

RAILWAY AFFAIRS IN OTHER COUNTRIES

The annual report for the government railway lines of the Union of South Africa for the 12 months ended December 31, 1913, recently issued by W. W. Hoy, the general manager, contains this significant remark: "Having regard to the industrial troubles and the season of drought during 1913, it is satisfactory that the tonnage of traffic and the number of passengers carried should show an improvement." On December 31, 1913, the mileage of the government lines totaled 8,281, of which 7,807 miles was of 3 ft. 6 in. gage and 474 miles of 2 ft. gage, during the year the mileage having been increased 433 or approximately 5.5 per cent. In 1913 there was carried a total of 12,402,526 tons of revenue freight, including 6,985,832 tons of coal, these being increases of 634,928 tons and 461,997 tons, respectively. Although the total tonnage thus showed an increase of 5.58 per cent, the total freight revenue decreased 2.03 per cent, mainly because of rate deductions made in 1912. The total freight revenues were $38,645,456, a decrease of $801,125, and the coal revenues were $9,208,190, a decrease of $381,725. The revenues from passenger traffic in 1913 were $16,447,173. This was an increase of $335,524 over 1912, or 2.08 per cent, but compares with increases in 1912 over 1911 of 7.47 per cent and 1913 over 1910 of 20.07 per cent. The gross earnings for the lines operated were $60,333,237. The gross expenditures were $43,658,040, thereby leaving a surplus of $16,675,197 as compared

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Ruins of a Red Cross Train Thrown Into the River Marne at a Wrecked Railway Bridge

with $21,299,836 in 1912 and $23,803,094 in 1911. The operating ratio was thus 72.36 per cent as compared with 64.97 per cent in 1913. The capital expenditure during the year amounted to $11,911,265, the total at the end of the year being $408,032,190, or $48,856 per mile. The report states that when all the lines under construction at present are completed the mileage operated by the South African Railways will be approximately 9,318 miles.

* * *

Lord Rosebery, former prime minister of England, has made a donation of $6,000 to the London School of Economics and Political Science for the endowment of a prize to be awarded annually in the department of railway transportation at that school of the University of London. Regulations giving the conditions for the award will shortly be drawn up by the advisory committee on railway subjects, which includes among its members Sir Samuel Fay, general manager of the Great Central; Sir George Gibb, formerly general manager of the London & South Western; Sir Charles Owens, director of the London & South Western; Francis H. Dent, general manager of the South Eastern & Chatham; Frank Potter, general manager of the Great Western, and H. A. Walker, general manager of the London & South Western.

TRAIN ACCIDENTS IN SEPTEMBER[1]

The following is a list of the most notable train accidents that occurred on the railways of the United States in the month of September, 1914:

		Derailments.				
Date.	Road.	Place.	Cause of Derailm't.	Kind of train.	Kil'd.	Inj'd.
1.	Grand Rapids & I....	Kalamazoo.	flood	P	0	5
1.	Missouri, K. & T....	Chase.	unx	P.	0	11
†15.	St. Louis & S. F....	Lebanon, Mo.	flood	P	28	27
†18.	Alabama G. S.....	Klondyke, Ala.	malice	P	11	42
19.	Balt. & Ohio.....	Woodlyn.	b. journal	P	0	6
25.	Louisville & N..	Turners	d. track	F.	2	1
†28.	Chicago G. W.....	Waverly.	d bridge	P	2	6

The train that was derailed near Kalamazoo, Mich., on the first, was a northbound passenger. Five passengers were slightly injured. The cause of the derailment was the weakening of a bridge abutment by a flood.

The train derailed near Chase, Tex., on the first, was southbound passenger No. 29, and two cars were overturned. Eleven passengers in these cars were injured. A bridge was badly damaged by the derailed cars, but the bodies of the cars were of steel and were not crushed. The tender was the first vehicle to leave the track. The cause of the derailment is reported as not discovered.

The derailment near Lebanon, Mo., on the 15th was reported in the *Railway Age Gazette*, September 18, page 541. Westbound passenger train No. 5 was derailed about 2:50 a. m., because of a weakness in the track due to a flood, the flood having been caused by a cloudburst. Twenty-seven passengers and one employee were killed, nearly or quite all being drowned, and 26 passengers and 1 employee were injured. The train had been running about 45 miles an hour, and had been nearly stopped before it struck the defective track. One coach fell into deep water. It was stated by residents that eight or nine inches of water had fallen within the space of three hours.

The train derailed at Klondyke, Ala., on the 18th was northbound passenger No. 2. Nine passengers and two trainmen were killed and 42 passengers were injured. The train ran over a misplaced switch about 3 a. m., and the engine and first three cars were thrown violently against a loaded freight car standing on a side track. The engineman was killed. M. J. McDonough, commercial agent of the St. Louis & San Francisco at Birmingham, was also among the killed. The switch had been maliciously misplaced immediately before the train reached it. A reward of $1,000 was offered for the capture of the perpetrator of the deed.

The train derailed at Woodlyn, Pa., on the evening of the 19th was a southbound passenger, and five cars left the rails. The train was running at about 50 miles an hour, and one car fell down a high bank. All of the passenger cars, however, were of steel and only six passengers are reported as injured. A bridge across a small creek was destroyed. The derailment was caused by the breaking of a journal.

The train derailed near Turners, Ky., on the 25th was fast freight No. 39. The engine and five cars ran off the track and knocked down five spans of a bridge. The engineman and fireman were killed and a brakeman was injured. It is supposed that the tender was the first vehicle to leave the track. The cause was not discovered; neither was there any evidence that the bridge had been weakened.

The train derailed near Waverly, Iowa, on the 28th was mixed train No. 92 on the Sumner-Waverly branch of the Chicago Great Western. A wooden bridge was being torn down to be replaced by a steel structure; and one span of this bridge collapsed after the engine passed over. The cause could not be ascertained with precision. A combination baggage and passenger car sank with the span, but did not go all the way down to the water. The engine was not derailed but the tender hung suspended, as did a coach. One passenger who was standing on the platform was killed; five others, who were inside of the cars, received slight injuries. One bridgeman at work underneath the structure was killed and one injured. The same engine and train passed over the bridge in the opposite direction about an hour previously. The train was moving about four miles an hour.

Electric Car Accidents.—Of the nine notable electric car accidents reported in the newspapers as occurring in the United States in the month of September six are charged with one or more fatalities each. At Memphis on the 17th a freight train ran into a car on a crossing and eleven passengers were killed, 24 others being injured. The car was struck by a northbound freight (of 90 cars) just after a southbound freight had cleared the crossing. The engineman saw the street car (as soon as the southbound freight had passed him) about 330 ft. before reaching the crossing. He saw that it was about to cross and applied the brakes, but could not stop; he reduced his speed from 16 miles an hour to about 10 miles an hour. In a similar accident at Bridgeton, N. J., on the 8th four persons were killed, and in a butting collision at Wenham, Mass., on the 16th, three were killed. Accidents at South Thomaston, Maine, at Mahanoy City, Pa., and at Wilkesbarre, Pa., caused the death of one each.

[1]Abbreviations and marks used in Accident List:
rc, Rear collision——bc, butting collision——xc, Other collisions——b, Broken——d, Defective——unf, Unforeseen obstruction——unx, Unexplained——derail, Open derailing switch——ms, Misplaced switch——acc. obst., Accidental obstruction——malice, Malicious obstruction of track, etc.——boiler, Explosion of locomotive on road——fire, Cars burned while running——P. or Pass., Passenger train——F. or Ft., Freight train (including empty engines, work trains, etc.)——Asterisk, Wreck wholly or partly destroyed by fire——Dagger, One or more passengers killed.

THE MAINE PUBLIC UTILITIES COMMISSION

As has been announced in these columns, the state of Maine has provided for a new commission to take the place of the railroad commission which has supervised railroad affairs in that state for the last 55 years. The new law was adopted last year, but it has only gone into effect this present month, because the voters of Maine have a referendum privilege, and the people had to wait till September, 1914, to settle whether those opposed to the new law were to have their way. The present status of affairs is set forth by a correspondent writing from Bangor, who says:

The voters of Maine have retained the act creating the Maine Public Utilities Commission by a vote of 67,365 in favor and 37,008 opposed. It is now pretty well determined that Governor Haines, despite vigorous opposition from all over the state, has made up his mind to create a board consisting of three lawyers. There is strong opposition to this procedure, but it appears certain that the chairman of the new board will be Associate Justice A. M. Spear, of the Supreme Court of Maine, who will resign his position on the bench to accept the new appointment. The other two members of the board, it is believed, will be Samuel W. Gould, of Skowhegan, ex-congressman—as previously announced in the *Railway Age Gazette*—and W. B. Skelton, of Lewiston, ex-state bank examiner. All three are lawyers, and this fact has led to the presentation of a large number of protests at the governor's office. Arthur Chapin, of Bangor, the president of the state board of trade, calls for the rational plan of a lawyer, a business man and a practical railroad man. "There should be a practical financier on the board," said he, "for the protection of all interests." A prominent railroad officer, who seconds Mr. Chapin's proposal for a lawyer, a business man and a railroad man on the new board, expresses similar sentiments: "If the governor appoints lawyers alone," said this officer, "all they will look after will be the legal end of the questions that come before them. They are trained to look at the law first, and that is their sole business. A business man of practical training should also be a member of the commission for the reason that the gas and electric coroporations, telephone companies, etc., are under its jurisdiction."

Before the referendum was taken upon the act creating the commission, Governor Haines had decided to appoint three lawyers, and it is the belief of many citizens that this fact was largely responsible for the referendum on the act.

A New Plan of Government Control of Railways*

Regulation Has Failed, and the Public Should Guarantee Securities and Have Representative Directors

By E. P. Ripley
President, Atchison, Topeka & Santa Fe

You all know how fashionable it has been to acquire notoriety by abuse of the railroads. You remember Louis Brandeis, Tom Lawson, Senator Cummins and LaFollette, to say nothing of our friends Murdock and Bristow, who, knowing but little, protested much and forcibly against granting to the railroads any relief. You remember that for many years the quack nostrums prescribed by such men were in favor, their misleading statistics accepted as facts, until it has now become apparent to all that the patient is seriously ill; that the patent medicines have wholly failed and that other methods must be followed.

The government has, so to speak, befouled its own nest—it has destroyed the confidence of the American investor in the securities of its own home roads. The attitude of Congress and of many of the state legislatures has been to regard the railroads as a criminal class—every statute has bristled with prohibitions and penalties and the most influential politicians have been those who could devise new means of torture for railroad stockholders and managers.

Unfortunately enough, there has been developed certain irregularities, perhaps dishonesties in the management of certain corporations, and these have been seized upon as a justification for putting a strait-jacket on the entire transportation business of the country.

I hope it is needless for me to say that I do not approve some of the methods that have been pursued, but these cases of corporate mismanagement or incompetency are the exception and not the rule. For seven years the books of the railroads have been open to the inspection of the Interstate Commerce Commission, and every facility offered to enable that body to ascertain the facts. I maintain that during the last ten years no other business has been conducted on any higher moral plane or with greater regard to economy or efficiency. To condemn all because of the shortcomings of a few is as unjust as to condemn all banks because some of them are badly managed. The crowning act of injustice as well as folly is the practical disfranchisement of railroad securities as a basis for asset currency. The railroad securities of this country have been regarded as "gilt-edged"; they have been favorite investments for savings banks and insurance companies—safeguarding the savings of the thrifty of our population, and they were beginning to be popular in Europe, also. An eminent authority on financial matters says:

"The exclusion of railroad and industrial securities as bases for emergency currency was not the result of wise and patriotic lawmaking, but was done in response to ignorant popular clamor against railroads and big business—to spite capital."

The government passes on and approves the investments of our fiduciary institutions—it says in effect that railroad securities are good enough to secure your money and mine, but not good enough for acceptance by government as basis for issuing currency, thus putting all the world on its guard against the securities of the largest industry of the country.

In the strained conditions that prevail in Europe it is altogether likely that as soon as our exchanges are open European investors will seek to return us large quantities of our securities. Who will buy them? Why should anybody buy them, since our own Congress has said in effect that they are secondary in security to bonds of municipalities or states? If there are no buyers there will be no price. Picture to yourself the result of a flood of securities on the market and no buyers. What will be the effect on savings banks, insurance companies, colleges—all fiduciary and benevolent institutions, whose assets consist largely in railroad securities? With a shrinkage of values of unknown size, they will be practically bankrupt.

I am not an alarmist, and I do not wish to paint a gloomy view of the situation, yet I do not think I have exaggerated the crisis to which hysteria and systematic muckraking have brought us.

It would be a foolish thing to prophesy disaster and to offer no remedy or palliative. The present system cannot last. It may almost be said to have broken down already, and talk of flying to government ownership as being the only recourse is getting more and more common. But the public knows too well what the operation of the railroads by government agencies would mean—the waste, the inefficiency, the political pull. No one can point to any business enterprise successfully and economically conducted by government, and to exchange the efficiency of present methods for those of a government bureau would be a bad bargain, indeed.

I said that no business had been well conducted by government, and I repeat it, but some people point to the post office and to the Panama canal construction as evidence that government can do things.

As to the post office, it is archaic in its methods, wasteful in its administration—such efficiency as it possesses comes mostly from the service rendered by the railroads, for which they are underpaid. I would guarantee to form a syndicate which would give a better service for less money and pay the railroads fairly at the same time.

As to Panama, the work has doubtless been done well and promptly, yet it may be permitted us to doubt if a private corporation might not have done it as well for much less money; and it should be remembered that the reason for such success as it has had lies in the fact of its entire divorcement from politics. We cannot trust Congress to keep its hands out of business matters. It interferes in our post office service, our diplomatic service, our navy and army matters and our Interstate Commerce Commission. What would the conditions be if government attempted railroad operation? I believe that there is not at present in this country any considerable sentiment in favor of government ownership in view of its probable consequences, and yet those who study conditions and who realize that the present system cannot stand have not as yet perceived any other alternative.

The proper settlement of this railroad question concerns every man, woman and child and is likely to have most important bearings on the future of the country. Shall we continue the policy of starving the railroads into inefficiency and semi-paralysis, or take them into the absolute ownership and control of government, or turn them loose to shift for themselves free of all restraint?

The first method is being tried and has gone far enough to demonstrate its impracticability; the second would, in the opinion of most of us, be disastrous. I do not favor the third, for I believe the public should be considered and should have a voice in railroad questions which concern its welfare.

The present system of so-called "regulation" is failing, if

*An address delivered before the Knife and Fork Club, Kansas City, Mo., on October 24.

it has not failed already. Is there no relief save in government ownership and operation? Why not try at least experimentally a middle course?

Every night five magnificent trains leave Chicago at practically the same hour for Kansas City. Each train carries every modern device for the comfort of passengers and not one of them is loaded to its capacity.

Six trains leave Chicago for Omaha nightly and five for St. Paul, and of all of them the same may be said.

Probably one of these trains—certainly two of them—would amply care for all the business and a great saving would result from discontinuing the other four. This is only one instance of what could be accomplished by co-operation—which, by the way, is forbidden by law.

Every one knows that if all the roads reaching Kansas City were under one management the business could be done better and cheaper.

Suppose the government should say to each of the lines serving certain territory, we will guarantee that your net earnings for the next five years shall not be less than the average for the last five, and you shall also be guaranteed six per cent on any additions and betterments which (with our consent) may be made on the property. In return we demand one or more seats on your board and the power of absolute veto upon any act or proposed act which we consider deleterious to the community or otherwise improper.

Would not this give us all the admitted benefits of common control, all the economies incident to common ownership, and at the same time protect the rights of the public? Would it not do away with the enormous waste of the competitive system and permit the business to follow the line of least resistance, with the result of lessened expenses and probably lower rates? Who would be injured by it? Would anybody lose by it?

Suppose the establishment of railway "groups" somewhat after the manner of "Regional Reserve Banks"—each group governed by a board of directors in which the government may be fully represented. Suppose all unnecessary train service be dispensed with, all ticket and freight solicitors and their offices eliminated, with the consequent expense. Would not net earnings be at once improved and the guaranty of the government at once rendered safe? Would not the result be the immediate restoration of confidence? I do not belittle the difficulty of such an arrangement, and I realize that everything would depend on the men selected for such control.

And further, I wish it understood that the suggestion is wholly that of an individual, and that I am not making it officially. I do not know that my own board of directors would approve it, still less what view others may take of it: it is simply a possible solution of a difficult problem, and it may perhaps serve as food for thought for abler minds than mine.

To me it seems perfectly clear that the present system under which private individuals are expected to furnish the cash, while a group of lawyers at Washington provide a management out of their own theories, cannot possibly continue. Something will certainly have to be done very soon.

In the celebrated case of Bardell vs. Pickwick we read that one Mr. "Phunky" was intrusted with the duty of "opening the case," and the chronicler adds that when opened the "case" appeared to have very little inside of it. If it shall appear to you that the same remark would suitably apply to what I have said remember that it was your worthy secretary who procured for you the affliction.

LOCOMOTIVE PERFORMANCE ON THE CHICAGO GREAT WESTERN

The Chicago Great Western has made a very interesting comparison of the performance of 10 Consolidation, 10 Mallet and 10 Mikado locomotives during the 12 months ending March 31, 1914, with a view of determining which class of engines proved to be the most efficient. These 30 engines were operated over the Eastern division between Stockton, Ill., and Oelwein, Iowa, under as nearly comparable conditions as possible throughout the 12 months. A careful record was kept of the mileage, tons hauled, operating expenses and repair expenses, together with the amount of coal consumed, these figures being included in the accompanying table.

Average Performance of Ten Locomotives in Each Class for 12 Months Ending March 31, 1914

Class of locomotive	Consolidation	Mallet	Mikado
Total mileage	20,609.8	14,035.8	33,764.8
Operating expenses*	9,170.42	7,463.73	13,944.64
Running repairs**	1,543.30	1,444.68	2,971.96
Shop repairs	1,196.86	2,568.34	1,944.67
Total repairs	2,740.16	4,013.02	4,916.63
Total operating expense and repairs	11,910.58	11,476.75	18,861.27
Coal consumed (tons)	3,124.5	2,509.9	4,746.4
Potential ton miles	34,045,358	27,296,555	71,565,805
Gross ton miles (incl. lading and cars)	24,819,920	22,876,360	62,195,000
Percentage of gross to potential ton miles	72.90	83.81	86.91
Gross tons per mile	1,204.3	1,909.5	1,842.0
Coal consumed per 100 gross ton miles (lb.)	24.11	19.79	15.22
Coal consumed per engine mile (lb.)	303.21	357.64	281.14
Cost per 100 gross ton miles (cents)	4.58	4.32	3.02
Cost per engine mile (cents)	57.79	81.77	55.86
Cost of maintenance—			
Per 100 gross ton miles (cents)	1.102	1.752	0.687
Per engine mile (cents)	13.30	28.60	14.55
Per work unit† (dollars)	2.85	3.52	2.65
Per road unit†† (dollars)	66.8	93.1	66.8

*Includes enginemen, enginehouse expenses, fuel, lubricants and other supplies.

**Includes running repairs made at Oelwein shops and at other points.

†Work unit equals tractive effort multiplied by locomotive miles, divided by 1,000,000.

††Road unit equals weight on drivers in pounds multiplied by locomotive miles and divided by 100,000,000.

Note.—The figure for shop repairs for the Consolidation engines is based on the average cost of the repairs of all Consolidation engines and divided between the 10 engines under consideration on the basis of mileage made by each engine against the total mileage made by all Consolidation engines.

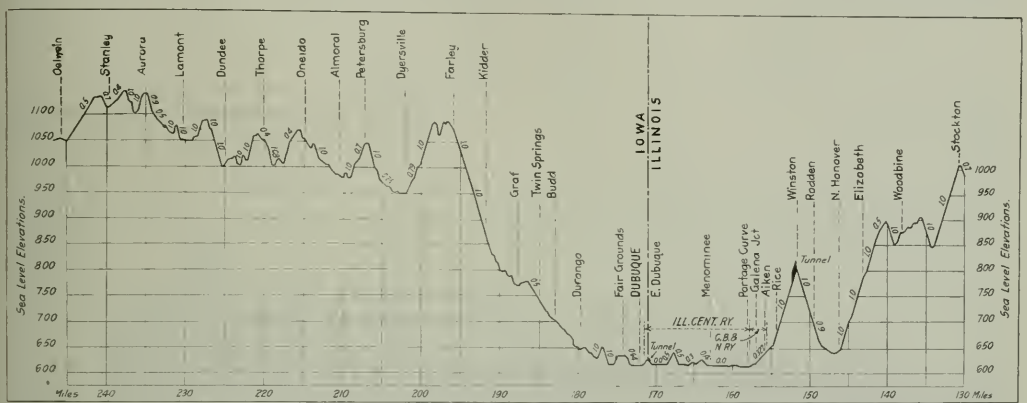
The locomotives used in each class were of the same dimensions and all three classes were equipped with brick arches. The Mikado engines were the only ones equipped with superheaters. The Consolidation engines weigh 198,850 lb. on drivers, and have

Chicago Great Western Mallet Type Locomotive

a tractive effort of 46,630 lb. The Mallet engines have a weight of 307,000 lb. on drivers, and a tractive effort of 81,175 lb. The Mikado engines have a weight on drivers of 218,000 lb. with a tractive effort of 55,000 lb. The general dimensions of the engines are given in the table at the end of the article.

It will be noted from the table showing the average performance of the different classes, that the Mikado type engines performed a greater mileage than either the Consolidation or the Mallet

It is surprising to note the relatively small amount of gross tons per mile for the Mallet locomotives with such a high percentage of gross to potential ton miles. This, of itself, would speak very favorably for the Mikado design for road service, especially with the designs of engines under consideration. The cost of maintenance per work unit and per road unit shows the Consolidation and the Mikado very nearly on a par, with the Mallet much more expensive to maintain. This, however, is to be



Profile of the Division of the Chicago Great Western Over Which the Locomotives Were Operated

engines. This may be accounted for by the fact that the Mikado engines were given the preference in fast freight runs. However, the number of gross tons per mile for them was very much greater than that handled by the Mallets in proportion to the power of the two kinds of engines. The cost for operating and repairs per 100 gross ton miles shows a marked efficiency for the Mikado type engine; but it should be remembered that the service in which the Mikado engines was used permitted of greater

expected of the Mallet locomotive. The general dimensions and proportions of the three types of locomotives follow:

General Data

	2-8-0	2-6-6-2	2-8-2
Type	Freight	Freight	Freight
Service	Bit. coal	Bit. coal	Bit. coal
Fuel	46,630 lb.	81,175 lb.	55,000 lb.
Tractive effort	222,650 lb	353,100 lb.	283,000 lb.
Weight in working order.	198,850 lb.	307,000 lb.	218,000 lb.
Weight on drivers	23,800 lb.	21,900 lb.	25,000 lb.
Weight on leading truck..	.....	24,200 lb.	40,000 lb.

Consolidation Type Locomotive in Service on the Chicago Great Western

economy in fuel. The cost of maintenance, that is, the running and shop repairs per 100 gross ton miles, also shows a material saving to the credit of the Mikado type engine. These two sets of figures show, perhaps, to better advantage the actual cost of operation of the different types of locomotives. Without a doubt, a large part of the savings made by the Mikado type engine is accounted for by the use of the superheater. However, credit must be given to the Mikado design, which has in so many cases proved to be a very economical design of engine for freight service.

Weight on engine and tender in working order...	434,000 lb.	502,100 lb.	371,650 lb.
Wheel base, driving.....	17 ft.	10 ft.	16 ft. 6 in.
Wheel base, total.....	25 ft. 8 in.	45 ft. 4 in.	35 ft. 2 in.
Wheel base, engine and tender	58 ft. 6 in.	72 ft.	65 ft. 1 in.
	Ratios		
Weight on drivers ÷ tractive effort	4.25	3.78	3.96
Total weight ÷ tractive effort	4.77	4.35	5.15
Tractive effort × diam. drivers ÷ total equivalent heating surface*....	792	799	651
Total equivalent heating surface* ÷ grate area...	75	74.3	77.5

Ratios—Continued			
Firebox heating surface ÷ total equivalent heating surface,* per cent	5.36	4.32	4.90
Weight on drivers ÷ total equivalent heating surface*	53.5	53.1	40.2
Total weight ÷ total equivalent heating surface*	60.0	61.0	52.2
Volume both equivalent simple cylinders (cu. ft.)	15.66	24.20	19.86
Total equivalent heating surface* ÷ vol. cylinders	237	239	273
Grate area ÷ vol. cylinders	3.16	3.22	2.48
Cylinders			
Kind	Simple	Compound	Simple
Diameter and stroke	24 in. by 30 in.	23 in. & 35 in. by 32 in.	27 in. by 30 in.
Wheels			
Driving, diameter over tires	63 in.	57 in.	63 in.
Engine truck wheels, diameter	33 in.	30 in.	33 in.
Trailing truck wheels, diameter	.....	30 in.	42 in.

Mikado Type Locomotive Used on the Chicago Great Western

Boiler			
Style	Straight	Straight	Straight
Working pressure	200 lb.	205 lb.	187 lb.
Outside diameter of first ring	80 in.	86 in.	82 in.
Firebox, length and width	66 in. by 108 in.	117 in. by 96 in.	84 in. by 120 in.
Tubes—number and outside diameter	413—2 in.	450—2¼ in.	262—2 in.
Flues—number and outside diameter	.....	.....	36—5¾ in.
Tubes, length	16 ft. 4 in.	21 ft.	20 ft. 6 in.
Heating surface, tubes	3,514 sq. ft.	5,539 sq. ft.	3,833 sq. ft.
Heating surface, water tubes	28 sq. ft.	25 sq. ft.	31.4 sq. ft.
Heating surface, firebox	171 sq. ft.	225 sq. ft.	235 sq. ft.
Heating surface, total	3,713 sq. ft.	5,789 sq. ft.	4,099 sq. ft.
Superheater heating surface	.....	.....	880 sq. ft.
Total equivalent heating surface*	.....	.....	5,419 sq. ft.
Grate area	49.5 sq. ft.	78 sq. ft.	70 sq. ft.
Tender			
Tank	Water Bottom	Water Bottom	Water Bottom
Wheels, diameter	33 in.	33 in.	33 in.
Water capacity	8,000 gal.	8,000 gal.	8,000 gal.
Coal capacity	15 tons	15 tons	15 tons

*Total equivalent heating surface = total evaporative heating surface + 1.5 times the superheating surface.

SANTA FE LOSS AND DAMAGE COMMITTEE

On the Atchison, Topeka & Santa Fe, as was noted in an article by H. R. Lake in the *Railway Age Gazette* of August 7, the investigation of over-short and damage reports has been given to the operating department and is primarily in the hands of the chief clerks to the general superintendents. The co-operation of other departments, however, is secured by various loss and damage committees, the most important of which covers the entire system and meets semi-annually. At the last meeting of this committee, held at Pueblo, Col., on September 28, there were present 125 representatives of the operating, traffic, mechanical and accounting departments from all over the system and several reports were read that give interesting facts in addition to those published in Mr. Lake's article.

It was shown, for example, that the highest per cent of the total amount paid for loss and damage was on the following commodities: Fruit, 8.14 per cent; grain, 8.04 per cent; live stock, 5.02 per cent; oil, 4.15 per cent, and household goods, 3.17 per cent, responsibility for the various claims being placed as follows: defective equipment, 3.1 per cent; wreck, 0.5 per cent; delay, 1.4 per cent; fire, .05 per cent; concealed loss, mostly damage, 5 per cent; concealed damage, 10 per cent; loss from improper packing, 7.5 per cent; loss from bulk shipments, 7.5 per cent; freezing, 0.7 per cent.

The Santa Fe has a very large and important traffic in live stock. In the past five years the number of cars of stock which it has handled has increased more than 10 per cent, but at the same time there has been a reduction in the average payment on live-stock claims from $2.93 per car in the fiscal year ending June 30, 1910, to $1.25 in 1914, a decrease of 57 per cent.

The committee has planned to direct its efforts, between this and its next semi-annual meeting, towards the reduction in the damage account on less than carload shipments. Thus far, but little headway has been made in this direction, and whereas the payment for loss on less than carload shipments has been reduced 20 per cent in a year and for damage on carload shipments 35 per cent, the amounts paid for damage on less than carload shipments have been reduced but two per cent. As part of the campaign the committee has adopted a book illustrating the proper method of loading less than carload freight, which is to be placed in every freight house. An expert will also be sent out to lecture to freight handlers on the subject and he will be able to give point to his remarks by means of a display of miniature loaded cars which he will take with him.

That the officers of the company are taking great interest in this loss and damage work is shown by the following message from President E. P. Ripley which was read at the meeting:

"I am sending this to express my appreciation of the results already obtained in the loss and damage movement, and the hope that as much progress be made during the coming year. All these loss and damage payments are net reductions. We paid last year a little over $700,000 in such claims, and it should be remembered that in order to make a profit of a like sum we would have to add about two and a half million in earnings. Putting it in another way: The $700,000 paid out is more than half of one per cent of our common stock. When we consider that the cause of this payment is nearly all human carelessness it looks very large. The encouraging feature of it is that it is on the down-grade. Here's hoping that its pace can be accelerated."

The New Kansas City, Mo., Union Passenger Station

This Is One of the Largest in the Country, Providing Facilities for All Roads Entering the City

The opening for traffic of the new Union passenger station at Kansas City, Mo., next Sunday, November 1, marks the completion of the main unit in one of the most comprehensive railway terminal developments ever undertaken in this country. This project, involving an expenditure of over $40,000,000, not only provides a new, modern passenger station for all the roads entering the city, but also includes the construction of a belt line around the city with the reduction of grades on a portion of the existing line from 1.5 per cent to 0.9 per cent, the separation of all grades with streets within the limits of the improvements on the existing line, the building of two new freight yards for the interchange of traffic, the construction of four local freight houses and one new team track yard. Work on this project has been prosecuted actively for the past four years and it is now practically all completed with the exception of the construction of a double deck, double track bridge across the Kaw river and an 8,000 ft. double track steel viaduct, which, combined, provide a direct entrance to the station for the four roads entering from Kansas City, Kan., and which latter work has been delayed by negotiations with the city of Kansas City, Kan. The entire development was described in detail in the *Railway Age Gazette* of May 23, 1913. This article will, therefore, refer only to the passenger station.

Front View of the Station Building Showing Office Wings and Carriage Concourse

This project has been carried out by the Kansas City Terminal Railway Company, a corporation formed for this purpose. The stock is owned equally by 12 roads, the Atchison, Topeka & Santa Fe, the Chicago & Alton, the Chicago, Burlington & Quincy, the Chicago, Rock Island & Pacific, the Chicago, Milwaukee & St. Paul, the Missouri, Kansas & Texas, the Missouri Pacific, the St. Louis & San Francisco, the Union Pacific, the Wabash, the Chicago Great Western, and the Kansas City Southern, which, together with the Quincy, Omaha & Kansas City, a subsidiary of the Burlington, include all the roads entering the city. With the exception of the Kansas City Southern, the Chicago Great Western and the Quincy, Omaha & Kansas City, all the roads formerly used the old Union station, while the three roads mentioned occupied the Grand Central station at Second and Wyandotte streets. Certain trains of the Rock Island, St. Paul and Santa Fe also stopped at a third station at Grand avenue and Twenty-second street on their way in to the old Union depot. All of these stations have been badly congested for several years and they did not afford the modern facilities now demanded by the traveling public. These conditions led to the construction of the new Union station for the joint use of all the roads entering Kansas City.

There is no suburban traffic at Kansas City and a large proportion of the passengers are ticketed through, transferring from one road or train to another with the consequent waiting in the station between trains. With this very heavy transfer much greater space is required for waiting rooms and attendant facilities and for the handling of baggage, than is customarily found in modern terminals, especially in a city of 250,000 population. Over 260 scheduled trains, exclusive of extra sections and special trains, entered and departed from the Union and Grand Central stations daily. The maximum number of scheduled trains in one hour was 30. The number of passengers handled in 24 hours varies from 20,000 to 35,000, over 30 per cent of whom are ticketed through in addition to a large number who buy locally to Kansas City and then to destination. It was frequently necessary to accommodate 1,500 persons in the waiting room of the old Union station alone at one time.

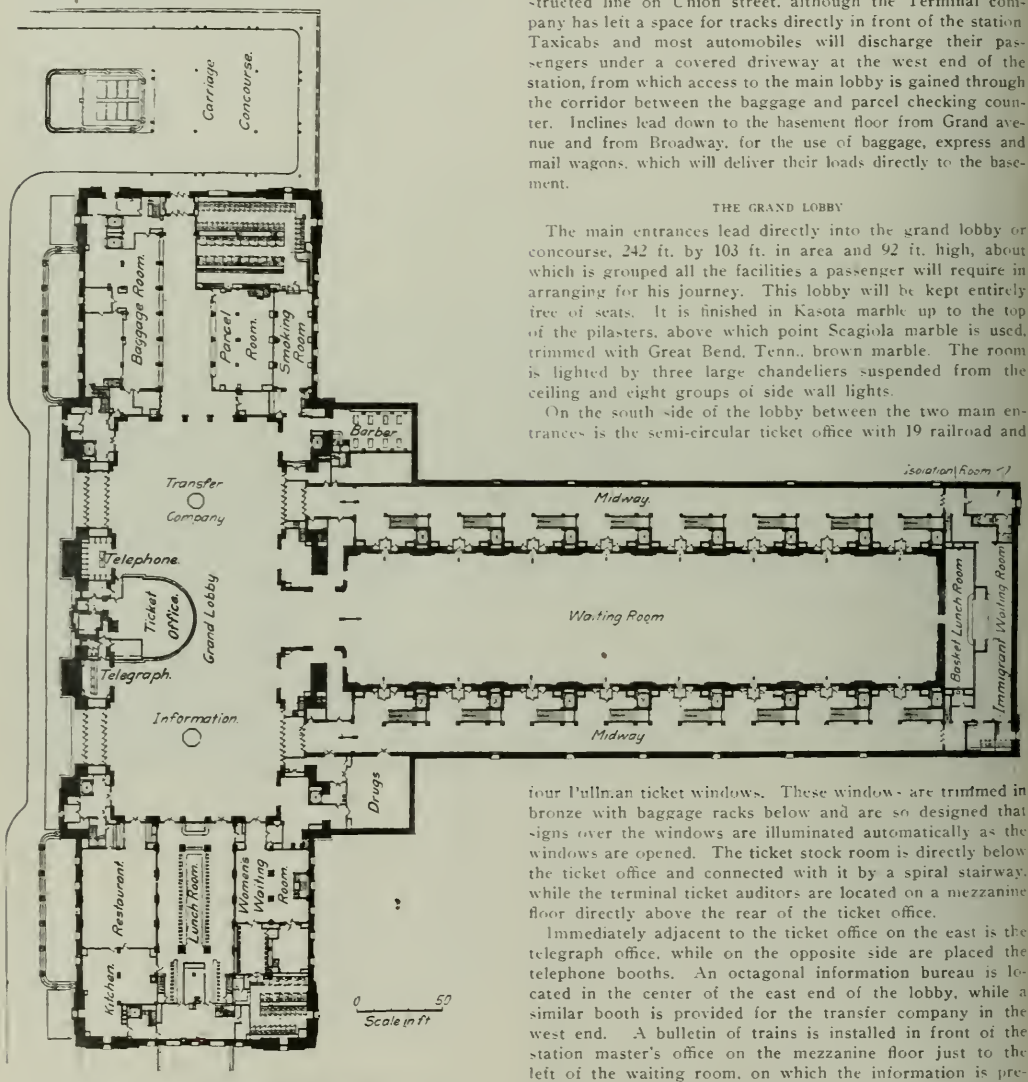
While most of the trains terminate here, the Santa Fe, the Rock Island and the Missouri Pacific operate a number of trains through Kansas City. Practically all of these trains require the inserting or cutting out of dining cars, connecting line sleepers, or other cars in the station with the minimum delay. This requires a flexible track layout, permitting switching to be done without interference with other trains.

THE NEW STATION

The new station is located at Twenty-third street between Grand avenue and Broadway, near the present Grand avenue station and about two miles southeast of the old Union station. It is thus situated midway between the business center of the city on the north and the principal residence district on the south. The station is a massive building of stone and concrete, costing $6,000,000, or with the land, tracks and other appurtenances, about $11,000,000. It is built in the shape of a "T" with the head house facing on a plaza fronting which

is a park area of about eight acres, which will be graded down and beautified by the city. The head house is 510 ft. long by 143 ft. wide and six stories high, the upper two floors in the wings of the building being devoted to offices for the terminal company and tenant roads. The stem of the "T" is 410 ft. long by 165 ft. wide and extends out over the tracks.

The new building is of steel construction with concrete walls up to the first story or plaza level. Above this, it is faced



Floor Plan of New Kansas City Union Station

with Bedford limestone trimmed with Maine granite on the prominent faces and bush-hammered concrete elsewhere. It is founded on rock throughout, except for a few piers in the trainshed, which are in an old creek bed and are carried on concrete piles driven to rock and capped by a concrete slab.

An 80-ft. driveway and a 20-ft. sidewalk have been provided in front of the station. Facing on this driveway are three large arched windows separated by massive columns. The main entrances lead from this driveway under the two end windows and are protected by canopies extending to the curb line. These main entrances to the station will be used by all passengers arriving on foot, on street cars or by private automobiles. Up to the present time the local street railway system has made no provision for street car service nearer than the existing line on Grand avenue and a recently constructed line on Union street, although the Terminal company has left a space for tracks directly in front of the station. Taxicabs and most automobiles will discharge their passengers under a covered driveway at the west end of the station, from which access to the main lobby is gained through the corridor between the baggage and parcel checking counter. Inclines lead down to the basement floor from Grand avenue and from Broadway, for the use of baggage, express and mail wagons, which will deliver their loads directly to the basement.

THE GRAND LOBBY

The main entrances lead directly into the grand lobby or concourse, 242 ft. by 103 ft. in area and 92 ft. high, about which is grouped all the facilities a passenger will require in arranging for his journey. This lobby will be kept entirely free of seats. It is finished in Kasota marble up to the top of the pilasters, above which point Scagiola marble is used, trimmed with Great Bend, Tenn., brown marble. The room is lighted by three large chandeliers suspended from the ceiling and eight groups of side wall lights.

On the south side of the lobby between the two main entrances is the semi-circular ticket office with 19 railroad and four Pullman ticket windows. These windows are trimmed in bronze with baggage racks below and are so designed that signs over the windows are illuminated automatically as the windows are opened. The ticket stock room is directly below the ticket office and connected with it by a spiral stairway, while the terminal ticket auditors are located on a mezzanine floor directly above the rear of the ticket office.

Immediately adjacent to the ticket office on the east is the telegraph office, while on the opposite side are placed the telephone booths. An octagonal information bureau is located in the center of the east end of the lobby, while a similar booth is provided for the transfer company in the west end. A bulletin of trains is installed in front of the station master's office on the mezzanine floor just to the left of the waiting room, on which the information is presented by means of small metallic letters placed in slots according to a system devised by the Commercial Sign Company, Ashtabula, Ohio. No train announcing system will be installed at present and all trains will be called by ushers.

THE WAITING ROOMS

Directly opposite the ticket office and opening from the grand lobby is the general waiting room, 352 ft. long by 78 ft. wide. This area is given up largely to seats, having 44

double mahogany seats with a capacity of 750 persons. This room is finished in terra cotta with a base of Great Bend marble and a paneled plaster ceiling. Natural illumination is provided by large triple windows over each train gate while large light clusters are placed along each side wall.

On each side of this room are eight train gates, directly back of which is an exterior concourse are stairways leading to the platforms below. Each gate is equipped with two National train indicators. In this way the passengers are enabled to remain seated in the waiting room until their trains are ready and by collecting in those seats adjacent to the train gates through which they must pass, they are advised at once when their trains are ready without the necessity of standing about the gate.

The concourse on each side outside the train gate is also used as an exit from trains by incoming passengers, who, however, do not pass through the main waiting room, but directly into the grand lobby through doors opposite the main entrance. In this way incoming and outgoing passengers are entirely separated except on the stairways leading to the track platforms, and the plans will permit the construction of escalators, which, if found necessary, will remove this conflict.

Just north of the main waiting room is a basket lunch room with a small lunch counter for the use of passengers carrying their own lunches. Beyond this in the extreme north end of the building is an immigrants' waiting room with seats for 150 persons and with access to the opposite side of this same lunch counter. An isolation room for convicts, persons with contagious diseases, etc., is also provided here. The isolation and immigrants' waiting rooms are connected directly with the concourse on each side, eliminating the necessity for this class of passengers passing through the main waiting room or coming in contact with the other passengers.

Leading off from the northeast corner of the grand lobby is the women's waiting room, 45 ft. by 45 ft. in area, attractively finished in molded plaster panels decorated in imitation tapestry with white trimmings. Connecting with this are the women's rest room and the lavatory, with free and pay toilets and a shoe shining stand. Directly over the lavatory on a mezzanine floor three private bathrooms are provided for the use of women passengers. Directly below the women's waiting room and accessible only from this room is a children's playroom, where children may be left in the care of the maid in charge. Connecting with this children's room is another small basket lunch room.

In a similar location in the west wing are located the men's smoking room, shoe shining stand and free and pay toilets. Leading off from the same corridor is a nine-chair barber shop, while directly above the barber shop and entered through it are five bathrooms.

The Grand Lobby Looking Down on the Semi-Circular Ticket Office

BAGGAGE AND EXPRESS FACILITIES

The baggage checking counter, 90 ft. long, is located at the west end of the grand lobby to the left of the taxicab entrance and is attractively finished in bronze. While hand baggage is checked directly at the counter, heavier pieces brought in by taxicabs are delivered at an entrance on the court at the west end of the building and immediately lowered to the basement or track level floor, where they are weighed. Baggage delivered by the transfer company is unloaded directly on the lower floor. Passengers may exchange taxicab

or transfer checks for baggage checks at the baggage counter on the main floor. All baggage is weighed as received and no checks are issued until the weight has been ascertained and any excess charges paid. While only hand baggage will be received and delivered on the main floor, the passenger is able to arrange for the checking of all baggage at this counter. It is also planned to weigh all baggage transferred from one train to another and to attach excess tags for collection at destination. Eleven Kron dial automatic scales of capacities ranging from 500 lb. to 10,000 lb. have been installed for this purpose.

The basement floor is devoted entirely to the handling of city baggage. All baggage transferred from one train to another will be assembled and held in the sub-basement. To move the city baggage to and from trains it is lowered to the sub-basement by elevators, from which floor a subway leads under the tracks near each end of the train shed, with elevators at each platform. In this way all trucking across tracks at grade is avoided, while city baggage is kept entirely separate from transfer. Ten Elwell-Parker electric motor trucks have been installed to transport the baggage. The baggage rooms on the main and basement levels have 2-in. maple floors laid diagonally over pine flooring on concrete.

Directly across the corridor from the baggage counter on the main floor is the parcel check room with a 45-ft. counter. Special attention was given to the design of this room to make it accessible to the public and convenient for the employees. The storage racks are of pipe with special racks for overcoats, umbrellas, etc. A storeroom with dumbwaiter connection is located directly above for the storage of unclaimed parcels.

All express and mail is handled in the three-story express building immediately west of the station. The east 160 ft. of all three floors is occupied by a branch railway postoffice and the remainder is divided between the American, Adams and Wells-Fargo express companies. As in the baggage room, the basement floor is devoted to the handling of city business, while all transfer traffic is kept in the sub-basement. The basement mezzanine floor is occupied by the clerical forces. Express and mail matter is taken to and from trains through the subways on the sub-basement level referred to above, while all city mail and express deliveries are made from the driveways on the basement level.

THE DINING FACILITIES

With the exception of the small lunch counter in the basket lunch room at the north end of the main waiting room, all the dining facilities are grouped at the east end of the grand lobby. Connecting directly with the lobby in the center is the lunch room, with a seating capacity of 75 at the counter, in addition to tables grouped along the wall on each side. Additional tables are also placed on a balcony over the east end of the lunch room for those passengers who desire a moderate priced dining room. This lunch room is finished in American Pavanazzo marble wainscot with a base and top of Verde antique marble with plaster above, stippled to secure a tapestry effect. The counter is equipped with solid bronze swivel seats with renewable cane backs and seats. All orders are transmitted to the kitchen by telautograph.

At the right of the lunch room and entered from the grand lobby is the main dining room, with a seating capacity of 142. This room is finished with tapestry glass on the lunch room side. Elsewhere it is finished in Italian Skyros marble wainscoting with plaster above. Semi-indirect lighting is adopted. A private dining room with a seating capacity of 20 is located over this main restaurant for the use of special and private parties. These dining facilities have all been designed in close co-operation with the Fred Harvey Company, which operates this concession.

Interior of the Main Waiting Room

THE STORES

Much study was given to the location and arrangement of the various stores in the station to provide those articles customarily desired by the traveling public and at the same time to bring the maximum rental to the terminal company. This business is expected to be especially remunerative here because of the large number of passengers waiting for some time between trains.

At the northeast corner of the grand lobby adjoining the women's waiting room is the drug store, with entrances from the lobby and the east midway. This store is elaborately finished in native walnut with bronze hardware and illuminated showcases. A soda fountain is provided of Travernelle Fleury marble trimmed in Belgian Black marble with a black glass top. In addition to carrying a complete line of drugs and sundries with a prescription counter on the balcony, a public postal substation is also located in this room.

Directly across the exit corridor is the news-stand, while on the opposite side across the main waiting room is the candy booth, both of which are finished in silver wood. A cigar stand is located at the west end of the lobby near the entrance to the smoking room and barber shop. All these concessions in the station except the barber shop and the parcel room are operated by the Harvey Company. The parcel room is operated directly by the Terminal company.

Other facilities in the station include a hospital over the main floor baggage room with separate wards for men and women, quarters for nurses and a small operating room; a special room on the track level floor for receiving funeral parties without the necessity of their passing through the main waiting room; a common office for the depot passenger agents of all the roads, located near the barber shop, and lounging and locker rooms with bathrooms for passenger trainmen, porters and station ushers on the basement mezzanine floor, lockers being provided for 250 conductors and 80 station ushers.

The Station Building, West Trainshed and Express Building

THE TRACK LAYOUT

Sixteen through tracks are provided under the train shed, each of which is of sufficient length to accommodate two trains, the trains pulling through the station so that the engines are at the far end. The tracks are spaced alternately 12.5 ft. and 31.5 ft. To give a greater flexibility of operation it is planned to install double crossovers between each two adjacent tracks in the center of the train shed, but this has been postponed temporarily. Provision has been made for eight additional station tracks on the north when traffic conditions demand, two of which tracks will be used for the present for the storing of sleeping cars en route and surplus equipment. Beyond these tracks are the two main freight tracks.

In addition to these through tracks, two stub tracks have been built east of the station for the loading of mail cars and one along the retaining wall of the Grand avenue incline for the unloading of theatrical scenery. At the west end of the station eight depressed stub tracks have been built for the loading of express cars. All tracks are laid with 90-lb. rails and plain angle bars on 8 in. of crushed stone ballast below the ties with 6 in. of sand or cinders below the stone. The platforms are of concrete with the surface 8 in. above the top of rail.

The train sheds are of an extended umbrella shed type connected by steel trusses extending over the track. The roof of the shed is of Federal cement tile with prism glass at regular intervals to illuminate the platforms below. Federal cement tile was also used on the main building, while prism glass was inserted in the platform above the trucking subways. The train shed is 1,370 ft. long and extends over eight platforms.

THE POWER HOUSE

The power house is located near the west end of the express building. The principal equipment includes three batteries of 1,016 h. p. high reverse-setting Babcock & Wilcox boilers, with space for a fourth battery when required; two 1,250 k. v. a., 2,300-volt, 60-cycle turbo-generator sets with exciters on the ends of the shafts; two Nordberg cross-compound Corliss air compressors with a capacity of 3,500 cu. ft. of free air per min.; one 60-ton and one 30-ton Carbondale exhaust system refrigerating plans for cooling the drinking water and serving the dining room and other concessions in the station. The exhaust steam vacuum system is used for heating the station and adjacent buildings. Over 85,000 sq. ft. of direct radiation is provided in the station alone in addition to an even greater amount of indirect radiation provided in all the larger public areas. All public rooms are artificially ventilated with air washed and tempered. Live steam is also furnished by the power house for heating up locomotives at the roundhouse.

PERSONNEL

This entire development has been designed and built under the direction of John V. Hanna, chief engineer, and his staff, consisting of A. C. Everham, assistant chief engineer; A. H. Stone and G. M. Walker, Jr., assistant engineers; J. Tuthill,

building engineer; S. O. Swenson, electrical engineer; G. E. Tebbetts, bridge engineer; G. E. Ellis, signal engineer, and J. M. Hammond, D. S. McCalman and E. P. Weatherley, division engineers. Jarvis Hunt, Chicago, was the architect for the station, working in co-operation with the engineering department. The George A. Fuller Construction Company, Chicago, was the general contractor for the station and auxiliary buildings, with E. S. Belden, engineer in charge.

CAMPAIGN AGAINST THE EXTRA CREW LAW IN MISSOURI

At the election on November 3, the voters of the state of Missouri will be called upon to vote upon the "full crew" law passed at the last biennial session of the Missouri legislature in 1912, which was by petition referred to the people in accordance with the referendum act. The railroads of the state have been conducting a campaign, aided by many of the commercial and other interests of the state, to defeat the bill by presenting to the people facts and arguments which show that such a bill is unnecessary and would in no way promote safety and that its only purpose is to create jobs for members of the Brotherhood of Railway Trainmen, at whose instigation the bill was introduced and passed.

The bill as passed prohibits the operation in Missouri of any freight train composed of less than 40 cars not equipped with a crew consisting of at least one engineer, one fireman, one conductor, one flagman and one brakeman, or any freight train composed of 40 cars or more not equipped with a crew consisting of at least one engineer, one fireman, one conductor, one flagman and two brakemen.

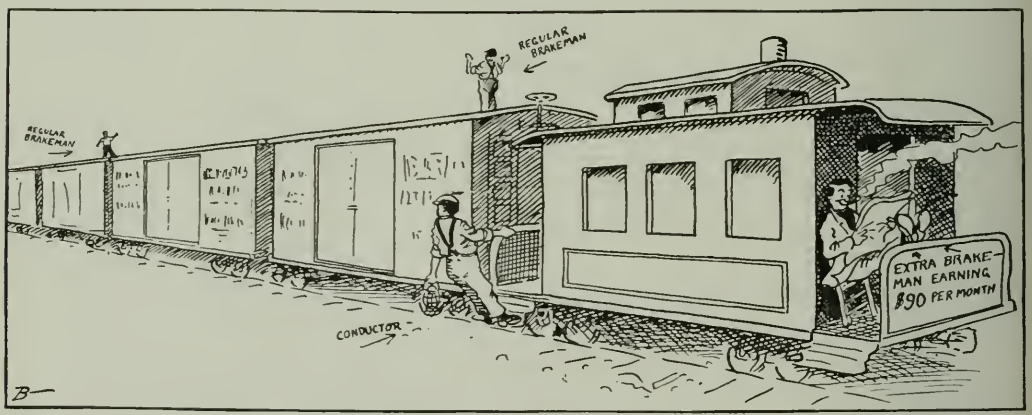
The status of this law and its liability to repeal by the people as a court of last resort is peculiar as relates to Missouri, as this is the second state in which an extra crew bill has been enacted which has a constitutional amendment providing for the initiative and referendum. In this respect the railways of Missouri may be considered as fortunate, for they are, by this means, able to appeal direct to the people for relief from legislation which they allege is unfair and discriminatory. While the bill was pending in the legislature the railroads endeavored to oppose it by presenting facts to show its true purpose, and that it was in no way a safety first measure, and when their efforts in this direction failed they immediately decided to take advantage of the referendum provision to endeavor to defeat the bill by the public sentiment.

Referendum petitions were circulated by employees of the roads and others immediately after the passage of the bill, and by the general assembly of 1912, and in a short time the signatures of 97,971 citizens were secured, many more than were required by the constitutional amendment. The invoking of the referendum by petition automatically suspended the enforcement of the bill until the voters could pass on it.

The railroads have been greatly handicapped in the efforts to obtain publicity for their arguments by a Missouri statute, which provides:

> It shall not be lawful for any corporation . . . to directly or indirectly . . . influence or attempt to influence the result of any election to be held in this state, or procure or endeavor to procure the election of any person to a public office by the use of money belonging to such corporation, or by subscribing any money to any campaign fund of any party or person, or by discharging or threatening to discharge any employee of such corporation for reason of the political opinions of such employees, or to use or offer to use any power, effort, or influence, or other means whatsoever to induce or persuade any employee or other person entitled to register before, or vote at any election, to vote or refrain from voting for any candidate, or on any question to be determined or at issue at any election.

Any violation of this law is punishable by forfeiture of charter or franchise. As the law applies only to corporations it does not militate against the labor unions, who are working for the full crew law and who are said to be expending large sums of money for publicity. Flaming posters and billboards in all the large cities inform the public that every seven minutes a trainman is killed because of the lack of safety appliances on the railways, posters placed in all saloons where there is a union bartender tell the patrons that the full crew bill is an aid to safety first. Posters are circulated illustrated with views of head-on and rear-end collisions to emphasize the necessity of a full crew law.



Everybody Works But Extra

Many of the newspapers of the state, however, and commercial and farmers' organizations have come to the aid of the railroads and have assisted greatly in publishing the arguments against the passage of the law. The railways of Missouri were the first to take advantage of the referendum to test public sentiment on legislation, and for this reason, in part, the newspapers have given a great deal of publicity to the campaign.

In all publicity issued by the railways it has been pointed out that the railways cannot afford to be forced to neglect or abandon safety first for their general plans for making travel more safe, and that a third brakeman on freight trains and a second on passenger trains is not in the interest of safety and that the state public service commission has full power to deal with the situation. In the first circular letter issued to the public there appeared the following:

"What the Law Will Cost the Railways

"Based on last year's business, this law, if made effective,

will cost the railways of Missouri more than $500,000 a year. This sum equals 5 per cent interest on $10,000,000. Ten million dollars would build 500 miles of additional railway at $20,000 a mile, or equip 6,666 miles of road with automatic block signals at $1,500 a mile, or purchase 1,000 steel coaches at $10,000 each, or eliminate 2,000 grade crossings at $5,000 each, or construct 1,000 new depots at $10,000 each. Five hundred thousand dollars a year taken from the railways of Missouri by the adoption of this law will reduce their borrowing capacity $10,000,000, and to that extent will prevent the physical improvement of existing lines of railways."

Naturally the railways are proceeding with caution, and yet with considerable energy to inform the people of the facts in the case. Extensive statistics have been prepared to offset the arguments of the labor leaders, which are in no way backed up with specific instances, that a full crew law is conducive to safety first, showing the number of accidents that occur on trains having less than 40 cars and those having more than 40 cars. It will be necessary to offset the large union labor vote of St. Louis, Kansas City, St. Joseph, Springfield, Joplin and Carthage by the votes of the farmers and there are many indications that the latter are now inclined to believe that the railways have been maltreated by legislators who have been under the spell of the union labor lobby at Jefferson City, and who apparently believe that their interests and those of the railways are closely allied, at least in this particular instance.

At the beginning of the campaign O. M. Spencer, general solicitor of the Chicago, Burlington & Quincy lines in Missouri, sent a circular letter to all attorneys for the Burlington in Missouri, asking their assistance in defeating the law. This letter quoted the statute regarding the use of money in elections and continued: "I am forced to ask you and such of you only as feel kindly enough disposed to give this company your services gratis in the work on election day, to advise me in reply if you are willing to attend the conference of all attorneys of the Burlington in Missouri in order to discuss and adopt the best means of informing the people of the purpose and effect of the law, with the hope that the same may be rejected at the election. I feel we can well afford to lend a hand to the company in this emergency, because we owe it to ourselves as good citizens of the state of Missouri to protect her commerce from the unjust burden which this law proposes without conferring the least benefit upon the public." The circular also included the principal arguments against the law, and quoted some statistics compiled by C. W. Kouns, general manager of the Atchison, Topeka & Santa Fe, which were presented to the joint railroad committee of the House and Senate of the Kansas legislature last winter to show that the long trains are no more liable to accidents than the short, local trains, and that therefore there is no necessity for a third brakeman to reduce the liability.

On September 22 an appeal to the shippers and passengers of Missouri was published in the St. Joseph Gazette, over the signatures of 50 of the most prominent farmers, livestock commission men, wholesalers and jobbers in St. Joseph and vicinity, as an advertisement set in large type and occupying with the signatures a full newspaper page. Among the arguments presented in this appeal were the following:

"At the present time, through and local freight trains are equipped as follows: One engineer to run the engine; one fireman to run the fire; one conductor to run the train; one flagman or brakeman to flag the train; one brakeman for such other services as emergencies may require. The above enumeration would seem to show enough men in the operation of any through train. To the above number the law proposes to add another brakeman. There would seem to be no room for another job on such a train, especially when it is remembered that all such trains are equipped with air brakes, and the brakes are set and released by the engineer on the engine.

"The best argument against this proposed law is, perhaps, the fact that at the same legislature a public service commission was created, which commission has full power to regulate the number of men to be employed on trains in exact proportion to the service necessary to the proper operation of such trains. This commission could make its requirements of certain companies whose road and character of freight might require a greater service and a greater number of brakemen for the protection of a train than it would of some other company with its train of an equal number of cars, because of the different conditions under which the two companies operate; hence it would seem to be the part of wisdom, instead of adopting a hard and fast rule like this law would prove to be for all time to come, to allow this question of regulating the number of employees on trains to rest with the tribunal created for the specific purpose of regulating the operation of railroads.

"We call the public's attention to this law and its purpose and effect. This extra expense, if imposed, must come to the railroad companies through increased rates. Rates are paid by the shippers and passengers; therefore, the shippers and passengers are asked by this law to vote this increased expense upon themselves. Can they afford to do it? We think not."

The tendency of many of the newspapers to give the railways a square deal was indicated at the forty-eighth annual meeting of the Missouri Press Association, held at the Planters' Hotel in St. Louis on September 16, 17 and 18, when resolutions were adopted, following an address to the 300 editors present by B. F. Bush, president of the Missouri Pacific, saying that it is essential for the future agricultural, commercial and industrial welfare of the nation that the railroads be permitted to receive sufficient remuneration to enable them to render high-class service and to make such betterments and improvements from time to time as the needs of different communities may require, and to re-establish American railroad securities as a highly respected and sound investment. These resolutions were general in character, but they were soon followed by many editorial utterances strongly condemning the full crew bill. For example, the Princeton Post pointed out that business men are just beginning to realize that the tendency of government by commission has spread from its original restrictions on the railways to other forms of business, and that the restrictions which were urged upon the transportation companies are now being turned against themselves, and are found exceedingly irksome as applied to their branches of commerce and industry. The editorial further says that Missouri farmers have resented with spirit and energy, legislation that might and would undoubtedly militate against them, Missouri manufacturers would be as quick and as keen to resent discriminatory legislation and Missouri railways are resenting the enactment of a bill which would entail an annual increased expenditure of $500,000 on their part, unless the business men and farmers of Missouri repeal it as a part of fair play and in the interest of justice, not only to themselves, but to the railways as well.

The Plattsburg Leader, in an editorial on safety first, pointed out that as the originators of the safety first movement the declaration of the railroads that the full crew bill is not conducive to safety first should carry weight and conviction to the public.

The Gallatin North Missourian pointed out that no farmer would be willing to have the farmers of the state assume the burden of an added $500,000 taxation annually on Missouri farm land, that they would resent any efforts to compel them to apply a hired man for every 10 acres of land owned by them, and that the $500,000 would, if used for betterment to stations, stock yards and service, give the farmer a benefit. "Hence the farmer and business man will serve his own interest by voting 'no' on referendum No. 9, and will also aid the railways to escape from legislation which had its origin at

the same source as did the obnoxious single tax amendment of two years ago."

The St. Joseph, Mo., Gazette, printed an editorial containing the following: "Profitable farming is not opposed to organized labor, but it can see no reason why organized labor should be so conducted as to compel the commerce of the state to pay it an unjust tribute. It is plain to the most simple minded that whatever added expense the railroads are put to in order to perform their daily service to the people of this state must, in the final analysis, be paid by the commerce of the state. The 'full crew' law adds an unnecessary expense to every railroad operating trains in this state, and ought to be voted out of existence by scratching Yes and leaving No."

At a meeting of the officers and directors of the Commerce Club of St. Joseph on October 16, resolutions were passed against the law. Similar resolutions were passed by the executive committee of the Federation of Missouri Commercial Clubs in an appeal to the farmers and business men of Missouri generally to vote against the law.

Forward St. Louis, the official organ of the Business Men's League of St. Louis, on October 19 published an article attacking the full crew law, saying in part: "The number of men who should compose a full crew is a technical question. It is exactly such a question as the Public Utilities Commission is expected to settle. The Public Utilities Commission was created and exists to decide, among other problems, matters like this. The number of men who should constitute a full crew is not a subject for legislation, but a question for determination by the state commission.

"Greater safety is not obtainable by increasing the number of train employees."

These and many other resolutions have been given wide circulation in the press of Missouri, and the railroads also have furnished the newspapers of the state from time to time with news letters containing items against the bill which have been generally published.

An interesting feature of the campaign is a cartoon depicting the arduous duties of the extra brakeman, which is reproduced herewith, which is accompanied by the following, a parody on "Everybody Works but Father":

1

Everybody works but Extra,
He rides in the caboose all day,
Reads the daily papers,
And smokes his pipe of clay.
He makes a full crew fuller.
He gets in everybody's way,
Everybody works but Extra
And the people have to pay.

Chorus

You must scratch YES,
If you want to VOTE NO.

2

The railroads can't do a "hooter"
When the Brotherhood has its say
As to how many men are needed
On trains that run all day,
With nothing to do but keep moving,
No cars to set out or in,
Everybody works but Extra,
And the people put up the tin.

3

What right have the owners to meddle,
With the way we run their road,
The stockholders have no duty,
Except to carry the load.
The managers don't know nothing
The Legislature holds the line,
Everybody works but Extra
If you overlook Amendment Nine.

BRITISH AND GERMAN EXPORTS OF LOCOMOTIVES

In the October 16 issue were presented some statistics on British and German exports of railway materials, compiled by the British Board of Trade. The following table from the same source gives a comparison of the British and German exports of railway locomotives to the principal neutral and colonial markets for the years 1912 and 1913, 1912 being the latest year for which official figures are available for Germany:

Principal Colonies and Neutral Countries to which exported	From Germany (1912)	From United Kingdom (1913)
British India	$55,500	$4,192,500
Norway	42,500	.....
Sweden	54,000	1,500
Denmark	167,000	450
Netherlands	178,000	311,000
Belgium	77,000	24,500
France	1,463,000	6,000
Spain	924,000	148,500
Italy	354,000	1,000
Greece	88,000	.....
Servia	234,000	.....
Roumania	203,000	.....
Russia	271,000	.....
Turkey	438,000	18,000
Tunis	50,500	.....
Morocco	46,500	.....
Egypt	149,500	72,500
Dutch East Indies	378,500	15,000
China	194,500	51,500
Japan	277,000	35,000
Korea	126,000	.....
Brazil	836,500	394,000
Argentina	383,000	3,478,000
Chile	1,051,500	368,000
Cuba	67,000	1,500
Total to above markets	$8,559,500	$9,120,250
Total to all markets	$9,287,500	$13,909,500

Some details regarding the market for locomotives in some of the principal countries are shown in the following paragraphs.

The imports of locomotives and parts into the Union of South Africa in 1912 and 1913 from the United Kingdom and Germany, and the total imports from all countries, were as follows:

	1912	1913
United Kingdom	$46,790	$277,610
Germany	15,100	22,605
All countries	61,905	300,740

A Belgian consular report for the year 1912 remarks that during the five preceding years the total number of locomotives imported into Egypt amounted to 113. Of this total the United Kingdom furnished 48 and Germany 53 locomotives.

The following figures, taken from an Austrian consular report from Barcelona, indicate the fluctuation which has taken place in recent years in the value of the imports of locomotives and tenders into Spain:

1909	$2,080,000
1910	980,000
1911	2,220,000

Locomotives weighing over 35 tons came principally from Germany, lighter engines from Great Britain.

English Railway Receives Suggestions from Employees.—Some time ago the Great Western Railway of England on the advice of its general manager, established a suggestion committee, to which proposals from the company's employees as to improved methods of operation, measures for greater safety to the public and staff, etc., were to be sent. Quite recently 20 awards—17 in the passenger department and 3 in the freight—were made in respect to suggestions submitted. About 1,500 suggestions, on the most diversified subjects, have been sent in since the committee was established, and it is stated that some of the most helpful proposals have been received from those least gifted with the art of fluently expressing their ideas. The committee has still about 300 suggestions under consideration.

INTERSTATE COMMERCE COMMISSION—RAILWAY RATES—GENERAL PROSPERITY

By E. B. Leigh

President, Chicago Railway Equipment Company

Railway rates, general prosperity, and the function of the Interstate Commerce Commission in connection therewith were the subjects of comment by the commission in its decision of July 29, 1914, in the "Five Per Cent Advance Case."

The commission held, "the law did not confer upon us power of aiding general prosperity." A propaganda, of which the commission disapproved, had proceeded "as if the commission had the legislative power in that form to stimulate business activity and promote the public welfare." The commission concluded: "We have no authority to approve rate increases with a view to stimulating business."

It is manifestly of the utmost importance that somewhere in our government, responsibility shall lie for that specific promotion of the general welfare which consists of protecting the railways against influences, governmental and otherwise, which tend to impoverish the roads, and with them, the whole people.

If the Interstate Commerce Commission does not perform that function, who will?

It is undoubtedly true that, as originally organized, the functions of the commission were largely confined to an administrative or semi-judicial consideration of complaints and alleged abuses, specifically referred to it for adjudication. Under these conditions the decisions and orders of the commission did not broadly affect the railroads' prosperity, or the general business of the country.

But with the enlargement of its powers, and particularly when Congress delegated the rate making power to the commission, that body was logically and inevitably vested with the responsibility of that which would naturally flow from its exercise of such sweeping powers, and not only in its effect upon the railroads themselves, but upon all collateral as well as general business interests.

Congress is unquestionably charged with promoting the general welfare. The general railway problem has been committed by Congress to the commission. Whatever the precise terms of the law, the commission clearly has the responsibility.

The decisions of the Supreme Court in the "Shreveport Case" and the "Inter-Mountain Rate Case" seem clearly to suggest not only this responsibility, but the broad inherent powers of the commission and the consequent necessity of its wise and prudent exercise of such authority.

As now constituted, with the broad scope and power delegated to it by Congress, and as suggested and virtually defined by the Supreme Court, is not the Interstate Commerce Commission today more of a legislative than a judicial body?

It would seem that the fundamental purpose of the creation of the commission, with its enormous, delegated power, must be that of conserving the good and benefit of the people as a whole, and not merely that of partisan or isolated interests.

As railway prosperity affects general prosperity (or the people as a whole), to just that extent is the commission responsible for such general prosperity.

Not only have the railways developed the agricultural, mining, manufacturing and commercial activities of this country; but because of their enormous requirements for the maintenance and extension of their own properties, have become the most potent single, contributing factor to general business prosperity.

The commission held, "The law did not confer upon us power of aiding general prosperity." It can hardly be claimed that the law conferred upon them the power (or right) of *impairing* or *retarding* general prosperity. If it gave the commission the power of legislating upon that which virtually affects general prosperity, may we not assume that the law (surely intended for good, and

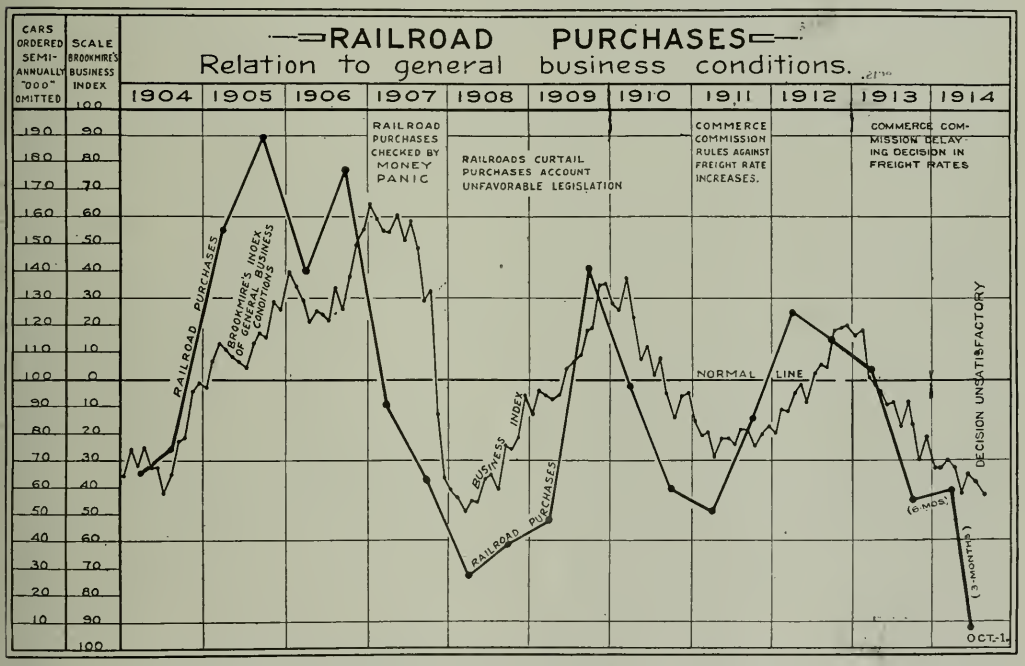


Chart Showing Relation of Railroad Purchases to General Business Conditions

not evil) *did* confer upon the commission not only the power, but the *obligation* of aiding prosperity?

Its now defined scope and authority make the commission the possible controlling factor not only in the measure of prosperity of the railways, but of the whole people. The commission is thus invested with the greatest power for the possible confiscation of private property the world has ever seen.

On the other hand, its authority carries with it the ability of the commission to be the greatest conservator of the public good, and the greatest direct contributor to stable, normal business conditions.

Is not the commission thus legally and morally bound to execute this sacred trust in the interest of not one or a few elements of our national activities, but in the interest, and for the benefit, of the people as a whole?

The necessities of the railways have not only been proven, but formally admitted by the commission. The necessities of the country are equally obvious, and more than proven.

For many months past a large number of the industries wholly dependent upon the railways have been practically prostrated, while others more or less dependent upon the railways have experienced most serious curtailment.

This is not due to the European war, but is a condition of steady growth from about the middle of 1913. The effect of this prostration upon business in general had been clear for many months—not only to those engaged in railway and cognate industries, and banking, but to the shippers and general public.

The commission in its decision of July mentions protests against the advance sought. But it is significant that not a single business organization located in "Official Classification Territory," where advances were sought, is listed as opposing a general advance. On the contrary the country today is almost a *unit* for an advance.

These facts sufficiently reveal the extent to which the people have been directly "touched in their pocketbooks" by the distress arising from the inability of the railways to operate and develop as they would under normal conditions.

The Interstate Commerce Commission is not only as good a place as any, but the logical place, for the United States government to begin applying the principle that encouragement and solicitude for the welfare of business are as vitally important as supervision and restriction.

Railway purchases as a measure of general business prosperity were discussed last December by the author of this article in an address which undertook to show from statistics covering a period of years, that general depression had uniformly followed a marked decrease in railway buying, while general business activity had regularly succeeded resumption of substantial outlays by the railways.*

What is the relation between railway prosperity and general business prosperity? How is it measured, and how can it be demonstrated?

The number of freight cars built each year taken as a unit, and termed "railway purchases," has been projected on the well known chart of the Brookmire Economic Service for the ten year period 1904, to October 1, 1914, inclusive, and the relation between "railway purchases" and the trend of "general business" clearly shown.

While it is not possible, within the limits of this article, to trace in graphic detail the relative movements from month to month during this ten year period, the chart clearly confirms the soundness of the doctrine that *railway purchases measure general business prosperity.*

It should be noted that up to 1908 these two factors ("railway purchases" and "general business") moved in normal relation; but in 1908 a new condition or factor appeared, due to the investment of the rate making power in the hands of the Interstate Commerce Commission.

*The article referred to was published in the *Railway Age Gazette*, December 19, 1913, page 1161.

Thus, for the first time were "railway purchases" controlled by *abnormal* rather than normal conditions, and have so continued, more or less, from 1908 to the present time.

The year 1908 was notably the leanest of business years, notwithstanding bumper crops, plentiful money and absence of disturbed political conditions—the three recognized elements making for good business. It likewise recorded the smallest number of cars ordered during the period, and the minimum of railway purchases for many years past.

In 1912 heavy purchases continued throughout the year, carrying general business to the high peak, at the end of the year.

Just here it is again illuminating to consider the effect of "railway purchases":

The year 1912 was a "presidential" year, proverbially and historically a poor business year, and fraught with more of those "uncertain" elements normally operating to check or hold back business than in almost any previous year.

The "Banking Index" throughout the year ranged at about "normal," with crop conditions "good." But it is believed neither of these fundamentals would have offset the drastic change in politics, early and clearly foreshadowed.

Just why was 1912 the one exceptional "presidential" year? Why were the political conditions and political policies almost ignored?

If there had been any doubt as to the *basic factor* of *railway purchases,* it was brought into bold relief in 1912, and that year furnishes the answer.

At this point it may be interesting to note a comparison of conditions prevailing in 1908 and 1912.

Economists recognize three great fundamental factors as foreshadowing and affecting business:

MONEY	CROPS	POLITICS
Let us apply this to the years		
1908		1912
Plethoric Reserves	Railroads *Not* Buying	Normal Reserves	Railroads *Buying*
Bumper Crops	Result:	Normal Crops	Result:
No Disturbing Political Conditions	Very low ebb of business	*Very* Disturbed Political Conditions	Business very nearly booming.

In 1913, the heavy purchases of new equipment continued during the first three months; but sharply declined at the beginning of the second half of the year—almost immediately sinking to the lowest level reached these several years.

The conditions clearly foreshadowed at the middle of the year eventuated, and have remained, not only throughout 1913, but in more accentuated form during the present year to date.

While it is true that the railway supply industry is logically the first to recognize, and to participate in, a revival of general business, and is likewise the first to detect the signs, and feel the effects, of its impending decline, nevertheless the *principle* holds good, and exerts itself throughout the entire fabric of general business.

The natural and conclusive deductions to be made from the foregoing are:

That while general financial conditions are essentially fundamental to all industry and commerce of every character, the railways, consuming, directly or indirectly, between 40 and 50 per cent of the production of the steel and iron industry—itself a basic industry—clearly are *the basic factor* in initiating a general business movement, and whose cessation of purchases (conversely) retards such movement.

In other words, and *regardless of favorable money conditions, crop conditions, political conditions, or any of the other fundamentally contributing factors to a sound business condition, unless the railways are placed in a position to make purchases,* and *do make purchases on a normal scale, normal prosperity is withheld from general business.*

It is this great, salient feature of the question which the Interstate Commerce Commission is urged to recognize, as it has been recognized by the industrial and commercial world.

General News Department

Announcement has been made by the Illinois State Board of Equalization that the assessments on railroad property in the state will not be decreased for 1914, as requested by a committee of railroad tax officers last week, but in some instances will be advanced.

The date for the beginning of arbitration proceedings in Chicago on the demands of the western engineers and firemen for advances in wages and changes in working conditions, has been changed from November 9 to November 30, because although four members of the arbitration board representing the railroads and their employees have been selected no agreement has yet been reached on the two neutral members of the board.

The New York State Civil Service Commission announces competitive examinations to be held November 14 for engineers under the Public Service Commission, First district. It is expected that a number of appointments will be made to positions in charge of the construction of the tunnels to be built under the East river between New York and Brooklyn. For the position of resident engineer, the salary will be from $3,000 to $4,200; junior engineer, grade 8, from $1,500 to $1,800, and grade 7 from $1,200 to $1,500. Applicants are wanted also for the positions of draftsman and of inspector of steel.

Officers of the National Tehuantepec Railroad say that the Mexican government has ordered the immediate rehabilitation of that line. New ties will be laid the entire length of the road, Salina Cruz to Coatzacoalcos, and this will be followed later by relaying the track with heavy steel. More than 100,000 cross-ties have arrived at Nonoalco station from the central part of Mexico. The traffic of the National Tehuantepec has fallen off considerably during the last few months, due partly to the opening of the Panama Canal, but chiefly to the unsettled condition of political and business affairs of the country.

A. A. Robinson, for many years chief engineer of the Atchison, Topeka & Santa Fe, later president of the Mexican Central Railway and one of the most prominent of the pioneer railway builders of America, was the guest of honor at a dinner given on October 21 at Topeka, in honor of his seventieth birthday, by a number of prominent officers of the Santa Fe and other men who had served with Mr. Robinson during his active career. Among those who responded to toasts were President E. P. Ripley of the Santa Fe; President H. U. Mudge of the Chicago, Rock Island & Pacific, and W. C. Nixon, receiver of the St. Louis & San Francisco; and the guests included about 150 prominent railway officers, including the principal officers of the Santa Fe.

Steel Corporation Reduces Quarterly Dividend

The United States Steel Corporation on October 27 reduced its quarterly dividend from 1¼ per cent to one-half of one per cent, thereby placing the common stock on a two per cent basis. It has been on a five per cent basis since June, 1910.

Protection for Innocents

The Union Pacific Bulletin publishes the following letter received by D. E. Burley, general passenger agent of the Oregon Short Line—the "innocent" writer demanding protection from a railroad he had attempted to defraud. It shows, however, that ticket manipulation is becoming a thing of the past:

"Last week while I was in Salt Lake I had an extra railroad ticket good from Salt Lake to Chicago which I did not have no use for. I tried to sell it to several people, including hotel runners, hack men, hotel clerks and porters who, I was told, made a business of handling railroad tickets. None of them wanted to pay me any cash for it, except if they could sell it to some one else. I finally gave it to one of the porters of the ——— hotel, who promised me he could sell it for me next day. When I asked him for the money he denied that he ever saw me. It is simply a case of robbing me of my ticket. Now, Mr. Burley, I think the railroad should protect innocent people against such crooks. This man told me his name was John Smith. He is about 5 ft. 5 in. tall and probably weighs about 140 lb. He is dark complected. I expect to be in Salt Lake some time next January and hope you will have some good news for me."

Defects in Government Regulation

E. P. Ripley, president of the Atchison, Topeka & Santa Fe, and Frank Trumbull, chairman of the board of the Missouri, Kansas & Texas and the Chesapeake & Ohio, were the principal speakers at the dinner of the Knife and Fork Club held at Kansas City on October 24. Mr. Ripley's address is published elsewhere in this issue. Mr. Trumbull's talk was impromptu. He said in part:

"For many years everybody seemed to be wanting to regulate the railways. We told you that if you went ahead indiscriminately you would soon find your own business regulated. The trade commission bill has this significant provision: 'Unfair competition shall be unlawful.' Business men may not know exactly what unfair competition means, but they know that this declaration means trouble. It also means a good deal of work for the lawyers.

"In the railway business, you must not only not do any wrong, but you must not make any mistakes. Such is the nature of the regulation to which we are subjected. And do you suppose that any railway company would have dared to spend $375,000,000 upon any such project as the Panama canal? That will cost you $500,000,000 before it makes returns and then it won't pay a profit. You people will have to foot the bills. Can you imagine what would be done to a railway company that had done as the government has in this instance?

"The rising tide of democracy expresses itself in the criticism of the individual and of the conduct of business. It used to be a matter of pride when a bank was so well managed that it could return a profit of 50 per cent, but if a bank now returns a profit of 25 per cent, it is at once assumed that there is something wrong and that there must be an investigation.

"But the bank legislation is much more intelligently planned in the United States than the railway legislation. We are punished if we attempt to co-operate. The banks who do not co-operate are punished. They are made to act together for the common good; we are forbidden to do so.

"The trouble with regulation of industries in the United States is a division of responsibility, which amounts to a lack of responsibility. The bank has but one master. The railway, for instance, has 50—the federal government, 48 states composing the nation, and that other great state—the state of mind.

"There are many strong men in the country who are now at great personal sacrifice attempting to work out solutions of this problem. We need more of them. We need more of that high patriotism which attempts to handle these matters intelligently for the good of all."

New Haven Annual Meeting

The annual meeting of the stockholders of the New York, New Haven & Hartford was held at New Haven on Wednesday of this week. The number of directors was reduced from 27 to 17, and the board was authorized to establish an executive committee of nine (a majority of the board). The agreement which had been made with the federal authorities at Washington for the relinquishment of the control of the Boston & Maine, in accordance with authority conferred by the stockholders, last April, was ratified by a vote of 899,877 shares to 14,097.

The new members of the board are Benjamin Campbell, vice-president of the road, in charge of traffic; Frank W. Mattison, of Providence; Joseph B. Russell, of Boston, who served on the Meyer minority stockholders' committee of a year ago; Eli

Whitney, of New Haven, also a member of the Meyer committee, and Harris Whittemore, of Naugatuck, Conn., whose father John H. Whittemore, was long a director. The old members re-elected and the dates of their first election are: F. F. Brewster and H. K. McHarg, 1907; T. DeWitt Cuyler, 1910; Francis T. Maxwell and Edward Milligan, 1911; John T. Pratt, 1913; W. Murray Crane, 1913; Howard Elliott, September 1, 1913; Arthur T. Hadley, September 18, 1913; James L. Richards, October 22, 1913; A. S. May, August 11, 1914, and J. H. Harding, September 29, 1914. The election of all directors was substantially unanimous. Among the members now retiring from the board are D. N. Barney, J. S. Hemingway, Robert W. Taft, A. H. Robertson and Samuel Rea. The Pennsylvania Railroad still has a representative on the board in the person of Mr. Cuyler.

President Howard Elliott, in his review of the year said:

"This board of directors for whom you have voted today, containing, as you know, some new names, will devote the best of their time and talents and ability to safeguarding this property. On this list of directors there are no men who participated in those transactions—most of them seven or eight years ago—which have been the subject of much discussion during the last two or three years. So that this board comes to the care of your property fully unprejudiced.

"I feel that if there is a little uplift in the volume of business, a little increase of various rates which we are asking the commissions to grant us, with more efficiency and economy, this road will weather the storm and start, perhaps, to rehabilitate itself and do better for its owners, whether they are bondholders or stockholders."

Annual Meeting of Boston & Maine

An adjourned annual meeting of the stockholders of the Boston & Maine was held at Boston Wednesday of this week. The number of directors was reduced from eighteen to fourteen, and the personnel of the board considerably changed. Five directors, Richard Olney, A. W. Sulloway, Lucius Tuttle, E. F. Greene and Alexander Cochrane, resigned and C. S. Cook, of Portland, Maine, and N. G. Eastman, of Exeter, N. H., were added to the board.

The five trustees agreed on by the federal authorities to manage the majority stock formerly held by the New York, New Haven & Hartford were also added to the directorate. One of the trustees, Frank P. Carpenter, belonged to the old board.

The new board is made up as follows: James H. Hustis, Frederic C. Dumaine, Samuel Carr, James M. Prendergast, Charles W. Bosworth, James D. Upham, George H. Prouty, Frank P. Carpenter, Marcus P. Knowlton, James L. Doherty, Henry B. Day, Charles P. Hall, Charles S. Cook and E. G. Eastman.

Former Chief Justice M P. Knowlton, one of the trustees, made a brief statement. He said

"The corporation is fortunate in its president lately chosen, whose ability and experience give the trustees great hope that, taking advantage of the improved external conditions, if we are favored with them, we shall see the dawn of a brighter day in the financial life of the company.

"With some hesitation, but in accordance with the expressed expectation of the parties to the suit in which they were appointed, the trustees have decided to vote for themselves for directors."

The election was unanimous, 315,513 shares out of 416,543 outstanding being voted.

Railway Electrical Engineers

The seventh annual convention of the Association of Railway Electrical Engineers was held at the LaSalle Hotel, Chicago, October 27 to 30, C. R. Gilman, chief electrical engineer of the Chicago, Milwaukee & St. Paul, presiding. A report of the convention will be published in next week's issue. The following is a list of the companies exhibiting at the convention:

Adams & Westlake Company, Chicago, Ill.—Adlake electric car lighting fixtures, Adlake unity roundhouse and factory lighting fixtures. Represented by G. L. Walters and C. B. Carson.

Benjamin Electric Manufacturing Company, Chicago, Ill.—"Safety First" reflectors for Type C Mazda lamps for yard, train shed and shop lighting; Benjamin lamp grip socket; lighting specialties. Represented by H. E. Watson, A. E. Lubeck, G. B. Weber and R. C. Mons.

Central Electric Company, Chicago, Ill.—Okonite wires, cables, tapes; D. & W. fuses and cut-outs, boxes, maxolite and alexalite lighting units; Abryl glassware; Raleo receptacles and plugs; Diehl fans. Represented by J. M. Lorenz, R. N. Baker, D. W. Woodhead and Allen McNeil.

Crouse-Hinds Company, Syracuse, N. Y.—Conduit fittings for cars, stations, roundhouse and shop requirements, panel boards, knife switches and battery charging outfits. Represented by A. F. Hills, F. F. Skeely, C. M. Crofoot, Walter Fagan, T. J. Fleischer, Charles Dembsky, Edward C. Otto, C. H. Bissell and E. G. Smith.

Geo. Cutter Company, South Bend, Ind.—Sollux lighting units, Mazda arc and Cutter cut-outs. Represented by Otis Duncan, Fred Duncan, C. A. Howe and C. Fuller.

Delta-Star Electric Company, Chicago, Ill.—Automatic and non-automatic train connectors for car lighting; axle generator; charging, welding and shop plugs and receptacles; high tension out-door sub-stations, disconnecting switches, bus-bar supports, choke coils, carbon-tetrachloride fuses, roof and wall entrance tubes, portable high tension testing equipments, cable fault finders. Represented by H. W. Young and A. S. Pearl.

Economy Fuse & Manufacturing Company, Chicago, Ill.—Renewable cartridge fuses. Represented by A. E. Tregenza, W. J. Guntz and J. B. Griffith.

Edison Storage Battery Company, Orange, N. J.—Battery plates in different stages of manufacture; three types of car-lighting cells; two types of signal batteries. Represented by H. G. Thompson, W. F. Bauer, F. V. McGinnis and C. A. Luckey.

Electric Storage Battery Company, Philadelphia, Pa.—Axle-lighting system, new farm lighting, self contained, mounted on skids, for shipment as one unit, Exide and Iron-Clad batteries, standard chloride battery for car lighting. Represented by J. L. Woodbridge, H. M. Beck, Godfrey H. Atkin, T. Milton, F. G. Beetene, O. R. Shortall, J. L. MacBurney and H. B. Marshall.

Federal Sign Company, Chicago, Ill.—Electrical signs, fixtures, lanterns, car inspectors' flashlights. Represented by F. T. Baird and Leonard Shepard.

Flexible Steel Lacing Company, Chicago, Ill.—Alligator bell fasteners and lacing machines. Represented by G. E. Purple.

General Electric Company, Schenectady, N. Y.—New 6-volt turbo-generator equipment for headlight and cab light on steam locomotives; complete conduit and wire arrangement for locomotive installation. Represented by C. C. Bailey, C. H. Jones, B. F. Bilsland, R. H. Parker and S. W. McCune, Jr.

Gould Coupler Company, New York.—Gould simplex system for lighting cars, new stoneware jars for replacing lead-lined wooden tanks. Represented by George G. Milne, G. R. Berger, John T. Dickinson, M. R. Shedd and W. F. Bouche.

Harter Manufacturing Company, Chicago, Ill.—Interior and exterior electric lighting for railway stations and buildings. Represented by W. N. Soffe, C. G. Fries and G. A. Harter.

Holophone Works of G. E. Company, Cleveland, Ohio.—New line of reflectors for series lamps, new prismatic refractor for high candle power wide angles, complete line of metal and glass reflectors, new nitrogen lamps for both out-door and in-door use. Represented by L. C. Doane.

Kerite Insulated Wire & Cable Company, New York.—Samples of insulated wires and cables. Represented by Azel Ames, B. L. Winchell, Jr., P. W. Miller, J. W. Young and G. A. Graber.

Main Belting Company, Philadelphia, Pa.—Reception booth for guests. Represented by W. E. Fawcett and F. A. Zimdars.

National Lamp Works of G. E. Company, Cleveland, Ohio.—All train lighting lamps, locomotive headlight lamps; regular 110-volt multiple lamps; nitrogen lamps, including multiple and street series; lighting units for 1000 watt lamps. Represented by C. W. Bender and L. C. Kent.

National Metal Molding Company, Pittsburgh, Pa.—Sherarduct conduit, completely wired metal molding board, flexible steel conduits, boxes, lock-nuts and bushings, conduit in different stages of manufacture, illustrations of buildings equipped with Sherarduct conduits. Represented by H. C. Moran and I. A. Bennett.

Oneida Steel Pulley Company, Oneida, N. Y.—Keystone axle pulley, corrugated steel bushing, special steel pulley with 2-in. flaring flange. Represented by N. G. Stark.

Okonite Company, New York.—See exhibit of Central Electric Company. Represented by L. G. Martin, Walter Candee and W. J. Kyle.

Peerless V Belt Company, Chicago, Ill.—Peerless V belt drive in connection with axle lighting systems. Represented by J. R. Shays, Jr., and J. E. Cagney.

Pyle-National Electric Headlight Company, Chicago, Ill.—Type E and S generators, improved headlight cases for road and switch engines. Represented by J. Will Johnson, William Miller, J. E. Kilker and C. W. Dabl.

Safety Car Heating & Lighting Company, New York.—Safety axle-lighting system, electric car lighting fixtures, distributing fan. Represented by A. C. Moore, J. H. Rodger, C. A. Pinyard and George E. Hulse.

Sangamo Electric Company, Springfield, Ill.—Meters, watt hour and ampere; meters for electrically lighted passenger cars. Represented by M. B. Southwick.

Western Electric Company, New York City.—Sunbeam lamps, Malin electric interphones, ever-ready flashlights. Represented by George Porter, P. W. Green and G. F. Kelly.

Westinghouse Lamp Company, New York.—Incandescent electric headlights; all forms of multiple Mazda lamps for railway, industrial and residential lighting; Type C Mazda lamps and fixtures for railway yard and station lighting for all forms of multiple and series lighting. Represented by A. J. Cole, W. H. Rollinson, A. M. Brown and J. G. Harvey.

June Mechanical Conventions

At a meeting of the executive committees of the American Railway Master Mechanics' Association, the Master Car Builders' Association and the Railway Supply Manufacturers' Association, held at the Hotel Biltmore, New York, October 22,

it was decided to hold the 1915 conventions at Atlantic City, N. J., June 9 to 16 inclusive. Everything went off very harmoniously, although the conventions missed going to the Pacific coast by a hair; the first test ballot was a tie between that place and Atlantic City as a first choice. Chicago came forward with a strong bid and had quite a number of supporters. It took several ballots to finally decide on Atlantic City. The convention hall will be enlarged about one-third and the entertainment features will probably be about the same as in 1914, the matter being left in the hands of the presidents of the three associations. Headquarters, as before, will be at the Marlborough Blenheim.

MEETINGS AND CONVENTIONS

The following list gives names of secretaries, dates of next or regular meetings, and places of meeting.

Air Brake Association.—F. M. Nellis, 53 State St., Boston, Mass. Next convention, May 4-7, 1915, Hotel Sherman, Chicago.

American Association of Demurrage Officers.—A. G. Thomason, Demurrage Commissioner, Boston, Mass. Annual convention, 1915, Richmond, Va.

American Association of Dining Car Superintendents.—H. C. Boardman, D. L. & W., Hoboken, N. J.

American Association of Freight Agents.—R. O. Wells, Illinois Central, East St. Louis, Ill. Annual meeting, May 21-24, 1915, Richmond, Va.

American Association of General Passenger and Ticket Agents.—W. C. Hope, C. R. R. of N. J., 143 Liberty St., New York.

American Association of Railroad Superintendents.—E. H. Harman, Room 101, Union Station, St. Louis, Mo. Next meeting, May 20-21, 1915, San Francisco, Cal.

American Electric Railway Association.—E. B. Burritt, 29 W. 39th St., New York.

American Electric Railway Manufacturers' Association.—H. C. McConnaughy, 165 Broadway, New York. Meetings with American Electric Railway Association.

American Railway Association.—W. F. Allen, 75 Church St., New York. Semi-annual meeting, November 18, Chicago.

American Railway Bridge and Building Association.—C. A. Lichty, C. & N. W., Chicago.

American Railway Engineering Association.—E. H. Fritch, 900 S. Michigan Ave., Chicago. Next convention, March 16-18, 1915, Chicago.

American Railway Master Mechanics' Association.—J. W. Taylor, 1112 Karpen Bldg., Chicago. Annual meeting, June 9-11, 1915, Atlantic City, N. J.

American Railway Safety Association.—L. F. Shedd, C. R. I. & P., Chicago. Next meeting, November, Chicago.

American Railway Tool Foremen's Association.—A. R. Davis, Central of Georgia, Macon, Ga. Annual meeting, July, 1915.

American Society for Testing Materials.—Prof. E. Marburg, University of Pennsylvania, Philadelphia, Pa.

American Society of Civil Engineers.—Chas. W. Hunt, 220 W. 57th St., New York. Regular meetings, 1st and 3d Wednesday in month, except June, July and August, 220 W. 57th St., New York.

American Society of Engineering Contractors.—J. R. Wemlinger, 11 Broadway, New York. Regular meetings, 2d Thursday in month, at 2 P. M., 11 Broadway, New York.

American Society of Mechanical Engineers.—Calvin W. Rice, 29 W. 39th St., New York. Annual meeting, December 1-4, 1914, New York.

American Wood Preservers' Association.—F. J. Angier, B. & O., Mt. Royal Sta., Baltimore, Md. Next convention, January 19-21, 1915, Chicago.

Association of American Railway Accounting Officers.—E. R. Woodson, 1300 Pennsylvania Ave., N. W., Washington, D. C. Annual convention, April 28, 1915, Atlanta, Ga.

Association of Manufacturers of Chilled Car Wheels.—George W. Lyndon, 1214 McCormick Bldg., Chicago.

Association of Railway Claim Agents.—C. W. Egan, B. & O., Baltimore, Md. Annual meeting, 3d week in May, 1915, Galveston, Tex.

Association of Railway Electrical Engineers.—Jos. A. Andreucetti, C. & N. W., Room 411, C. & N. W. Sta., Chicago.

Association of Railway Telegraph Superintendents.—P. W. Drew, Soo Line, 112 West Adams St., Chicago. Annual meeting, June 22-25, 1915, Rochester, N. Y.

Association of Transportation and Car Accounting Officers.—G. P. Conard, 75 Church St., New York. Next meeting, December 8-9,

Bridge and Building Supply Men's Association.—L. D. Mitchell, Detroit Graphite Co., Chicago, Ill. Meetings with American Railway Bridge and Building Association.

Canadian Railway Club.—James Powell, Grand Trunk, P. O. Box 7, St. Lambert (near Montreal), Que. Regular meetings, 2d Tuesday in month, except June, July and August, Windsor Hotel, Montreal, Que.

Canadian Society of Civil Engineers.—Clement H. McLeod, 176 Mansfield St., Montreal, Que. Regular meetings, 1st Thursday in October, November, December, February, March and April. Annual meeting, January, Montreal.

Car Foremen's Association of Chicago.—Aaron Kline, 841 Lawler Ave., Chicago. Regular meetings, 2d Monday in month, except July and August, Lytton Bldg., Chicago.

Central Railway Club.—H. D. Vought, 95 Liberty St., New York. Regular meetings, 2d Friday in January, May, September and November. Annual meetings, 2d Thursday in March, Hotel Statler, Buffalo, N. Y.

Engineers' Society of Western Pennsylvania.—Elmer K. Hiles, 2511 Oliver Bldg., Pittsburgh, Pa. Regular meetings, 1st and 3d Tuesday, Pittsburgh.

Freight Claim Association.—Warren P. Taylor, R. F. & P., Richmond, Va. Annual meeting, June 16, 1915, Chicago.

General Superintendents' Association of Chicago.—A. M. Hunter, 321 Grand Central Station, Chicago. Regular meetings, Wednesday, preceding 3d Thursday in month, Room 1856, Transportation Bldg., Chicago.

International Railway Congress.—Executive Committee, 11, Rue de Louvain, Brussels, Belgium. Next convention, June 23 to July 6, 1915, Berlin.

International Railway Fuel Association.—C. G. Hall, C. & E. I., 922 McCormick Bldg., Chicago. Annual meeting, May 17-20, 1915, Chicago.

International Railway General Foremen's Association.—Wm. Hall, 829 W. Broadway, Winona, Minn. Next convention, July 14-17, 1915, Sherman House, Chicago.

International Railroad Master Blacksmiths' Association.—A. L. Woodworth, C. H. & D., Lima, Ohio.

Maintenance of Way and Master Painters' Association of the United States and Canada.—T. I. Goodwin, C. R. I. & P., Eldon, Mo. Next convention, November 17-19, 1914, Detroit, Mich.

Master Boiler Makers' Association.—Harry D. Vought, 95 Liberty St., New York. Annual convention, May, 1915.

Master Car and Locomotive Painters' Association of the United States and Canada.—A. P. Dane, B. & M., Reading, Mass. Next convention, September 14-17, 1915, Detroit, Mich.

Master Car Builders' Association.—J. W. Taylor, 1112 Karpen Bldg., Chicago. Annual meeting, June 14-16, 1915, Atlantic City, N. J.

National Railway Appliances Association.—Bruce V. Crandall, 537 So. Dearborn St., Chicago. Next convention, March 15-19, 1915, Chicago.

New England Railroad Club.—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass. Regular meetings, 2d Tuesday in month, except June, July, August and September, Boston.

New York Railroad Club.—Harry D. Vought, 95 Liberty St., New York. Regular meetings, 3d Friday in month, except June, July and August, 29 W. 39th St., New York.

Niagara Frontier Car Men's Association.—E. Frankenberger, 623 Brisbane Bldg., Buffalo, N. Y. Meetings monthly.

Peoria Association of Railroad Officers.—M. W. Rotchford, Union Station, Peoria, Ill. Regular meetings, 2d Thursday in month, Jefferson Hotel, Peoria.

Railroad Club of Kansas City.—C. Manlove, 1008 Walnut St., Kansas City, Mo. Regular meetings, 3d Friday in month, Kansas City.

Railroad Master Tinners, Coppersmiths and Pipefitters' Association.—U. G. Thompson, C. & E. I., Danville, Ill. Annual meeting, May, 1915.

Railway Business Association.—Frank W. Noxon, 30 Church St., New York. Annual meeting, December 10, 1914, Waldorf-Astoria Hotel, New York.

Railway Club of Pittsburgh.—J. B. Anderson, Room 207, P. R. R. Sta., Pittsburgh, Pa. Regular meetings, 4th Friday in month, except June, July and August, Monongahela House, Pittsburgh.

Railway Electrical Supply Manufacturers' Association.—J. Scribner, 1021 Monadnock Block, Chicago. Meetings with Association of Railway Electrical Engineers.

Railway Fire Protection Association.—C. B. Edwards, Fire Ins. Agt., Mobile & Ohio, Mobile, Ala.

Railway Signal Association.—C. C. Rosenberg, Times Bldg., Bethlehem, Pa.

Railway Storekeepers' Association.—J. P. Murphy, L. S. & M. S., Box C, Collinwood, Ohio. Annual meeting, May, 1915.

Railway Supply Manufacturers' Association.—J. D. Conway, 2136 Oliver Bldg., Pittsburgh, Pa. Meetings with Master Car Builders and Master Mechanics Associations.

Railway Telegraph and Telephone Appliance Association.—G. A. Nelson, 50 Church St., New York. Meetings with Association of Railway Telegraph Superintendents.

Richmond Railroad Club.—F. O. Robinson, C. & O., Richmond, Va. Regular meetings, 2d Monday in month, except June, July and August.

Roadmasters' and Maintenance of Way Association.—L. C. Ryan, C. & N. W., Sterling, Ill.

St Louis Railway Club.—B. W. Frauenthal, Union Station, St. Louis, Mo. Regular meetings, 2d Friday in month, except June, July and August, St. Louis.

Salt Lake Transportation Club.—R. E. Rowland, Hotel Utah Bldg., Salt Lake City, Utah. Regular meetings, 1st Saturday of each month, Salt Lake City.

Signal Appliance Association.—F. W. Edmunds, 3868 Park Ave., New York. Meeting with annual convention Railway Signal Association.

Society of Railway Financial Officers.—Carl Nyquist, C. R. I. & P., La Salle St. Sta., Chicago.

Southern Association of Car Service Officers.—E. W. Sandwich, A. & W. P. Ry., Atlanta, Ga. Next regular meeting, January 21, 1915, Atlanta, Ga.

Southern and Southwestern Railway Club.—A. J. Merrill, Grant Bldg., Atlanta, Ga. Regular meetings, 3d Thursday, January, March, May, July, September, November, 10 A. M., Candler Bldg., Atlanta.

Toledo Transportation Club.—Harry S. Fox, Toledo, Ohio. Regular meetings, 1st Saturday in month, Boody House, Toledo.

Track Supply Association.—W. C. Kidd, Ramapo Iron Works, Hillburn, N. Y. Meetings with Roadmasters' and Maintenance of Way Association.

Traffic Club of Chicago.—W. H. Wharton, La Salle Hotel, Chicago.

Traffic Club of New York.—C. A. Swope, 291 Broadway, New York. Regular meetings last Tuesday in month, except June, July and August, Waldorf-Astoria, New York.

Traffic Club of Pittsburgh.—D. L. Wells, Erie R. R., Pittsburgh, Pa. Meetings bimonthly, Pittsburgh. Annual meeting, 2d Monday in June.

Traffic Club of St. Louis.—A. F. Versen, Mercantile Library Bldg., St. Louis, Mo. Annual meeting in November. Noonday meetings October to May.

Train Despatchers' Association of America.—J. F. Mackie, 7122 Stewart Ave., Chicago. Annual meeting June 15, 1915, Minneapolis, Minn.

Transportation Club of Detroit.—W. E. Brierley, Superintendent's office, L. S. & M. S., Detroit, Mich. Meetings monthly, Normandie Hotel, Detroit.

Traveling Engineers' Association.—W. O. Thompson, N. Y. C. & H. R., East Buffalo, N. Y.

Western Canada Railway Club.—W. H. Rosevear, P. O. Box 1707, Winnipeg, Man. Regular meetings, 2d Monday, except June, July and August, Winnipeg.

Western Railway Club.—J. W. Taylor, 1112 Karpen Bldg., Chicago. Regular meetings, 3d Tuesday in month, except June, July and August, Karpen Bldg., Chicago.

Western Society of Engineers.—J. H. Warder, 1735 Monadnock Block, Chicago. Regular meetings, 1st Monday in month, except January, July and August, Chicago. Extra meetings, except in July and August, generally on other Monday evenings.

Traffic News

The Chicago & North Western and the Chicago, Burlington & Quincy have announced a reduction of passenger fares in the state of Wyoming from 4 cents a mile to 3 cents a mile, applying between all stations in the state. A similar reduction was made several years ago by the Union Pacific.

The advance of approximately five per cent in freight rates in Central Freight Association territory allowed by the Interstate Commerce Commission went into effect on October 26. The increase applies to all interstate class rates and to most commodity rates, with the exception of heavy, low grade articles, such as coal, coke, iron ore, cement, plaster, etc.

will be advanced. The result as a whole will be a much more scientific and logical set of rates and a slightly higher basis. The freight tariffs will be filed with the proper commissions between now and January 1, and it is hoped that they will be approved."

Car Surpluses and Shortages

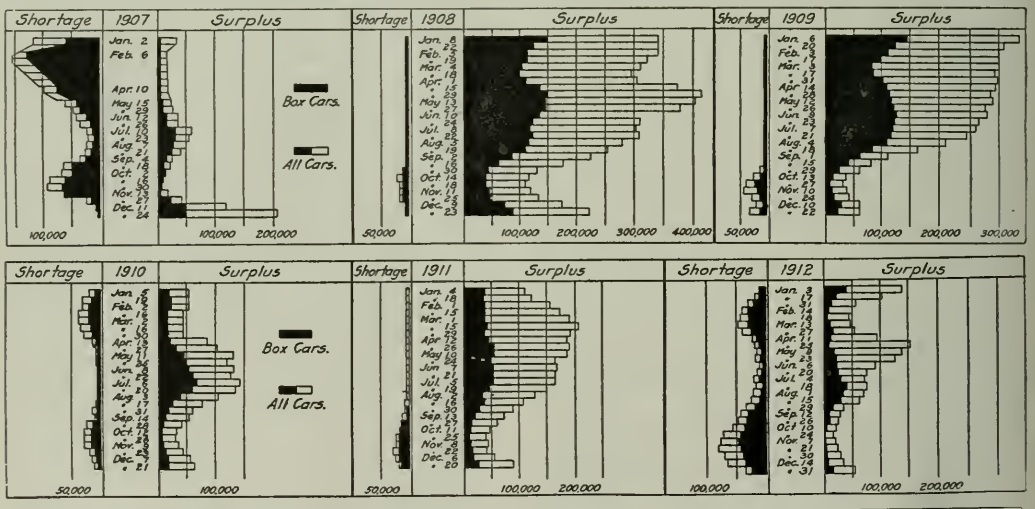
Arthur Hale, chairman of the committee on relations between railroads of the American Railway Association, in presenting statistical bulletin No. 177-A, giving a summary of car surpluses and shortages by groups from June 14, 1913, to October 15, 1914, says: The total surplus increased approximately 21,000 in the past two weeks, and stands at 154,342, the largest for the same period in any year since the publication of these bulletins.

The total surplus on October 15, 1914, was 154,342 cars; on October 1, 1914, 133,382 cars, and on October 15, 1913, 37,198 cars. The prior maximum record was on October 14, 1908, when the surplus was 115,036 cars.

CAR SURPLUSES AND SHORTAGES

Date	No. of roads.	Surpluses Box.	Flat.	Coal, gondola and hopper.	Other kinds.	Total.	Shortages Box.	Flat.	Coal, gondola and hopper.	Other kinds.	Total.
Group *1.—October 15, 1914	9	0	550	492	557	1,599	443	0	0	7	450
" 2.— " 15, 1914	33	3,288	472	5,249	2,869	11,878	10	0	20	0	30
" 3.— " 15, 1914	30	5,649	1,977	20,826	4,070	32,522	130	4	0	268	402
" 4.— " 15, 1914	12	5,212	2,081	5,819	995	14,107	0	30	185	0	215
" 5.— " 15, 1914	26	1,337	939	4,206	1,542	8,024	30	2	0	0	32
" 6.— " 15, 1914	30	17,402	1,722	5,717	7,322	32,163	4	2	0	0	6
" 7.— " 15, 1914	4	1,834	29	584	384	2,831	0	0	10	40	50
" 8.— " 15, 1914	16	2,574	420	1,703	2,752	7,449	155	0	273	33	461
" 9.— " 15, 1914	14	1,000	159	167	987	2,313	16	0	8	0	24
" 10.— " 15, 1914	22	8,067	1,187	2,454	8,879	20,587	0	562	88	40	690
" 11.— " 15, 1914	6	17,552	1,688	0	1,629	20,869	0	0	0	0	0
Total	202	63,915	11,224	47,217	31,986	154,342	788	600	584	388	2,360

*Group 1 is composed of New England lines; Group 2—New York, New Jersey, Delaware, Maryland and Eastern Pennsylvania lines; Group 3—Ohio, Indiana, Michigan and Western Pennsylvania lines; Group 4—West Virginia, Virginia, North and South Carolina lines; Group 5—Kentucky, Tennessee, Mississippi, Alabama, Georgia and Florida lines; Group 6—Iowa, Illinois, Wisconsin and Minnesota lines; Group 7—Montana, Wyoming, Nebraska, North Dakota and South Dakota lines; Group 8—Kansas, Colorado, Missouri, Arkansas and Oklahoma lines; Group 9—Texas, Louisiana and New Mexico lines; Group 10—Washington, Oregon, Idaho, California, Nevada and Arizona lines; Group 11—Canadian lines.



Car Surpluses and Shortages, 1907 to 1914

The Portland Commercial Club has issued a call for a meeting of the commercial bodies in the northwest to be held in Seattle on November 5, for the purpose of organizing a protest against the arbitrary of $17.50 which is to be charged by the Southern Pacific between San Francisco and North Pacific coast points. Transcontinental round trip fares to the Panama-Pacific Exposition next year for those who travel by the northern route will be $17.50 higher than the fare by the direct route.

The New York, New Haven & Hartford announce that a new tariff, adjusting the merchandise and class rates, is being prepared, and one adjusting the commodity rates. "Every effort has been made to eliminate discrimination and remove inequalities. Some rates in the new tariffs will be reduced and some

Almost one-half of the surplus increase is in coal cars. This class of equipment increased generally in all sections except group 1 (New England) and group 9 (southwest) where there is a slight decrease.

Surplus box cars show a large increase in group 6 (northwest) and lesser increases in eastern states, central freight association territory and on Canadian roads. There is also a considerable increase in surplus miscellaneous cars in the northwest.

The total shortage on October 15, 1914, was 2,360 cars; on October 1, 1914, 2,355 cars, and on October 15, 1913, 43,246 cars.

There is practically no change in the total shortage.

The accompanying table gives car surplus and shortage figures by groups for the last period covered in the report and the diagram shows total bi-weekly surpluses and shortages from 1907 to 1914.

Increased Illinois Intrastate Rates Opposed

The Chicago Association of Commerce has announced its intention of opposing before the Illinois Public Utilities Commission the putting into effect of the five per cent increase in intrastate freight rates, tariffs for which were recently filed by the roads. This association did not oppose the five per cent increase in interstate rates before the Interstate Commerce Commission, except as applied to lake and rail rates, but will oppose the Illinois rates on the ground that the situation is different, in that the Illinois rates are already considerably higher than the prevailing level of rates in Central Freight Association territory. The Illinois Manufacturers' Association has not yet announced its position.

Waste in Personal Injury Claim Payments

H. G. Askew, statistician for the Texas railways, reports that 35 of the companies in the fiscal year ending June 30 last, paid out for personal injury claims $2,846,117, an increase of $80,118 over the amount paid for the preceding year. Mr. Askew says:

"Those who have given the subject of personal injury payments the closest study aver that not over one-half of the vast total paid by railroads in settlement of personal injury cases reaches those injured or the heirs of those who are victims of accidents incidental to transportation. If this statement is to be accepted, it is apparent that for the last fiscal year 35 railroads paid out $1,423,058, which amount under any system of economics having standing can be denominated only as waste. At 10 cents a pound this wasted sum would be sufficient to purchase over 56,922 bales of cotton. At the average yield of cotton in Texas during the present year it would require almost 170,000 acres to produce the cotton that could have been purchased by the waste incidental to methods that prevail under legislative sanction for the handling of personal injury cases.

"This wastefulness is accounted for in many ways. It should be borne in mind that all expenses of railroads, except legal expenses, in handling personal injury cases, are by law charged to operating accounts. The prevailing contingent fees charged by attorneys for claimants will run from one-fourth to one-half of the sums recovered. The court and witness expenses of railroads and claimants will bring the total amount paid out by railroads to a figure that makes the estimate of 50 per cent reasonable—that is, those who have suffered the injuries, in the long run, receive but half the sums paid out by the railroads. Payments for personal injuries are by law made a part of the operating expenses of railroads. The higher these operating expenses are, necessarily the higher must be the freight rates, for railroads have but one way of collecting money that must be charged by them in payment of damages, and that is from the producers and consumers who pay the rates of freight that are fixed by agents of the people selected by the people. As long as this wasteful method of handling personal injury cases is permitted to prevail in the end, the people must themselves bear the entire burden thereof, either in depreciated service or in other inconvenience that necessarily follows lack of sufficient funds."

Railway Construction in Cuba.—Papers were recently signed in Havana for the organization of the Ferrocarril del Norte Occidental, with a capital of $60,000, which will build a railroad along the north coast of Cuba from Havana to Mantua, touching several important towns in the provinces of Havana and Pinar del Rio.

Commission and Court News

INTERSTATE COMMERCE COMMISSION

The Interstate Commerce Commission has adopted a conference ruling providing that on all claims accruing on and after November 1, 1914, for overcharges on freight, interest shall be awarded in connection with reparation granted on the informal docket in the same manner as it is now awarded in contested cases.

The Oklahoma Traffic Association has filed with the Interstate Commerce Commission a complaint charging discrimination in the rates on agricultural implements from St. Louis, Chicago, Moline and Rock Island, Ill., and other points to Oklahoma City, as compared with the rates to Kansas City, Joplin and Springfield, Mo., and other points.

Divisions Determined by Commission Order

In re rates on lumber and other forest products from points in Arkansas and other states to points in Iowa, Minnesota and other states. Opinion by Commissioner McChord:

In original report in this case given in 30 I. C. C., 371, and reported in the *Railway Age Gazette* of May 29, page 1210, the commission refused to sanction an increase of approximately one cent per 100 lb. on the rates of lumber and other forest products from points on the St. Louis Southwestern in Arkansas and other states to points in Iowa, Minnesota and other states proposed primarily as a result of a controversy concerning divisions. At the end of 60 days the carriers have been unable to determine the divisions of the existing rates with the result that the commission finds it necessary to prescribe divisions as follows: On lumber destined to points on the Chicago, Burlington & Quincy, the revenue is to be divided on the basis of 18 cents to East St. Louis and the balance to the lines beyond; on lumber shipped to Des Moines, Iowa, via the Wabash division will be made on the basis of 65.4 per cent to East St. Louis and 35.4 per cent beyond, the result being a division to the St. Louis Southwestern of 16.5 cents per cent, and to the Wabash of 8.5 cents. (31 I. C. C., 673.)

Sleeping Car Fares Upheld

Commercial Club of the city of Sioux Falls v. Pullman Company et al Opinion by Commissioner Daniels:

The commission finds that the sleeping-car rates of $2 for a lower and $1.60 for an upper berth between Sioux Falls, S. Dak., and St. Paul and Minneapolis, Minn., are not unreasonable. This service is performed by the Pullman Company, operating over the Chicago, St. Paul, Minneapolis & Omaha, and the Great Northern operating its own sleeping cars. The commission finds that although the rates to some nearby points are lower, principally because of competition, the service to some of them is actually operated at a loss. It was alleged that the berth-mile rate of 8 mills is unreasonable, but the commission in its report gives the following expression of opinion: "The value to the passenger of sleeping-car occupancy can not be gaged by exactly the same standards as passenger transportation by day. To the latter, mileage, in the absence of unusual conditions, may be applied as a fair rule of the value of the service. The bare service of transportation to the occupant of a sleeping car, however, has been covered in the first instance by the passenger fare paid. The value of the occupancy of a sleeping car over and above the value of being carried a certain distance is found primarily in obtaining a night's rest under as comfortable conditions as compatible with railroad travel, essentially a night's lodgings; and secondly, in the keeping intact for the transaction of business the daylight hours which otherwise would be spent in covering distance. If the physical conditions under which transportation is conducted were invariably the same, if the speed of sleeping cars were uniformly the same, if the traffic density on all sleeping-car lines were the same, and if detraining during the night imposed no discomfort, mileage might possibly be taken as a measure of the value of sleeping-car occupancy. But it then would be a fair test because it would roughly measure the advantage of a night's occupancy of the sleeper to the passenger

and the cost of service to the carrier. What the patron of a sleeper seeks first is a night's rest, and for this he pays as he would for a hotel room, for a unit service, and this service is approximately the same whether the car be hauled 200 or 300 miles during the sleeping hours. Whether a berth has been in use 4 hours or 10 hours, as a rule it can not again during the same night be made a source of revenue to the carrier. Hence, berth-mile rates are of little comparative value, and are not controlling in fixing rates for the occupancy of sleeping cars." (31 I. C. C., 654.)

Rates on Coal to Weatherford, Tex.

Weatherford Chamber of Commerce et al. v. Missouri, Kansas & Texas et al. Opinion by Commissioner Daniels:

The commission finds that the present carload rates of $2.50 per ton on lump coal and $1.70 per ton on slack coal from mines in Oklahoma and western Arkansas to Weatherford, Tex., are unjust and discriminatory, and it is ordered that rates not exceeding $2.25 per ton on lump and $1.65 on slack coal be established. (31 I. C. C., 665.)

The Eastern Rate-Advance Case

The application of the Easten railroads for further consideration of their request for authority to increase freight rates, with the testimony of Messrs. Willard, Conant, Strauss and others, before the commission at Washington, was reported in part last week, page 729.

On Wednesday the commission heard Lawrence Chamberlain, of Kountze Brothers, the New York bankers. Mr. Chamberlain appeared as the representative of the Investment Bankers' Association of America. He gave reasons why the commission should grant a 5 per cent increase in freight rates, if only, to keep up the credit of the carriers. The investment bankers believe it would be a wise thing for the commission to grant the increase even if it were solely for the purpose of renewing confidence in railroad securities. They wanted the increase for its psychological effect. For some years there had been an increasing reluctance to buy railroad bonds and this reluctance became so acute during the past year that American investors have refused to buy the highest grade of standard railroad bonds at better than panic prices. He mentioned a series of American railroads, with details, whose bonds were lower than at any time in 16 years. He had been informed by the committee which regulates transactions since the close of the Stock Exchange that no railroad securities have sold as high as on closing day.

Samuel Rea, president of the Pennsylvania, testified at length. He said that he considered the situation caused by the European war a sufficient reason for the commission to grant what the railroads ask. The commission in its report of July 29 recognized the need for more revenues for the carriers and the 1914 financial returns clearly indicate that this necessity has now become vital. The returns for July and August show a decline in gross earnings of about 6 per cent, as compared with a loss of less than 3½ per cent for the entire year 1913. The companies have been compelled by reason of this to continue the forced retrenchment in operating expenses. But the retrenchment policy and practice will not produce real savings in expenses or real increase in net profits, for sooner or later the property and equipment must be brought up to standard. It may be that since June 30 as the result of drastic retrenchments some railroads will show slightly better net operating results.

"Such apparent improvement is of little mutual benefit. It must also be remembered that the railroads are continually increasing their investment in road and equipment, on which increase they should earn an adequate return.

"Had the railroads before the war been in a sound, healthy condition it might have been claimed that in so far as their volume of business was temporarily affected thereby the burden was one which the railroads should have assumed. . . . The railroads, however, are subject to regulation by public authority covering not merely the rates they shall charge but many of the conditions affecting their operating costs and methods; they are and have been placed in a category entirely distinct from that of industries not subject to such regulation. They should be in such a position of health that they could withstand their proper burden during a period of general adversity such as this, so that with an improvement in business they might be in a position to render a proper and adequate service and earn a fair return on their property investment.

"The question here is not whether the commission shall advance rates merely in order to sustain security prices, or even to continue dividends; although important, that is but one phase of a big question. This petition is for an advance in rates, which it is hoped will result in enabling the carriers to provide the proper facilities, improvements and service needed by the public and earn an adequate return on property investment.

"The existence of a crisis in the affairs of these roads can no longer be questioned. Having earned a return of only 3.99 per cent in 1914 on the property investment, with operating revenue progressively diminishing since the close of the fiscal year, with practically all improvement work suspended, with forces largely reduced, with passenger and freight train service curtailed and maintenance of roadway and equipment deferred, this is a time for very definite and certain relief.

"In addition to whatever may be eventually realized from the methods for obtaining additional revenues suggested tentatively by the commission the situation is one that calls for positive and immediate treatment on the broadest scale within the powers of the commission."

Mr. Rea said that the Pennsylvania now had 35,000 freight cars in need of repairs and out of use on account of the inadequacy of revenue and that 329 locomotives were likewise tied up for the same reason.

Clifford Thorne made the final statement to the commission. "The railroads are asking for a sort of war tax," said Mr. Thorne. "They are asking the government to lift the burden off a part of the community and shift it over on to the shoulders of others. They ask the wage earner who has lost his job, the cotton planter who cannot sell his cotton and the manufacturer who has been compelled to close his shop to carry the burden of the railroads in addition to their own." He said that the present emergency could be met either by the use of accumulated surplus or by a slight reduction in dividend rates. The very purpose of allowing the railways to accumulate the large surpluses shown in their reports had been to meet just such a situation as now confronts the country.

STATE COMMISSIONS

The Michigan Railroad Commission after a number of hearings has authorized the railroads of the state to increase class rates approximately 5 per cent. The commission some time ago allowed a number of commodity rate increases asked by the railroads to go into effect, but in its decision on class rates made some modifications in the request of the railroads.

The Indiana Public Service Commission has suspended the freight tariffs of Indiana railroads on intrastate business, showing increased rates, which were to have gone into effect October 26 and November 16. The suspension order was for thirty days, to November 20, and it is expected that a hearing on the entire rate question will be held before that time and the controversy settled by the commission. It is said that some members of the commission are extremely busy in a political way just now.

The Illinois Public Utilities Commission has handed down a decision that the issue of transportation by railroads for advertising space is illegal. The commission declares that to authorize such an exchange would defeat the purpose of the law, which requires the filing of rates and schedules with the commission. The commission says that no information of real value would be obtainable where an effort was made to ascertain what rates and charges were being made for service rendered in the way of transportation. "If compensation for transportation may be paid by advertising in newspapers," said the commission, "then on the same principle transportation may be paid for under any arrangement of barter, exchange or trade on the same basis that property is transferred from one to another. Values of property other than money rest solely within the judgment of men. There is no fixed standard by which a certain quantity of property of any kind can be said to equal at all times a definite sum of money. Confusion, discrimination and inequality would certainly attend such contracts if permitted under the law."

PERSONNEL OF COMMISSIONS

W. B. Nantel, formerly minister of inland revenue in the Borden cabinet of the Canadian government, has been appointed a member of the Railway Commission of Canada, succeeding N. E. Bernier.

COURT NEWS

The Arkansas Supreme Court has sustained the validity of the extra crew law passed by the last legislature.

The state of Illinois on October 26, through the attorney-general, filed a petition in the circuit court for a writ of mandamus compelling the Board of Review to impose a tax on the Illinois Central on certain property which it is claimed the railroad has never filed for taxation, consisting of securities of other corporations and real estate, of a value estimated in the petition at $80,000,000.

Suit Against Atlantic Steamship Conference Dismissed

The United States circuit court at New York has handed down a decision in the suit instituted by the government on January 4, 1911, against the lines comprising the Atlantic Steamship Conference, charging conspiracy in restraint of trade, under the Sherman anti-trust law.

The decision dismissed all but one of the contentions made by the government. The court restrains the steamship lines in the conference from sending out "fighting ships" or steamers selected by the members of the conference to carry passengers at lower rates than competing lines, and thus drive the competing lines out of business. In all other respects the court gives a clean bill of health to the steamship conference which, according to the government, comprised steamship lines carrying upward of 90 per cent of all the steerage passenger traffic between Europe and North America at the time of the institution of the suit. The fixing of rates charged against the conference only appertained to steerage rates. The decision was reached by Judges Lacombe, Coxe, Ward and Rogers, sitting as an expediting court in order to eliminate the intermediate step in the appeal which is to be taken. Special Assistant Attorney General Henry A. Guiler has announced his intention of carrying the case to the United States Supreme Court.

Judge Lacombe was selected by his associates to write the decision. He applies the rules of reason established in the Standard Oil and Tobacco decisions by the Supreme Court. The Atlantic conference, he holds, is not an unreasonable monopoly, but has done much good in the way of insuring better service to the public. The defendants are not even required to defray the costs of court. The decision exempts the Canadian Pacific and the Allan Line from the "fighting ship" injunction, because those two lines desisted from the practice of using these vessels before the government's bill was filed.

In reference to the "fighting ships," Judge Lacombe says:

"Upon occasion when some steamship owner or charterer, not a member of the conference, has put a vessel on a berth adjoining the one from which vessels of the conference were about to sail and has offered to carry passengers at a lower rate than that asked by such member, an extra vessel has been put on, ostensibly by one of the lines of the conference, but really by the conference itself, at the same or a lower rate, and all have co-operated to furnish such a 'fighting ship,' and thereby keep out competition. This seems clearly to be within the prohibition of the act: the case is analogous to that presented in the United States versus the Eastern States Retail Lumber Dealers' Association."

The government claimed that the Russian volunteer fleet and the Uranium Steamship Company were driven out of business by the methods of the conference, and that the conference, after their annihilation, raised the steerage rates to artificial prices.

Judge Lacombe further states: "The testimony fails to satisfy us that the defendants, or any of them, have charged excessive or exorbitant rates for the transportation of passengers of any class, especially when it is considered that vastly more in the way of safety, speed, sanitary conditions, physical comforts, etc., is now given to the passenger than was given to him before the agreements and conferences were entered into."

The defendant companies were: The Hamburg-American Line; Allan Steamship Company; Canadian Pacific Steamship Company; the International Mercantile Marine; the International Navigation Company; Cunard Steamship Company, Ltd.; British and North Atlantic Steam Navigation Company, Ltd. (Dominion Line); Holland-American Line; North German Lloyd; Red Star Line; Russian East Asiatic Steamship Company, Ltd. (Russian-American Line); Oceanic Steam Navigation Company, Ltd. (White Star Line).

Railway Officers

Executive, Financial, Legal and Accounting

Walter L. Ross, president of the Toledo, St. Louis & Western, with headquarters at Toledo, Ohio, has been appointed receiver for that road by Judge John M. Killits.

W. H. Biggar, general counsel of the Grand Trunk and the Grand Trunk Pacific, with headquarters at Montreal, Que., has been elected vice-president and general counsel of the Grand Trunk Pacific.

James Moore, who has been paymaster of the Atchison, Topeka & Santa Fe for 43 years, will retire on account of ill health on November 1. He will be succeeded by W. C. Reichenbach, with headquarters at Topeka, Kan.

P. E. Clark, vice-president of the Tennessee, Kentucky & Northern, has been elected president, succeeding George A. Clark, deceased, and T. C. McCampbell, general auditor, succeeds P. E. Clark as vice-president; both with headquarters at Nashville, Tenn.

Operating

H. Adkins, general superintendent and chief engineer of the Tennessee, Kentucky & Northern, has been appointed general manager, with headquarters at Nashville, Tenn.

A. N. Williams, formerly trainmaster of the Missouri, Kansas & Texas at Denison, Tex., has been appointed trainmaster of the Chicago, Rock Island & Pacific at Estherville, Iowa.

John Malcolm Rapelje, assistant general manager of the Northern Pacific, at St. Paul, Minn., has been appointed general manager of the lines east of Paradise, Mont., succeeding E. A. Goodell, deceased, and the position of assistant general manager has been abolished. Mr. Rapelje was born on January 22, 1857, at Chippewa, Ont., and was educated in the common schools. He began railway work in August, 1879, as a brakeman on the Grand Trunk, and then became a fireman on the Atchison, Topeka & Santa Fe. From May, 1882, to November, 1887, he was conductor on the Canadian Pacific, and from January of the following year to June, 1898, was conductor on the Yellowstone division of the Northern Pacific. He was then appointed, trainmaster on the same division, and subsequently became conductor until June, 1902, when he again became trainmaster on the same division. From April, 1905, to July, 1908, he was superintendent of the same division at Glendive, Mont., and then to May, 1910, was superintendent of the Rocky Mountain division at Missoula, Mont. He was then superintendent of the Idaho division at Spokane, Wash., until April, 1912, when he was appointed general superintendent of the lines from Mandan, N. D., to Paradise, Mont., with headquarters at Livingston, Mont. In May, 1914, he was appointed assistant general manager at St. Paul, Minn., which position he held at the time of his recent appointment as general manager of the same road as above noted.

J. M. Rapelje

Traffic

H. L. Shepherd has been appointed foreign freight agent of the Rock Island Lines at Galveston, Tex.

H. C. Hamilton, assistant general freight agent of the Lehigh Valley, at Buffalo, N. Y., has been appointed general freight agent, with headquarters at New York, and S. A. Story, through freight agent at Buffalo, has been appointed assistant general freight agent, with office at Buffalo.

Engineering and Rolling Stock

A. C. Bradley has been appointed division engineer of the Oklahoma division of the Chicago, Rock Island & Pacific at El Reno, Okla., in place of Garrett Davis, who has been promoted to a position in connection with the valuation work, with office in Chicago.

W. P. Kimble, division engineer of the Erie at Marion, Ohio, with jurisdiction between Kent and Dayton, has been transferred to the Marion-Dayton division. R. H. Boykin, supervisor of the third division at Marion, with jurisdiction between Kent and West Salem, has been appointed division engineer with jurisdiction between Marion and Kent. K. W. Collister, supervisor of the fourth division at Marion, has resigned.

T. McHattie, master mechanic of the Grand Trunk at Montreal, Que., has been appointed master mechanic of the Eastern lines, with headquarters at Montreal; W. H. Sample, master mechanic at Ottawa, Ont., has been appointed master mechanic of the Western lines, with headquarters at Battle Creek, Mich., succeeding G. Vliet, deceased; J. Markey, master mechanic at Toronto, Ont., has been appointed master mechanic of the Ontario lines, with headquarters at Toronto; J. R. Donnelley, master mechanic of the Northern division at Allandale, has been appointed assistant master mechanic of the Ontario lines, with headquarters at Allandale, and the titles of master mechanic of the Ottawa division, and the Northern division, are abolished.

OBITUARY

J. Hull Browning, formerly president of the Northern of New Jersey, a subsidiary of the Erie, died on October 26, in New York, at the age of 72.

Brayton Ives, formerly from October, 1893, to 1896, president of the Northern Pacific, died on October 22, at his summer home in Ossining, N. Y. He was born in 1840, at Farmington, Conn., and was graduated from Yale University in 1861. He served in the United States army during the civil war and rose to the position of brigadier general of volunteers. Mr. Ives was president of the New York stock exchange from 1876 to 1880, and subsequently was president of the Western National bank of New York. He was then president of the Northern Pacific for about three years, and later served as president of the Metropolitan Trust Company. He also was a director and president of a number of industrial corporations.

Edward Francis Winslow, formerly president of the St. Louis & San Francisco, died on October 22, at Canandaigua, N. Y. He was born on September 28, 1837, at Augusta, Me., and began railway work in 1860. He then served in the United States army during the civil war and rose to the position of brigadier general of volunteers. From 1867 to 1868 he was the chief contractor engaged in the construction of the St. Louis, Vandalia & Terre Haute, now a part of the Vandalia. He was then to 1873 president during the construction of the St. Louis & Southeastern, now a part of the Louisville & Nashville, and during 1872 was also engaged as a contractor on the construction of the Cairo & Vincennes, now a part of the Cleveland, Cincinnati, Chicago & St. Louis. From 1875 to 1876 he was receiver of the Burlington, Cedar Rapids & Minnesota and then to November, 1879, was vice-president and general manager of the same road, which was reorganized as the Burlington, Cedar Rapids & Northern and is now a part of the Chicago, Rock Island & Pacific. He was subsequently vice-president of the Atlantic & Pacific, now a part of the Santa Fe System; vice-president and general manager of the Manhattan Elevated Railways of New York City, and in March, 1880, became president of the St. Louis & San Francisco. The following year he became president also of the New York, Ontario & Western and in addition was president of the North River Construction Company, the chief contractor engaged in the construction of the New York, West Shore & Buffalo, now the West Shore.

Equipment and Supplies

LOCOMOTIVE BUILDING

The Russian Government Railways are inquiring for prices on a number of locomotives.

The Georgia Railroad has ordered three Mikado type locomotives from Lima Locomotive Corporation.

The Cardenas-American Sugar Company, New York, has ordered one switching locomotive from the Baldwin Locomotive Works.

The Cleveland, Cincinnati, Chicago & St. Louis has ordered 10 switching locomotives from the American Locomotive Company.

CAR BUILDING

The Russian Government Railways are reported in the market for 400 freight cars, to be used for carrying grain. This item has not been confirmed.

The Nashville, Chattanooga & St. Louis has ordered 500 freight cars from the American Car & Foundry Company, and 500 cars from the Mount Vernon Car Manufacturing Company.

The Great Northern is in the market for the following all-steel passenger equipment for the Spokane, Portland & Seattle: 3 70-ft. mail and express, 2 70-ft. baggage, 3 73-ft. smoking, 10 73-ft. first class coaches and 3 73-ft. parlor cars.

The Northern Pacific is in the market for 21 standard sleeping cars in addition to those reported in the *Railway Age Gazette* of October 23. The corrected list now stands: 21 standard sleeping cars, 3 tourist sleeping cars, 6 dining cars, 47 coaches, 7 baggage, 10 dynamo baggage, 4 dynamo mail and baggage and 18 mail and express cars, a total of 116 cars, all of which are to be of all-steel construction.

Swedish State Railways.—According to a report handed to the government by the Board of the Swedish State Railways, the receipts for last year amounted to $24,443,864, in addition to which there were state grants for new railways, etc., amounting to $5,308,339. The expenditure was $18,528,645, leaving a surplus on the working of $5,901,219. The right of way, rolling stock, etc., were estimated at the end of the year to be worth $169,452,600.

Equipment Orders Placed in Germany Cancelled.—A large number of orders placed in Germany before the war by railroads in England and its colonies have now been cancelled and bids asked from firms in the United Kingdom and, in some cases, from firms in this country. Included are the following: Railways of the Union of South Africa, 10 heavy locomotives and 34 passenger cars; South Indian Railways, 16 superheater freight engines and 178 all-steel freight cars, and others for the Assam-Bengal and the Taff Vale railways. An order for 50 freight cars for the Royal Siamese State Railways also has been transferred to an English firm.

Railway Construction in Salvador.—It is reported that work on the Salvador section of the International Railways of Central America is progressing satisfactorily. The surveys have now reached San Salvador and work has been taken up at Santa Ana on the same line. The Salvador Railway has continued its schedule train service between San Salvador, the capital, and the port of Acajutla and from the town of Sitio del Nino to the second city of the republic, a distance of 25 miles. The work of reconstructing the branch line from Ateos to Santa Tecla, which has not been in operation for several years is nearly completed. Another new project is the construction of a line from the port of La Libertad to San Salvador and Santa Tecla. This concession has already been granted, and it is planned to begin work on the road this fall and to complete the construction within two years.

Supply Trade News

The Warner-Reiss Sales Company, St. Louis, Mo., has recently been succeeded by the Warlic Heater Manufacturing Company of the same city.

Charles Hyland, for many years foreman boiler maker in the Jackson (Mich.) shops of the Michigan Central, has resigned to accept the position of boiler expert with the Flannery Bolt Company, Pittsburgh, Pa., succeeding Tom R. Davis, deceased.

Charles F. Pierce, formerly in charge of the railroad department of the Ross-Schofield Company, New York, has been appointed special representative of the Q & C Company, New York, which has taken over the exclusive license and control of the Ross-Schofield system of water circulation for locomotive boilers for the United States and Canada, as was noted in the *Railway Age Gazette* of last week.

The Buda Company, Chicago, Ill., has taken over the repair link for wrecking chains patented by John E. Buckley, former foreman blacksmith of the Illinois Central. This link is of special advantage in wrecking equipment where chains are often broken, and has been used on the Illinois Central for some time. Tensile tests have shown it to be stronger than the other links of the chain to which it is attached. This device is illustrated in the 1912 edition of the M. C. B. Dictionary on page 881.

The Roberts & Schaefer Company, Chicago, has been awarded a contract for the equipment for a 1,000-ton reinforced concrete Holmen type locomotive coaling plant at Nashville, Tenn., by the Louisville & Nashville. This company also received a contract from the Louisville, Henderson & St. Louis for the building of a 200-ton Holmen type coaling plant with weighing facilities at Henderson, Ky. The Illinois Central awarded a contract to this firm for a large barge loading plant to be built immediately at Harahan Incline, New Orleans.

The Smith Locomotive Adjustable Hub Plate Company, which was recently reorganized, still has its headquarters in suite 207-8 Commerce building, Pittsburg, Kan., but the personnel has been changed and is now as follows: A. J. Sams, president; A. H. McCormick, vice-president, and W. G. Wolfe, secretary and treasurer. The directors are A. J. Sams, A. H. McCormick, W. G. Wolfe, W. O. Van Pelt and C. W. Moore. The company is just completing an order for hub plates for 10 Mountain type locomotives for the Seaboard Air Line, and has an order for plates for 20 locomotives for an eastern line.

The Electric Storage Battery Company, Philadelphia, Pa., has supplied 100 type MV-19 "Ironclad-Exide" cells for a storage battery locomotive recently put in service at the Watertown arsenal, Watertown, Mass. The locomotive was built by the Baldwin Locomotive Works. It weighs 50,000 lb., and is of standard gage. The one hour performance on level track with clean dry rails will be a draw bar pull of 5,950 lb. at a speed of approximately two miles an hour based on the average discharge voltage of the battery. When hauling a trailing load of 100 tons on clean dry rails, the speed will be approximately 3.75 miles an hour on level track, and approximately 1.7 miles an hour on a 3 per cent grade. The maximum draw bar pull on level track with sand will be from 12,000 to 14,500 lb.

Tom R. Davis, mechanical expert of the Flannery Bolt Company, Pittsburgh, Pa., died at his home in Dravosburg, Pa., on October 12, 1914, after a long illness. Mr. Davis was born in Allegheny City, Pa., on July 13, 1854. He was educated in the public schools and began work in 1872 as a machinist apprentice in the shops of the Allegheny Locomotive Works (now the Pittsburgh plant of the American Locomotive Company). In 1875 he became a fireman on the Pittsburgh, Ft. Wayne & Chicago, and in the following year passed his examination for engineer. In 1877 he became a special salesman for the Crosby Steam Gage & Valve Company, Boston, Mass., but left in 1880 to accept the managership of the Monongahela Manufacturing Company at Monongahela City, Pa. In 1883, he returned to the Crosby Steam Gage & Valve Company and remained in its employ until 1893 when he became associated with the Garlock Packing Company at Pittsburgh as special agent. In 1898 he entered the employ of the Homestead Valve Manufacturing Company, leaving that company in June, 1904, to become mechanical expert of the Flannery Bolt Company, which position he occupied at the time of his death.

Charles Moulton Gould, vice-president and treasurer of the Gould Coupler Company and the Gould Storage Battery Company, New York, died at his home at Bayside, Long Island, on October 20. Mr. Gould had been associated with the Gould Coupler Company for many years. He was born in Buffalo, N. Y., on September 7, 1873, and received his education in the public schools of that city and in De Veaux College at Niagara Falls. In 1895, shortly after graduation, he entered the plant of the Gould Coupler Company at Depew, N. Y., founded by his father, Charles A. Gould, now the company's president. He served in the works for several years and had a large share in their development and the town of Depew which grew up around them, finally going to the New York office as vice-president and treasurer as noted above. Mr. Gould was very much interested in yachting, and was a prominent member of the New York Yacht Club and the Manhasset Bay Yacht Club.

C. M. Gould

TRADE PUBLICATIONS

Mine Jacks.—The Buda Company, Chicago, Ill., has recently issued bulletin No. 177, illustrating and describing the Buda No. 502-B and the Buda No. 504-B Ratchet Jacks.

Insulating Brick.—The Armstrong Cork & Insulation Company, Pittsburgh, Pa., has recently issued a booklet descriptive of nonpareil insulating brick for boiler settings. The booklet describes the brick, treats of its various merits, illustrates the method of application in connection with common brick and fire brick, and contains a number of views of actual installations.

Electric Railway Equipment.—The Westinghouse Electric & Manufacturing Company in connection with the convention of the American Electric Railway Association, held at Atlantic City on October 12 to 16, has recently issued a half dozen interesting pamphlets dealing with electrically operated railway lines. Railway Data Exchange No. 10 contains much information pertaining to the operation of street railways, dealing more particularly with such subjects as improvements of voltage on interurban lines, effect of voltage on performance of motors, cost of stops and trailer operation, etc. Circular 1549 entitled "Heavy Traffic Centers," contains several illustrations of the heavy traffic centers in various large cities throughout the country where surface lines are equipped with Westinghouse apparatus. Circular No. 1550 deals with the company's 1,500-volt Direct Current Sub-station Equipment, and gives description of a number of different roads throughout the country which are using this apparatus. Circular No. 1546, "Train Operation for City, Suburban and Interurban Service," contains a number of illustrations with brief notes showing the advantages to be derived from the use of multiple unit trains. Following its usual custom, the company has this year issued Progress Leaflet No. 1552, in which is outlined the progress made by the company in electric railway apparatus. Among the items included this year are the Philadelphia Terminal electrification of the Pennsylvania Railroad; the electrification of the Bluefield Division of the Norfolk & Western; the recent addition to the New York, New Haven & Hartford and a number of other steam railroad electrifications and surface, elevated and subway lines in cities both at home and abroad.

Railway Construction

Alabama Roads (Electric).—We are told that the Allentown Power Company, Decatur, Ala., has under consideration the question of building a line from a point on the projected Florence & Huntsville south to Decatur, about 15 miles. C. F. Thompson, president, Birmingham.

Canadian Roads Electric.—At a recent election, a by-law was carried in eleven municipalities, authorizing their respective councils to enter into contracts with the Hydro-Electric Power Commission of Ontario for the construction of a proposed line from Toronto, Ont., north to Newmarket, thence east to Port Perry, to be known as the Hydro-Electric Municipal Railway. F. A. Gaby, Toronto, chief engineer of the Hydro-Electric Commission.

The Hydro-Electric Power Commission of Ontario has been asked to make a report on a proposed electric line to be built in Ontario from a point on Georgian bay, through Guelph to Hamilton and to the Niagara peninsula. Mayor Carter of Guelph is quoted as saying that the line would be built.

Carolina, Atlantic & Western.—Track laying on the Charleston Northern, which is building from Andrews, S. C., south to Charleston, 57 miles, is nearing completion, it is said, and the bridges over the Santee and the Cooper rivers are expected to be finished so that the line can be opened for operation about November 1. A brick and stone passenger station has been completed at North Charleston, and work is nearing completion on brick freight terminals at the foot of Society street in Charleston. W. R. Bonsal, president, Hamlet, N. C. (May 8, p. 1055.)

Charleston Northern.—See Carolina, Atlantic & Western.

Cherry River Southern.—This company, which was incorporated last year to build a line in West Virginia, has completed the permanent survey, it is said, from Curtin in Nicholas county, W. Va., to Bay's Ferry, about 30 miles. It is expected that contracts will be let in the near future for carrying out the work. The proposed route is along the Gauley river and Hominy creek, also Angling creek to Meadow river, thence along that stream. The line is to be built to develop coal and timber lands. The incorporators include S. W. Richey, Cincinnati, Ohio; H. L. Kirtley; G. McClintic and W. G. Mathews, Charleston, W. Va. (December 5, p. 1099.)

Hiawassee Valley.—This company, which was organized last year, to build a 35-mile line, has given the general contract to R. L. Herbert, it is said, and a sub-contract for work on four miles near Andrews has been given to T. McFarland, Knoxville, Tenn. The plans call for building from Andrews, N. C., on the Southern Railway, southwest via Marble to Peach Tree, thence southeast via Hayesville to Hiawassee, Ga., 35 miles. R. E. Mason is superintendent of construction, and C. N. Matone, Asheville, is said to be interested.

Niagara River & Eastern.—Incorporated, in New York, to build a 20-mile line from Lockport, N. Y., west to the Niagara river. The company plans to use both steam and electricity as the motive power. The incorporators include F. A. Dudley, Niagara Falls; F. C. Conant, Buffalo, and C. Hickey, Lockport.

Northern Pacific.—This company has awarded a contract to W. J. Hoy Co., St. Paul, Minn., for grade separation work in Spokane, Wash. The work extends from Hilliard street west to Sixth avenue, a distance of two miles through the central portion of the city. For a large portion of the distance six tracks will be maintained. There are 19 separate street crossings where bridges will be required. Most of these will be of reinforced concrete. For a distance of about 15 blocks the fill for tracks between streets will be enclosed on all sides by concrete retaining walls of the gravity type. The average height will be 17 ft. from ground level to base of rail. The work will include new concrete concourses, stairways, etc., at the depot. The approximate quantities of material used are 80,000 cu. yd., plain concrete, 17,000 cu. yd., reinforced concrete and 120 tons reinforcing steel. Steel work and grading is not covered by the present contract.

Parker & Colorado River (Electric).—A franchise has been given to this company by the Department of the Interior, it is said, to build an electric line through the Colorado River Indian Reservation. The projected route is from Parker, Ariz., south to a point near Ehrenberg, where a ferry is to be established to receive freight from Palo Verde Valley, Cal. Grading for the railway is to be started at once. W. H. Tharpe, Parker, Ariz., is interested.

Quincy & Hamilton.—Incorporated in Illinois with $500,000 capital and headquarters at Hamilton, Ill. The plans call for building from Quincy, Ill., north to Hamilton, about 35 miles. The incorporators include C. S. Carscalion, New York; C. D. Warren, Toronto, Ont.; C. H. Petsche, St. Paul, Minn.; E. D. Parmelee, Chicago, and E. W. Wood, W. H. Orr and R. Wallace, Hamilton, Ill.

Texas Roads.—Plans are being made to build a railway from Austin, Tex., northwest to Big Springs, about 275 miles. The construction work will probably be started early next year. John D. Kinney, Austin, is back of the project.

RAILWAY STRUCTURES

Gallup, N. M.—The Atchison, Topeka & Santa Fe is preparing preliminary sketches for a combination station and hotel to be built at Gallup, N. M. This building will be of reinforced concrete with a brick facing construction. It will be 220 ft. by 140 ft. and two stories high.

Grand Canyon, Ariz.—The Atchison, Topeka & Santa Fe is preparing plans for a new hotel to be built at Grand Canyon, Ariz. The building will be of wood and will have a log house appearance. It is 180 ft. by 162 ft. in area and two stories high. Bids will soon be received by G. W. Harris, chief engineer of the Atchison, Topeka & Santa Fe Coast Lines, Los Angeles, Cal. It is planned to have this hotel completed in time to accommodate the tourists to the Panama-Pacific Exposition in 1915. The approximate cost will be $65,000.

New London, Conn.—An officer of the New York, New Haven & Hartford writes that a contract for improvements in the vicinity of the Thames river bridge, west of Hallam street, New London, and across Winthrop cove, has been let to Ryan & Keon, Boston, Mass. The work consists of a concrete culvert and fill across the cove in place of the existing timber trestle, together with certain street changes. Plans for the Thames river bridge have not yet been completed.

North Toronto, Ont.—The Railway Commission of Canada has issued an order for the removal of the grade crossing at Yonge street, in North Toronto. This is to be accomplished by the construction of a subway for highway traffic under the railway tracks of the Canadian Pacific.

Philadelphia, Pa.—Mayor Blankenburg has signed an ordinance, authorizing the city officers of Philadelphia to enter into an agreement with the Pennsylvania Railroad for the elimination of the grade crossing and elevation of the company's tracks on Lehigh avenue, Philadelphia. The estimated cost of the work is $300,000 for construction and $160,000 for right of way. It is expected that this work will be placed under contract in the near future.

St. Paul, Minn.—Plans have been made, it is said, for building a new single track bridge over the Mississippi river at St. Paul, to be used by the Chicago, St. Paul, Minneapolis & Omaha and the Chicago, Milwaukee & St. Paul. It is understood that work on the new structure will be started during the coming winter.

South Amboy, N. J.—An officer of the Raritan River Railroad writes that this company will build a steel and concrete bridge to have three spans each 30 ft. long, and a height of 30 ft. over Washington avenue at South Amboy. The railroad company will carry out the work with its own forces. The estimated cost is $9,000.

Wilkesbarre, Pa.—The Public Service Commission of Pennsylvania has approved plans for a viaduct at Kidder street in Wilkesbarre. The city officers are directed to enter into a contract with the various railroads. The city is to pay 40 per cent of the cost, the Lehigh Valley 25 per cent, and the Central of New Jersey and the Delaware & Hudson each 17:5 per cent. The improvements will cost about $87,000.

Railway Financial News

Central Vermont.—This company, the Grand Trunk's New England Line, operates a main line from New London, Conn., to Montreal, Que., with branches to Rouses Point, Vt., Waterloo, Que., etc., which bring the total mileage to 536 miles. In the fiscal year ended June 30, 1914, the road had gross operating revenue of $4,509,111 as compared with $4,577,590 in 1913. There was an increase in the freight revenue of $72,591 to $3,030,773, but the passenger revenue, on the other hand, decreased $112,616 and was $1,150,247. Operating expenses increased from $3,658,247 to $3,946,074, largely because of increased maintenance of way expenses due to the severe winter and because of increased charges for maintenance of equipment. The net operating revenues, accordingly, decreased from $919,343 to $554,038. In 1913 there was a net deficit of $9,796. In the fiscal year 1914, however, the company earned but $492,994 with which to pay fixed charges of $752,252, and had to draw upon the Grand Trunk under the latter's guarantee for the difference, $259,258. In 1914 the Central Vermont carried 4,187,550 tons of freight as compared with 4,323,512 tons in 1913—the total ton mileage being 331,141,087, as against 318,758,408 ton miles. The earnings per ton per mile fell from 9.3 mills to 9.2 mills. It was figured that the expenses per ton per mile were 7.9 mills and 7.7 mills respectively, the net earnings thus being 1.3 mills per ton mile in 1914 and 1.6 in 1913. The number of passengers carried on the other hand was 1,840,922, as compared with 2,115,889 in 1913. The earnings per passenger mile decreased from 2.32 cents in 1913 to 2.30 cents in 1914. The expenses per passenger mile, figured at 2.63 and 2.20 cents respectively, thus left a net loss per passenger mile of 3.3 mills in 1914, as against net earnings of 1.2 mills in the previous year. At the end of the year there was cash on hand of $246,331, and loans and bills payable of $5,881,978.

Chicago, Rock Island & Pacific.—Judge Mayer, in the United States district court, has granted a temporary stay in the sale of the *Railway* company stock pending an appeal from his decision refusing to grant a postponement of the sale. This was at the request of the protesting minority bondholders, who are headed by N. L. Amster.

Duluth, South Shore & Atlantic.—This company, operating 628 miles, in the fiscal year ended June 30, 1914, had a net loss, after the payment of expenses, rentals, taxes and interest of $550,989, as compared with a similar net loss of $537,520 in 1913. The Duluth, South Shore & Atlantic is controlled by the Canadian Pacific. Its main line, 409 miles in length, runs from Sault Ste. Marie, Mich., where it makes connection with the Canadian road, west along the southern shore of Lake Superior to Superior. There are also important branches to St. Ignace (43 miles) and to Houghton (48 miles). In 1914 the road earned freight revenue per mile of road of $3,335 and passenger revenue per mile of road of $1,948, as compared with $3,597 and $1,738 respectively in 1913. The total freight revenue in 1914 was $2,091,597, of which $204,403 was from the carriage of iron ore. As compared with 1913, there was a decrease in earnings from ore traffic of $65,432, but this was partly offset by increased traffic in forest products and other commodities. The ton mile rate in 1914 was 8.04 mills, as against 8.65 mills in 1913, the total ton mileage carried being 260,289,207, as against 260,406,913. The average receipts per passenger mile in 1914 amounted to 2.449 cents, and in 1913 to 2.460 cents. The average haul per ton of freight increased from 75.37 miles to 80.93 miles; and the average trainload of revenue freight was increased from 245 to 269 tons. The company has paid no dividends for several years, and its net loss this year is the greatest for some time. On June 30, 1914, the company had on hand cash to the amount of $32,204. At the same time it had working assets of $1,232,888 and working liabilities of $12,704,731; $950,000 of the latter representing loans and bills payable, $8,033,635 matured interest unpaid and $3,000,000 matured income certificates unpaid.

Hocking Valley.—The Public Utilities Commission of Ohio has approved of an issue of $4,000,000 6 per cent one-year notes dated November 2, 1914, to be sold at not less than 97¾, the proceeds to be used to refund $4,000,000 5 per cent notes maturing November 1, 1914.

National Railways of Mexico.—J. J. Hanauer and H. H. Wehrhane have been elected members of the New York board of directors, succeeding Felix M. Marburg and James H. Perkins, resigned. The executive committee of the company is now as follows: Carlos Bassave, Luis Cabrera, Modesto Rolland, Elia S. de Lima and Rafael Nieto.

Seaboard Air Line.—The regular quarterly dividend of 1 per cent on the preferred stock has been passed because of general industrial conditions. The company has outstanding $23,894,100 preferred stock, and has been paying dividends at the regular rate of 4 per cent on this stock for a year.

Toledo, St. Louis & Western.—W. L. Ross, president, has been appointed receiver on the application of creditors of the road. In regard to the receivership The Wall Street Journal says:

"Not long after the Rock Island people tired of holding it and in 1907 D. G. Reid, with characteristic facility, sold the Alton to the Clover Leaf, then under control of Edwin Hawley and his associates. In this transaction the Clover Leaf acquired $14,420,000 Alton common and $6,380,000 preferred, giving in exchange $6,480,000 series A 4 per cent bonds and $5,047,000 series B bonds to bear 2 per cent interest to July 31, 1912, and 4 per cent thereafter.

"In the year of this sale Alton paid 4 per cent on its preferred stock and 4 per cent on the prior lien participating preferred stock. In the following year an initial dividend of 1 per cent was paid on the common, 4 per cent on the preferred and 5 per cent on the prior lien stock, and subsequently dividends went up and down as follows: 1909, common, 4; preferred, 4; prior lien, 8; 1910, common, 2; preferred, 4; prior lien, 6; 1911, common, 0; preferred, 2; prior lien, 4, 1912, 2 on the prior lien and none on the others; none on any of them since.

"Inability of the Alton to maintain its dividends obliged the Clover Leaf in 1911 to pass the 4 per cent dividend on its preferred stock which had been paid regularly from 1907 to October, 1911. No dividend has been paid on the preferred since that time. The burden of carrying the Alton bag was too onerous.

"Clover Leaf has outstanding $9,995,000 common and $9,952,000 preferred. In addition to the bonds secured by the Alton stock the company has outstanding $9,550,000 prior lien mortgage 3½ per cent bonds due in 1925, $6,500,000 first mortgage 4 per cent bonds due in 1950 and redeemable after 1925 and about $1,000,000 equipment notes.

"The company defaulted interest on its series A and B gold bonds, secured by Alton stock, August 1, and a bondholders' protective committee was formed to protect their interest. This committee has been working on various plans to meet the situation, but to date has not arrived at any final conclusion. One suggestion was to make the bonds income bonds, and another contemplated the bondholders exchanging their holdings for Alton stock and a proportion of Clover Leaf stock. This last, it is said, was not seriously considered.

"By the terms of the bond issue, ninety days must elapse after the date of the interest default before any legal action can be taken by bondholders. The committee, including foreign holdings promised, but not delivered, has had deposited with it about 80 per cent of the outstanding bonds.

"For the fiscal year ended June 30, last, Clover Leaf showed a total income of $1,213,545 to apply to charges as compared with $1,150,561 the year preceding, when the surplus after charges was $63,762. In the year ended June 30, 1914, a deficit was shown, because of heavier charges due to the sale direct to car manufacturers during the year of about $1,000,000 equipment notes.

"Clover Leaf paid par for the $6,480,000 Alton preferred stock owned and $35 a share for the $14,420,000 par value common stock, paying in bonds. Alton preferred was quoted at 12, when the market closed last July and the common at 9. Thus, the investment in the preferred, which cost $6,480,000, is now worth only $777,600 at market prices, and the common, which cost $5,047,000, would be worth $1,297,800 on the same basis.

"It is not believed that the Clover Leaf interests would be at all loath to part with the Alton investment."

ANNUAL REPORTS

ST. LOUIS SOUTHWESTERN RAILWAY CO.

OFFICE OF
CHAIRMAN OF THE BOARD OF DIRECTORS.

NEW YORK, September 15, 1914.

To the Stockholders of the
St. Louis Southwestern Railway Company:

The Twenty-third Annual Report of your Company, for the fiscal year ended June 30, 1914, is herewith presented.

Detailed exhibits showing the traffic and operating results for the year, and the financial and physical condition of the property at the close of the year, will be found in the accompanying report of the President.

The physical condition of the property has been well maintained and substantially improved by additions and betterments to the roadway and track the treasury having been only partially reimbursed for such expenditures by the issuance of First Terminal and Unifying Mortgage Bonds), and also by the acquisition of additional rolling stock, mainly under equipment trust agreements, the deferred payments thereunder extending over a period of ten years from the dates of the agreements. Expenditures for additions and betterments to roadway and track and for terminal facilities, aggregating the sum of $522,721.06, have been advanced from the treasury, for which it has not yet been reimbursed, and which expenditures remained unfunded at the close of the year.

It is appropriate to state that, under existing Government regulations, carriers are unable to obtain reimbursement in full for expenditures made for additions and betterments to property. Bonds for additions and betterments can only be issued for the actual expenditures, excluding discount on the bonds as a charge against the property, and your company has not been able to dispose of its bonds and equipment trust obligations at par, thus making it necessary for it to assume and pay the discount on such securities. During the past five years the discount on funded debt charged off against "Profit and Loss" amounted to $2,276,249.76. In addition to this, it may be stated, as a matter of information, that equipment trust notes issued to acquire equipment represent only partial payment for the equipment, as the trust agreements, by their terms, require initial cash payments of about 15% of the value of the equipment; initial cash payments of this character during the past five years aggregated the sum of $921,027.40, which was paid out of current funds. There has also been paid out of the treasury, from current funds, on account of equipment trust notes matured during the past five years, the sum of $1,046,892.75—these payments having served to reduce the book liability on account of such notes. Thus, it will be noted, a large portion of the expenditures for additions and betterments to roadway and track and for additional equipment has not been capitalized.

Your company has no floating debt. At the close of the fiscal year its current assets were largely in excess of its current liabilities, as fully set forth in Exhibit "N" to be found on pages 38, 39 and 40.

Exhibit "O" on page 41 furnishes, in a condensed form, an analysis of all resources, showing, also, how the same were applied during the fiscal year.

CAPITAL STOCK.

No change has been made in the capital stock of your company during the current fiscal year.

FUNDED DEBT

As shown by the condensed balance sheet, the funded debt has been increased $4,345,000.00, as follows:

First Terminal and Unifying Mortgage Bonds issued:		
For reimbursement of treasury on account of expenditures for additions and betterments made by the St. Louis Southwestern Ry. Co., and advances made to Proprietary, Affiliated and Controlled Companies, covering similar expenditures made by them to December 31, 1913, viz.:		
St. Louis Southwestern Ry. Co.	$605,643.85	
St. Louis S.W. Ry. Co. of Texas	718,356.15	
Dallas Terminal Ry. & U. D. Co.	158,000.00	$1,482,000.00
To acquire a like amount of First Refunding and Extension Mortgage Bonds of the Gray's Point Terminal Ry. Co.		125,000.00
To acquire a like amount of First Mortgage Bonds of the Stephenville North and South Texas Ry. Co.		184,000.00
Equipment Trust Obligations issued:		
Series—Special Equip. Trust with The Phila. Trust, Safe Deposit and Ins. Co., dated June 1, 1913, covering:		
3 Steel underframe dining cars		
2 Steel underframe parlor cars		
200 General service steel underframe coal cars	$ [illegible]	
10 Consolidation locomotives		
10 Ten-wheeled locomotives		
Series "D" with U. S. Trust Co. of N. Y., dated February 1, 1914, covering:		
205 Gen'l service steel frame coal cars	349,000.00	
8 Gas-electric motor cars		
Series "E" with Guaranty Trust Co. of N. Y. dated April 1, 1914, covering:		
1500 Steel underframe box cars		
400 Steel underframe flat cars	1,700,000.00	
100 Steel underframe and steel frame coal cars		
Total		$2,750,000.00
Deduct:		
Equipment Trust Obligations matured and paid during year:		
Series—Penn. Co. for Insurances on Lives and Granting Annuities	$34,000.00	
Series "A" with U. S. Mort. and Trust Co. of N. Y.	46,000.00	
Series—Special Equip. Trust with The Phila. Trust, Safe Deposit and Ins. Co.	66,000.00	146,000.00 2,554,000.00
Net increase, this year		$4,345,000.00

The issuance of the securities, as above shown was authorized, after full hearing, by the Public Service Commission of the State of Missouri.

BONDS IN COMPANY'S TREASURY—UNPLEDGED.

Your company holds in its treasury, unpledged, the following mortgage bonds, subject to future sale or other disposition:

St. Louis Southwestern Railway Company:	
First Term. & Unifying Mtg. Bonds—5%—par value	$2,756,000.00
Southern Ill. and Mo. Bridge Company:	
First Mortgage Bonds—4%—par value	600,000.00
Paragould Southeastern Ry. Co.:	
First and Ref'g Mtg. Bonds—5%—par value	511,000.00
Total	$3,867,000.00

PARAGOULD SOUTHEASTERN RAILWAY COMPANY—LEASE.

Effective January 1, 1914, the railroad and property of the Paragould Southeastern Railway Company, a line beginning at a point in Paragould, Greene County, Arkansas, where it connects with the track of the St. Louis Southwestern Ry. Co., and thence extending in an Easterly direction a distance of 8.84 miles in Greene County, Arkansas, 20.46 miles in Dunklin County, Missouri, and 7.96 miles in Mississippi County, Arkansas, to the City of Blytheville, Arkansas, having a total main track mileage of 37.26 miles, was leased by the St. Louis Southwestern Ry. Co., for a period of thirty years, and on and after that date was merged with, and operated as a part of your company's lines. This lease was duly authorized by the Boards of Directors of both companies and approved by the Public Service Commission of the State of Missouri, in its order dated December 15, 1913. Your company has acquired all of the stock ($100,000 par value) and all of the bonds, $311,000 par value, issued by the Paragould Southeastern Ry. Co., which securities are now held in the treasury, unpledged.

DIVIDENDS ON PREFERRED STOCK.

Three quarterly dividends, aggregating 2½%, were declared by the Board during the fiscal year, payable as follows: 1% on October 15, 1913; 1% on January 15, 1914, and ½ of 1% on April 15, 1914. No dividend was declared for the last quarter of the fiscal year, as the Board did not feel justified in approving a dividend for that period in view of the results from operations and prevailing financial conditions.

William Hickok Taylor, Senior Vice-President and Director, died suddenly on February 7, 1914. The great loss sustained by your company and his associates was expressed by the Board of Directors in a resolution unanimously adopted at a special meeting, held on February 13, 1914, a copy of which will be found on page 6 of this report.

The Board acknowledges its appreciation of the faithful and efficient services of its officers and employes during the fiscal year under review.

For the Directors,
EDWIN GOULD,
Chairman.

"COTTON BELT ROUTE"

ST. LOUIS SOUTHWESTERN RAILWAY CO.

OFFICE OF THE PRESIDENT.

ST. LOUIS, MO., September 1, 1914.

MR. EDWIN GOULD,
Chairman of the Board of Directors

DEAR SIR—

I submit herewith the Annual Report of the Company for the fiscal year ended June 30, 1914, showing the results from operation during the year and the financial and physical condition of the property at the close of the year.

During the year the average main track mileage operated was 1,734 miles, an increase of 125.6 miles over the preceding year. The main track mileage operated at the close of the fiscal year, June 30, 1914, was 1,753.8 miles, an increase of 145.3 miles over the main track mileage as of June 30, 1913, which is due to acquisition, through leases, of the Stephenville North & South Texas Ry. Co., 106.9 miles, and the Paragould Southeastern Ry. Co., 37.3 miles, and adjustment of mileage figures heretofore used, of 1.1 miles.

A detailed exhibit of the mileage operated on June 30, 1914, showing main line and branches separately, as well as mileage in each of the states through which the company operates, will be found in table No. 1 of the appendix to this report.

In the condensed comparative statement, immediately following, will be found the financial results from operation for the year ended June 30, 1914.

FINANCIAL RESULTS FROM OPERATION—ENTIRE SYSTEM.
INCOME STATEMENT FOR FISCAL YEAR.

ITEM.	Year ended June 30, 1914.	Year ended June 30, 1913.	+Increase. —Decrease. This Year.
AVERAGE MILES OPERATED	1,734.9	1,609.3	+ 125.6
RAILWAY OPERATING INCOME:			
RAIL OPERATIONS:			
Revenues	$12,744,555.24	$13,296,949.59	—$ 552,394.35
Expenses	9,767,717.12	9,215,796.90	+ 551,920.22
Net Revenue	$ 2,976,838.12	$ 4,081,152.69	—$1,104,314.57
OUTSIDE OPERATIONS:			
Revenues	$ 47,349.20	$ 43,971.15	+$ 3,378.05
Expenses	66,083.49	56,610.21	+ 9,473.28
Net Deficit	$ 18,734.29	$ 12,639.06	+$ 6,095.23
Net Railway Operating Revenue	$ 2,958,103.83	$ 4,068,513.63	—$1,110,409.80
RAILWAY TAX ACCRUALS	601,886.34	468,697.19	+ 133,189.15
Railway Operating Income	$ 2,356,217.49	$ 3,599,816.44	—$1,243,598.95
OTHER INCOME	998,668.36	1,044,324.53	— 45,656.17
GROSS INCOME	$ 3,354,885.85	$ 4,644,140.97	—$1,289,255.12
DEDUCTIONS FROM GROSS INCOME	3,019,114.93	2,757,949.93	+ 261,165.00
INCOME BALANCE TRANSFERRED TO CREDIT OF PROFIT AND LOSS	$ 335,770.92	$ 1,886,191.04	—$1,550,420.12

PROFIT AND LOSS STATEMENT.

Item.	Year ended June 30, 1914.	Year ended June 30, 1913.	+Increase. —Decrease. This Year.
Credits:			
Credit Balance (at beginning of fiscal period)	$ 4,873,538.91	$ 4,402,584.80	+$ 470,954.11
Credit Balance transferred from Income	335,770.92	1,886,191.04	— 1,550,420.12
Miscellaneous Credits	57,809.40	15,350.93	+ 42,458.47
Total	$ 5,267,119.23	$ 6,304,126.77	—$1,037,007.54
Debits:			
Dividend Appropriations of Surplus:			
On Preferred Capital Stock, not held by Co., $19,893,650.00, Current year 2½% —Preceding year 5%.	$ 497,341.25	$ 994,682.48	—$ 497,341.23
Appropriations of Surplus for Additions and Betterments		163,110.61	— 163,110.61
Funded Debt Discount Extinguished through Surplus	72,040.76	220,110.00	— 148,069.24
Loss on Retired Road and Equipment—Road	11,315.40	9,926.23	+ 1,389.17
Loss on Retired Road and Equipment—Equip't	210,495.92	33,659.34	+ 176,836.58
Miscellaneous Debits:			
S. S. & S. T. Ry. Co., Gen'l Acc't written off	550,620.47		+ 550,620.47
P. S-E. Ry. Co., Gen'l Acc't written off	43,977.94		+ 43,977.94
Sundry Items	41,418.35	9,099.20	+ 32,319.15
Balance, Credit, Carried to General Balance Sheet	*3,839,909.14*	*4,873,538.91*	— 1,033,629.77
Total	$ 5,267,119.23	$ 6,304,126.77	—$1,037,007.54

OPERATING REVENUES.

The total operating revenues for the current fiscal year amounted to $12,744,555.24, a decrease of $552,394.35, or 4.15% compared with the preceding year. On page 26, Exhibit "A," will be found a statement giving the detail of total operating revenues by the several revenue accounts.

Freight revenues decreased $569,346.42 or 5.77%. The general depression in business which prevailed throughout the entire country, in connection with unfavorable weather conditions in the southwest territory, adversely affected the freight traffic movement on these lines. Droughts, floods and early frosts occurred at intervals during the year, resulting in an almost complete failure of the fruit and vegetable crops in Eastern Texas and a decreased yield of other products of agriculture. The tonnage of lumber, and other forest products, which constitutes a large percentage of the company's traffic, decreased 11.47% as compared with the preceding year.

Passenger revenue increased $43,374.50 or 1.66%, which is attributable principally to an improved local passenger movement in Texas. The reduction in passenger rates in Missouri and Arkansas, following the decisions of the United States Supreme Court on June 16, 1913, resulted in a substantial decrease in the company's revenue. The volume of travel in those States shows its usual normal increase, due to the natural growth and development of the country, and had the rates inhibited by the Supreme Court decisions prevailed during the year, the company would have enjoyed a very material increase in its passenger revenue. The estimated loss to the company during the year by reason of the reduced passenger rates resulting from these decisions, is $340,000.00.

A decrease in express revenue of $18,470.65 or 6.18% resulted from an enforced reduction in express rates effective February 1, 1914, and to the increase made on the express business by the Parcels Post.

Non-transportation miscellaneous revenue decreased $45,527.42 or 75.06%, which is explained by the abnormally large receipts in the preceding fiscal year, for detouring trains of other carriers over this line during the high water troubles in the spring of 1913.

OPERATING EXPENSES.

During the fiscal year ended June 30, 1914, the total operating expenses show an increase of $551,920.22, or 5.99%, as compared with the preceding year. The per cent of expenses to revenues was 76.64 as against 69.31% for the preceding year, or an increase of 7.33%.

Notwithstanding the loss of revenues and the further burdens imposed by the steady increases, from year to year, in the railroad's "cost of living," on account of the increased cost of supplies, increased wages, and the flood of anti-railroad legislation, the management has felt in duty bound to maintain the property to the high standard demanded for safe and efficient operation.

The principal increase in operating expenses was due to the large outlay for heavy repairs and renewals of freight-train cars, made necessary, in a large measure, by the age of such cars, as indicated by the general account "Maintenance of Equipment."

In accordance with the rules prescribed by the Interstate Commerce Commission effective July 1, 1907, there has been included in "Maintenance of Equipment," during the current fiscal year, and also during the preceding six years, adequate charges for depreciation and obsolescence, based on the average life of the equipment.

The general operating expense accounts show increases and decreases, as compared with the preceding year, as follows:

Maintenance of Way and Structures	Increase	$ 20,551.35 or	1.08%
Maintenance of Equipment	Increase	416,310.59 or	18.76%
Traffic Expenses	Decrease	3,092.39 or	0.61%
Transportation Expenses	Increase	77,315.46 or	1.91%
General Expenses	Increase	40,835.21 or	7.44%

In Exhibit "B," on pages 28 and 29, will be found a comparison of operating expenses in detail, by primary, as well as by general accounts.

TRAIN AND CAR LOADING.

The following tables show the average load per freight train and per loaded freight car for the past ten years.

Average load, in tons, per loaded car (including company material).

Year ended June 30.	St. L. S-W. Ry. Co.	St. L. S-W. Ry. Co. of Tex.	Entire System.
1905	18.19	15.54	17.43
1906	18.79	16.63	18.13
1907	19.01	17.06	18.40
1908	19.25	17.34	18.69
1909	17.84	16.67	17.49
1910	18.58	16.89	18.14
1911	18.78	17.30	18.32
1912	18.02	16.44	17.54
1913	18.36	16.44	17.78
1914	18.22	16.19	17.62

Average load, in tons, per train (including company material).

Year ended June 30.	St. L. S-W. Ry. Co.	St. L. S-W. Ry. Co. of Tex.	Entire System.
1905	385.02	177.33	295.50
1906	415.15	194.49	315.06
1907	425.92	202.81	323.35
1908	407.61	189.99	311.19
1909	394.23	190.34	301.61
1910	434.16	196.27	326.11
1911	423.70	200.04	320.16
1912	447.25	211.19	340.58
1913	461.11	214.50	349.49
1914	455.14	199.32	337.65

RATE LITIGATION.

In the annual report for the preceding year reference was made to the decision of the Supreme Court of the United States, on June 16, 1913, adversely affecting the passenger and freight tariffs of this company and other carriers operating in Missouri and Arkansas. In pursuance of this decision both the Missouri and Arkansas rate cases were remanded to the respective district courts, with instructions to dismiss the bills therein without prejudice.

In the Missouri rate case, the United States District Court for the Western District of Missouri dismissed the complaint and refused to appoint a Master in Chancery to hear the claims for alleged overcharges on intra-state traffic. The Attorney General of Missouri, in the name of the State, thereupon instituted suits against all carriers involved, seeking to recover the alleged overcharges both on freight rates and passenger fares, covering intra-state business, during the pendency of the injunction.

In the Arkansas rate case, the United States District Court for the Eastern District of Arkansas appointed a Special Master in Chancery to hear and report upon all claims for alleged overcharges on intra-state traffic, during the time the rates were enjoined, and fixed a time within which the claims should be presented. A large number of claims have been presented to the Master, who is now engaged in investigating the same, but he has not yet made a report to the Court.

The reduction in the intra-state tariffs has forced a reduction in inter-state tariffs, but the carriers will avail themselves of all proper means to secure a restoration of the tariffs previously in effect, or an increase in the present tariffs. In view of the expressions of the Interstate Commerce Commission relating to passenger fares, in its recent decision in the matter of the application of the Eastern lines for a 5% increase in freight rates, a petition has been presented to the Interstate Commerce Commission, which, if granted, will enable the carriers to increase inter-state fares in Missouri and Arkansas, and favorable action on this petition is anticipated. Negotiations are also pending with the Missouri Public Service Commission looking to an increase in Missouri intra-state passenger fares, and altogether the outlook for increased passenger fares is now more favorable than at any time since the United States Supreme Court's decision referred to was rendered.

AGRICULTURAL AND INDUSTRIAL.

During the current fiscal year, the agricultural development work has been continued along educational lines, including the improvement of home and living conditions, the methods of saving the waste products of the farms, the improvement of breeds of live stock and better cultural methods in growing of farm crops. In certain well adapted sections the dairy industry has been encouraged and special attention given to the matter of saving feeds for feeding live stock during the Winter months. As a result of this company's efforts, and those of the agricultural experiment stations, the Government Farm Demonstration Service, and the agricultural press, the farmers of the southwest have begun to adopt the silo as a means of preserving rough foods for Winter feeding. During the past year a great many silos have been built along this company's lines, and, in most cases, the results have been highly satisfactory.

An agricultural special train was operated over the entire system during the Winter months, 195 stations located on this company's lines were visited and approximately 90,000 people visited the train. The agricultural special train has proven a splendid means of reaching a large number of people for the purpose of disseminating agricultural information and instruction.

Considering the general business depression, the industrial conditions along this company's lines are fairly satisfactory. The lumber industry has suffered greatly during the past year, but it is hoped that general conditions may soon admit of a revival in that business.

EQUIPMENT.

The following equipment, contracted for under trust agreement with The Philadelphia Trust, Safe Deposit and Insurance Co., during the preceding year, was received during the current year: 10 consolidation locomotives, 10 ten-wheel locomotives, 200 general service steel underframe coal cars, and 2 steel underframe parlor cars.

During the fiscal year there was acquired from the Stephenville North and South Texas Ry. Co., 1 coach, 1 combination baggage and express car, 1 caboose car, 20 box cars, 3 flat cars and 2 wrecking cars; and from the Paragould Southeastern Ry. Co., 2 locomotives and 1 box car.

The following cars were rebuilt to replace cars destroyed or worn out from old age, and paid for from current funds: rebuilt at Company Shops, 4 furniture cars, 281 box cars, 28 flat cars, 7 coal cars and 1 boarding car: rebuilt by the American Car and Foundry Co., 500 box cars.

New equipment built at Company Shops, 4 combination caboose and coach cars.

The following equipment was contracted for during the fiscal year under Trust Agreements:

Agreement with the United States Trust Company, of N. Y., executed February 1, 1914, covering:

205 General service steel frame coal cars.
8 Gas-electric motor cars.

Of the foregoing equipment the 205 general service steel frame coal cars were received during the current fiscal year; none of the 8 gas-electric motor cars was received during the current fiscal year: however, 5 of them have been received since June 30, 1914, and the remaining 3 will be received soon.

Agreement with the Guaranty Trust Co. of New York, executed April 1, 1914, covering:

1500 Steel underframe box cars.
400 Steel underframe flat cars.
100 Steel underframe and steel frame coal cars.

None of the foregoing equipment was received during the current fiscal year; however, at date of this report the following has been received: 400 steel underframe flat cars; 100 steel underframe and steel frame coal cars; 716 steel underframe box cars; and delivery of the full complement will be completed at an early date.

Arrangements have been concluded for the rebuilding of all freight cars, acquired under equipment trust agreements, which were destroyed up to June 30, 1914. These replacement cars will all be delivered prior to November 30, 1914, and at that date, there will be no vacant numbers in any series of freight cars, covered by the company's outstanding equipment trust obligations, on account of cars destroyed prior to the close of the fiscal year under review.

ADDITIONS AND BETTERMENTS.

Expenditures for Additions and Betterments—Road, during the current year amounted to $896,079.16 and for Equipment, after allowing for value of equipment retired, $715,755.58, making the total amount expended for additions and betterments during the year $1,611,834.74.

The exhibit styled "Property Investment—Road and Equipment" on page 33, shows, in detail, the expenditures for additions and betterments during the current fiscal year.

NEW BRIDGE OVER THE MISSISSIPPI RIVER AT MEMPHIS, TENN.

In the last annual report announcement was made of the organization of the Arkansas & Memphis Railway, Bridge and Terminal Company for the purpose of constructing, maintaining and operating a double track railway and highway bridge over the Mississippi river at Memphis, Tenn. The capital stock of this company is owned equally by the Chicago, Rock Island & Pacific Ry. Co., St. Louis, Iron Mountain & Southern Ry. Co. and this company. Work has progressed on this bridge during the current fiscal year, and at the date of this report the substructure work is practically completed. The prevailing stringency in the financial market due to the disastrous European war, may result in temporarily suspending work on the bridge, but it is hoped that matters will be so adjusted that it can be completed without extended delay.

NEW PASSENGER TERMINALS AT DALLAS, TEXAS.

The work of constructing the new union passenger station and facilities of The Union Terminal Company at Dallas, Texas, is now under way.

As stated in the preceding annual report, the St. Louis Southwestern Railway Company of Texas owns a one-eighth proprietary interest in these new terminals and will make use of the facilities when completed.

FORTY-THIRD YEAR—GENERAL STATEMENT OF THE AFFAIRS OF THE NEW YORK, NEW HAVEN AND HARTFORD RAILROAD COMPANY

FOR THE YEAR ENDING JUNE 30, 1914.

INCOME ACCOUNT OF THE NEW YORK, NEW HAVEN AND HARTFORD RAILROAD COMPANY.

For the Year ending June 30, 1914, in	1914.	Comparison with Year 1913. Comparison with 1913. Increase.	Decrease.
	2046.29 miles operated.		46.20 miles.
OPERATING REVENUE:			
Freight Revenue	$32,476,323.26		$1,595,601.49
Passenger Revenue	27,400,672.89		495,627.40
All other Revenue from Transportation	4,772,208.85		4,655.76
Revenue from Operations other than Transportation.	1,968,437.82	100,074.39	
TOTAL OPERATING REVENUE	$66,617,692.82		$1,995,810.26
OPERATING EXPENSES:			
Maintenance of Way and Structures	$8,831,064.18	$937,974.14	
Maintenance of Equipment	10,389,458.10	788,789.54	
Traffic Expenses	502,019.87		80,290.35
Transportation Expenses	26,868,687.50		334,583.45
General Expenses	1,924,120.16		23,879.04
TOTAL OPERATING EXPENSES	$48,515,349.81	$1,288,010.84	
NET OPERATING REVENUE	$18,102,343.01		$3,283,821.10
NET REVENUE FROM OUTSIDE OPERATIONS	85,480.03		559,967.17
TOTAL NET REVENUE	$18,187,823.04		$3,843,788.27
RAILWAY TAX ACCRUALS	3,568,219.04		146,536.94
	$14,619,604.00		$3,697,251.33
INCOME FROM OTHER SOURCES:			
Dividends on Stocks	$3,521,760.93		$2,965,755.73
Interest on Bonds	273,243.58	31,899.46	
Income from Unfunded Securities	2,049,876.77		172,219.42
Rents Received	708,878.81	206,561.76	
Hire of Equipment	244,181.37	13,550.55	
Sinking and Other Reserve Funds	202,229.33		13,988.55
Income from Physical Property	163,609.60	90,185.98	
Miscellaneous Income	84,209.51		6,028.93
TOTAL INCOME FROM OTHER SOURCES.	$7,247,989.90		$2,815,794.88
TOTAL INCOME	$21,867,593.90		$6,513,046.21
DEDUCTIONS FROM INCOME:			
Interest on Bonds, Debentures and Other Liabilities.	$11,839,722.50	$810,593.41	
Rentals of Leased Lines	4,658,542.27	112,748.69	
Rentals other than above	2,684,177.22	293,034.17	
Separately Operated Properties: Loss Boston R. R. Holding Co. Guarantee	$1,118,756.00	615,487.51	
N. Y., W. & B. Ry. Co. Guarantee (Bond Interest)	864,000.00	86,250.00	
B. & A. R. R. Operating Guarantee	95,324.68	137,905.55	
	$2,078,080.68		
Miscellaneous Tax Accruals	92,690.95	10,307.47	
Miscellaneous	245,717.41	73,911.84	
TOTAL DEDUCTIONS FROM INCOME	21,598,931.03	2,140,528.64	
NET INCOME TRANSFERRED TO PROFIT AND LOSS ACCOUNT	$ 268,662.87		$8,653,574.85

NOTE. Dividend No. 136 for 1½%, paid Sept. 30, 1913, was charged to Profit and Loss Account....

The Operating Expenses were 72.83% of the Total Operating Revenue. Increase over 1913, 4.00%.

The Operating Expenses and Taxes were 78.18% of the Total Operating Revenue. Increase over 1913, 3.94%.

OPERATING RESULTS.

MILES OPERATED.

There was a decrease in average miles of road operated of 46.20 miles. The average miles of track maiotained was 4,397.75 compared with 4,452.55 the previous year, a decrease of 54.80 miles. These decreases were mainly due to giving up certain trackage rights on the Boston & Albany and Boston & Maine and to the Central New England assuming the operation of the line between Danbury, Connecticut, and Hopewell Junction, New York. Details of changes in mileage as of June 30, 1914, compared with June 30, 1913, will be found on page 60.

REVENUES AND EXPENSES.

The general business depression during the greater part of the fiscal year caused a decrease in the operating revenue of $1,995,810.26, while operating expenses increased $1,288,010.84, resulting in a decrease in net operating revenue of $3,283,821.10.

Freight revenue decreased $1,595,601.49, 4.7%, and passenger revenue $495,627.40, 1.8%. Express revenue fell off $307,378.75, 9.7%, due partly to reduced express rates ordered by the Interstate Commerce Commission, effective February 1st, 1914, and to the increase in shipments by Parcels Post, for which no adequate compensation has as yet been received. There was an increase of $198,177.34 in other passenger train revenue, mainly due to the inclusion of a full year's receipts from the Pullman Company and extra fares on Limited trains, the previous year's accounts having been credited with only six months' proportion, as the Pullman contract became effective January 1st, 1913. Net revenue from outside operations decreased $559,967.17, largely because the Pullman Company operated equipment formerly operated by the railroad. Revenues from operations other than transportation, after deducting decrease of about $100,000.00 account of falling off in revenue from discharging, wharfage, hoisting and car service; shows a net increase of $100,074.39, largely on account of additional rentals at Grand Central Terminal. In this connection, however, it should be noted that the net payment for entrance to and use of the passenger terminal at New York for the year ending June 30th, 1914, amounted to $3,150,947, as compared with $2,983,969 for 1913. The net charge against the Company during 1914 was equivalent to about 31 cents for each passenger into and out of the terminal.

MAINTENANCE OF WAY AND STRUCTURES.

This account increased $937,974.14, caused in part by higher wages and in part by the larger amount of renewals required because of work that was deferred in previous years.

There were 2,060,485 ties laid in renewals as compared with 1,814,190 in the previous year, an increase of 14%. This includes 137,907 creosoted ties with screw spikes and tie plates put in between New Haven and Woodlawn and on the Harlem River Branch, compared with 123,672 last year, an increase of 28%. There were 25,783 tons of new rail laid, an increase over the previous year of 3,173 tons, or 14%.

Removal of snow and ice cost $108,378.90 more than in the previous year, and the maintenance of the electric power transmission system cost $154,969.00 more. Much work was done on signals and interlocking plants.

The track, bridges and structures of the company are in safe and serviceable condition, but expenses for maintenance of way must be liberal because of the heavy equipment and the great number and speed of trains.

MAINTENANCE OF EQUIPMENT.

This account increased $788,789.54, due to some increase in wages, work on electric locomotives deferred in 1912, increase in repairs to freight cars of $351,985.82, and an increase in the charges for depreciation of $476,738.67.

Since July 1st, 1913, charges to depreciation have been made as required by the Interstate Commerce Commission, based on the original cost of equipment, as follows:

		Total charge for year
2 %	on Steam Locomotives	$ 298,633.94
2 %	on Electric Locomotives	" " " " .. 76,923.03
2 %	on Passenger Train Cars	" " " " .. 302,927.62
2½%	on Steel Freight Train Cars	
2½%	on Wood Freight Train Cars	" " " " .. 985,777.81
3 %	on Floating Equipment	" " " " .. 88,526.11
2½%	on Work Equipment, Steel	
2½%	on Work Equipment, Wood	" " " " .. 20,577.28
	TOTAL	$1,773,365.79

The equipment of the Company, other than the freight cars, is in good condition. In 1906-07-08 a large number of new freight cars were purchased, about 20,000, and heavy repairs are now needed on these cars and charges for this class of work will be heavy for several years to come. Because of the decreased volume of business this class of work was deferred and there are about 2,500 more bad order freight cars on the road than should be the case under normal conditions. Repairs are now being made more rapidly and the number of bad order cars is decreasing.

TRAFFIC EXPENSES.

This account decreased $80,290.35.

TRANSPORTATION EXPENSES.

This account decreased $334,583.45. The miles run by trains of all classes were 25,254,718, a decrease of 1,559,166. The cost per revenue train mile for transportation expenses was $1.12, compared with $1.07 for last year, an increase of 5 cents, or 4.7%. The average number of passengers per train was 96, an increase of 1, and the average number of tons of revenue freight per revenue train mile was 303.96, an increase of 13.81 tons, or 4.5%. There was an increase in wages, the greater part of which was the result of awards under Federal Arbitration Acts, and increases in forces at engine terminals so as to take better care of power and insure greater regularity of service.

The cost of fuel decreased $356,045.96.

Injuries to persons required the large sum of $1,181,735.59, an increase of $37,966.92, due to the settlements for the sad and disastrous accidents in 1912-1913. Of the $1,181,735.59, $318,324.93 was charged to the Accident and Casualty Operating Reserve, and the balance, $863,410.66 to Operating Expenses. There remains in the Accident and Casualty Operating Reserve $1,042,597.17, which will be used to take care of the unadjusted personal injury claims prior to the current fiscal year, so that the charges to Operating Expenses account personal injuries for the current fiscal year will probably be materially less than for the past fiscal year.

Loss and Damage accounts of all kinds amounted to $1,966,492.64, or 8 cents per train mile.

Very earnest efforts have been made during the year to reduce accidents and damage and to improve the practice in the consumption of fuel.

GENERAL EXPENSES.

This account decreased $23,879.04 although the Company had to sustain unusual burdens, the result of negotiations with the Federal Government and investigations by the Public Service Commission of Massachusetts, the Department of Justice of the United States and the Interstate Commerce Commission.

The Federal Act requiring valuation of railways increased expenses $24,176.77, and this expense will be more during the coming year. The Commissioners advise that they will begin to value the property of the Company April 1st, 1915, and by that date the Company expects to have completed the resurvey of 1,000 miles of road.

FINANCIAL.

CAPITAL STOCK.

Of the total authorized outstanding capital stock of 1,800,170 shares, 228,991 shares are in the treasury and 1,479 shares are owned by The Rhode Island Company. During the past fiscal year there has been no increase in the capital stock. A dividend of 1½% was paid Sept. 30, 1913, and charged to Profit and Loss Account.

TEMPORARY FINANCING.

In 1913 the Company had a large floating debt, because of the Massachusetts law prohibiting any funded debt exceeding in amount the paid in capital of the Company. This law was changed in July, 1913, so as to permit the issue of bonds to an amount equal to twice the amount of the capital stock.

In order to fund the floating debt under this new law and to provide tor the purchase of steel passenger cars and for other improvements the Directors in July, 1913, arranged for an issue of six per cent. convertible debentures to the amount of $67,552,000, to be offered to the holders of the stock and the outstanding convertible debentures of the Company. General financial conditions at that time were not favorable, and to make certain that the Company would get its money when needed the Directors caused this proposed issue of debentures to be underwritten. The stockholders approved this arrangement at a meeting August 22, 1913.

The issue of these debentures though opposed before the Public Service Commission of Massachusetts, was on October 14, 1913, finally approved by that Commission. An appeal was taken from this decision to the Supreme Court of Massachusetts, which on January 9th, 1914, decided that the proposed issue was not lawful.

There were $40,000,000 of notes maturing on December 1st, 1913 and $5,000,000 of bonds maturing February 1st, 1914. Therefore, it became necessary pending the decision on the application for the issue of the proposed six per cent. convertible debentures to borrow on November 18th, 1913, $45,000,000. to retire the notes maturing on December 1st, 1913 and the bonds maturing on February 1st, 1914. Later other amounts were borrowed to pay for new equipment and for improvements which could not be stopped or postponed, the whole amount to be provided aggregating nearly $54,000,000., all payable prior to July 26th, 1914. The decision of the Massachusetts Supreme Court made necessary an alternative plan of immediate financing, to take care of the maturing short term notes and to meet capital requirements until 1915.

With the assistance of Messrs. J. P. Morgan & Co., the First National Bank and the National City Bank of New York, and Messrs. Kidder, Peabody & Co., Lee, Higginson Co., of Boston, there were sold $50,000,000. of Notes dated May 1st, 1914, as follows:

$20,000,000. The New York, New Haven and Hartford Railroad Company One Year 5% Collateral Gold Notes, callable at 100-½%

$10,000,000. The Harlem River and Port Chester Railroad Company One Year 5% Gold Notes, Series "A," guaranteed by The New York, New Haven and Hartford Railroad Company as to principal and interest, callable at 100-½%.

$20,000,000. The New England Navigation Company Three Year 6% Collateral Gold Notes, callable at 101-½%, all dated May 1st, 1914.

The Bankers further agreeing to take within six months' time, at their option, $10,000,000. of One Year 6% Notes of The New York, New Haven and Hartford Railroad Company without collateral. The collateral pledged under the New Haven and Navigation Company notes, mentioned above, consisted of some of the securities in the treasuries of the companies.

It was expected to market some of the collateral and to retire the notes in part. From the proceeds of collateral sold, notes to the amount of $435,000 have been cancelled; but the war and general financial conditions made further sales of securities impossible.

Your directors have had in mind the urgent necessity for a broad plan for permanent financing, but the laws are conflicting and circumstances and conditions have not been favorable.

INCREASE IN DEBT.

The outstanding indebtedness of the Company and its leased lines in the hands of the public (not including that held in the treasuries of subsidiary companies) has been increased during the year by the amount of $4,522,250.00, as follows:

INCREASES.	
Five per cent. Collateral Gold Notes	$19,927,000.00
Providence Securities Company 4% gold debentures assumed as a direct instead of an indirect liability (heretofore an obligation of The New England Navigation Co.)	19,180,000.00
Six per cent. six months notes dated Nov. 18, 1913 (balance matured but notes not presented by holders)	40,000.00
Six per cent. three months note dated April 13, 1914	400,000.00
Five per cent. six months notes dated January 14, 1914	2,000,000.00
Five per cent. six months notes dated January 26, 1914	250,000.00
Four and one-half per cent. five year promissory notes dated May 7, 1914	222,000.00
Five per cent. six months notes dated June 26, 1914	550,000.00
Five per cent. four months note dated June 26, 1914	375,000.00
The Harlem River & Port Chester R. R. Co. one year 5% gold notes, guaranteed by The New York, New Haven & Hartford Railroad Company	10,000,000.00
	$52,944,000.00
DECREASES.	
New Haven St. Ry. 5% first mortgage bonds, paid in August, 1913	$599,000.00
Four per cent. non-convertible debentures, paid Feb. 1, 1914.	5,000,000.00
New Haven St. Ry. 5% convertible mortgage bonds, paid in June, 1914	229,000.00
Four and one-half per cent. notes, paid in July, 1913	2,375,000.00
Five per cent. notes, paid in November and December, 1913.	39,995,000.00
Note in favor of City of New Haven, paid September 16, 1913.	23,750.00
	$48,421,750.00
Total Increase	$4,522,250.00

MATURING DEBT.

There will mature between October 1st, 1914, and June 30th, 1915, the following obligations for which your Company is responsible:

October 26, 1914, five per cent. four months note	$375,000.00
December 1st, 1914, Middletown Horse R. R. 5% 1st Mortgage Bonds	150,000.00
December 26th, 1914, five per cent. six months note	550,000.00
January 14th, 1915, five per cent. six months notes	1,000,000.00
January 27th, 1915, five per cent. six months notes	200,000.00
May 1st, 1915, five per cent. one year Collateral Gold notes.	
Total issue $20,000,000.00	
Less, paid off 435,000.00	
	19,565,000.00
May 1st, 1915, The Harlem River & Port Chester Railroad Co. Five per cent. one year Gold Notes, Series "A"	10,000,000.00
Total	$31,840,000.00

A statement of your Company's Contingent Liabilities in the hands of the public is shown in this report. All of the companies therein mentioned were able to meet their obligations for interest and dividends without recourse to your Company's guaranty except the Boston Railroad Holding Company and the New York, Westchester and Boston Railway Company.

INSURANCE FUNDS.

As no appropriations have been made by the New Haven Company to the Fire Insurance and Coal Insurance Funds since June 30, 1911, the current losses being charged to Operating Expenses, it was thought unnecessary to continue these Funds, and they were cancelled and contracts for insurance placed; the securities and assets of the various Funds turned into the treasury of the New Haven Company, and the reserve in those funds credited to the Profit and Loss Account of the New Haven Company.

No appropriation has been made to the Accident and Casualty Fund since June 30, 1911, and it was cancelled. For the 1913 fiscal year there was charged to the Accident and Casualty Reserve $337,744.21, for the 1914 fiscal year $318,324.93, leaving $1,042,597.17, which has been set up as a reserve to take care of unadjusted personal injury claims prior to July 1, 1914.

The New England Steamship Company Marine Insurance Fund was cancelled and contracts for insurance placed, the securities and assets turned into the treasury of the Steamship Company and the reserve in the Fund credited to the Profit and Loss Account of the Steamship Company. The securities were subsequently sold to the New Haven Company.

MERCHANTS AND MINERS TRANSPORTATION COMPANY.

Because of the attitude of the Federal authorities and the very serious financial condition of this Company, the securities of the Merchants and Miners Transportation Company were sold in April, 1914. Additional Capital was needed to finance the Merchants and Miners Transportation Company which the New Haven Company was unable to furnish. On account of unfavorable conditions the sale resulted in a loss of $3,594,500.00.

These securities were held by The New England Navigation Company and their cost was reflected in the capital stock of that company. The capital stock of The New England Navigation Company was reduced by 35,945 shares, the New Haven Company's investment in the Navigation Company was reduced a like amount, and the amount of the reduction in value of the New Haven Company's investment in the Navigation Company was charged to the Profit and Loss Account of the New Haven Company.

PROFIT AND LOSS.

The Profit and Loss Surplus of $7,916,557.24 as of June 30th, 1913, has been reduced by transactions shown on page 39, to $1,822,246.14 as of June 30th, 1914.

EQUIPMENT TRUST.

Under date of April 1st, 1914, an arrangement was made with the Farmers' Loan & Trust Company for an Equipment Trust, under which the Company is to make semi-annual payments for fifteen years, when the title to the equipment will be vested in the Company.

NEGOTIATIONS WITH THE DEPARTMENT OF JUSTICE OF THE UNITED STATES.

On April 11th, 1914, a pamphlet was mailed to each stockholder giving some account of the negotiations with the Department of Justice for a peaceful solution of the so-called "New England Railroad Situation."

At a meeting of the stockholders on April 21st, 1914, the Directors were authorized to complete negotiations and to arrange for the segregation of the various properties that were under dispute. Since then there have been prolonged conferences with the Department of Justice.

The Department filed its petition in the District Court of the United States, Southern District of New York, on July 23, 1914, and the Company filed its answer on September 17, 1914.

An agreed decree is to be entered which produces the following results:

First. The New Haven Company transfers to Frank P. Carpenter, of Manchester, New Hampshire, Henry B. Day, of Newton, James L. Doherty, of Springfield, Charles P. Hall, of Newton, and Marcus P. Knowlton, of Springfield, all in Massachusetts, as trustees, 31,065 shares of the common stock and 244,939 shares of the preferred stock (being all of the common and all but 28,000 shares of the preferred stock) of the Boston Railroad Holding Company, the latter being the holder of 6,543 shares of the preferred and 219,189 shares of the common stock (a majority of all outstanding stock) of the Boston & Maine Railroad, in trust to sell the Boston and Maine shares under the order of the Court.

The trustees shall hold the shares and exercise all the powers the owners of the shares of the Holding Company are entitled to exercise, excepting the right to sell or dispose of them until otherwise ordered.

No order directing the sale of any of the shares of the Holding Company shall be made by the Court until after July 1st, 1915, unless the New Haven Company shall in writing consent thereto. If no sale is made before July 1st, 1915, the Court, on application of any party, and after a hearing at which the Commonwealth of Massachusetts shall be invited to appear, shall determine when a sale shall be made and fix the terms and conditions thereof.

The trustees shall also use their best efforts to complete the sale of the shares of the Boston & Maine Railroad before January 1st, 1917.

Second. The New Haven Company transfers to the same trustees, the following shares of corporations, the railroad lines of which are leased to the Boston & Maine or Maine Central Railroad Company:

922 shares of capital stock of the Northern Railroad (of New Hampshire),
1,015 shares of capital stock of the Connecticut River Railroad Company,
63 shares of capital stock of the Manchester & Lawrence Railroad,
246 shares of capital stock of the Hereford Railway Company,
2,469 shares of capital stock of the Concord & Montreal Railroad,
184 shares of capital stock of the Vermont & Massachusetts Railroad,
193 shares of capital stock of the Lowell & Andover Railroad Company,
412 shares of capital stock of the Boston & Lowell Railroad,
710 shares of capital stock of the Pemigewasset Valley Railroad,
1,464 shares of capital stock of the Connecticut & Passumpsic Rivers Railroad Company,
73 shares of capital stock of the Upper Coos Railroad,
18 shares of capital stock of the Concord & Portsmouth Railroad,
98 shares of capital stock of the Wilton Railroad Company,
86 shares of capital stock of the Peterborough Railroad,
84 shares of capital stock of the Nashua & Lowell Railroad and
354 shares of capital stock of the Massawippi Valley Railway Company.

The trustees shall hold these shares and exercise all the powers in the management of the corporations which the owners of the shares are entitled to exercise. They shall sell the shares, whenever in their judgment such sale or sales can be made to the best advantage, so long as they remain subject to sale and upon such terms as the New Haven Company shall request in writing signed by its President or Chairman of the Board of Directors and approved at a meeting by said Board.

The trustees shall exercise their best efforts to complete the sale of said shares before January 1st, 1917.

Third. The New England Navigation Company transfers to Lyman B. Brainerd, of Hartford, Charles Cheney, of South Manchester, George E. Hall, of Bridgeport, William W. Hyde, of Hartford, and Walter C. Noyes, of New London, all in Connecticut, as trustees, 400,000 shares being all of the capital stock of The Connecticut Company.

The trustees shall hold these shares and exercise all the powers in the management of The Connecticut Company which the owners of the shares therein are entitled to exercise.

The trustees shall sell said shares for such prices and upon such terms as shall be named by the New Haven Company and the Navigation Company in a writing signed by their respective President or Chairman of their Boards of Directors and approved at a meeting by their Boards.

The trustees shall exercise their best efforts to complete the sale of said shares before July 1st, 1919.

Fourth. The New Haven Company transfers to John O. Ames, John P. Farnsworth, Kathbone Gardner, Theodore Francis Green, and Charles C. Mumford, all of Providence, Rhode Island, as trustees, 96,855 shares, being all of the capital stock of The Rhode Island Company, and The New England Navigation Company transfers to the same trustees 9,132 shares in the capital stock of the Providence & Danielson Railway Company, bonds of said company to the par value of $600,000., 7,000 shares in the capital stock of the Sea View Railroad Company, and bonds of said company to the par value of $600,000.

The trustees shall hold said shares and bonds and exercise all the powers in the management of these trustees companies which the owners of shares therein are entitled to exercise.

The trustees shall sell said shares and bonds at such time or times as shall be named by the New Haven Company in a writing signed by its President or the Chairman of its Board of Directors and approved at a meeting by said Board.

The trustees shall exercise their best efforts to complete the sale of the said shares and bonds before July 1st, 1919.

Fifth. The 53,981 shares of the capital stock of the Berkshire Street Railway Company and the 6,500 shares of capital stock of The Vermont Company owned by the New Haven Company, shall be sold before July 1st, 1919; provided, however, such sale shall not be proceeded with until action shall have been taken by the Commonwealth of Massachusetts authorizing a sale of the shares of the Berkshire Street Railway Company or until the Court, on the application of any party, and after a hearing at which the Commonwealth of Massachusetts shall be invited to appear, shall by further order so direct.

Sixth. The New England Navigation Company shall sell on or before July 1st, 1917, the 15,000 shares of preferred and 20,000 shares of common stock in the Eastern Steamship Corporation and bonds of said corporation to the par value of $2,500,000., held by it, and pending such sale the New Haven Company and the Navigation Company are enjoined from voting upon the capital stock of said Eastern Steamship Corporation.

Seventh. The New Haven Company shall sell on or before July 1st, 1919, 5,000 shares of the capital stock of the New York & Stamford Railway Company and bonds of the said company to the par value of $678,000., also the rights to the capital stock and other securities of the Westchester Street Railroad Company now owned by it, and the Navigation Company shall sell on or before July 1st, 1919, the rights to the capital stock and other securities of the Shore Line Electric Railroad, a corporation of New York, when the same may be issued, and the gold notes of the New England Investment & Security Company, a voluntary association, to the par value of $13,709,000. now owned by it.

Eighth. The times within which the sales heretofore ordered shall be made may be extended in each case by the Court for good cause shown upon the application of any party or any body of liquidators or trustees, and if they are not sold by the Trustees 60 days before the last date fixed for the sale they shall be sold at public auction.

Ninth. None of the shares or other securities hereinbefore ordered sold shall be offered to the stockholders of the New Haven Company as a class either in proportion to their stockholdings or otherwise, or be sold to the New Haven Company or to any person or persons, corporation or corporations, to be held in its interests, directly or indirectly, or so as to re-establish in any manner the combination and control which it is the purpose of the decree to terminate.

There is now pending before the Interstate Commerce Commission an application of the New Haven Company, under Act of Congress approved August 24th, 1912, known as the Panama Canal Act, for authority to retain stocks and other securities and continue control of its steamship lines including The New England Steamship Company and The Hartford & New York Transportation Company. Similar applications are required by law from all railroad companies having an ownership in steamship lines.

The contract between the New York Central & Hudson River Railroad Company and the New Haven Company for sharing in the financial results of the operation of the Boston & Albany Railroad, has already been canceled, and the Company has also disposed of its interest in the Merchants & Miners Transportation Company.

The final papers giving effect to the agreement with the United States Government are now being drawn up by the Counsel of the Company and the Attorney General of the United States, and it is expected that the agreed decree will become effective in the near future.

In view of the present conditions and the policy of the Federal Government and its various departments, the Directors have felt that it was wise to agree with the Department of Justice and to divest itself of ownership in these various properties, and therefore, with the authority of the stockholders it made every reasonable concession towards a peaceful adjustment, but with the hope that the arrangement will not ruthlessly and unnecessarily sacrifice values and impair the service that the various properties can give to the public.

It is believed that in the time allowed the Company, if there is a return of prosperity to the country, with a more reasonable attitude on the part of the public toward railroad corporations, many of these properties will show a value much in excess of the estimates today, and that losses in carrying these properties will be reduced if patience is exercised and fair treatment accorded.

The report of the Interstate Commerce Commission of June 20th, 1913, said about these properties:

"They are for the most part of substantial value and in many instances are a kind of property the value of which should improve."

This is true, and within the past year each of the properties within the control of the New Haven Company has been improved physically, and in its organization and ability to serve the public.

A summary of the properties covered by the decree, and the book value thereof, including stock, bonds, notes and advances, as shown on the books of the New Haven Company and the Navigation Company is as follows:

	As carried on books of	
	New Haven Company.	*New England Navigation Company.*
Boston Railroad Holding Co.	$29,371,165.97	
Boston & Maine R. R. subsidiary lines	1,417,216.95	
The Connecticut Company	2,125,000.00	$40,000,000.00
The Rhode Island Company	27,852,336.41	1,266,379.37
Berkshire Street Railway Company	9,809,395.58	
The Vermont Company	1,477,164.31	4,200,000.00
Eastern Steamship Company		
New York & Stamford Railway	1,395,523.40	
The Westchester Street Railroad	1,152,150.84	
Shore Line Electric Railroad		117,000.00
New England Investment and Security Company		13,631,750.00
	$74,599,953.46	$59,215,129.37

From time to time it has been intimated that the present financial condition of the New Haven Company is due to these and similar investments. It is fair, however, to point out certain conditions which are national in their enect on railroad net income, conditions over which neither the New Haven Company, nor any other company, has any effective control.

Some of these conditions are:

1. Increase in rates of interest.
2. Increases in rates of pay.
3. Increased costs due to changes of working hours and working conditions.
4. The so-called Full Crew Law, which makes necessary the employment of extra and unneecessary men.
5. The federal valuation of railroads.
6. The great increase in accounting and special reports to numerous public authorities.
7. The increase in taxes.
8. The increased demands for luxurious passenger facilities, both train and station.
9. Stationary or falling rates.
10. Inadequate pay for mail and parcels post.

Increase in rates of pay and rates of interest as compared with 1903 shows an increased annual charge of more than $8,000,000. The various governmental requirements mean a charge of at least $300,000 a year. The taxes in 1914 were $1,182,829.52 more than in 1903. The underpay for carriage of mail matter represents more than $700,000. a yrr. in gross earnings. Much passenger train service is furnished far below any fair estimate of the cost for the particular service rendered. Without allowing for this loss on non-remunerative passenger trains, the foregoing additional burdens compared with 1903, represent a net loss of at least $10,000,000. a year; a loss greater than the annual interest on the cost of all outside properties acquired.

The same general causes reduce the income received by your Company from the transportation companies in which it is interested.

The attention of stockholders is called to what Mr. Commissioner Daniels, of the Interstate Commerce Commission, said in his dissenting opinion of July 29th, 1914, in the "Eastern Railroads Advance Rate Case," as follows:

"The world-wide phenomenon of rising prices is by this time no novelty. Since 1906 the average rise in the world's price level is estimated by competent statisticians at from 30 to 50 per cent. It has mirrored itself in the rising cost of living; it has evoked, and most properly, advances in wages and salaries; it has coincided with an increase in the nominal rate of interest where part of the interest so-called is but compensation for the anticipated depreciation of the capital sum later to be paid. This rise in the price level must eventually be reckoned with in railroading. For a time its effects may be masked by adventitious increases in the volume of traffic, but this temporary relief in its very nature is uncertain, and sooner or later the difficulty is sure to reappear. For a time it may be circumvented by extraordinary economies, but in its nature it is inexorable. It must be faced, not trifled with. It is hardly an adequate remedy to accord to carriers relief only when their returns have reached the well-nigh desperate level now shown in Central Freight Association territory. Even before this inadequate return is evidenced, higher rates are warranted. Such a solution of the present case would have done no less than justice to the carriers and would have promoted the welfare of the community they serve.

"A living wage is as necessary for a railroad as for an individual. A carrier without a sufficient return to cover costs and obtain in addition a margin of profit large enough to attract new capital for extensions and improvements cannot permanently render service commensurate with the needs of the public."

SPECIAL INVESTIGATIONS.

By the Company.

During the year, for the purpose of checking the methods and operations of the Company, special investigations of some of its affairs were made by order of the Chairman of the Board as follows:

(1) An expert in the purchase and handling of supplies made a critical examination of the methods of the Company in purchasing, storing and issuing of material. His report is being used by the officers of the Company as a basis for introducing such improvements and economies as are reasonable and practicable in this part of the Company's affairs.

(2) A committee of signal experts, one from the Pennsylvania Railroad, two from the New York Central and one from the Delaware, Lackawanna & Western Railroad, made a critical examination and report on the signals and signal practice of the Company. Their investigation, report and suggestions are being used as a basis for improving the New Haven's signal system and practice as rapidly as the financial conditions permit.

(3) The Stone & Webster Corporation, of Boston, made a critical examination of the financial condition, organization and methods of management of the various trolley properties, and an elaborate report which has been of considerable use to the Company in perfecting the details of its organization and in adopting the most advanced methods of trolley management.

(4) The firm of Price, Waterhouse & Company, Accountants, assigned one of its principals, who has been engaged since January 1st in a critical examination of the past history of the financial transactions of the Company. His work is not completed, but soon will be and his reports will be used during the current fiscal year as a basis for further simplification and improvement of the Company's corporate organization. All of his reports were transmitted promptly to the Interstate Commerce Commission.

(5) In order to obtain a complete and thorough history of the charters, mortgages, leases and the character of each security, of the Company, a thorough investigation was made of all these papers by a competent lawyer detailed from the Company's law department for that purpose. He has made the most complete history of this part of the New Haven system that has ever been prepared, which will be used during the coming year as a basis for drawing up a financial plan that will permit the refunding of the Company's floating debt if the necessary legislation can be obtained.

By the Public Service Commission of Massachusetts.

On Dec. 17, 1913, the Public Service Commission of Massachusetts began an investigation of the expenditures of the New Haven Company classified under the head of "Other Expenses." Certain sums of money have been spent in former years for advertising, legislative and miscellaneous expenses which it was thought should not have been spent. Prior to this investigation all expenditures of the character complained of had been stopped.

BY THE INTERSTATE COMMERCE COMMISSION.

In response to a resolution of the United States Senate of February 3rd, 1914, a prolonged investigation was made by the Interstate Commerce Commission of the financial transactions of the New Haven Company since 1903. Their report was published on July 11th, 1914. While statements to the contrary have been circulated, it is proper to point out that the Company co-operated to the fullest extent in furnishing information to the Commission, and no books, papers or documents in the possession of or within the control or jurisdiction of the Company were burned or destroyed, either before, during or since the investigation. The records of the Company have been preserved carefully and the general orders of the Commission applicable to the preservation of all records have been complied with. Explicit instructions were given and obeyed that the files of the Company should remain open at all times to the most complete investigation and inspection by the representatives of the Commission. The custodians of the records of the Company assisted the Commission's examiners, and the latter were granted every facility within the power and control of the Company to aid them in their investigations.

For nearly two years prior to this investigation in Washington, examiners and representatives of the Commission have been almost continuously at the offices of the Company,—at one time as many as sixteen. They have examined the books, documents and files of the Company, and no information has been kept from them and all information obtainable having a bearing on the subjects under investigation was furnished promptly and fully by the officers and employees of the Company.

The following is an illustration of the action taken to respond to requests for information:

Within a period of forty-eight hours, from Friday afternoon until Sunday afternoon, 504 clerks were taken from their regular duties and worked 6,220 hours, equivalent to 777 clerks for one day, at a cost of $1,400., in order to segregate certain records, which were then sent in a special car to Washington so as to be there Monday morning.

All of the suggestions made in the report of the Commission which are of a helpful nature and which will in any way aid the Company in sustaining itself under the present conditions, which are so adverse to all railroads, and particularly to those in New England, are now being made use of and steps are being taken to give effect to the various suggestions and recommendations.

Special counsel were assigned last Spring to an investigation of the affairs of the Billard Company as far as they affect the New Haven Company. Requests for information having proved ineffectual, orders have been given to institute judicial proceedings to compel an accounting.

Counsel are also carefully considering whether, in the testimoney obtained by the Commission or elsewhere, evidence can be found that will enable the Company to bring an effective suit against any other parties to recover funds alleged to have been improperly diverted from the Company's treasury.

ADDITIONS AND BETTERMENTS.

As shown in table on page 51, $3,290,549.97 was spent for additions and betterments and charged to Capital Account.

NEW EQUIPMENT: Under the new Equipment Trust (Farmers Loan & Trust Co., Trustee) there have been added during the year:

72 Steel Coaches.
28 " Smokers.
15 " Postal Cars.
12 " Multiple Unit Motors.
24 " " " Trailers.

and in addition:

NEW EQUIPMENT: (Not under the Equipment Trust.)

3 Electric locomotives,
34 Steel coaches,
1 Steel smoker,
20 Milk cars,
6 Steel postal cars,
1 Steam crane,
1 Rail unloader,
1 Transformer,
3 Steel car floats.

For this equipment, the conversion of certain cars from one class to another, providing safety appliances, also superheaters, pumps, flash boilers, etc., on locomotives, the Company paid $1,054,659.07, the entire amount of which was charged to the equipment account. There are also due on 1913 orders, ten steel smoking cars and four multiple unit cars and on 1914 orders, fifty steel baggage cars, thirty steel passenger coaches and twenty steel combination cars.

At the present time, with the exception of baggage cars and four dining cars, all of the regular express passenger train service is handled with all-steel or steel underframe cars between New York and Boston via the three routes, Shore Line, Springfield and Hartford-Willimantic. The same is also true of the New York-Springfield, New York-Winsted, New York-Pittsfield, New York-New Haven, and, with the exception of two trains, New Haven-Boston & Maine service.

As stated above, equiament is under order, the early receipt of which is expected; these cars and reinforcement of four dining cars now under way will complete the above trains with all-steel or steel underframe equipment.

ABANDONMENT OF NEW WORK: All construction and betterment work has been stopped except that which is so far advanced that its completion is required and that which the Company is compelled under legal orders to complete. This policy must of necessity continue until the Company can obtain money from increased earnings and through some plan that will permit financing its floating debt at lower rates of interest than are now current.

Therefore many improvements cannot now be undertaken, that would add to the comfort and convenience of the public and eventually produce economies in the operation of the railroad.

ELECTRICAL DEPARTMENT.

Between New York and New Haven, including all yards and sidings, and the Cedar Hill yard at the latter point, your Company has 518 miles of track equipped for electrical operation, excluding that part of the New York Central Company between Woodlawn and Grand Central Terminal used under lease but maintained by that Company. The volume of passenger and freight business moving between New Haven and New York is very heavy and the necessity for the most effective organization is very essential.

The investment in the electrification between New York and Cedar Hill in power, locomotive, transmission lines, distributing system, electrical shops, when all the business is handled electrically, will be about $20,000,000.

For the purpose of supervising closely and making the most effective use of these large investments and because the operation and maintenance of this extensive electrical installation is very technical, an Electrical Department was organized on March 18th, 1914, consisting of a Consulting Electrical Engineer, with necessary assistants, having advisory jurisdiction over matters pertaining to the engineering, construction and operation of the electrical system and equipment. Better results are being gradually obtained by having this new department acting in co-operation with the divisional operating officers.

THE TROLLEY COMPANIES.

During the past year a change has been made in the method by which the electric traction properties are operated. Heretofore the details of management have been largely centralized in the general offices of The New York, New Haven & Hartford Railroad Company in New Haven; but now the principal units have been given independent organizations separated from the New Haven, thus giving to the electric properties a complete staff of officials, all of whom give their entire time and attention thereto. It is expected that greater efficiency will be obtained by this change.

During the year the same high standard of maintenance of these properties has been continued and they are in better physical condition now than at any time since their purchase. In common with all transportation companies throughout the eastern part of the United States, the electric properties have not maintained the customary growth in gross revenue, and, coupled with very extensive requirements by the municipalities served by the various lines for improved street conditions and new pavement, the expense for operation has increased in much greater ratio than the gross revenue.

Large undertakings for improvements and betterments of the properties which were well under way at the beginning of the year have been carried to completion, so that these lines are now in very much better position to take care of any increase in business which may come to the transportation companies with a revival in general business and industrial conditions in the territory served.

BERKSHIRE STREET RAILWAY COMPANY.

This Company operates through ownership or lease 144.86 miles of track in western Massachusetts and southwestern Vermont.

The New York, New Haven & Hartford Railroad Company holds all the capital stock of the Company at a cost of $6,371,395.58, and all the stock of The Vermont Company at a cost of $571,164.31, a total of $6,942,559.89. It also holds bonds of the Berkshire and Vermont Companies and notes of the Berkshire Company amounting to $4,344,000.00.

During the year there was spent $681,823.89 for additions to the property, the principal item being for completion of an extension from Lee through East Lee to Huntington to a connection with the street railroad lines running westward from the city of Springfield, this line not as yet being in operation. In addition to this there were expenditures for track improvements necessitated by state highway construction and city road betterments.

During the year the net revenue of the Company was sufficient to provide interest on all underlying bonds and rentals of leased lines; but not sufficient to pay the total amount of interest due the New Haven Road, the defeit being $72,507.17.

THE CONNECTICUT COMPANY.

This Company operates through ownership, lease and trackage agreement 705 miles of track, all in the western half of Connecticut; in addition to which it owns 88.1 miles of track under lease to The Shore Line Electric Railway Company in New London, Norwich, Willimantic, Danielson and Putnam.

The New England Navigation Company owns all of the capital stock of the Company, at a cost of $40,000,000.00. The New Haven Company also holds the 6% demand notes of this company amounting to $2,125,000.00, all of which have been issued to provide funds for additions and betterments.

During the past year there was spent for additions to the property the sum of $1,214,535.70, by far the greater part of which was for track betterment and paving to meet the requirements of the various municipalities served by the company, other large expenditures having been made to improve power conditions at a number of points.

During the past year the Company earned sufficent to pay all operating expenses, taxes and interest and returned to the Navigation Company $1,500,000.00 as dividend and showed a surplus of $1,072.42. The following table shows the results of the operations of the company for the past four years:

	1911	1912	1913	1914
Operating Revenue	$7,565,512.49	$8,030,620.94	$8,454,624.90	$8,085,398.70
Operating Expenses and Taxes	5,656,400.74	5,561,547.31	5,868,526.09	5,767,388.57
Total Operating Income	1,909,111.75	2,469,073.63	2,586,098.81	2,318,010.13
Non-Operating Income	148,415.12	62,541.28	62,077.64	260,522.82
Gross Corporate Income	2,057,526.87	2,531,614.91	2,648,176.45	2,578,532.95
Deductions for Interest and Rentals	939,464.25	1,012,539.29	1,039,154.86	1,077,460.53
Net Corporate income	1,118,062.62	1,519,075.62	1,609,021.59	1,501,072.42
Dividends	1,000,000.00	1,500,000.00	1,500,000.00	1,500,000.00
Corporate Surplus	118,062.62	19,075.62	109,021.59	1,072.42

NEW YORK & STAMFORD RAILWAY COMPANY.

This Company operates through ownership or lease 37.51 miles of track in Westchester.

The New York, New Haven & Hartford Railroad Company owns all the capital stock of the Company at a cost of $610,643.40. It also owns property between the Mianus River and the State line between New York and Connecticut, which is leased to the New York & Stamford Railway Company at an annual rental of $20,000.00. The New Haven Company also owns first mortgage bonds of the New York & Stamford Railway Company carried at a cost of $599,880.00, and also holds 6% demand notes of the New York & Stamford Railway Company in the amount of $185,000.00, the notes all having been issued for additions and betterments, chiefly for double tracking a large portion of this line to care for the large distribution of commuting travel between New York and the various suburban points.

The amount spent for additions and betterments during the current year was $58,184.89, for new double tracking.

During the year the Company did not earn an amount sufficient to pay operating expenses, taxes and interest on the outstanding bonds, the deficit being $5,824.17.

THE RHODE ISLAND COMPANY.

This Company operates through ownership or lease 345.3 miles of electric railroad track, and 9.43 miles of steam operated trackage of the Narragansett Pier Railroad Company, all in the State of Rhode Island. This includes all of the electric railroad in the cities of Providence, Pawtucket and Woonsocket and the large industrial communities adjacent.

The New York, New Haven & Hartford Railroad Company owns the entire capital stock of the Company at a cost of $24,352,336.41, in addition to which it now holds 6% demand notes of the Company in the sum of $3,500,000.00, all issued to provide funds for expenditures for betterments and improvements of the property. The Rhode Island Company has also outstanding $1,000,000.00 in notes for monies borrowed from outside sources.

During the current year the Company has spent $1,568,914.21 for betterments and improvements, consisting of the following:

A tunnel under the hill to connect the business and residential portions of the city of Providence has been completed and put in operation, eliminating an expensive and cumbersome operation by gravity plane. A very large amount has also been spent for additions to the power house to meet the requirements of the Company for a number of years. An extension of 10 miles from Centerdale to Chepachet was built to provide transportation

facilities for territory heretofore without direct connection with the city of Providence.

The earnings of the Company were sufficient to take care of the operations and pay all interest, rentals and taxes, and leave a surplus of $347,642.94.

The Company leases the property of the Sea View Railroad Company and the Providence & Danielson Railway Company, owned by The New England Navigation Company and representing a total investment for stock and bonds of $1,266,379.37, on which The Rhode Island Company pays rental of $83,124.00 annually.

The following table shows the operating results for the past four years:

	1911	1912	1913	1914
Operating Revenue	$4,675,942.97	$5,045,006.29	$5,322,646.93	$5,379,148.55
Operating Expenses and Taxes	3,094,124.53	3,577,337.58	3,561,613.37	3,896,798.53
Total Operating Income	1,581,818.44	1,467,668.71	1,761,033.56	1,482,350.02
Non-operating Income	100,281.06	94,933.55	134,336.15	144,658.84
Gross Corporate Income	1,682,100.40	1,562,602.26	1,895,369.71	1,627,008.86
Deductions for Interest and Rentals	1,080,543.86	1,175,003.38	1,225,319.00	1,279,365.92
Net Corporate Income	601,556.54	387,598.88	670,050.71	347,642.94
Dividends	581,130.00	290,565.00	581,130.00	.....
Corporate Surplus	20,426.54	97,033.88	88,920.71	347,642.94

The Westchester Street Railroad Company.

This Company operates through ownership or lease 30.67 miles of track in Westchester County, New York.

During this year the Public Service Commission for the 2d District of New York authorized the Company to issue 7,000 shares of stock to represent the cost of the property to the New Haven Road. This is carried at a cost of $896,379.63, in addition to which the New Haven holds notes of the Westchester Company to the amount of $255,771.21 issued for capital improvements of the Company's property since acquisition.

The amount spent for additions and betterments during the current year was $56,625.54, for improvements of and additions to the track and line construction.

During the year the Company earned an amount sufficient to pay the interest on outstanding notes; but paid no dividends, the surplus from operations amounting to $4,883.99.

WATER LINES.

The causes that adversely affected the results on the steam and trolley lines had a somewhat similar affect on the various water lines owned and controlled by your Company.

The Hartford and New York Transportation Company.

The gross earnings of The Hartford & New York Transportation Company were $1,096,499.16 as compared with $1,157,337.82 for the previous year; but by careful operation the expenses were reduced so that the net income of this Company for the fiscal year just past was $85,965.42 as compared with $64,285.70 for the previous year.

This Company reduced its equipment by one barge which had become obsolete, but on account of the depression in business did not replace it.

The property of this Company is in good condition.

New Bedford, Martha's Vineyard & Nantucket Steamboat Company.

On account of considerable activity in Martha's Vineyard and Nantucket the earnings of the New Bedford, Martha's Vineyard and Nantucket Steamboat Company increased from $209,469.82 to $232,704.45; by careful operation the expenses were reduced somewhat, so that the net income of this Company for the year just past was $62,708.25 as compared with $25,630.17 for the previous year.

Just as soon as financial conditions permit this Company should add to its equipment a modern steamer to care for the growing business between the main land and the two islands.

The New England Steamship Company.

The gross earnings of The New England Steamship Company were $4,677,211.94, a decrease of $219,512.25. In spite of this decrease in gross earnings, by careful operation and rearrangement of work on some of the piers in New York, the deficit in meeting the fixed charges of this company of $355,070.50 for the year ending June 30th, 1913, was reduced to a deficit for this year of $77,802.62.

One steamer, the "City of Bridgeport," which was not needed, was sold for $100,000 in cash, and one transfer tug was dismantled and put out of service.

During the investigation of the Company's affairs by the Interstate Commerce Commission, some criticism was made upon the character of the steamships and the operation thereof. As a result, the Secretary of Commerce caused a very thorough investigation to be made by the Supervising Inspectors of New York and Boston. The United States Steamboat Inspection Service has prepared a very complete report on this steamship property and it is now a matter of record with the United States Government, open to the inspection of all interested parties. Space does not permit the publishing of this report, but the following extract summing up the Government's report will be of interest:

> "This office is therefore of the opinion in view of the nature of the safeguards placed upon these vessels and the excellent discipline that prevails, that danger from fire is a minimum, and that a menace to the lives of the patrons of this line does not exist."

REAL ESTATE.

Grand Central Terminal.

To utilize the real estate and "aerial rights" adjacent to the Grand Central Terminal in New York, the following buildings have been constructed: Biltmore Hotel, Merchants and Manufacturers Exchange, Adams Express Company and United Cigar Stores. The New Haven Company being a joint user of the Terminal and its approaching tracks joined with the New York Central in advancing money for the development of the property not required for railroad use.

The total amount advanced by your Company during the past fiscal year was $1,628,190.35, and its aggregate advances to June 30th, 1914, for these purposes, $4,153,161.75.

All of the advances made yield a satisfactory interest rate and the lessees of the buildings pay ground rents and taxes, which reduce the expenses of the Grand Central Terminal, and in addition the lessees pay annual sinking fund payments, which, together with accretions to the fund, will in about twenty-seven years return to the owning Companies the sums advanced.

The following buildings are now under construction:

Todd Building, for which the Company must advance	$325,000.00*
Yale Club, for which the Company must advance	250,000.00

*$40,000 of this amount has been paid since June 30, 1914.

Other buildings are projected, work upon which will begin in the near future, as follows:

Postoffice Building, between East 45th and East 46th Streets.
Apartment House, 50th Street and Park Avenue.
Apartment House, 51st Street and Park Avenue.

As to these the Company is under no present obligation to advance money but retains an option to participate at any time within two years.

The New Haven Company has also advanced $1,310,000.00, one-half of the cost of the office building located at the Grand Central Terminal, which amount is to be repaid with interest in annual instalments extending over a period of twenty-five years, and of which amount $104,800.00 has been repaid, leaving $1,205,200.00 to be repaid.

Increased Efficiency and Safety.

Last year's report referred to the effort of officers and employees to raise the railroad and service to a higher standard of efficiency, safety, discipline and economy. The North Haven accident of September 2d, 1913, following as it did other serious accidents, made it imperative that the rules and regulations of the Company be of such a character as to safeguard to the greatest extent possible the lives of the public and the employees.

For some time previous to this accident negotiations had been conducted with committees representing the engineers and firemen to revise rules which were not in accordance with modern railroad practice. The new management felt that it owed a duty to the public as well as to the employees to put the new rules into effect at once. The engineers and firemen felt aggrieved at this position of the Company and voted to strike. On October 18th, 1913, however, the matter was adjusted amicably with the employees, and rules containing the principles for which the management contended remained in effect.

These negotiations, in the judgment of your officers, tended to establish a better understanding and improved relations between the employees and the management, and have assisted materially in restoring confidence throughout the service. Every effort is being made by officers and men to promote a spirit of helpful co-operation, so necessary to maintain and operate the properties efficiently, safely and economically, and to give good service to the public.

Safety and Efficiency Bureau.

At the present time the Company has fully organized safety and efficiency bureaus as follows:

1 Central Committee.
7 Divisional Committees.
13 Shop, Engine House and Terminal Committees.
1 Telegraph Department Committee.
1 Electrical Department Committee.

Regular meetings are held and considerable has been accomplished in the way of removing obstructions, securing better clearances, eliminating unsafe practices, improving view at grade crossings, etc.

New Haven Railroad Club.

The New Haven Railroad Club was organized on February 26th, 1914, and is composed of officers, assistants, chief clerks, bureau foremen, or other employees of The New York, New Haven & Hartford Railroad Company, or affiliated companies, holding co-ordinate positions.

The object of the Club is to promote knowledge on all matters relative to the maintenance, operation and general administration of railroads, and to encourage social relations and a common understanding between departments.

Monthly meetings are held (except in June, July and August) in the Railroad Y. M. C. A. building at New Haven, preceded by a dinner at a nominal cost.

The average attendance at these meetings has been about one hundred and sixteen. There is much interest taken in the Club and its object, and good results are already being accomplished.

Rates.

During the year the passenger rate between Boston and New York, 229.15 miles, was increased from $4.75 to $5.00 with corresponding increases at intermediate points.

Tariffs have been filed increasing the rates for mileage books from 2c. to 2½c. a mile. Tariffs are now being prepared adjusting local passenger rates, outside of the commutation zones, to 2½c. a mile. A new tariff adjusting the merchandise and class rates is being prepared, and one adjusting the commodity rates. These tariffs are very complicated and in preparing the new schedules every effort has been to eliminate discrimination and remove unequalities. Some rates in the new tariffs will be reduced and some will be advanced. The result as a whole will be a much more scientific and logical set of rates and a slightly higher basis. The freight tariffs will be filed with the proper Commissions between now and January 1st, and it is hoped that they will be approved.

Service.

Every effort has been made to give regular and safe service, both freight and passenger, and to economize, some of the non-remunerative passenger trains have been discontinued with the result that 284,897 miles less were run by passenger trains this fiscal year than last.

Approximately 32% of all passenger trains operated by the Company earn less than 50c. and approximately 30% earn 50c. and less than $1.00 a mile, or 62% earn less than $1.00 per mile. The average cost of running all trains (passenger and freight) on the New Haven road for the last fiscal year for transportation expenses, maintenance of equipment and taxes, and not including anything for maintenance of way or administration expenses, or interest on the investment, was $1.69 per mile.

These figures emphasize the fact that the road is performing a large amount of service for the public at a loss and justify some increases in the passenger rates and some decreases in service.

STOCKHOLDERS.

The following statement of stockholders of the New Haven Company, and their location and holdings is of interest:

	Classification of Capital Stock June 30.		
	1914	1913	1912
Shares Held In:			
Massachusetts	570,166— 36%	35%	35%
Connecticut	264,491— 17%	19%	19%
New York	529,167— 33½%	33%	34%
Rhode Island	40,463— 2½%	3%	3%
Miscellaneous	166,892— 11%	10%	9%
	1,571,179 100%	100%	100%
Treasury	228,991		
	1,800,170		
Number of Stockholders in:			
Massachusetts	12,215— 46¼%	48%	48%
Connecticut	5,728— 21¾%	23%	23%
New York	4,257— 16¼%	15%	15%
Rhode Island	803— 3%	3%	3%
Miscellaneous	3,383— 12¾%	11%	11%
	26,386 100%	100%	100%

THE NEW YORK, NEW HAVEN AND HARTFORD RAILROAD COMPANY.

GENERAL BALANCE SHEET, JUNE 30, 1914.

ASSETS.	1914.	Comparison with June 30, 1913. Increase.	Decrease.
Property Investment:			
Road and Equipment:			
Investment to June 30th, 1907:			
Road	$78,378,611.83		
Equipment	35,126,455.57		
	$113,505,067.40		
Investment since June 30th, 1907:			
Road	$55,339,106.23	$3,025,057.88	
Equipment	26,696,890.13	261,539.47	
General Expenditures	362,461.93	3,952.62	
	$82,398,458.29		
	$195,903,525.69	$3,290,549.97	
Less, Reserve for Accrued Depreciation of Equipment	2,145,733.97	1,761,948.21	
	$193,757,791.72	$1,528,601.76	
Securities:			
Securities of Proprietary, Affiliated and Controlled Companies—Pledged:			
Stock (Exhibit I)	$18,595,340.92	18,595,340.92	
Funded Debt (Exhibit II)	88,502.50	88,502.50	
Notes (Exhibit III)	4,169,781.71	4,169,781.71	
Securities Issued or Assumed —Pledged:			
Funded Debt (Exhibit VII)	2,430,000.00	2,430,000.00	
Securities of Proprietary, Affiliated and Controlled Companies—Unpledged:			
Stock (Exhibit IV)	21,084,064.42		$18,594,536.92
	$46,367,689.55		
Other Investments:			
Advances to Proprietary, Affiliated and Controlled Companies for Construction, Equipment and Betterments	$1,625,991.83	521,261.16	
Miscellaneous Investments:			
Physical Property	8,331,679.34		12,000.42
Securities — Pledged (Exhibit V)	33,954,797.45	33,954,797.45	
Securities—Unpledged (Exhibit VI)	95,736,311.66		27,966,131.38
	$139,648,780.28		
Total Property Investment	$379,774,261.55	$14,715,616.78	
Investment in Buildings, Grand Central Terminal, New York.	5,358,361.75	1,575,790.35	
Working Assets.			
Cash	$6,066,957.80		$6,208,472.47
Securities Issued or Assumed —Held in Treasury (Exhibit VIII)	22,901,450.00		231,000.00
Marketable Securities (Exhibit IX)	1,863,205.12		2,665,107.65
Loans and Bills Receivable	34,420,322.36		17,498,821.97
Traffic and Car Service Balances due from other Companies	319,259.11	85,194.46	
Net Balance due from Agents and Conductors	2,826,408.45		208,440.22
Miscellaneous Accounts Receivable	5,276,068.38	427,256.93	
Materials and Supplies	5,642,340.20		338,150.95
Other Working Assets	552,202.15		88,572.23
Total Working Assets	$79,868,413.57		$26,736,114.10
Accrued Income not Due:			
Unmatured Interest, Dividends and Rents Receivable	$1,298,728.86		$361,517.80
Deferred Debit Items:			
Temporary Advances to Proprietary, Affiliated and Controlled Companies			$1,175,571.80
Betterments on Leased Lines, Distributed as rental over term of Leases	$3,526,506.04	$466,787.01	
Working Funds	840,637.22		719.93
Other Advances	3,031,387.97	1,836,878.00	
Rents and Insurance Paid in Advance	24,018.42	5,825.98	
Unextinguished Discount on Securities	386,666.66		1,003,628.96
Special Deposits	486,293.96	341,118.96	
Cash and Securities in Sinking and Redemption Funds:			
Connecticut Railway and Lighting Company Sinking Fund	$742,151.60	94,745.77	
Worcester and Connecticut Eastern Railway Sinking Fund	122,000.00	23,000.00	
	$864,151.60		
Cash and Securities in Insurance and Other Reserve Funds:			
Insurance Fund			1,953,883.93
Accident and Casualty Fund			1,698,666.31
Coal Insurance Fund			29,470.74
Other Deferred Debit Items	1,375,271.17	319,450.81	
Total Deferred Debit Items	$10,534,933.04		$2,774,135.14
	$476,834,698.77		$13,570,359.91

LIABILITIES.	1914.	Comparison with June 30, 1913. Increase.	Decrease.
Stock:			
Capital Stock	$180,017,000.00		
Premium realized on Capital Stock Sold (Since July 1, 1909)	19,282,887.50		
Total Stock and Premium Realized since July 1, 1909.	$199,299,887.50		
Mortgage, Bonded and Secured Debt:			
Mortgage Bonds, including Bonds of Merged Roads assumed (Exhibit X)	$58,929,000.00		$850,000.00
Collateral Gold Notes (Exhibit XI)	19,927,000.00	$19,927,000.00	
Plain Bonds, Debentures and Notes, including Debentures of Merged Roads assumed (Exhibit XII)	157,964,450.00	14,899,000.00	
	$236,820,450.00		
Obligations for Advances received for Construction, Equipment and Betterments	474,803.98		
Total Mortgage, Bonded and Secured Debt	$237,295,253.98	$33,976,000.00	
Liability under Contract with New York Central, for this Company's half interest in Equipment of B. & A. Equipment Trust of 1912	$2,436,000.00		$174,000.00
Working Liabilities:			
Loans and Bills Payable	$4,251,957.98		$38,346,792.02
Traffic and Car Service Balances due to other Companies	3,277,918.70	$441,025.05	
Audited Vouchers and Wages Unpaid	4,813,961.08		1,588,238.54
Matured Interest, Dividends and Rents Unpaid	1,263,084.37		2,679,091.41
Matured Mortgage, Bonded and Secured Debt Unpaid	28,512.68	22,000.00	
Other Working Liabilities	435,919.15	228,187.73	
Total Working Liabilities	$14,071,353.96		$41,922,909.19
Accrued Liabilities Not Due:			
Unmatured Interest, Dividends and Rents Payable	$2,812,266.17		$45,700.58
Taxes Accrued	187,796.11	7,796.11	
Total Accrued Liabilities not Due	$3,000,062.28		$37,904.47
Deferred Credit Items:			
Operating Reserves	$1,042,597.17		$2,301,679.60
Other Deferred Credit Items —Representing Possible Credits to Income or Profit and Loss	$6,860,651.26		
Other Deferred Credit Items —Miscellaneous	908,515.29		
	$7,769,166.55	$2,804,438.65	
Total Deferred Credit Items	$8,811,763.72	$502,759.05	
Appropriated Surplus:			
Reserves from Income or Surplus:			
Invested in Sinking and Redemption Funds:			
Connecticut Railway and Lighting Co. Sinking Fund	623,188.03	$94,745.77	
Equipment and Personal Property Leased	9,474,943.16	85,260.03	
Profit and Loss Account (Page 39)	1,822,246.14		6,094,311.10
	$476,834,698.77		$13,570,359.91

For Contingent Liabilities See Pages 40 and 41.

DISTRIBUTION OF HOLDINGS:			
1 to 10 shares inc...	12,127	9,314	8,698
11 " 50 " " ...	9,651	8,685	8,626
51 " 100 " " ...	2,363	2,348	2,295
101 " 500 " " ...	1,891	1,995	2,101
501 " 1,000 " " ...	207	228	216
1,001 and over...	147	146	170
	26,386	22,716	22,106
INDIVIDUAL AND CORPORATE STOCKHOLDERS:			
Males ...	11,113	8,185	8,079
Females ...	10,930	10,102	9,710
Trustees and Guardianships...	3,551	3,666	3,584
Insurance Co's and other corporations	802	763	733
	26,386	22,716	22,106
AVERAGE SHARES PER STOCKHOLDER:	59.5	69.06	71.32

The Company is pre-eminently one that is owned and controlled by stockholders living along the line of the road. There are only 77 stockholders living in Europe. There are 147 stockholders owning more than 1,000 shares with total holdings of 507,916 shares, and there are 26,239 stockholders owning 1,063,263 shares.

Stockholders are urged most earnestly to inform themselves about the situation of the Company, to explain the difficulties in their respective communities, and to use their active influence to help the management in its efforts to reduce expenses and to increase rates slightly, and to obtain favorable consideration for the Company at this time, when the help of everyone interested in the welfare of New England is needed in order to maintain efficiently the transportation system that is so closely interwoven with the industrial, financial and social life of this part of the country.

ORGANIZATION.

The past year has been a most trying one for the Company, the owners of its securities, employees, officers and directors. That the Company has been able to sustain itself under the very disturbed conditions is evidence of its inherent strength. It has had to meet great loss in revenues, large increases in expenses; it has been the subject of exhaustive investigations and of much hostile criticism, of which no complaint is now made, but instead an appeal for fair treatment and constructive aid.

Among the conditions necessary for the success of the Company are:

First: Freedom from disturbance and the opportunity for constructive work.

> "There is much truth," said the Interstate Commerce Commission in its report of June 20, 1913, on the New England situation, "in the claim of the carriers that they have been so occupied with investigations and so criticized by the public that no fair opportunity has been given for the operation of their railroad properties."

Second: The removal of restrictions and conflicts in the laws and policies of the various New England States which prevent the Company from adopting a comprehensive financial plan enabling it to meet its obligations by mortgage bonds.

Third: A readiness on the part of Commissions, both State and National, to permit a readjustment and increase in freight and passenger rates; and an increase in the pay received for the carriage of mail and parcels post.

Fourth: Adequate time for the Company to dispose of its investments in other companies. The Directors, as trustees for the stockholders, as well as in a large measure for the community served by the lines, should, for the protection of the property, its owners and the business of the New England States, not be forced to sacrifice these investments and at a time when values have been depressed by adverse criticism, controversy and generally poor business conditions.

The Directors and Officers are endeavoring most earnestly to conduct the affairs of the Company in a lawful, prudent and efficient manner, and are continuing to compact, improve, maintain and preserve the property in order to meet adequately the public demands and to benefit the stockholders. They will continue to strengthen its working organization, fully realizing that only with public confidence and support, and especially the co-operation of the various Commissions and governmental authorities, can the success of the Company be assured.

Your attention is directed to the tables hereto attached giving additional information about each of the properties in which your Company is interested.

The year opened with the staff of officers and the employees seriously disturbed and somewhat demoralized and discouraged because of the conditions and obstacles to be met and overcome. The efforts of the officers and employees have been directed to bringing about a better feeling towards the Company from the communities served, as well as to improving the operation of the various properties. The thanks of the owners of the property are due to the many loyal officers and employees who have rendered faithful service during the year under the most serious and most unusual conditions and obstacles.

Respectfully submitted by order of the Board of Directors.

HOWARD ELLIOTT,
Chairman of the Board and President of the Company.

PROFIT AND LOSS ACCOUNT.

CREDIT.		
Balance brought forward from June 30th, 1913...		$7,916,557.24
Credit balance of net income for the year...		268,662.87
Balance in Insurance Funds transferred to this Account....		1,983,354.67
Adjustment of securities to par value...		123,720.53
Miscellaneous Items ...		25,863.55
		$10,318,158.86
DEBIT.		
Dividend paid September 30th, 1913.....$2,356,768.50		
Loss resulting from the sale of securities of the Merchants & Miners Transportation Co...	3,594,500.00	
Unamortized loss on the New York, Westchester & Boston Ry. Co. bonds, which bonds were received in payment for advances to the New York, Westchester & Boston Ry. Co. and the bonds sold to the public by the New Haven Company prior to the past fiscal year...	1,265,295.62	
Loss on Treasury securities sold or reduced to Par ...	426,361.37	
Depreciation on equipment assigned to the Boston & Albany R. R. prior to July 1st, 1913, under "Boston & Albany Equipment Trust of 1912" ...	237,108.36	
Depreciation prior to July 1st, 1913, on equipment put out of service...	130,070.61	
Franchise and other taxes at Grand Central Terminal prior to July 1st, 1913...	111,592.57	
Rental, Grand Central Palace, N. Y., for station facilities during construction of permanent station buildings, charges accruing prior to July 1st, 1913, the amount not determined until recently ...	83,686.43	
50% of net charges to Profit and Loss made by the Boston & Albany R. R., assumed by the New Haven Company under agreement to share equally in the net results of the operation of the Boston & Albany, which agreement was cancelled as of January 31st, 1914.....	71,749.81	
Miscellaneous charges ...	218,779.45	
		8,495,912.72
Balance June 30th, 1914, as per balance sheet..		$1,822,246.14

STATEMENT OF CONTINGENT LIABILITIES.

JUNE 30TH, 1914.

Under the provisions of Section 4, Chapter 519, of the Acts of the General Court of the Commonwealth of Massachusetts, passed at its 1909 Session, The New York, New Haven and Hartford Railroad Company promises when they shall be sold, to guarantee the principal of, and the dividends and interest upon the capital stock, bonds, notes and other evidences of indebtedness of Boston Railroad Holding Company acquired by it. On June 15th, 1910, the General Court of the Commonwealth of Massachusetts passed an act authorizing the issue of preferred stock (without voting power) of Boston Railroad Holding Company, in exchange for its four per cent. fifty-year Debentures dated November 1st, 1909; and on January 10th, 1911, the $20,012,000 Debentures owned by The New York, New Haven and Hartford Railroad Company were exchanged for preferred stock. On June 30th, 1914, there were held by the public 28,000 shares of preferred stock of Boston Railroad Holding Company, on which the guaranty had been executed; and on the same date The New York, New Haven and Hartford Railroad Company held the following stock:

31,065 shares of Common Stock of Par Value...$3,106,500.00
244,939 shares of Preferred Stock of Par Value..24,493,900.00

THE NEW YORK NEW HAVEN AND HARTFORD RAILROAD COMPANY

Is liable jointly with other roads for any deficiency on foreclosure of bonds of the Boston Terminal Company.

Is liable by endorsement on $200,000 six per cent. demand notes dated May 1st, 1914, of the Central New England Railway Company deposited as Collateral under Indenture dated May 1st, 1914, securing $20,000,000 one year 5% Collateral Gold Notes of The New York, New Haven and Hartford Railroad Company.

Guarantees the payment of principal and interest of the four per cent. First Mortgage Gold Bonds of the Central New England Railway Company of the issue of January 1st, 1911, to the amount of $12,012,000.

Is liable by endorsement on $1,325,000 six per cent. demand notes dated May 1st, 1914, of The Connecticut Company deposited as Collateral under Indenture dated May 1st, 1914, securing $20,000,000 one year 5% Collateral Gold Notes of The New York, New Haven and Hartford Railroad Company.

Is liable by endorsement on $3,000,000 six per cent. demand notes, Series "E," dated May 1, 1914, of The Harlem River and Port Chester Railroad Company deposited as Collateral under Indenture dated May 1st, 1914, securing $20,000,000 one year 5% Collateral Gold Notes of The New York, New Haven and Hartford Railroad Company.

Guarantees the payment of principal and interest of The Harlem River and Port Chester Railroad Company one year 5% Gold Notes, Series "A," dated May 1st, 1914, to the amount of $10,000,000.

Is liable by endorsement on $819,781.71 five per cent. demand note dated September 22nd, 1911, of the Hartford and Connecticut Western Railroad Company (previously endorsed by the Central New England Railway Co.) deposited as Collateral under Indenture dated May 1st, 1914, securing $20,000,000 one year 5% Collateral Gold Notes of The New York, New Haven and Hartford Railroad Company.

Is liable by endorsement on $1,150,000 six per cent. demand notes dated May 1st, 1914, of Housatonic Power Company deposited as Collateral under Indenture dated May 1st, 1914, securing $20,000,000 one year 5% Collateral Gold Notes of The New York, New Haven and Hartford Railroad Company.

Guarantees the payment of principal of $300,000 and interest on the 6% one year Notes of the Housatonic Power Company dated March 31st, 1914.

Guarantees four per cent. dividends on preferred stock of the New England Investment and Security Company, $4,000,000, and payment of principal at one hundred five per cent. on liquidation; also guarantees the payment of principal, $5,000,000 and interest of the New England Investment and Security Company fifteen-year Funding Gold Notes dated April 1st, 1909.

Guarantees the payment of principal and interest of the Gold Debenture of The New England Navigation Company in case of termination of lease of the Old Colony Railroad Company, $3,600,000.

The New York, New Haven and Hartford Railroad Company and the Pennsylvania Railroad Company, jointly and severally, guarantee the payment of the principal and interest of the outstanding $16,000,000.00 First Mortgage four and one-half per cent. Gold Bonds dated August 1st, 1913, due August 1st, 1953, of the New York Connecting Railroad Company.

Guarantees the payment of principal and interest of the four per cent. fifty-year First and Refunding Mortgage Gold Bonds of the New York and Stamford Railway Company, of the issue of November 1st, 1908, to the amount of $925,000.

Is liable by endorsement on $185,000 six per cent. demand notes dated May 1st, 1914, of New York and Stamford Railway Company deposited as Collateral under Indenture dated May 1st, 1914, securing $20,000,000 one year 5% Collateral Gold Notes of The New York, New Haven and Hartford Railroad Company.

Guarantees the payment of principal and interest of the four and one-half per cent. First Mortgage Gold Bonds of The New York, Westchester and Boston Railway Company of the issue of July 1st, 1911, to the amount of $21,200,000.

Is liable by endorsement on $1,725,000 six per cent. demand notes dated May 1st, 1914, of The Rhode Island Company deposited as Collateral under indenture dated May 1st, 1914, securing $20,000,000 one year 5% Collateral Gold Notes of The New York, New Haven and Hartford Railroad Company.

Is liable by endorsement on $150,000 five per cent. demand note dated May 1st, 1914, of Rutland Railroad Company deposited as Collateral under Indenture dated May 1st, 1914, securing $20,000,000 one year 5% Collateral Gold Notes of The New York, New Haven and Hartford Railroad Company.

Guarantees four per cent. dividends on preferred stock of the Springfield Railway Companies, $3,387,900, and payment of principal at one hundred five per cent. on liquidation.

OF THE ABOVE CONTINGENT LIABILITIES THE FOLLOWING ARE IN THE HANDS OF THE PUBLIC THE INTEREST OR DIVIDENDS WERE ALL MET BY ISSUING COMPANIES UNLESS OTHERWISE NOTED.

Name of Company.	*Nature of Obligation.*	*Form of Guaranty.*	*Total Amount Liability.*	*Rate.*	*Date Due.*	*Annual Interest or Dividends.*
*Boston Terminal Co.	Bonds.	Joint with other Co's.	$14,500,000.00	3½%	Feb. 1, 1947	$507,500.00
New York & Stamford Ry. Co.	1st Ref. Mtge. Gold Bonds.	Sole	247,000.00	4%	Nov. 1, 1958	9,880.00
Central New England Ry. Co.	1st Mtge. Gold Bonds.	Sole	12,012,000.00	4%	Jan. 1, 1961	480,480.00
‡New York, Westchester & Boston Ry. Co.	1st Mtge. Gold Bonds.	Sole	19,200,000.00	4½%	July 1, 1946	864,000.00
Springfield Ry. Co.	Preferred Stock.	Sole	3,387,900.00 and payment of principal at 105% on liquidation.	4%		135,516.00
New England Investment & Security Co.	Preferred Stock.	Sole	4,000,000.00 and payment of principal at 105% on liquidation.	4%		160,000.00
¶Boston R. R. Holding Co.	Preferred Stock.	Sole	2,800,000.00	4%		112,000.00
§New York Connecting R. R. Co.	1st Mtge. Gold Bonds.	Joint with Penn. R. R.	16,000,000.00	4½%	Aug. 1, 1953	720,000.00
Housatonic Power Co.	One Year Notes.	Sole	300,000.00	6%	Mar. 31, 1915	18,000.00
The Harlem River & Port Chester R. R. Co.	One year 5% Gold Notes. Series "A."	Sole	10,000,000.00	5%	May 1, 1915	500,000.00

*Interest on Bonds paid out of Rentals received from Companies using Terminal.

‡Did not earn interest on bonds. Paid by The New York, New Haven & Hartford R. R. Co.

¶Did not earn dividend on preferred stock. Paid by The New York, New Haven & Hartford R. R. Co.

§Not complete or in operation. Interest charged to construction.

PLEDGED

SECURITIES OF PROPRIETARY, AFFILIATED AND CONTROLLED COMPANIES.

EXHIBIT I.

	Number of shares.	*Book Value.*
STOCKS.		
Central New England Railway Co. Common Stock	47,920	$868,566.55
Central New England Railway Co. Preferred Stock	37,360	1,052,335.91
Hartford & Conn. Western R. R. Co.	17,482	1,201,063.69
New York, Ontario & Western Ry. Co. Common	291,600	13,105,185.62
New York, Ontario & Western Ry. Co. Preferred	22	3,212.00
Rutland Railroad Co.	23,520½	2,364,977.15
TOTAL		$18,595,340.92

EXHIBIT II.

FUNDED DEBT.	*Par Value.*	*Book Value.*
Central New England Railway Co.	6%	$200,000.00
4% First Mortgage Gold Bonds	$85,000.00	$88,502.50

EXHIBIT III.

NOTES.	*Rate of Interest.*	*Book Value.*
Central New England Railway Co.	6%	$200,000.00
The Harlem River & Port Chester R. R. Co.	6	3,000,000.00
Hartford & Conn. Western R. R. Co.	5	819,781.71
Rutland Railroad Co	5	150,000.00
TOTAL		$4,169,781.71

These securities comprise part of the Collateral Pledged under the Indenture dated May 1st, 1914, securing 5% Collateral Gold Notes.

EXHIBIT IV.

SECURITIES OF PROPRIETARY, AFFILIATED AND CONTROLLED COMPANIES.—UNPLEDGED.

	Number of Shares.	*Book Value.*
STOCKS.		
Boston & Providence R. R. Corporation	5,246	$ 1,582,443.18
The Boston Terminal Co.	2,000	200,000.00
Central New England Ry. Co. Common Stock and Scrip	30	543.90
Central New England Ry. Co. Preferred Stock and Scrip	10	281.60
The Harlem River & Port Chester R. R. Co.	10,000	1,000,000.00
Holyoke & Westfield R. R. Co.	200	20,000.00
The New York Connecting R. R. Co.	15,000	1,527,204.33
Norwich & Worcester R. R. Co.	971	219,038.19
Old Colony R. R. Co.	98,132	13,065,341.80
Providence, Warren & Bristol R. R. Co. Common	4,867	730,212.67
Providence, Warren & Bristol R. R. Co. Preferred	1	220.00
Providence & Worcester R. R. Co.	9,551	2,738,762.75
Roxbury Central Wharf Co.	7	7.00
South Bay Wharf & Terminal Co.	9	9.00
TOTAL		$21,084,064.42

STOCK.

EXHIBIT V.

MISCELLANEOUS INVESTMENTS.—PLEDGED.

	Number of Shares.	*Book Value.*
STOCKS		
American Telephone & Telegraph Co.	314	$ 37,782.56
Concord & Montreal R. R.	2,469	395,765.70
Connecticut & Passumpsic Rivers R. R. Co.	1,464	208,162.44
Northern R. R. (of New Hampshire)	922	130,750.27
Pennsylvania Railroad Co.	1,168	71,907.64
The Rhode Island Co.	96,855	24,352,336.41
Waterbury Gas Light Co.	8,374	847,971.88

BONDS.	*Par Value.*	
American Telephone & Telegraph Co. 4½% Gold Bonds due 1933	$ 6,300.00	$ 6,290.55
Chicago, Burlington & Quincy R. R. Co. (Ill. Div.) 3½% Bonds due 1949	10,000.00	9,150.00
Chicago & Eastern Illinois R. R. Co. 5% Bonds due 1937	22,000.00	25,300.00
Chicago, Rock Island & Pacific R. R. Co. 4% General Mortgage Bonds due 1988	38,000.00	38,000.00
New York, Westchester & Boston Ry. Co. 4½% First Mortgage Gold Bonds due 1946	2,000,000.00	2,000,000.00
New York and Stamford Railway Co. 4% First and Refunding Mortgage Gold Bonds due 1958	678,000.00	599,880.00
The Vermont Company. 5% First Mortgage Gold Bonds due 1931	846,000.00	846,500.00

NOTES.	*Rate of Interest.*	
Housatonic Power Co.	6%	1,150,000.00
New York and Stamford Railway Co.	6	185,000.00
The Connecticut Co.	6	1,325,000.00
The Rhode Island Co.	6	1,725,000.00
TOTAL		$33,954,797.45

These securities comprise part of the Collateral Pledged under the Indenture dated May 1st, 1914, securing 5% Collateral Gold Notes.

EXHIBIT VI.

MISCELLANEOUS INVESTMENTS.—UNPLEDGED.

	Number of Shares.	*Book Value.*
STOCKS.		
Berkshire Street Railway Co.	53,981	$ 6,371,395.58
Boston Railroad Holding Co. Preferred	244,939	24,493,900.00
Boston Railroad Holding Co. Common	31,065	3,106,500.00
Millbrook Co.	1,000	100,000.00
The New England Navigation Co.	494,055	53,322,899.48
New York & Stamford Railway Co.	5,000	610,643.40
New York, Westchester & Boston Ry. Co. Stock and Scrip	49,249	6,241,951.76
The Vermont Co.	6,500	571,164.31
Wood River Branch R. R. Co.	336	21,477.50
The Westchester Street R. R. Co.	7,000	896,379.63
TOTAL		$95,736,311.66

EXHIBIT VII.

SECURITIES ISSUED OR ASSUMED.—PLEDGED.

	Par Value.	*Book Value.*	
FUNDED DEBT.			
New York, Providence & Boston R. R. Co. 4% General Mortgage Bonds due April 1st, 1942	$247,000.00	$247,000.00	
The New York, New Haven & Hartford R. R. Co. 6% Convertible Debenture certificates, due Jan. 15th, 1948	600,800.00	600,800.00	
3½% Non-Convertible Debenture certificates, due April 1st, 1954	2,100.00	2,100.00	
3½% Convertible Debenture certificates, due Jan. 1st, 1956	852,100.00	852,100.00	
3½% Non-Convertible Debenture certificates, due March 1st, 1947	9,000.00	9,000.00	
Providence Securities Co. 4% Fifty year Gold Debentures, due May 1st, 1957	719,000.00	719,000.00	
Total			$2,430,000.00

These securities comprise part of the Collateral Pledged under the Indenture dated May 1st, 1914, securing 5½ Collateral Gold Notes.

EXHIBIT VIII.

SECURITIES ISSUED OR ASSUMED, HELD IN TREASURY.—UNPLEDGED.

	Number of Shares.	*Book Value.*	
STOCKS.			
The New York, New Haven & Hartford R. R. Co.	228,991	$22,899,100.00	$22,899,100.00
FUNDED DEBT.	*Par Value.*	*Book Value.*	
The Consolidated Ry. Co. 3, 3½ and 4% Debentures and Scrip	$2,350.00	$2,350.00	2,450.00
Total			$22,901,450.00

EXHIBIT IX.

MARKETABLE SECURITIES.

	Number of Shares.	Book Value.	
STOCKS:			
Boston & Lowell R. R. Corporation..	412	$88,775.13	
City National Bank, Holyoke.....	100	11,500.00	
Connecticut River R. R. Co.....	1,015	276,220.04	
Concord & Portsmouth R. R. Co.....	18	3,285.00	
Hereford Railway Co.....	246	21,928.77	
Iron Works Aqueduct & Water Co...1/12 Interest		100.00	
Lowell & Andover R. R. Co.....	193	41,919.26	
Manchester & Lawrence R. R. Co....	63	14,081.66	
Massawippi Valley Railway Co.....	354	46,020.00	
Nashua & Lowell R. R. Co.....	84	20,179.51	
Pemigewasset Valley R. R. Co.....	710	99,676.51	
Peterborough R. R. Co.....	86	8,390.00	
Pittsfield & North Adams R. R. Corp	50	6,965.26	
Quincy Quarries Co.....	38	2,110.00	
Upper Coos R. R. Co.....	73	10,242.75	
Vermont & Massachusetts R. R. Co...	184	30,439.77	
Village Water Co., New Hartford...	2	24.00	
Westingbouse Air Brake Co.....	9	967.00	
Wilton R. R. Co.....	98	21,389.14	
Miscellaneous	...	2,500.00	
			$706,704.80
FUNDED DEBT:	*Par Value.*		
Berkshire Street Ry. Co. 5% 20 year Gold Debentures.....	$200,000.00	$200,000.00	
Central New England Ry. Co. 5% Income Bond Scrip.....	608.50	608.50	
Central New England Ry. Co. (D. C. R. R.) 4½% First Mortgage Gold Bonds	5,000.00	5,230.00	
Park Square Theatre Co., Inc. 5% Second Mortgage Notes.....	320,000.00	320,000.00	
Wood River Brauch R. R.*Co. 5½% First Mortgage Bonds.....	56,500.00	28,250.00	
Pawtuxet Valley Electric Street Ry. Co. 5% Bonds.....	38,000.00	39,900.00	
			$593,988.50
NOTES:	*Rate of Interest.*		
City Lumber and Coal Co.....	5%	$15,000.00	
P. C. Larkin.....	5	63,894.05	
Providence, Warren & Bristol R. R. Co.	6	38,617.77	
Salts Textile Manufacturing Co.....	5	75,000.00	
Shearer Realty Trust Co*.....	5	200,000.00	
Rutland Railroad Co.....	5	50,000.00	
Trustees of the Massachusetts Automobile Club Trust.....	5	90,000.00	
Waterbury Lumber & Coal Co.....	5	5,000.00	
Ida V. Whitney.....	4½	25,000.00	
			$562,511.82
Total			$1,863,205.12

EXHIBIT XII.

NEW YORK, NEW HAVEN AND HARTFORD RAILROAD COMPANY DEBENTURES, INCLUDING DEBENTURES OF MERGED ROADS ASSUMED.

	Total Outstanding.	Date of Maturity.	Interest Payable.	
Convertible 6% Debenture Certificates .....$	39,029,000.00	Jan. 15, 1948	Jan. 15.	July 15
Convertible 3½% Debenture Certificates	9,765,450.00	Jan. 1, 1956	Jan. 1.	July 1
Non-Convertible 4% Debentures	5,000,000.00	Mch. 1, 1947	Mch. 1.	Sept. 1
Non-Convertible 3½% Debentures	5,000,000.00	Mch. 1, 1947	Mch. 1.	Sept. 1
Non-Convertible 3½% Debentures	10,000,000.00	Apr. 1, 1954	Apr. 1.	Oct. 1
Non-Convertible 4% Debentures	15,000,000.00	July 1, 1955	Jan. 1.	July 1
Non-Convertible 4% Debentures	15,000,000.00	May 1, 1956	May 1.	Nov. 1
European Loan of 1907...	27,985,000.00	Apr. 1, 1922	Apr. 1.	Oct. 1
Naugatuck R. R. Co. 3½% Debentures	234,000.00	Oct. 1, 1930	Apr. 1.	Oct. 1
Hartford Street Railway Co. 4% Debentures Series M	165,000.00	Jan. 1, 1930	Jan. 15.	July 15
The Consolidated Railway Co. 3½, 3½% and 4% Debentures	972,000.00	Feb. 1, 1930	Feb. 1.	Aug. 1
4% Debentures	4,255,000.00	July 1, 1954	Jan. 1.	July 1
4% Debentures	2,309,000.00	Jan. 1, 1955	Jan. 1.	July 1
4% Debentures	1,340,000.00	Apr. 1, 1955	Apr. 1.	Oct. 1
4% Debentures	2,011,000.00	Jan. 1, 1956	Jan. 1.	July 1
Providence Securities Co. 4% Gold Debentures....	19,899,000.00	May 1, 1957	May 1.	Nov. 1
	$157,964,450.00			

RENTALS OF LEASED LINES.

FOR THE YEAR ENDING JUNE 30, 1914, IN COMPARISON WITH YEAR 1913.

	1914.	Comparison with 1913. Increase.	Decrease.
*Old Colony Railroad.....$	2,107,393.48	$21,769.23	
Boston & Providence Railroad.....	494,807.50		$3,856.05
Providence & Worcester Railroad.....	416,000.00		
Norwich & Worcester Railroad.....	290,537.00		11.70
The Harlem River & Port Chester Railroad	1,197,100.96	86,778.38	
Holyoke & Westfield Railroad.....	46,000.00		
Providence, Warren & Bristol Railroad.	55,158.89	1,098.18	
Chatham Railroad	3,610.00		
Betterments to Leased Lines irrecoverable, distributed as rental over term of leases	47,934.44	6,970.65	
TOTAL .....$	4,658,542.27	$112,748.69	

*There has been no increase in the Capital Stock of the Old Colony Railroad Company during the past fiscal year.

EXHIBIT X.

THE NEW YORK, NEW HAVEN AND HARTFORD RAILROAD COMPANY BONDED DEBT INCLUDING BONDS OF MERGED ROADS ASSUMED.

	Rate and Character of Debt.		Total Outstanding.	Date of Maturity.	Interest Payable.	
N. Y., N. H. & H. R. R. Co.—H. R. & P. C.....	4%	First Mortgage	$15,000,000.00	May 1, 1954	May 1.	Nov. 1.
New York, Providence & Boston R. R. Co.....	4%	General Mortgage	1,000,000.00	April 1, 1942	April 1.	Oct. 1.
Housatonic Railroad Company	5%	Consolidated Mortgage	2,839,000.00	Nov. 1, 1937	May 1.	Nov. 1.
Danbury & Norwalk Railroad Company.....	6%	Consolidated Mortgage	100,000.00	July 1, 1920	Jan. 1.	July 1.
" " " "	5%	Consolidated Mortgage	400,000.00	July 1, 1920	Jan. 1.	July 1.
" " " "	5%	General Mortgage	150,000.00	Apr. 1, 1925	Apr. 1.	Oct. 1.
" " " "	4%	First Refunding Mtge. Gold	350,000.00	June 1, 1955	June 1.	Dec. 1.
New Haven and Derby Railroad Company.....	5%	Consolidated Mortgage	575,000.00	May 1, 1918	May 1.	Nov. 1.
Providence and Springfield Railroad Company.....	5%	First Mortgage	750,000.00	July 1, 1922	Jan. 1.	July 1.
Naugatuck Railroad Company	4%	First Mortgage	2,500,000.00	May 1, 1954	May 1.	Nov. 1.
Boston and New York Air Line R. R. Co.....	4%	First Mortgage Gold	3,777,000.00	Aug. 1, 1955	Feb. 1.	Aug. 1.
Providence Terminal Company	4%	First Mortgage Gold	4,000,000.00	Mch. 1, 1956	Mch. 1.	Sept. 1.
Worcester and Conn. Eastern Ry. Co.....	4½%	First Mortgage Gold	1,990,000.00	Jan. 1, 1943	Jan. 1.	July 1.
New Haven and Centerville St. Ry. Co.....	5%	First Mortgage	283,000.00	Sept. 1, 1933	Mch. 1.	Sept. 1.
Meriden Horse R. R. Co.....	5%	Consolidated Mortgage	415,000.00	Jan. 1, 1924	Jan. 1.	July 1.
Norwich Street Railway Co.....	5%	First Mortgage	350,000.00	Oct. 2, 1923	Apr. 1.	Oct. 1.
Montville Street Railway Co.....	5%	First Mortgage	250,000.00	May 1, 1920	May 1.	Nov. 1.
New London Street Railway Co.....	5%	First Mortgage	150,000.00	Oct. 2, 1923	Apr. 1.	Oct. 1.
Middletown Horse R. R. Co.....	5%	First Mortgage	150,000.00	Dec. 1, 1914	June 1.	Dec. 1.
Portland Street Railway Co.....	5%	First Mortgage	30,000.00	Nov. 1, 1916	May 1.	Nov. 1.
Hartford, Manchester and Rockville Tram. Co.	5%	First Mortgage	200,000.00	Oct. 1, 1924	Apr. 1.	Oct. 1.
Hartford Street Railway Co.....	4%	First Mortgage Gold	2,500,000.00	Sept. 1, 1930	Mch. 1.	Sept. 1.
Greenwich Tramway Co.....	5%	First Mortgage	320,000.00	July 1, 1931	Jan. 1.	July 1.
*Branford Electric Co.....	5%	First Mortgage	63,000.00	Oct. 1, 1937	Apr. 1.	Oct. 1.
Torrington & Winchester St. Ry. Co.....	5%	First Mortgage	150,000.00	Dec. 1, 1917	June 1.	Dec. 1.
Meriden, Southington and Compounce Tramway Co.....	5%	First Mortgage	175,000.00	July 1, 1928	Jan. 1.	July 1.
Pawtuxet Valley R. R. Co.....	4%	First Mortgage	160,000.00	Apr. 1, 1925	Apr. 1.	Oct. 1.
New England R. R. Co.....	4%	Consolidated Mortgage	10,000,000.00	July 1, 1945	Jan. 1.	July 1.
" " " "	5%	Consolidated Mortgage	7,500,000.00	July 1, 1945	Jan. 1.	July 1.
Stafford Springs Street Ry. Co.....	5%	First Mortgage Gold	400,000.00	July 1, 1956	Jan. 1.	July 1.
New Haven and Northampton Co.....	4%	Refunding Cons. Mtge. Gold Bonds	2,400,000.00	June 1, 1956	June 1.	Dec. 1.
			$58,929,000.00			

NOTE.—Certain property of this Company is subject to a lien under a mortgage of the New York & New England Railroad Company to secure Boston Terminal Bonds of that Company to the amount of $1,500,000., due April 1, 1939, bearing interest at 4 per cent.

*Principal, and interest to maturity deposited with the Union and New Haven Trust Co.

EXHIBIT XI.

THE NEW YORK, NEW HAVEN AND HARTFORD RAILROAD COMPANY COLLATERAL GOLD NOTES.

5% Collateral Gold Notes dated May 1st, 1914, due May 1st, 1915. Total Outstanding $19,927,000.00.

Interest payable May 1st and November 1st. For list of collateral pledged as security see pages 42—44—45. Exhibits 1—2—3—5—7.

ADDITIONS AND BETTERMENTS.

YEAR ENDING JUNE 30, 1914.

Real Estate	$274,186.35
New or Improved Bridges:	
New London, Conn.....$68,114.97	
New Haven, Conn..... 24,173.12	
Midland Division (Various)..... 24,548.52	
Providence, R. I..... 16,136.95	

Mt. Vernon, N. Y.	13,452.91	
Hazardville, Conn.	8,348.48	
South Boston, Mass.	6,257.76	
Whately, Mass.	5,490.50	
Natick, R. I.	5,000.03	
Sundry Places	15,157.97	
		186,681.21
Glenbrook, Conn.—New Haven, Conn., Electrification		955,610.47
New Haven, Conn.—Springfield, Mass., Signals		216,660.36
Stamford, Conn.—New Haven, Conn., Signals		192,369.61
Berkshire Jct., Conn.—New Milford, Conn., Double Tracking		153,094.76
Woodlawn, N. Y.—New Haven, Conn., Re-distribution System		124,251.06
Woonsocket, R. I., Improved Freight Facilities		67,839.99
Cos Cob, Conn., Power Plant		51,910.10
Hartford, Conn., Additional Tracks		31,061.79
Middletown, Conn.—Willimantic, Conn., Improvements		24,902.19
Bradford, R. I., Improved Freight Facilities		22,878.05
Stonington, Conn., Track Improvements		22,603.71
Torrington, Conn., Freight House Improvements		19,954.78
New Rochelle Jct., N. Y., Revision Track Layout		19,759.02
Stamford, Conn.—Woodlawn, N. Y., Circuit Breakers		18,946.15
New Haven, Conn., Re-arrangement Telephone Facilities		16,977.78
South Bay Jct., Mass., Paving and Drains		14,718.34
South Boston, Mass., Pier No. 1, Improvements		13,984.35
Olneyville, R. I., Temporary Freight Facilities		12,534.68
Elimination of Grade Crossings		233,913.84
New or Improved Stations		16,571.17
New or Improved Yards and Sidings		64,831.51
New or Improved Cross-overs		24,105.58
Sundry Other Additions and Betterments		248,663.65
		$3,029,010.50
New Equipment, consisting of 3 electric locomotives, 34 steel coaches, 6 steel postal cars, 1 steel smoker, 20 milk cars, 3 steel floats, 1 steam locomotive crane, 1 transformer, 1 rail unloader, 20 passenger and freight cars converted to freight train cars and 262 passenger and freight train cars converted into work cars and tool cars		1,054,659.07
		$4,083,669.57
Less: Equipment put out of Service and Equipment transferred to Equipment Trust		793,119.60
Total		$3,290,549.97
These expenditures were disposed of as under:		
Charged to Cost of Road		$3,025,057.88
Charged to Equipment		261,539.47
Charged to General Expenditures		3,952.62
		$3,290,549.97

DEBT OF LEASED ROADS, INTEREST ON WHICH IS PAID BY THE NEW YORK, NEW HAVEN AND HARTFORD RAILROAD COMPANY AS PART OF RENTAL.

Date of Issue.	*Name of Road.*	*Character of Debt.*	*When Due.*	*Amount Outstanding.*	*INTEREST.* *Rate.*	*When Payable.*	*Annual Interest.*
Jan. 1, 1888	Old Colony R. R.	Bonds	Jan. 1, 1938	$4,000,000.00	4	Jan. and July	$160,000.00
Feb. 1, 1894	" " "	"	Feb. 1, 1924	3,000,000.00	4	Feb. and Aug.	120,000.00
Dec. 1, 1895	" " "	"	Dec. 1, 1925	5,598,000.00	4	June and Dec.	223,920.00
July 1, 1902	" " "	"	July 1, 1932	1,000,000.00	3½	Jan. and July	35,000.00
July 1, 1888	Boston and Providence R. R.	"	July 1, 1918	2,170,000.00	4	Jan. and July	86,800.00
Oct. 1, 1897	Providence & Worcester R. R.	First Mortgage	Oct. 1, 1947	1,500,000.00	4	Apr. and Oct.	60,000.00
Mar. 1, 1897	Norwich & Worcester R. R.	Debentures	Mar. 1, 1927	1,200,000.00	4	Mar. and Sept.	48,000.00
Jan. 1, 1901	Connecticut Ry. & Lighting Co.	First and Refunding Mtge.	Jan. 1, 1951	12,551,000.00	4½	Jan. and July	*$564,795.00
Jan. 1, 1899	Connecticut Lighting & Power Co.	First Mortgage	Jan. 1, 1939	209,000.00	5	Jan. and July	†10,450.00
July 1, 1893	Bridgeport Traction Co.	" "	July 1, 1923	706,000.00	5	Jan. and July	†35,300.00
				$31,934,000.00			$1,344,265.00

*Fractional certificates for bonds amounting to $378.36 outstanding do not draw interest.

†Rental assumed by The Connecticut Co. and the Housatonic Power Co.

ANNUAL REPORT OF THE MINNEAPOLIS, ST. PAUL & SAULT STE. MARIE RAILWAY CO.

INCLUDING CHICAGO DIVISION (WISCONSIN CENTRAL)
FOR THE FISCAL YEAR ENDED JUNE 30, 1914

Submitted herewith is a report for the fiscal year ended June 30, 1914. The Gross Earnings, Operating Expenses, Fixed Charges, Surplus, etc., are as shown in the following condensed statement.

	Soo Line	Chicago Division	Soo Line System
Gross Earnings	$18,717,689.36	$10,588,533.23	$29,306,222.59
Operating Expenses	12,209,227.62	7,145,031.08	19,354,258.70
Net Earnings	$6,508,461.74	$3,443,502.15	$9,951,963.89
Income from other sources	1,083,243.69	46,709.49	1,129,953.18
Total Income	$7,591,705.43	$3,490,211.64	$11,081,917.07
Fixed Charges, Taxes, etc.	4,738,203.13	2,972,515.62	7,710,718.75
Surplus Income	$2,853,502.30	$517,696.02	$3,371,198.32

Dealing with the entire system and comparing the year's results with those of the preceding year, the Gross Earnings decreased $2,998,439.91, the Total Income decreased $2,838,321.28, and the Surplus Income decreased $3,249,567.62.

The percentage of Gross Earnings required for Operating Expenses for the year was 66%. The preceding year it was 59.8%.

Analysis shows the decrease of Gross Earnings to be the result of several factors: first and principally, the loss of grain tonnage caused by the lighter crop of 1913; a considerable loss of manufactured products and merchandise tonnage resulting from the depressed business conditions; a loss of passenger revenue on account of lower passenger rates established by some of the states through which the lines operate, and the refunding of overcharges, both passenger and freight, in consequence of the Court's decision in the Minnesota Rate Case.

A substantial increase in revenue from livestock and other miscellaneous farm products handled, supports the theory that the agricultural development of the Northwest is becoming more diversified in its character and should be an encouragement for the future.

The increased cost of operation is found principally in the increased cost of maintenance of way, structures and equipment, and reflects the higher cost of labor and materials, the necessity of displacing temporary structures, and the increasing cost of depreciation in obsolete equipment. The increases in the other items of expense denote the increasing cost tendencies occasioned by the higher cost of materials and constant pressure for higher wages.

During the year the mileage was increased by completion of the extension from Ambrose, N. D., to Whitetail, Mont., 85.77 miles, by the Iron Mountain Branch and the Ironton Branch in the Cuyuna Iron Range, 11.57 miles. The only new construction in progress at this time is an extension westward from Plaza to the Missouri River, a distance of thirty-three miles.

The Freight Terminals at Chicago were completed and have been in operation since April 1st last. These terminals are the property of the Central Terminal Railway Company, an Illinois corporation owned and controlled by the Soo Line, and report of that Company is therefore embodied herewith.

The Company's funded debt was increased during the year by the sale of $4,638,000 Minneapolis, St. Paul & Sault Ste. Marie Railway Company First Consolidated Mortgage Bonds, $1,280,000 Equipment Trust Notes and $150,000 Wisconsin Central Railway Company First and Refunding Mortgage Bonds; $783,000 of the last named Bonds were authorized and issued.

$1,010,993 Equipment Trust Notes, $56,000 Wisconsin Central Railway Company First General Mortgage Bonds and $7,000 Marshfield and South Eastern Division Bonds were retired during the year.

The early prospects of the season promised a record breaking grain crop in the Northwest this year, but the indications are that only an average crop has been matured. While the business condition in the Northwest seem sound and have the factors for local prosperity, under the present general financial and political complications prevalent throughout the world, superhuman wisdom and courage would be required to predict the business probabilities for the current year.

Respectfully submitted,

E. PENNINGTON,
President.

OPERATING REVENUES AND EXPENSES.

Revenue from Transportation:		
Freight Revenue	$12,748,506.27	
Passenger Revenue	4,436,911.33	
Excess Baggage Revenue	47,334.51	
Mail Revenue	391,770.88	
Express Revenue	343,133.97	
Other Passenger Train Revenue	1,138.38	
Switching Revenue	63,361.83	
Special Service Train Revenue	6,046.37	
Miscellaneous Transportation Revenue	18,104.19	
Total Revenue from Transportation		$18,056,327.73
Revenue from Operations Other than Transportation:		
Station and Train Privileges	$13,166.73	
Parcel Room Receipts	1,602.10	
Storage, Freight	3,765.12	
Storage, Baggage	2,014.36	
Car Service	33,972.38	
Telegraph Service	101,229.77	
Rents of Buildings and Other Property	45,329.63	
Miscellaneous	5,473.24	
Total Revenue from Operations Other Than Transportation		$206,553.33
Joint Facilities Revenue		11,498.04
Total Operating Revenues		$18,274,379.10
Operating Expenses:		
Maintenance of Way and Structures	$2,383,739.99	
Maintenance of Equipment	3,070,670.60	
Traffic Expenses	375,814.79	
Transportation Expenses	5,664,285.03	
General Expenses	427,715.15	
Total Operating Expenses		11,922,225.56
Net Operating Revenue		$6,352,153.54

GENERAL BALANCE SHEET, JUNE 30, 1914

ASSETS

Property Investment:		
Road	$95,101,425.01	
Equipment	20,859,560.68	
	$115,960,985.69	
Less Reserve for Accrued Depreciation	2,275,693.21	
Total		$113,685,292.48
Securities of Proprietary, Affiliated and Controlled Companies:		
Wisconsin Central Ry. Co. Stock	$3,658,337.09	
St. Paul Union Depot Co. Stock	103,600.00	
Minnesota Transfer Ry. Co. Stock	7,000.00	
Sault Ste. Marie Bridge Co. Stock	500.00	
Sault Ste. Marie U. D. Co. Stock	50,590.56	
Belt Ry. Co. of Chicago Stock	240,000.00	
Central Terminal Ry. Co. Stock	1,140,000.00	
Western Express Company Stock	50,000.00	
Central Terminal Ry. Co. Bonds	139,500.00	
Minnesota Transfer Ry. Co. Bonds	64,000.00	
Total		5,453,527.65
Miscellaneous Investments:		
Coeur d'Alene & Pend d'Orielle Ry. Co. 5% Bonds	$25,200.00	
Pillsbury-Washburn Flour Milling Co., Ltd., 5% Bonds	4,700.00	
Village of Alexandria Bonds	4,000.00	
W. C. Ry. Co. Equipment Contracts	1,871,931.58	
Tri-State Land Company Stock	25,000.00	
First National Bank and Soo Line Building Company Stock, part of Subscription of $375,000.00	50,000.00	
Miscellaneous Stocks	151.00	
Total		1,980,982.58
Working Assets:		
Cash	$4,479,428.45	
Traffic and Car Service Balances due from other companies	291,600.92	
Net Balances due from Agents	1,210,474.68	
Misc. Accounts & Bills Receivable	867,387.07	
Material and Supplies	2,841,486.18	
Total		9,690,377.30
Accrued Income Not Due:		
Unmatured Dividends	$111,696.00	
Unmatured Interest	17,086.01	
Total		128,782.01
Deferred Debit Items:		
Special Deposits for Equipment, etc	$748,083.98	
Tri-State Land Co	1,350,590.73	
Land Sales (Deferred Payments)	100,000.00	
Other Deferred Debit Items	37,962.04	
Working Funds	77,754.63	
Unextinguished Discount on Securities	677,819.10	
Total		2,992,210.48
Grand Total		$133,931,172.50

LIABILITIES

Capital Stock:		
Common	$25,206,800.00	
Preferred	12,603,400.00	
Total		$37,810,200.00
Mortgage, Bonded and Secured Debt:		
First Mortgage M. & P. Ry. Co. 4% Bonds	$286,000.00	
First Mortgage M. S. S. M. & Atl. Ry. Co. 4% Bonds	8,136,000.00	
First Consolidated Mortgage M. St. P. & S. S. M. Ry. Co. 4% Bonds	56,863,000.00	
Second Mortgage M. St. P. & S. S. M. Ry. Co. 4% Bonds	3,500,000.00	
Equipment Trust Obligations	7,057,000.00	
Total		75,842,000.00
Working Liabilities:		
Traffic and Car Service Balances due to Other Companies	$215,655.29	
Audited Vouchers & Wages Unpaid	2,871,634.82	
Miscellaneous Accounts Payable	306,067.57	
Matured Interest and Dividends Unpaid	1,390,585.00	
Total		4,783,942.68
Accrued Liabilities not Due:		
Unmatured Interest	$140,657.67	
Taxes Accrued	502,629.51	
Total		643,287.18
Deferred Credit Items:		
Operating Reserve	$189,882.08	
Other Deferred Credit Items	84,970.74	
Total		274,852.82
Profit and Loss		14,576,889.82
Grand Total		$133,931,172.50

Contingent Liabilities:

As joint maker with the Central Terminal Railway Company of Illinois of Bonds secured by mortgage on property of the Central Terminal Railway Company — $6,000,000.00

4% Leased Line Certificates of the Minneapolis, St. Paul & Sault Ste. Marie Railway Company, issued in exchange for Preferred Stock of the Wisconsin Central Railway Company, held therefor — $11,169,600.00

INCOME ACCOUNT, FISCAL YEAR ENDED JUNE 30, 1914

Net Operating Revenue		$6,352,153.54
Outside Operations:		
Revenues	$443,310.26	
Expenses	287,002.06	
Net Revenue from Outside Operations		156,308.20
Total Net Revenue		$6,508,461.74
Taxes Accrued		1,182,366.94
Operating Income		$5,326,094.80
Other Income:		
Dividends on Stock Owned	$458,110.00	
Hire of Equipment	371,472.09	
Interest and Discount	98,820.65	
Rents Receivable	69,476.61	
Interest on Wisconsin Central Railway Equipment Contracts	75,086.00	
Interest on Bonds Owned	10,278.34	
Total Other Income		1,083,243.69
Gross Corporate Income		$6,409,338.49
Deductions from Gross Corporate Income:		
Interest on Bonds	$2,639,028.66	
Interest on W. C. Ry. Leased Line Certificates	446,764.00	
Interest on Equipment Notes	316,899.17	
Rental of Terminals	153,144.36	
Total Deductions from Gross Corporate Income		3,555,836.19
Net Corporate Income		$2,853,502.30

PROFIT AND LOSS ACCOUNT TO JUNE 30, 1914

By Balance June 30, 1913		$14,468,468.22
Net Corporate Income for the Year Ended June 30, 1914		2,853,502.30
		$17,321,970.52
Deductions for Year:		
7 per cent Dividend on Preferred Stock	$882,238.00	
7 per cent Dividend on Common Stock	1,764,476.00	
Extinguishment of Discount on Bonds and Equipment Trust Notes	29,735.90	
Equipment Depreciation Prior to July 1, 1907	68,630.80	
		2,745,080.70
Balance Credit June 30, 1914		$14,576,889.82

THE MISSOURI PACIFIC RAILWAY COMPANY—FIFTH ANNUAL REPORT

St. Louis, Mo., September 10th, 1914.

To the Stockholders of
The Missouri Pacific Railway Company and the
St. Louis, Iron Mountain & Southern Railway Company:

The Boards of Directors herewith submit their report of affairs for the fiscal year ended June 30, 1914. The summary of results from operation is as follows:

	1914.	1913.	Increase or Decrease. Amount.	Per Cent.
Average Mileage Operated	7,284.53	7,257.00	27.53	0.38
RAILWAY OPERATING INCOME:				
Rail Operations — Revenue:				
Freight	$43,995,027.21	$45,748,269.39	—$1,753,242.18	3.83
Passenger	11,159,634.09	11,627,480.60	—467,846.51	4.02
Passenger—Other	183,343.24	199,628.55	—16,285.31	8.16
Mail	1,507,422.53	1,450,607.97	56,814.56	3.92
Express	1,513,059.78	1,711,305.35	—198,245.57	11.58
Miscellaneous	925,025.62	934,168.02	—9,142.40	0.98
Total Revenue from Transportation	$59,283,512.47	$61,671,459.88	—$2,387,947.41	3.87
Nontransportation Revenue	510,387.70	484,046.26	26,341.44	5.44
Total Operating Revenues	$59,793,900.17	$62,155,506.14	—$2,361,605.97	3.80
Rail Operations — Expenses:				
Maintenance of Way and Structures	$8,536,046.14	$9,263,360.32	—$727,314.18	7.85
Maintenance of Equipment	10,252,256.29	9,860,187.54	392,068.75	3.98
Traffic Expenses	1,330,086.51	1,425,167.92	—95,081.41	6.67
Transportation Expenses	21,292,356.67	22,528,447.44	—1,236,090.77	5.49
General Expenses	1,711,627.08	1,621,833.83	89,793.25	5.54
Total Operating Expenses	$43,122,372.69	$44,698,997.05	—$1,576,624.36	3.53
Net Revenues—Rail Operations	$16,671,527.48	$17,456,509.09	—$784,981.61	4.50
Net Deficit from Auxiliary Operations	73,363.79	93,004.62	—19,640.83	21.12
Net Railway Operating Revenue	$16,598,163.69	$17,363,504.47	—$765,340.78	4.41
Railway Tax Accruals	$2,513,432.41	$2,314,348.73	$199,083.68	8.60
Railway Operating Income	$14,084,731.28	$15,049,155.74	—$964,424.46	6.41
OTHER INCOME:				
Rent	$574,894.20	$519,527.98	$55,366.22	10.66
Dividends from Stock	61,265.75	78,751.50	—17,485.75	22.20
Interest	1,808,051.65	1,833,771.35	—25,719.70	1.40
Miscellaneous Income	3,567.64	31,548.07	—27,980.43	88.69
Total Other Income	$2,447,779.24	$2,463,598.90	—$15,819.66	0.64
Gross Income	$16,532,510.52	$17,512,754.64	—$980,244.12	5.60
DEDUCTIONS FROM GROSS INCOME:				
Rent	$1,047,273.64	$998,580.08	$48,693.56	4.88
Equipment Rents—Debit Balance	787,009.69	477,240.27	309,769.42	64.91
Interest	14,575,746.31	14,408,124.59	167,621.72	1.16
Miscellaneous Deductions	47,788.42	66,075.82	—18,287.40	27.68
Total Deductions	$16,457,818.06	$15,950,020.76	$507,797.30	3.18
Net Income or Loss	$74,692.46	$1,562,733.88	—$1,488,041.42	95.22
Operating Revenue per mile of road	$8,208.34	$8,564.90	—$356.56	4.16
Operating Revenue per revenue train mile	2.28697	2.23.867	.04830	2.16
Operating Expense per mile of road	5,919.72	6,159.43	—239.71	3.89
Operating Expense per revenue train mile	1.64932	1.60.993	.03939	2.45
Net Operating Revenue per mile of road	2,288.62	2,405.47	—116.85	4.86
Net Operating Revenue per revenue train mile	.63765	.62.874	.00891	1.42
Ratio of Operating Expense to Operating Revenue	72.12%	71.91%	0.21%	

CAPITAL STOCK.

There has been no change in the Capital Stock.

FUNDED DEBT.

The following changes were effected during the year in the funded debt in hands of the public:

The Missouri Pacific Railway Company—

Funded Debt decreased	$34,000.00	
Equipment Trust Obligations decreased	952,000.00	
Total Decrease		$986,000.00
St. Louis, Iron Mountain & Southern Railway Company—		
Funded Debt increased	$4,144,000.00	
Equipment Trust Obligations decreased	437,000.00	
Total Increase		$3,707,000.00

Statements on Pages 25 and 31 give the detail of these changes.

Under an Extension Agreement dated May 11, 1914, the Three Year Five Per cent Secured Gold Notes, issued by The Missouri Pacific Railway Company under its Trust Indenture dated June 1, 1911, (the total amount of such notes now outstanding being $24,942,000), were extended to June 1, 1915, with interest at the rate of six per cent. Additional collateral was deposited with the Trustee, The Union Trust Company of New York, to the extent of $3,000,000.00 face value of the St. Louis, Iron Mountain & Southern Railway Company First and Refunding Mortgage Six Per cent Forty Year Gold Bonds, Series "A."

The collateral now pledged as security for these notes is as follows:

$25,000,000 face value, St. Louis, Iron Mountain & Southern Railway Company 6 Per cent Forty-Year Gold Bonds, Series "A" (non-convertible), due July 1st, 1952, secured by the first and refunding mortgage and indenture supplemental thereto;

1,070,000 par value (10,700 shares), St. Louis, Iron Mountain & Southern Railway Company Stock;

1,972,000 face value, The Missouri Pacific Railway Company First and Refunding Mortgage Fifty-Year 5 Per cent Gold Bonds, Series "B" (non-convertible), due September 1, 1959;

9,800,000 par value (98,000 shares), The Denver & Rio Grande Railroad Company Preferred Stock;

15,000,000 par value (150,000 shares), The Denver & Rio Grande Railroad Company Common Stock;

828,380 face value, The Texas & Pacific Railway Company 5 Per cent Gold Notes, due June 1, 1915;

490,000 face value, Concordia Coal Company First Mortgage 5 Per cent Bonds, due October 1, 1945;

150,000 par value (1,500 shares), Baring Cross Bridge Company 7 Per cent Stock;

125,000 par value (1,250 shares), Pueblo Stock Yards Company stock;

1,000,000 par value (10,000 shares), Western Coal and Mining Company Stock.

NEW LINES.

No new lines or extensions were constructed during the year. An increase of 0.32 miles is recorded in the main line mileage of the St. Louis, Iron Mountain & Southern Railway Company, due to remeasurements and abandoned track, details of which are shown on Page 55.

EQUIPMENT.

The following new equipment was acquired and taken into the accounts, at a cost of $989,091.23:

7 Mountain Type Locomotives,
5 Pacific Type Locomotives,
30 Mikado Type Locomotives,
1 Business Car,
1 Caboose,
2 Steam Pile Drivers.

Orders were placed for the purchase of the following additional equipment, but delivery had not been made at close of year:

3 Steel Letter Cars,
4 Steel Paper Cars,
18 Steel Baggage Cars,
11 Steel Baggage-Mail Cars,
9 Steel Divided Coaches,
27 Steel Chair Cars,
1 Steel Passenger-Baggage Car,
1 Steam Wrecking Crane,
3 Locomotive Cranes,
1 Locomotive Pile Driver,
1 Bridge Erecting Derrick,
25 Caboose Cars.

Comparisons of inventory and capacity of equipment appear in statements on Pages 50 and 51.

ADDITIONS AND BETTERMENTS.

For the acquisition of right-of-way for extensions to tracks and station grounds, $25,887.74 were expended.

The expenditures for widening cuts and fills were nominal. The charges against this account were almost wholly attributable to bridge filling.

For protection of navigable channels and to prevent further encroachments of the Arkansas River, a large expenditure was recorded and accounts for almost all of the charge against "Protection of Banks and Drainage."

Except to conform to newly established grade line of levee along the Mississippi River at Helena and near Fulton, Arkansas, involving a betterment charge of about $10,000, no grade reductions or changes of line were undertaken.

Because largely in replacement of inadequate structures for waterways, the betterment charges for bridge work were relatively small (approximately $30,000), but the results of total expenditures, including maintenance charges, are reflected in the work performed and listed as follows:

New steel spans placed	311	lineal feet.
Culverts constructed (Concrete)	1,262	" "
(Cast Iron Pipe)	1,909	" "
Wooden bridges eliminated	16.843	" "

The filling in of wooden trestles involved the handling of 409,543 cubic yards of material.

New rail in replacement of lighter sections, was laid in main tracks to the extent of 83.59 miles, more than 92 per cent being standard 90-pound section; 131.13 miles were laid with re-rolled section, and 2.13 miles of released rail were relaid. This work involved a betterment charge of $56,000.

Ballast, involving the handling of 221,859 cubic yards of material, was applied as follows:

Gravel	85.52	miles.
Rock	.99	"
Cinders	2.05	"
Chatts	10.80	"
Total	99.36	miles.

The composition of tracks as to Rail and Ballast, Main Line and Branches, is statematized on page 49.

Additional second track, aggregating 1.29 miles, was added to that installed in previous year at Omaha.

Additional yard facilities were provided at Kansas City, Missouri, Omaha, Nebraska, Horace, Kansas, and Alexandria, Louisiana, which, with newly constructed sidings and spurs at various points, increased the track mileage 11.59 miles.

Right-of-way fencing to the extent of 47.18 miles, were constructed.

By the construction of sub-ways or over-head crossings, in order to comply with State laws and City ordinances, grade crossings were eliminated at six important points, and work is progressing upon viaducts at Nicholas Street, Omaha, and Tower Grove Avenue, St. Louis, which are expensive, and will require several months to complete.

Interlocking plants were installed at three crossings with foreign lines.

Automatic block signals were extended eight-tenths of a mile, and crossing signals, including alarm bells, automatic flag-men and other mechanical contrivances, were installed at a large number of points, involving a betterment expenditure of more than $28,000.

Telephone train dispatching circuits were increased 145.72 miles, and existing telegraph circuits were extended 10.29 miles.

New stations were constructed of Brick, 9; Frame 11; other stations were remodeled, improved or extended at 16 points.

New car repair shed was constructed at Paragould, Arkansas, and existing car repair sheds were extended or enlarged at four terminal points.

Extensions have been made to the water and fuel stations at eleven points, involving an expenditure to betterments of about $28,000.

An ice station for East-bound shipments was established at Osawatomie, and one at Hoisington, Kansas, necessitating the construction of a 500-ton capacity ice house at the former, and a 4000-ton capacity ice house at the latter.

The net expenditures for Additions and Betterments (including Equipment) for the year, of which the foregoing are the most important items, aggregated $1,931,518.56, and are enumerated under "Road and Equipment" on Pages 32 and 33.

OPERATIONS.

The total operating revenues were $59,793,900.17, a decrease of $2,361,605.97 or 3.8 per cent under last year; applied to the average operated mileage of the System, the revenues amounted to $8,208.34 per mile.

The decrease in revenue from freight traffic was $1,753,242.18 or 3.83 per cent. Herein is recorded the direct effect of the unfortunate, if not misguided, insistence upon reductions in tariffs, the legal right, although not necessarily the propriety, of exacting which, was finally confirmed by the United States Supreme Court, and which reductions were made effective during July 1913; for the number of tons of revenue freight handled this year was but 29,533 (0.13 per cent) less than the previous year, against which the revenues for transporting the tonnage show a shrinkage of 3.83 per cent. A similar, although grosser presentation, is found in the revenue of passengers carried, which declined $467,846.51, or 4.02 per cent., although the number of passengers carried increased 13.36 per cent. Combining the returns from both freight and passenger transportation, and striking an average, arrived at by utilizing all of the active factors involved, it is estimated that the enforced reductions in freight and passenger tariffs, have caused a loss in revenue, based upon the volume of this year's traffic, of not less than $1,800,000. even though the facilities and appointments necessary for such transportation—and involving large capital expenditures—have been substantially increased.

As partial compensation for the enforced hardling of Parcel Post, the Post-Office Department has allotted the System about $55,000 advance, which accounts for the increase in mail revenue.

The important effect of the introduction of the Parcel Post has naturally been to force Express Companies to reduce their rates, which in turn has an adverse effect upon the revenues from that business to the railroads. The volume of the combined Parcel Post Mail and Express traffic was greater than last year, yet the combined revenues therefrom were less by $141,431.

The detail of Operating Expenses with comparisons, are recorded on Pages 46 and 47. The total expenses were $43,122,372.69, a decrease of $1,576,624.36, or 3.53 per cent compared with last year. The operation of the property was not confronted with any extraordinarily adverse conditions. The expenditures for Maintenance of Way and Structures, and Maintenance of Equipment, together, equalled 31.43 per cent of total operating revenue. The condition of road-bed, locomotives and cars, generally, has been substantially improved. The particular increases in charges for road-work were against ties and against bridges, which make for greater stability and permanence.

Applying the Maintenance of Equipment charges to the equipment list as it existed at the beginning of the year, the expenditure equalled, per locomotive, $3,240.57; per passenger-train car, $882.96; per freight-train car, $112.40.

Traffic Expenses declined 6.67 per cent.

A reduction was accomplished in Transportation Expenses, equalling 5.49 per cent; the ratio of the total of such expenses to total Operating Revenue, was this year 35.61 per cent—last year 36.25 per cent. These figures exhibit a further refinement in these branches of the service, which directly and largely concern the shipper and passenger; the results reflect the ardent efforts of all Officers and Employes.

General Expenses increased 5.54 per cent, which includes $57,265 for "Valuation Expenses"—a Federal requirement.

There have been some increases in compensation to employes, affecting Maintenance of Equipment, but more particularly in the Transportation Department, which were not in effect throughout all of the previous year, necessitated by Federal or State action, like the so-called "Full Crew Law," which have burdened Transportation Expenses without resulting in any compensating advantages.

New industries, to the number of 547, were established on or adjacent to the right-of-way; additional sidings or extensions thereof were constructed to meet industrial necessities, to the number of 124.

The transactions of the Land Department may be found recorded on Page 59.

During the year, a total of 129 shares of the capital stock of the St. Louis, Iron Mountain & Southern Railway Company were acquired by The Missouri Pacific Railway Company, and are held in its treasury.

Negotiations looking to the construction of a new bridge across the Mississippi River at Memphis, have finally led to the formation of the Arkansas and Memphis Bridge, and Terminal Company, having an authorized capital stock of $100,000, of which $10,200 is paid in, and a 5 per cent Bond First Mortgage, issuable not in excess of $5,000,000. The stock is equally divided between the St. Louis Southwestern Railway Company, the Chicago, Rock Island & Pacific Railway Company, and the St. Louis, Iron Mountain & Southern Railway Company, each of the companies subscribing to an operating agreement extending a period of 50 years, and guaranteeing the principal and interest of the bonds.

Not only will the new bridge afford adequate facilities for each Company, but will insure their accommodation at a reduced cost. It is estimated that the economy to the Missouri Pacific System will be in excess of $100,000 per annum. The foundations and some of the piers are partially completed, and it is hoped to place the bridge in commission in the course of another year.

The desirability of the System having a direct outlet and access to the gulf port of New Orleans, has led to a 99-year contract with the Texas & Pacific Railway Company for the use of its tracks between Alexandria and New Orleans, Louisiana. Permanent terminal facilities at the latter point are assored by the St. Louis, Iron Mountain & Southern Railway Company acquiring one-half of the stock of the Trans-Mississippi Terminal Company, which will, by deed or lease, have immediate control of all the terminals in and about New Orleans which are especially necessary to the transaction of the business of the St. Louis, Iron Mountain & Southern Railway Company and the Texas & Pacific Railway Company, which companies jointly guarantee the principal and interest upon, not to exceed $7,500,000, of the First Mortgage 5 Percent Bonds of the Trans-Mississippi Terminal Company. This transaction will shortly be submitted to the stockholders of the Texas & Pacific Railway Company and the St. Louis, Iron Mountain & Southern Railway Company for ratification.

The Companies' investment in the capital stock of the Wabash Railroad Company was adjusted to market value of June 30th, 1914, resulting in a charge of $2,468,527.45 to Profit and Loss during the year covered by this report.

There is presented on Pages 18 and 19 a consolidated balance sheet of The Missouri Pacific and the St. Louis, Iron Mountain & Southern Railway Companies. This exhibit is prepared in the same form as the individual balance sheets shown herein, excluding all accounts between the two Companies; the Securities Issued or Assumed, held in the Treasury of either Company, having been deducted from the total securities issued, resulting in a statement of the securities outstanding in the hands of the public.

By order of the Board of Directors.

B. F. BUSH,
President.

THE MISSOURI PACIFIC RAILWAY COMPANY.

PROFIT AND LOSS.

June 30, 1914.

Credit Balance, June 30th, 1913			$6,597,988.98
Delayed Income Credits	$3,797.25		
Miscellaneous Credits	5,871.36	$9,668.61	
Less:			
Debit Balance Transferred from Income Account	$979,447.49		
Debt Discount Extinguished through Surplus	61,830.07		
Loss on Retired Road and Equipment	135,977.54		
Delayed Income Debits	60,833.34		
Miscellaneous Debits	55,607.71		
Reduction in Investment in Preferred Stock Wabash R. R. Co. to Market Value	1,733,715.45	3,027,411.60	3,017,742.99
Credit Balance, June 30th, 1914			$3,580,245.99

ST. LOUIS, IRON MOUNTAIN & SOUTHERN RAILWAY COMPANY.

PROFIT AND LOSS.

June 30, 1914.

Credit Balance, June 30th, 1913			$405,291.13
Credit Balance Transferred from Income Account	$1,054,139.95		
Miscellaneous Credits	51,548.81	$1,105,688.76	
Less:			
Debt Discount Extinguished through Surplus	$443,051.92		
Loss on Retired Road and Equipment	89,124.80		
Miscellaneous Debits	4,967.56		
Reduction in Investment in Preferred and Common Stock, Wabash R. R. Co. to Market Value	734,812.00	1,271,956.28	166,267.52
Credit Balance, June 30th, 1914			$239,023.61

Railway Age Gazette

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WE GUARANTEE, that of this issue 8,800 copies were printed; that of these 8,600 copies, 7,401 were mailed to regular paid subscribers to the weekly edition, 250 were provided for counter and news companies' sales, 1,100 were mailed to advertisers, exchanges and correspondents, and 49 were provided for samples and office use; that the total copies printed this year to date were 421,050, an average of 9,357 copies a week.

Volume 57 November 6, 1914 Number 19

Contents

* Illustrated.

Efficient Shop Production

A most decided improvement has been effected in railroad shop operation and organization during the past decade. Because of the growth in the size of locomotives and the increased amount of motive power, a movement had been started a few years prior to that time for improved shop facilities. When the new and larger shop plants were placed in operation it was found that the cost of making repairs was not decreased as had been expected. This focused attention on the necessity for improving the organization and methods of operation in order to make the best use of the improved facilities. In many instances the men were placed on a piecework basis with the idea of increasing their individual output as well as automatically correcting defective methods and practices which had passed unnoticed when daywork was in vogue. Gradually some of the roads tried to scientifically operate the shops by introducing shop schedules and systematically studying each operation with the idea of eliminating lost motion and inefficiency. These things all resulted in increased production at a reduced cost per unit. Many of the roads, however, have not followed up these matters to the extent which they should, probably because of a lack of appreciation on their part of the returns which might be effected. Some of the things have stood the test of time so well that there is no excuse for their not being adopted generally. Improvements which have been made in the mechanical department of the Frisco and which are described elsewhere in this issue are of special interest, in that they indicate those features which the officers of the mechanical department of that road thought to be of greatest value for the special conditions which they may have had to meet.

Final Argument in the Rate Case

There was a curious lack of snap to the final arguments in the rate advance rehearing which was held Thursday and Friday of last week. Especially was this true of Mr. Brandeis' argument. It might almost have been called perfunctory; it was certainly not characteristic. It may have been that the commission's special counsel did not believe that the railways had made out any case; that was the point of his final argument. It may have been that the case of the railroads was so strong that opposition to it on the part of the commission's counsel was for form's sake only. That there is any possibility of doubt as to which of these two conjectures is true throws an interesting light on the rehearing. If the majority of the commissioners still continue to get a comprehension of the question which they must decide by looking at it through a microscope instead of a telescope, they will probably decide against the railroads. Almost every exhibit submitted by the railroads in the rehearing, can be viewed in such a way as to fail, taken by itself or picked to pieces and the pieces studied separately, to be a convincing proof of the railroads' needs. The railroads' case is so large, so fundamentally right, that the real exhibit is the present condition of the country itself. It is so obvious that the commissioners will have to use some artificial means to avoid seeing it. About the only way they could do this would be to lock the door of their conference room and, as a preparation for the study of the evidence and arguments submitted, divest themselves of all previously acquired knowledge, experience and judgment and approach the question with a mind blank—utterly blank.

Truth-Telling and Railway Credit

The principle and system of regulation that have been adopted in this country have forced on the railway managers the necessity of showing before they can get general advances in their rates that they are needed to enable the roads to earn an adequate net return. To say that a road must have higher rates to earn an adequate return is equivalent to saying that it must have higher rates to enable it to pay its interest and reasonable dividends and thereby maintain the value of its securities and its credit. Yet, every time railway managers appear before the Interstate Commerce Commission and say the reason why they want advances in rates is that they must have higher net earnings in order to pay their interest and dividends and maintain their credit, some lawyer or commissioner asks them if they do not think that by saying these things they injure the credit of the railways! Of course they do. It also hurts a man's reputation for health to tell his physician he is sick.

It hurts his reputation for earning capacity to admit that he is out of a job and ask somebody to give him one. But are these reasons why men should not call physicians, or hunt jobs when they need them? The railways have to appeal to the Interstate Commerce Commission for the opportunity to increase their net earnings just as a man has to appeal to his physician when he is sick. The railway managers do not tell the commission that they need higher earnings to injure the credit of the roads, but ultimately to strengthen their credit. They cannot tell the facts without injuring the road's credit temporarily and the reason why they take their troubles to the commission and thereby make them public is to get relief that will enable them to escape from their troubles—relief, in other words, the granting of which is essential in order that the carriers may not only have good credit, but may deserve it. Which is worse: For the managers to tell the facts, even when temporarily this will injure the railways' credit, or to conceal the facts or tell lies in order temporarily to bolster it up?

THE STATESMANLIKE ARGUMENT OF MR. MINNIS

IN his argument before the Interstate Commerce Commission in the final rehearing of the five per cent rate case, J. L. Minnis said:

"At a time like this, when many of our people have lost their savings invested in railroads and the general investing public is apprehensive and more or less suspicious of railroad investments, a clear and explicit definition of the attitude of the government with respect to railroad credit is not only demanded by the public welfare, but by common honesty and fair dealings as between the government and its citizens. The people are entitled to know the attitude of the government expressed through the commission, and to determine for themselves whether they wish further to promote the railroad industry of the country by their savings, and this applies as well to those who now have investments as to those who may have a surplus to invest.

"That attitude cannot be announced in mere words, but if expressed it must be expressed in the application of a rule or measure to the facts in this case."

Never before, so far as we know, has this fact, which everyone who has studied the railroad question at all knows to be a fact, been so frankly, so clearly and so comprehensively put before the commission. If the railroads of the country are to be developed and kept abreast of the requirements of business through the use of private capital, private capital must be induced to enter this field. It would not make one iota of difference in the present case whether or not the securities issued against railroad property in this country had a face value grossly in excess of the actual money investment in the property. It is the duty of Congress to pass such laws as will prevent the misuse of railroad credit, and it is the duty of the courts to enforce such laws. It is, however, a vitally important duty of the Interstate Commerce Commission to so conduct its regulation of railroads as to insure continued investment of private capital in this field. Expediency is sometimes a word of disparagement. In the Interstate Commerce Commission's regulation of the railroads it is synonymous with statesmanship.

The Supreme Court of the United States has fixed a limit below which profits on an investment of private capital cannot be forced either by the legislature or a legislative body. The upper limit of the profits of investors in the stock of railroad companies is a question of expediency. As Mr. Minnis says, "The moral sense of right and justice of the investors has caused them to revolt, and will continue to cause them to revolt, against the suggestions that when they invest their money for the use of the public they must take all the chances and hazards, with a mere possibility of earning at the most a reasonable return on their investments, while the public who uses the product of the investment assumes no obligation or hazard whatever."

WHAT THE COMMISSION MIGHT DO

IT is important to a fair consideration of the question of rate advances in eastern territory, as it is now pending before the Interstate Commerce Commission, that both the developments which have raised it, and the various ways in which the commission can dispose of it, shall be clearly understood.

The original application of the railroads for increases in rates was not based on the ground that their total earnings were declining. It was based on the ground that while their total traffic and earnings were increasing, their operating expenses, taxes and property investment were increasing so much faster that their net earnings were relatively declining, and that therefore they had become unable to pay a satisfactory return either on the capital they already had invested, or on the new capital which they needed to raise. The statistics for the fiscal year 1913 supported this contention in every respect. Those for the fiscal year 1914, which have been made public since the commission's decision in the original case support it in a far more conclusive and striking manner. It is necessary to go back to the panic years of the 90's to reach a time when railway net earnings were relatively as small as in the fiscal year 1914.

The Interstate Commerce Commission conceded in its decision in the 5 per cent case, before the bad figures for the fiscal year 1914 were available, that the net operating income of the railways in eastern territory was insufficient for either their welfare or that of the public.

In other words, before the European war, with its demoralizing effect on the financial markets of the world, had begun the statistics of these railways demonstrated conclusively their great need for an increase in net earnings. The commission had conceded this as to the eastern lines, and had also, in effect, conceded that if the railways could not obtain the needed net revenues by the small advances in rates which it permitted in Central Freight Association territory, and by the other methods which it suggested, these things should be supplemented by still further increases in rates.

Now, what effect has the war had on the situation? Has it created the pressing needs of the railways? No; it has simply rendered very much more acute the pressing needs which already existed. Developments have shown that it is impracticable for the railways to apply speedily most of the various measures which the commission suggested in its opinion in the 5 per cent case as means of increasing their net earnings. Furthermore, the investigations which have been made by the railways show that the amount of additional net revenues which can be derived from these various sources is far less than the commission and its counsel believed.

In view of the statistics showing the results of the operations of the railways in eastern territory in the fiscal year 1913, and especially in view of the statistics showing the results of their operations in the fiscal year 1914, it is clearly manifest that if net results and return on investment are to be given any considerable weight in determining the reasonableness of entire schedules of rates, then it could not be held by any rational tribunal, entirely in the absence of any such emergency and change in conditions as those precipitated by the European war, that rates averaging only 5 per cent more than those now in effect in eastern territory would be unreasonable. Therefore, entirely in the absence of this special emergency and these special conditions the proposed rates on the whole could not be held to exceed a reasonable maximum. And, in addition, the war actually is going on and the conditions which it has created actually do exist to add their compelling force to the argument.

In view of all the facts, what are some of the plans which it may appear that the commission might adopt?

1. It might hold all of the advances proposed by the railways reasonable and permit the tariffs to go into effect immediately.

2. One of the objections which has been made to the tariffs filed by the railways in the so-called "5 per cent case" is that some of them provide for advances exceeding 5 per cent. The

commission might merely hold a general 5 per cent advance reasonable, thereby requiring the roads to eliminate all advances exceeding this percentage.

3. The commission might recognize the needs of the railways for immediate relief, but have some doubts as to whether rates 5 per cent higher than those in effect would in all cases be reasonable. It might therefore let tariffs carrying 5 per cent increases go into effect without previously passing on their reasonableness. There is no doubt about its authority to do this. The law does not require it to hold up all advances before passing specifically on their reasonableness. If it should take this action the roads would be given the immediate relief which they need and the commission would be left free to investigate later any specific rates or schedules of rates whose reasonableness might be challenged.

4. The commission might recognize the fact that the railroads need immediate relief, but feel that in the long run their needed increases in revenues should be secured by other methods than increases in rates. In that case it might let a 5 per cent increase go into effect for a certain specified period, as a year or two years. This would afford the railways immediate relief; it would give the commission time and opportunity to investigate the questions of spotting charges and so on, and, if at the end of the specified period the commission should decide that the higher rates should not be continued, they would automatically expire.

5. The commission might merely give the trunk lines a 5 per cent increase in certain of their rates, as it did the Central Freight Association lines.

The evidence that the railways need not only a 5 per cent increase, but more, is so conclusive that it is difficult to conceive how the commission can possibly convince itself that it should not hold such an increase reasonable. But if it should have its doubts as to whether it should grant such an advance without retaining the power of withdrawing it in case it should later decide that the need for it had not existed or had passed, that is no reason why it should not permit the advance to be made now. There is good ground for believing that some agreement could be reached by the commission and the managers of the railways to put the advance in effect only until it could be found out what time is going to bring forth. The concluding sentences of the statement made by President Willard of the Baltimore & Ohio to the commission on October 19 seem to be quite significant. Mr. Willard said:

> It is hardly necessary to suggest that if the commission, in view of the present situation should now conclude after consideration of all the facts to approve the tariffs as requested, and should it at any time later on appear that the situation had changed and the emergency had passed, and should it further appear that the carriers involved in this proceeding were then, taken as a whole, in such condition as to earnings, maintenance charges and return on capital obligations as to justify a reconsideration of the action now prayed for, this commission would have ample power to order at any time such reductions as might be fair and reasonable, and I am of the opinion that the carriers would not oppose such action by the commission when conditions such as I have enumerated shall have been established.

The railways' case may be summed up in two sentences: First, under the conditions which existed before the war began, and which would have continued to exist if it never had begun, rates averaging 5 per cent higher than those now in effect would not have been unreasonably high, and probably would have not been high enough. Second, the conditions produced by the war have made the needs of the railway greater and more pressing, and on the "fair return" theory itself, have, by increasing the return which must be paid on capital, made higher the "fair return" to which railways are entitled.

There are numerous ways in which the commission might deal with the situation. There is only one way in which to so deal with it as certainly and effectively to promote the public welfare, and that is by permitting the eastern railways to make the advances for which they are asking at the earliest practicable date.

THE NEWSPAPERS AND THE INTERSTATE COMMERCE COMMISSION

GENERALLY speaking, the newspapers of the country have been hostile to the railways for years past. Even papers that occasionally have recognized in their editorial columns the changed conditions in the railway business and in the relations between the roads and the public have been less disposed to publish matter of this sort than news articles giving the outbursts of the irresponsible, notoriety-seeking critics of the roads. In the past year or two, however, there has been evident a strong tendency on the part of the newspapers to change their tone on railroad matters, and to show that the old abuses have largely been corrected, that the railroads have been both tamed and educated and that they now need co-operation rather than further chastisement.

This change has been the result of several causes, chief of which perhaps are that the ethics of railway management have been improved, that the railroads have been rendered comparatively powerless by legislative restrictions, and the wide publicity that railroad officers have given to their affairs and to their arguments, and the consequent better understanding that the public has gained regarding the railroad situation.

This reversal of form on the part of the newspapers is strikingly reflected in their editorial utterances on the rate advance case before the Interstate Commerce Commission. In the general rate advance cases in 1910 and 1911 the newspapers were almost unanimously against the roads, and their columns were filled with inaccurate statements regarding railroad affairs emanating from sources unfriendly to the roads. When the roads were denied any advances in rates by the commission the decision was approved, and for two or three years almost every action of the commission was given hearty approval by the press.

But when the commission's predictions as to the future prosperity of the railroads failed to be sustained by the outcome, and when the net earnings of the railways grew worse instead of better, the newspapers began to question the wisdom of continued raids on the railroads by shippers seeking rate reductions, by labor unions seeking higher wages, and by legislation requiring increased expenditures. During the progress of the hearings before the commission in the case recently decided a large number of newspapers supported the petition of the roads for higher rates, while others that formerly were eager to embrace any opportunity to ridicule the claims of the roads assumed a waiting attitude. They took the position that if the roads needed the advance they would be able to convince the commission, and that the commission's decision could be depended upon to meet the situation.

This view might have prevailed had not the commission's excursions under the tutelage of Special Counsel Brandeis into the byways of "free service" and spotting charges, in the effort to increase rates indirectly, while denying a general advance, so complicated the situation with which the commission was attempting to deal and so delayed the rendering of the decision, that the country became impatient. The impression had become general that the commission would allow an increase, and this prospect was generally hailed throughout the country as a harbinger of returning prosperity. Naturally, the press began to criticise the delay. Had the decision been rendered promptly and upon the clear-cut issue presented it would undoubtedly have been accepted as final, both by the roads and by the public. If the commission had held that the roads were so prosperous that they did not need an advance in rates the press and the public might have believed it, and the railroads might have been compelled to adapt themselves to that fact.

Instead the commission found that the net operating income of the carriers in official classification territory considered as a whole, was smaller than was demanded in the

public interest, but granted only a very small increase in rates in part of the territory and held forth suggestions as to how the net income might be increased, some of which were vague, illusory and impracticable. Therefore, when to the disappointment of an unfavorable pronouncement of such a character that it has been referred to as "5 per cent decision and 95 per cent indecision," was added the circumstance that it was not rendered until a disastrous war had upset business and created an unprecedented emergency the tone of the press was changed to one of almost unanimous denunciation of the commission.

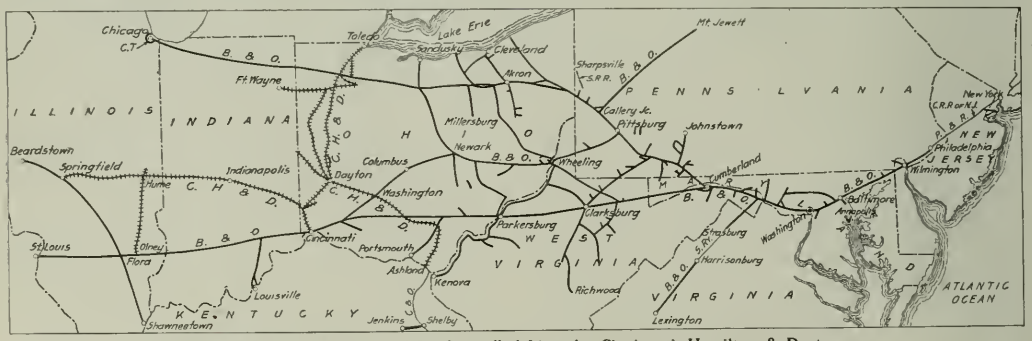
On October 22 we published extracts from about 30 leading newspapers of the country, taken without selection as they came to our exchange desk, demanding an immediate reopening of the case in view of the changed conditions created by the war. Only one of these editorials squarely opposed higher rates and nearly all contained severe criticism of the commission for its previous decision. In this week's issue we present another collection of editorials, most of them called forth by the attitude assumed by the commission in questioning railroad witnesses, and unanimously demanding a prompt advance in rates, not only for the benefit of the roads, but for the welfare of the country as a whole. But two of these oppose the position of the railways.

The *Railway Age Gazette* has frequently criticised the newspapers for their unfairness to the railroads. Some of the present criticism of the commission is perhaps equally unfair. Many papers which have found their advertising falling off have come to the conclusion that the railroad situation is at the bottom of the dull business conditions, and so, right or wrong, they are now for higher rates. But most of the newspaper comment seems to show an increased knowledge of the railway situation. In any event, the change in the tone of the press is highly significant as an indication of the extraordinary change in public sentiment which has taken place.

BALTIMORE & OHIO

As in the course of alternating periods of business prosperity and business depression it is difficult to tell whether a given pause in progress is simply a period of stocktaking before a further advance, or a sign of the turn of the tide to be followed by depression, so it is difficult to say whether the Baltimore & Ohio's showing in the fiscal year ended June 30, 1914, was a pause before a further advance or foreshadows a more or less lengthy period of depression for the road. Earnings fell off and expenses increased; maintenance of way was ample, but no new improvements were undertaken; additions were made to the equipment but repairs to a quite considerable number of freight cars were deferred; the average trainload remained stationary in the face of a large increase in empty car mileage, but transportation expenses per train-mile continued to mount still higher. All of the figures, moreover, in the 1914 annual report are affected by the flood damage caused in the previous year, and furthermore, the Baltimore & Ohio's own financial position is somewhat entangled with that of the Cincinnati, Hamilton & Dayton. The table at the end of these remarks shows the principal figures in the income accounts of 1914 and 1913.

The Baltimore & Ohio operates 4,478 miles of road. Like the Pennsylvania Railroad, it is both a coal road and a through trunk line; but unlike the Pennsylvania Railroad it combines both a line in Central Freight Association territory and one in Trunk Line territory; and furthermore, it is nearly all main line. Congestion of the main line is the problem which is constantly pressing upon the operating department for solution. When Mr. Willard took hold of the management of the property he at once began to add to both the equipment and track capacity and to increase the trainload. With the increased average trainload, however, there were quite considerable increases in transportation expenses per train-mile. The gradual building up of a better operating organization was to be combined with the added track facilities to eventually lower the train-mile cost. It is safe to assume that by no means all of the improvements, additions and betterments which were originally planned have been carried out because of the business depression, the flood and the impossibility of selling long-term railroad bonds. The operating organization is immensely better than it was a few years ago, and yet the net income per mile of road in 1914 is the smallest in more than ten years. The operating ratio has steadily risen in the last ten years from 66.78 to 75.29. The cost per hundred locomotive-miles run of wages, repairs, engine house expenses, fuel and other supplies has risen in these ten years from $25.50 to $38.37; in 1913 it was $36.66. Economies in transportation costs will probably be more clearly reflected in the 1915 figures than in the 1914 figures, because various special circumstances, such as the large increase in empty car movement, the falling off in tonnage of products of agriculture and of bar and sheet metal, and the after effects of the flood, temporarily offset these economies. On the other hand it is only a question of time, and that of a not very long time, until further quite considerable expenditures for additions and betterments will have to be made to increase the capacity of the transportation plant. The ability of the company to raise new capital on reasonable terms will then become a vitally im-



The Baltimore & Ohio and Its Controlled Line the Cincinnati, Hamilton & Dayton

portant question, not only to the railroad company, but to the shippers whom it serves.

Insofar as the present relation of working capital to current liabilities and the volume of business is concerned, the Baltimore & Ohio is in a thoroughly sound condition. In addition to the $20,000,000 which it had in cash to pay off $20,000,000 notes matured July 1, the company had $14,486,000 cash and, excluding the notes, $11,157,000 total working liabilities June

30, 1914. It is interesting to note that the effect of paying all wages semi-monthly has been to almost cut in half the amount of audited vouchers and wages unpaid. In 1914 this working liability amounted to $4,996,000, a decrease from 1913 of $4,278,000. On the other hand, the company refunded its $20,000,000 notes by the sale of $35,000,000 4½ per cent one-year notes. These new notes were sold before the beginning of the European war and the company's credit was high enough to permit of their sale to the public at par. With New York city paying 6 per cent for short-term money since the outbreak of the war, the prospects for refunding Baltimore & Ohio $35,000,000 notes in June of next year at any reasonable rate are bad unless conditions materially change and the public gains a confidence in railroad securities as investments which it does not now have. The Interstate Commerce Commission's attitude is, of course, of the utmost moment in this respect.

In 1914 the Baltimore & Ohio carried a total revenue tonnage of 69,382,000. Of the total revenue 77.80 per cent came from freight. Of the total tonnage carried in 1914, 66.60 per cent was furnished by products of mines, bituminous coal alone furnishing 46.51 per cent of all the tonnage carried. Manufactures furnished 15.88 per cent, products of agriculture 5.08 per cent, and merchandise 2.86 per cent. As was already mentioned, there was a very considerable falling off in the tonnage of products of agriculture, the total tonnage carried in 1914 being 3,522,000 tons, or 499,000 tons less than in 1913. There was also a very large falling off in the tonnage of coke, which tonnage in 1914 amounted to 3,891,000 tons, or less than 1913 by 912,000 tons. On the other hand, the tonnage of l. c. l. freight amounted to 1,987,000, an increase of 106,000 tons.

The Baltimore & Ohio's trainload of revenue freight in 1914 averaged 619 tons as against 620 tons in 1913; but the average number of loaded cars in trains was 23.99 in 1914 and 24.39 in 1913, while the average number of empty cars per train in 1914 was 12.96 as against 11.70 in the previous year. The average length of haul was 194 miles as against 198 miles in 1913; the average ton-mile rate was 5.64 mills in 1914 and 5.60 mills in 1913.

The following table shows the repairs, renewals and depreciation charges per unit of equipment in 1914 and 1913:

	1914	1913
Repairs per locomotive	$3,157	$3,589
Repairs per passenger-train car	564	797
Repairs per freight-train car	81	85

Total transportation expenses amounted to $38,699,000, an increase over 1913 of 3.82 per cent, and they amounted to 39.73 per cent of total operating revenues as compared with the transportation ratio of 36.70 per cent in 1913. As Mr. Willard points out in his annual report, the congestion following the flood necessitated detouring traffic in the earlier months of the year when business was heavy. In addition there was a full year of the higher wage scale for trainmen, which alone accounted for an increase in transportation expenses of $805,000. There was also a large increase in the payments for loss and damage to freight and injuries to persons, the total amount on these accounts in 1914 being $1,593,000 and $719,000 respectively, the total increase in the two accounts over the previous year being a little over $500,000.

The following table shows the principal figures for operation in 1914 as compared with 1913:

	1914	1913
Mileage operated	4,478	4,456
Freight revenue	$75,784,287	$80,194,490
Passenger revenue	15,893,721	15,537,078
Total operating revenue	97,411,441	101,556,132
Maint. of way and structures	12,207,191	14,019,620
Maint. of equipment	16,681,986	18,323,210
Traffic expenses	2,151,887	2,026,274
Transportation expenses	38,699,493	37,274,397
General expenses	2,314,336	2,136,137
Total operating expenses	72,054,892	73,779,638
Taxes	3,226,466	2,960,905
Operating income	21,244,837	23,941,278
Gross income	27,262,556	29,153,484
Net income	9,250,024	13,382,111
Sinking fund	49,457	47,861
Dividends	11,473,395	11,473,653
Surplus	2,223,371*	1,908,458

*Deficit.

Letters to the Editor

THE REDUCTION IN LOCOMOTIVE ORDERS

Chicago, Ill., September 28, 1914.

To the Editor of the Railway Age Gazette:

There are several barometers of general business, such as grain and steel production and prices, but for the railway supply man a more direct indication may be taken.

The buying situation for the past year or more, on railroads, has been affected in various ways by general business conditions; by the wait for the rate decision; by the shadow of the wage strike on the western lines and then by financial and general business reasons as imposed by the European war. All these are on top of a sort of a climax of financial stringency, brought about by increased taxation, expenses on account of state and governmental legislative regulations, wise or otherwise, all serving to reduce the purchasing power of one of the greatest buyers in our markets and have very materially contributed to the lessened market for the staples as well as the specialties used in railway maintenance.

How bad, at least, one phase of the situation has been is shown by a comparison of locomotives purchased this year as compared with past years. Taking the reports of the *Railway Age Gazette*, and for the sake of comparison with former years, including only orders placed by railroad or industrial companies in the United States, Canada or Mexico, we find that the orders in 1914 have been reported month by month as follows:

January 43	April 127	July 99
February 139	May 131	August 45
March 167	June 50	September 17

Total for nine months (locomotives).....818

The figure for any month is not necessarily that of the orders placed in that month, but is the total of the orders reported. The result, however, is the same. The average for the year, at this rate would be about 1,091, but the last three months give no promise of maintaining the average, and the total may not be above 900 or 1,000.

From the table showing cars and locomotives ordered, during the past 13 years, in the issue of January 2, 1914, we find that the average number of locomotives purchased per year, during the period 1901-1913 inclusive, was 3,798 per year. The greatest number ordered in any one of these years was in 1905, the number being 6,265; the lowest being 2,538 in 1904. The next lowest was 2,850 in 1911. The orders for 1912 were 4,515, or above the average, while 1913 indicated the tendency towards present low level by going below the average, the orders being 3,467.

The figures show that the railroads are purchasing, in an important line of their requirements, but about one-quarter of the average for 13 years past, a reduction of between $50,000,000 and $60,000,000 for the year, and this covers many lines of materials and will account for some features of general depression.

A further deduction would be that these conditions may prevail for some time and that the problem of railroad executives and motive power officers is to maintain their present equipment at the highest standard of efficiency and availability until the time does come when renewed purchasing of new equipment is made possible by increased revenues.

C. A. Seley,
President American Flexible Bolt Company.

Argentine Railway Construction.—The public works committee of the Argentine Chamber of Deputies has reported favorably upon the petition of the Buenos Aires Central for the right to construct the following lines of railway: One which, starting from the city of Cordoba, shall connect with the line authorized to the company by a previous law in the neighborhood of Villa Maria, and a branch connecting the company's main line with the city of Luian.

What the Press Thinks About the Rate Case

Sharp Criticism of Attitude of Interstate Commerce Commission. Papers Almost Unanimous for Rate Advance

In the issue of October 22, page 607, were published extracts from editorials from newspapers in all parts of the country on the reopening of the rate advance case, nearly all of which supported the contention of the railways that the emergency created by the European war is such as to warrant a modification of the commission's decision of August 1. Since the hearing in the reopened case the newspapers of the country have been almost unanimous in criticising the attitude assumed by the commissioners, and especially by the attorneys, Brandeis and Thorne, in the questioning of the railroads' witnesses. We present herewith extracts from the editorial utterances on the case which have come to our exchange desk in the last few days. As before, no selection has been made of those favorable to the railways and it is again noteworthy that out of 35 but two of those we have received come out squarely opposed to the plea of the railways.

PUBLIC POLICY AND THE RATE RAISE

[From the Chicago Tribune]

It is difficult to believe that a member of the Interstate Commerce Commission would put the question attributed in the reports to Commissioner Clements, when he asked President Willard if he thought the railroads should be granted relief denied other industries affected by war conditions. The question implies either ignorance or bias, and it is not pleasant to ascribe either to a man in Judge Clements' responsible position.

It is obvious that the railroads would not be before Judge Clements and his colleagues except for the fact that they are in an entirely different situation from "other industries." What they may charge for their commodity, transportation, is fixed by the will of Judge Clements and his colleagues. Any commissioner who should be capable of losing sight of this basic factor, or, worse still, of ignoring it, would be unfit for a place on the commission. Mr. Clifford Thorne, whose anti-railroad sentiment somewhat weakens the credit we are disposed to give argument, is confident that the railroads are fortified against present conditions by accumulated surplus or by the reduction of dividends. He concedes foundation for the railroad claim that a crisis exists. He therefore concedes a flat question of broad policy, and we believe it is one of the most critical ever presented to the commission.

If this question of policy is determined against the railroads and the railroad managers are correct, the results will be serious not merely to the security holders of the railroads, but to all business and all industry, including most emphatically the industry of agriculture.

If the railroads are granted the rate increase, on the other hand, and Mr. Thorne is right, it may result in a temporary injustice to some classes of shippers, or even a slight increase of burden to consumers. But it will be a temporary injustice, for it can be corrected when it is shown to be so, and when the present acute conditions have passed. And at worst the increase of rates cannot bear as heavily upon the public as would the consequences predicted by financiers and railroad experts.

WHY RAIL RATES SHOULD BE RAISED

[From the Milwaukee Evening Wisconsin]

The New York Journal of Commerce a few days ago voiced the sentiments of liberal-minded and practical citizens when it expressed the hope that the commission will regard the embarrassed condition of the railroads, which affects detrimentally their employees, their shareholders, their stockholders and the general credit situation, whose foreign ramifications are of extraordinary importance in this critical time. American railroad securities to the amount of many millions, reasons the Journal of Commerce, are still held abroad. "If the credit of the American railroads is made sound again, foreign holders will be well content to keep their holdings unless need of cash compels them to sell. But if the commission should again refuse to comply with the reasonable request of the railroads, or should again indefinitely delay its decision, then a flood of foreign selling would be inevitable at the first opportunity."

The question should not be decided under class pressure of any sort. The commission should keep its eye fixed on the larger interests of the whole people.

LET US HAVE ACTION

[From the Brooklyn Eagle]

The Times calls attention to some interesting phases, one of which is the fact that it cost the companies $5,000,000 to prepare the schedules first presented to the commission—it is expensive to make a request. Another is that presentation must be repeated, which is to say, facts already recorded must be duplicated. A third is that after protracted hearings, involving large outlays, it takes the commission about three months to reach a conclusion.

Unfortunately, this sort of thing cannot be dismissed as farcical. It is serious. Apparently, the commissioners think that the more drastically they deal with the railroads, the greater the protection they afford to the public. It is useless to remind them that adversity for the carrying corporations spreads, so to speak, all over the face of the earth. It is, or appears to be, a waste of breath to tell them that an ugly problem is clamoring for solution, that the case is desperate and that the patience of the public has reached a limit. It is exhausted. Let us have action.

NEEDS OF THE ROADS

[From the Albuquerque Journal]

Should permission be withheld, the decision apparently would be based upon the sins of a few of the companies, for which all of the other railroads and the public must suffer.

The argument of Mr. Thorne, of Iowa, in opposition to the increase was puerile. His declaration, that if the railroads were permitted to increase their freight rates he would back a movement to pay every Iowa farmer for losses if each of his hens failed to lay an egg a day, might have sounded catchy in a stump speech, but it had no place in an important semi-judicial hearing on a matter of the gravest public importance.

The opposition to the application for advancing rates is based chiefly on the reckless speculation in the New Haven and Rock Island, and to a less degree in the Baltimore & Ohio. In the face of present conditions, which call aloud for strengthening the credit and the service of the railroads by a rate increase, there can be no other basis for opposition.

PUTTING MONEY AT WORK

[From the Toledo Blade]

Money for the railroads can be obtained only if the railroads can show earnings assuring the interest upon the money borrowed. For some time, the railroads have been unable to give any such assurance. Earning power has slid down. Operating expenses have gone up.

So it has been impossible for the transportation companies to replace rails, lower grades, reconstruct bridges, put in branch lines, extend the block system, buy locomotives and order cars, as these things ought to be done in order to meet the demands

of traffic and answer the cry for betterments. Buying has been from hand to mouth. Little construction has been undertaken which could be postponed. And because of this condition, mills have not run to capacity, locomotive and car works have been running on part time, ore carriers have been tied up in the lake harbors, equipment houses have been wrapped in gloom, and labor, instead of being in demand, has had to plead for work.

It would be foolish to be sentimental over the woes of the railroads. But if, by increasing their earnings, the railroads can set millions of dollars of idle money into circulation, they should have that opportunity. Anything promising to set the hoarded money of the country at work ought to be given a trial.

RAILROAD TAX INCREMENT

[From the New York Commercial]

From one point of view, at least, the railroads which are seeking permission to increase their freight rates can present a strong case.

The two principal factors in the increased costs of operation are undeniably the higher rate of wages paid for railroad employees and the advance in prices exacted for railroad supplies and equipment. But besides these two factors of increased operating costs there enters into the situation a third and that is the rapidly advancing taxes paid by railroad companies. This increase is well illustrated by comparative statistics of the fiscal years 1911 and 1914 as compiled by competent authorities. Net earnings of 15 of the largest railroad systems of the country for the fiscal year 1914 are shown to have been $372,730,802, compared with $362,258,931 for 1911, the percentage of increase for the three years being 3 per cent. The taxes paid by the same companies for the fiscal year 1914 were in the aggregate $58,-973,229, compared with $45,621,165 in 1911. In the case of the taxes it then appears that the rate of increase has been 29 per cent during the three years under consideration.

It is not the contention that the value of railroad property has stood still during the three years mentioned; on the other hand it unquestionably has increased in value and therefore some increase in taxes was to have been expected, but the disparity between the rate of improvement of net earnings on the one hand and the increase of taxes on the other obviously is too great not to call for some remedy.

It is one of the phases of the rate question which might well be investigated by the Interstate Commerce Commission with a view to remedial measures.

RAILWAY FINANCES

[From the New York Evening Post]

That inducing foreign investors to renew their loans to American corporations or to refrain from selling back the stocks and bonds they hold, would be greatly simplified if the question of earning power were cleared from obscurity, through some further advance in rates, it is hardly necessary to argue. We are perfectly well aware that the argument is dangerous, for the reason that it might be applied with even greater force to a sweeping increase of rates. But no one expects such action as that, and no one has asked for it. The question really hangs on the commission's withholding, in its July order, of the full five per cent increase applied for by the railways.

IT MUST BE OPEN-MINDED

[From the St. Paul Pioneer Press]

The mental attitude of the members of the Interstate Commerce Commission in so far as it is exhibited by the character of questions they put to witnesses in the eastern rate hearing does not seem to us to be strictly right. It does not indicate that the commission is possessed of the open mind which is the first essential of a body at least semi-judicial in its nature. Questions which have for their purpose the eliciting of all of the facts are not only right, but necessary; but questions which seem studiously framed to embarrass witnesses and which indicate an antagonistic attitude by the commission will not leave a satisfactory impression upon the public mind. It is a business proposition and the commission sits as judge, not as proponent or antagonist. It is a proposition fraught with great importance when it was submitted, but doubly important now that the depressing hand of foreign war has been laid upon the world and we must accept our share. The public would have greater confidence in the wisdom and justice of the final decision if the commission presented a more judicial mind to the proceedings as they develop.

BUSINESS AND RAILROAD CREDIT

[From the Providence Journal]

One of the questions asked at the hearing on the rate schedules—should railroad stockholders not be willing to lose dividends when business is poor?—does not apply to the present situation, notwithstanding its plausibility. There is a difference between railroads and industrial enterprises in the United States.

The storekeeper and the manufacturer are at liberty to charge higher prices when the cost of materials and labor advances. The consumer is liable to be called upon at any time to pay 10, 20 or 50 per cent more for supplies. But the railroads for years have been deprived of the right to increase their incomes to meet higher taxes, the demands of labor, extra expenses forced upon them by new laws and rising prices of commodities. Four years ago the Interstate Commerce Commission rejected an application for rates corresponding to new conditions; last summer the commission acknowledged that the revenue was inadequate, and offered advice as to augmenting earnings without disturbing the present rate schedules to any appreciable extent, and now the petition is up again because the previous decisions did not give the relief needed. If the railroads had been allowed to follow the ordinary rules of business it is not likely that they now would be carrying on an argument in Washington.

PECULIAR STATUS OF RAILWAYS

[From the St. Louis Globe-Democrat]

The principal argument used against the granting of the application of the eastern railways for an increase of rates was an attempted parallel between the railway and ordinary private business. The comparison of railway with ordinary business is not altogether fair. Furthermore, the government has done everything in its power to aid ordinary business. It has extended the Aldrich-Vreeland currency act and enlarged it to care for the emergency in credit conditions. But ordinary business is not run by the government as the railways are. They must in all practical matters submit to the judgment of the Interstate Commerce Commission and the various state commissions and to the acts of Congress and the various legislatures. They must submit every schedule to the scrutiny of commissions, who hold hearings on complaints of shippers. Since the government has seen fit to exercise these large powers, which experience showed to be necessary, it has morally bound itself to do justice to the railways as well as to the public.

THE INTERSTATE COMMISSION AND THE EMERGENCY

[From the Baltimore Sun]

That the situation following the war, taken in connection with the conditions shown to exist prior thereto, has created a crisis in railroad affairs few will deny. The railroads' executives and others have testified to it, and even Mr. Clifford Thorne, who has appeared so persistently in opposition to the general advance in rates, admits that "today the railroads have some foundation for their claim." How will the commission meet this emergency? By permitting a uniform advance of 5 per cent of all the rates in the territory the immediate necessities would be met. The slower processes, proposed in the commission's previous order, of correcting objectionable or inequitable practices and the adjustment of abnormally low rates, could be proceeded with. If then, upon the basis of rates so established, the railroads should earn more than a fair and reasonable return upon the property devoted to the public use, the commission should order such reductions as would be fair and equitable. It would seem as if the

commission, with the co-operation of the railroads, might devise some method which would permit of the carrying out of such a policy.

THE HEART OF THE RATE QUESTION

[From the New York Times]

When the railways again are in the market there will be no question about the dividend upon Steel shares. The reduction of its dividend heretofore has been an early sign of the turning of the tide. Those who have based their judgment of business affairs upon the steel trade always have done well by expanding when the iron trade is low. It is lower now than it has been over any extended period of time since the formation of the Steel Corporation. It is not a prophecy of worse to come, but is a sign that the worst has been passed. In that restricted sense the Interstate Commerce Commission is a more depressing factor than the war. It also is a factor more easily controlled. The light of reason will dawn upon the commission a little before it is dazzling the eyes of everybody—if the commission is prudent.

A QUESTION OF RAILWAY POLICY

[From the New York Times]

The counsel for the Interstate Commerce Commission has made a plea before it, and in its behalf before the country, unlike anything which previously has come from the commission. Hitherto the commission has always asked, and has always received, more power to deal with the crises which its policy has raised. Now for the first time the commission admits its inability to deal with the situation, and refers the subject back to the source of the commission's power. The decline of credit which disables the railways from meeting the necessities of the country for facilities of traffic adequate to the country's growth is no concern of the commission. That is something apart from the reasonableness of rates, and is a question, in the words of the commission's counsel, of "financial policy of the government, with which another government agency is called upon to deal." Others have suggested that the commission was in water too deep for its comfort, and that it might be well for Congress to give it assistance, if the credit and usefulness of the commission, and the theory of regulation, were to survive the storm which the commission has raised, and which it now admits it cannot compose. No doubt the situation is made worse by the conditions growing out of the war, but the war is not the cause of the railways' troubles.

PLIGHT OF THE RAILWAYS

[From the San Jose Mercury Herald]

The attitude of the present national administration towards the railways of the United States has not been characterized by a sufficiently broad spirit of fairness in many important particulars and the result has been an impairment in efficiency which has reacted upon the people at large in the shape of reduced convenience in transportation facilities. While everybody recognizes in most of the railroad companies a willingness to charge all the traffic will bear, there is no general desire to deprive these corporations of a just return upon their capital invested and proper pay for the service they render. The cultivation of antagonism against the railways merely because they are powerful corporations will never adjust differences which may arise between them and the people. If there could be more harmony and a more cordial spirit of co-operation between government and railroads, mutual results would be better and the people would be benefited more acceptably than under the prevailing conditions.

RAILROADS IN A DIFFERENT SITUATION

[From the Jacksonville (Fla.) Times-Union]

From the grilling administered to the railroad men who appeared at the hearing, it looks as if the Interstate Commerce Commission, as at present constituted, is composed of men more prejudiced than the average of the American people against the railroads. Each witness was rigidly cross-examined, and the railroad men were reminded that the people of the United States as well as the railroads needed relief.

This important fact was lost sight of: The people of the United States fix their own prices for what they offer for sale or for their services. There is no commission that holds to the lowest level short of confiscation the value of their products or of their services. If the railroads enjoyed this privilege that is accorded to all other classes they would not be now complaining.

PREJUDICE HAS NO PLACE IN THE RATE CASE

[From the Philadelphia Ledger]

One-eighth of all the wealth of the United States is in railroads. Congress has seen fit to place this one-eighth of our national possessions in the hands of seven men. No other similar body is endowed with such power over the destinies of twenty billions of capital, two million employees and more than that number of investors.

The attitude of the Interstate Commerce Commission which most amazes the public is its apparent hostility to the railroads. It was created to weigh facts and hear testimony, but not to perform the duties of a prosecuting attorney.

What the public, which must pay all the bills of both railroads and shippers, would wish is the commission sitting as a judicial tribunal to hear cases. It ought to be equally friendly to both sides and antagonistic to neither.

In resenting what bankers and others interested in this vast railroad property are doing to protect it, the commission displays an attitude wholly unjustified. It is still the privilege of every American to guard what he owns.

THEY WANT THEIRS, ANYHOW

[From the Detroit News]

The railroad officials in the hearing at Washington stated their whole case when they said that dividend payments must be maintained regardless of conditions which affect income, because the fealty of the investor must be sustained if railroad finance is to go on as it has been going, carrying its load of "water."

It is the perfect privilege of the railroads to so argue. It is also the perfect privilege of the Interstate Commerce Commission to hold in mind the plight of other kinds of business in which dividend payments fall off if earnings decrease. It will strike the average man of affairs that the commission's attitude is the right one. In plain phrase, it is a case of shortened incomes generally and the necessity of getting down to economies. General business is accommodating itself to the condition. Why should not the railroads fall into line?

FAIR TREATMENT FOR THE RAILWAYS AN URGENT NATIONAL DUTY

[From the New York Tribune]

Questions asked at the railroad rate rehearing in Washington indicate that some of the members of the Interstate Commerce Commission do not grasp the problem with which they are dealing. Their point of view seems still to be that of the railroad baiter in the good old times when railroad baiting was supposed to be a patriotic pastime.

Why was the case of the eastern railroads, which had unsuccessfully appealed for a 5 per cent increase in freight rates, ordered to be reopened? Manifestly it was because the war in Europe had made the commission's decision of August 1 look preposterous.

A decision like that, which talked peace when there was no peace, could not be expected to give satisfaction. Public opinion was almost unanimous in regarding it as one of the most inopportune official judgments ever delivered.

Yet although the commission's belated discovery that a great European war had broken out was the only intelligible ground for granting a reargument we find the commissioners asking questions indicating that the extraordinary depression caused by the war is in their opinion no ground for granting the railroads further relief. According to one account of the hearing on Mon-

day, Commissioner Clements asked Mr. Willard, the president of the Baltimore & Ohio Railroad, "if he thought that the railroads should be dealt with in any other manner than other industries affected by war conditions."

Such a question is little short of amazing. Other industries are left free by the government to regulate their own affairs. They may raise their prices as they please without interference from Washington. But the railroads have no free hand. Their earning power is limited for them by the Interstate Commerce Commission's decrees, and they may be made to starve, even in the midst of general plenty, if the commission thinks it advisable to starve them.

The Interstate Commerce Commission needs to enlarge its vision and deal in the broadest national spirit with the rate question. Starving the railroads is a dead policy.

ARE THE RAILROADS STILL CRIMINALS?

[From the Chicago Herald]

Two incidents of the opening session at the rehearing granted by the Interstate Commerce Commission to the railroads on the rate increase question strike unpleasantly the reader who has no personal interest in railroad property, but who realizes that industry cannot prosper if transportation service be crippled. One is the immediate appearance and active participation of Clifford Thorne, who was, and may be yet, Iowa's railroad commissioner. Mr. Thorne first attracted national attention with a scheme for government ownership whose financial mathematics were simply ridiculous and whose estimates of "profits for the public" qualified him for the illustrious company of Colonel Mulberry Sellers and J. Rufus Wallingford.

The other was the attitude of Louis D. Brandeis, counsel for the commission. Mr. Brandeis at once took the tone of a prosecutor and appeared to assume that the railroad officials who were trying to show the need of higher rates were somehow criminals or witnesses for criminals.

The opening of the hearing does not augur well for a practical solution of the problem, nor for speedy action. Meanwhile the railroad situation is growing worse daily, and with it the situation of industry and commerce, which want low rates, of course, but want still more adequate and improved service, and are saying so in no uncertain tones.

Therefore it is respectfully suggested to the commission that it repress the volubility of Mr. Thorne, moderate the prosecuting zeal of Mr. Brandeis, and detach the inquiry from any sort of assumption that the railroads are still criminals who should be punished. That aspect of the situation may well be left to the courts. What the railroads need is help, that they may render the service without which trade and industry cannot prosper. And the evidence accumulates that the railroads, as an industry, are gasping for breath.

RAILROADS NO LONGER UNDER A CLOUD

[From the Indianapolis News]

Various railroad commissions throughout the Middle West, prominent among them being the one in Iowa, are resolved to combat the case. The shippers are ably represented. Among the counsel engaged is the commission's special attorney, Louis Brandeis. The question is even more complicated than it was during the previous hearing. The railroads undoubtedly have in the meantime been further embarrassed. The general trade disturbance was quickly felt by the carriers, and their hesitation about buying is quickly felt by the steel and iron business.

It is said that railroad stocks and bonds are no longer held by small groups, but that such systems as the Pennsylvania are owned by thousands of small shareholders, each of whom is vitally interested in the rate question. But acknowledging this, the maximum number of stock and bondholders is small compared to the body of the public. It is the shipper first, but the public ultimately, that must bear the burden of any general rate increase. It can be truthfully said that the railroads are no longer under a cloud. Even the New Haven investigation, and the more recent revelations in the Rock Island financing, should not—and do not—prejudice public opinion against the transportation business as a whole.

LIFT THEM OUT OF THEIR DIFFICULTIES

[From the Boston Transcript]

The President has recently consented not to push certain legislation that he had had in mind, affecting the roads. Certainly, in thus receding from his purpose his conviction of their embarrassment must be very strong. We can recall no other protest of business that has had any affect upon him. He is anxious that relief in some form shall be extended to them and we know of no other form than that in which it is asked that will lift them out of their difficulties.

PUBLIC POLICY AND RAILROADS

[From the Portland Oregonian]

Shippers have been accustomed to consider their interests best served by low rates and they have generally been ready to join in a demand for reduction. But the loss, delays and damage they suffer through inefficient railroad service under too low rates may far exceed any saving they make through a reduction, or the denial of an advance, in rates. If by paying a rate 5 per cent higher shippers could be assured that goods would arrive in Portland from New York in 14 days and in good condition, they might gain far more than if at the lower rate goods were kept three or four weeks on the road and arrived with packages broken in wrecks or otherwise damaged and some of them missing. The shipper is less interested in the amount of the rate, so long as it is reasonable, than in the assurance that it is as low as and that the service given him is as good as that of his competitor. From the standpoint of public policy, the wise course for the Interstate Commerce Commission seems to be the prompt grant of a fair general increase in rates, to be followed by a readjustment in detail.

RAILROAD RATES

[From the Duluth Herald]

"Why," it is asked on every hand, "should the railroads be any more entitled to relief from war-created difficulties than any other line of business?"

There's an answer to that. Obviously, it is that the railroad business is the only business whose charges are subject to the will of public authority.

MEET THE EMERGENCY

[From the Galveston Tribune]

The railroads were urging increased rates before the European war, and that conflagration has hit them as hard as all other lines of American industry. Now they come into court with added arguments for a raise in rates. And until the United States government gets ready to go into the railroad business it would be as well to allow sufficient rates to take care of reasonable dividends, interests and improvements.

PLEA OF THE DEMAGOGUE

[From the Kansas City Journal]

The railroads are not asking for a "war tax" nor are they trying to secure any special favors. All that the railroads are demanding at the hands of the government is common justice. The great fact seems to have been lost sight of that the government has undertaken to run the railway business of the country by means of the Interstate Commerce Commission. That body has established rates and prescribed methods which have hampered and harassed the railroads for years. If the government had not handcuffed the transportation interests they would not be asking anything. But since the government has assumed the responsibility of dictating to the railroads how they shall run their business, where else can they turn in time of trouble but to the cause of it all? Commissioner Thorne fairly represents the remnant of that feeling of antagonism toward railroads and other

business interests which prevailed so generally a few years ago. But a spirit of fairness and of reason has largely supplanted the unreasoning hostility of the political demagogues in the popular mind.

LIFE OR DEATH FOR RAILROADS?

[From the New York World]

War in Europe merely accentuates the plight of the railroads, which are suffering from too much taxation, too much political agitation, too much harmful legislation, such as the full-crew laws, and from the higher cost of supplies and constantly increasing payrolls. With income outstripped by outgo, the greatest of American industries is in no position to borrow money for betterments or to renew old loans, and the whole world finds in the prices of American railroad securities proof of the distrust with which investors regard the situation. In a country so extensive as this, the transportation interest cannot be starved without weakening every other industry. Its property must be kept up. Its credit must be sustained. If prices and wages rise, its rates must rise. Public regulation that is never constructive is certain soon or late to be destructive.

CARDS ON THE TABLE

[From Manufacturers' News, Chicago.]

We are interested in knowing just now who the shippers are who are opposing the application at present pending before the Interstate Commerce Commission. We read a piece in the newspaper a day or two ago a couple of columns long stating that the shippers were attacking the railroads' plea for freight rates, and we have seen more or less about a politician named Clifford Thorne of Iowa, who always bobs up when any controversy having to do with the railroads is on hand, representing shippers. Mr. Thorne comes from a state that has been going backwards for a number of years. We have no criticism to make of him. He is a lawyer, an office holder and not a shipper, and wants to make himself politically strong with the people of his state. He knows the sentiment in his state as to the carriers, and consequently figures out that it is good politics for him to oppose the advance. We think perhaps he is right from his viewpoint. But we would like to know the viewpoint of the shippers who are opposing the advance in rates. We cannot quite figure them out. We do not see why they do not take the witness stand and produce the figures. If the railroads should not have an advance, let us know why.

RAILROADS AND INDUSTRIES AFFECTED ALIKE

[From the San Antonio Express]

Argued from any angle, it seems pretty hard to get away from the justness of the principal position maintained by organized shipping interests and their counsel before the Interstate Commerce Commission that is now holding court on the petition of eastern railroads for "relief" through a general increase of at least five per cent in freight rates. This position is that our railroads are confronted with no condition as a result of the European war—or any other cause—that does not equally affect every other industry. The people may have become never so well disposed to cooperate in relieving the railroads, but it is obvious they will not worry much, at this time, over the interests of investors if the merit of the rate increase proposition is to be urged solely upon such a basis.

THE ROADS AND THE PUBLIC

[From the Sioux City Journal]

The point is that railroads as common carriers are public utilities, and anything that tends seriously to impair their efficiency must injure the public. This being true, and it being likewise true that the public has undertaken to supervise the railroads, it is not unreasonable to expect the public to take an interest in protecting them from deterioration. If a private business suffers by reason of war emergency its owner can take such measures as he may deem expedient to deal with the situation. If he finds trouble in getting money with which to operate, or if the business becomes unprofitable, he can shut up shop until the clouds roll by. Not so with the railroad. There is no danger that the American railroads will stop operating. There appears to be danger that their efficiency will be seriously impaired if they are not permitted to earn more revenue.

DO JUSTICE TO THE RAILROADS

[From the Virginian Pilot and Norfolk Landmark]

The opponents of rate increase insist that in the present crisis the railways of the country are suffering no more loss than other interests and had no ground for asking special relief. This was the contention of Mr. Brandeis who stands in the peculiar relation of amicus curiae to the commission. We are not able to see the situation that way. The railroads are public institutions first; enterprises for the benefit of their stockholders secondly. The crippling of their resources and curtailment of the service they render to every branch of production and trade in the land tends to spell general calamity. The issue is not alone that of enabling them to return dividends to investors, though that is an equitable consideration not to be lawfully disregarded, but is besides one of momentous concern to the people at large. A crippled transportation system emasculated of means vital to its vigorous operation would necessarily react with injurious effect on every business and industrial activity in America, while to force the railroads into costly sacrifices, in disordered times for protecting their credits and caring for their outstanding obligations, must necessarily have an evil influence on the financial situation, already complicated by the disturbed situation ahead.

THE ROADS AND THE PUBLIC

[From the Lincoln (Neb.) Journal]

Eastern railroads renew their plea for a five per cent rate increase on the ground that the war has increased their needs. But the war has hampered and embarrassed nearly all forms of business. Why should the railroads be allowed to shift their share of the embarrassment to the rest? The cotton growers have just tried this in Congress and were properly refused. It is a time for everybody to do the best he can at standing on his own legs. Few businesses have strength just now to bear the burdens of other business.

THE TRUE REMEDY

[From the Dallas News]

There is no fallacy more popular in this country than the idea that the case of the railroads is precisely the case of any individual, firm or corporation engaged in business. This fact is again illustrated by questions put to President Willard of the Baltimore & Ohio during the consideration of the application of the eastern railroads for an advance in freight rates. Mr. Willard had stated that the revenues of the railroads had decreased to a degree that threatened their solvency, whereupon he was asked if the revenues of all other enterprises in this country had not likewise suffered. Undoubtedly they have; but the case of such industries is not analogous to that of the railroads. When a private industry, a manufacturing industry, for example, finds that its cost of production is increasing, it has recourse to the simple expedient of increasing the price of what it has to sell. Or when it finds that the demand for its commodities is decreasing, it can readjust its expenses to its income either by reducing wages or by diminishing its output. The railroads enjoy no such freedom of action. As we have often said in the past, the true remedy would be to permit the railroads to accumulate and maintain a surplus fund sufficient to bridge over such embarrassments as the one now confronting them; but our policy seems to be opposed to that idea, and so long as it is, we shall be confronted by the alternative of increasing rates or of suffering the roads to become bankrupt.

Mechanical Department Progress on the Frisco

Work Checking System, Shop Schedules, Machinery and Tools, Centralized Manufacture, Locomotive Supplies

In connection with the other developments* toward increased efficiency and economy which have taken place on the Frisco within the past year or two, a number of important and far-reaching improvements are being made in the mechanical department. While several of these are only fairly under way, the results obtained thus far justify describing and commenting on them at this time. The most important of these steps of progress will be considered briefly in the following article:

DATE SHEET—TEN-WHEEL ENGINE—FIFTEEN DAYS IN SHOP

Day Erecting Floor	Boiler Work	Bench Work	Machine Shop	Blacksmith Shop	Oxweld Plant
1—Engine in shop					
2—Engine stripped	Flues removed				
3—Parts cleaned and delivered					
5—Cylinders bored Valve chambers bored			Cylinder heads	Valve rods and stems Link work Piston rods	Valve rods and stems Link work Piston rods
6—			Cylinder bushings Valve bushings	Guides, yoke and blocks Misc. motion work Brake rigging Spring rigging Tumbling shaft	Crossheads
7—Cylinder bushings applied Valve bushings applied			Throttle Dry pipes Eccentrics and straps Tumbling shaft	Rods Engine truck work Crossheads	Spring rigging Engine truck work Guides and blocks Reverse levers Brake rigging
8—Valve chamber bored Throttle and dry pipe applied			Guides and blocks Engine truck work Spring rigging Brake work Rocker boxes Tumbling shaft boxes	Boiler brackets	Misc. motion work Misc. brackets Reach rod
9—Frames and cylinders lined Guide yoke up Cab fittings ready		Tumbling shaft boxes Rocker boxes Spring rigging	Steam chests Wheels	Frame braces	Rods Frames Frame braces
10—Tumbling shaft applied Rocker boxes applied Dry pipe and throttle applied Shoes and wedges laid off Frame braces applied Eccentric straps applied Center casting applied	Flues applied	Engine truck ready Guides and block ready	Crossheads Motion work Driving boxes		
11—Driving boxes fitted Frames and cylinders bolted Running board bracket up Spring rigging up	Staybolts applied Boiler work completed	Steam chests ready Crossheads Reverse levers	Shoes and wedges Steam pipes		
12—Boiler tested Steam chest applied Reverse lever applied Lagging applied Engine wheeled Steam pipes ready		Brake rigging Links	Rods and brasses Pistons		
13—Front end door and ring applied Cab and running boards applied Guides applied Shoes and wedges applied Motion work applied Pilot beam applied	Ash pan up	Main rods Side rods Pistons			
14—Brake cylinders applied Air pump applied Steam and exhaust pipe applied and tested Valves set Pilot applied Jacket applied Cab fittings applied Piston applied Grate rigging applied	Front end netting applied				
15—Brake rigging applied Rods applied Pipe work completed Engine trial tripped Engine painted					

Shop Schedule or Date Sheet for a Ten-Wheel Locomotive

WORK CHECKING

The locomotive and coach repair shops at Springfield—both the so-called new shops and the North shops—are administered on a day-work basis, and until recently no attempt has been made to check accurately the output of the individual workman. Piece-work has automatically performed this function on roads on which it has been introduced, and at the same time has developed more adequate and efficient supervision. It was not deemed advisable, however, to introduce this system on the Frisco, although it was felt to be vitally necessary to develop some method whereby a careful check might be made of the itemized output, and in a constructive manner, so that the features which restricted the output, such as lack of proper knowledge and training on the part of the individual, unsuitable tools and machinery, defective material, poor design of parts, inadequate supervision, and other features of this sort, might be located and remedied in order to bring the efficiency to a maximum.

Under the old methods a record was kept by a time clerk of the time when the men started and left off work in the morn-

*See Studies in Operation, March 13, 1914, page 501; The Agency Plan, March 20, 1914, page 671; Economical Locomotive Performance, May 8, 1914, page 1018; Development Work, May 22, 1914, page 1125; Oxy-Acetylene Welding and Cutting, September 11, 1914, page 467; and Reclaiming Material, October 2, 1914, page 595.

ing, at noon and at night. The actual account against which the time was charged was based largely on the workman's statement or upon an approximation by the timekeeper. As a result the times charged against different jobs were not of sufficient accuracy to make it possible to intelligently check against abuses or defects such as those above mentioned.

To overcome this the Frisco has adopted a rather unique and unusual scheme. Work checkers have been provided, each one of these looking after from 50 to 100 workmen, depending on the class of work and the department in which they are employed. There are two of these checkers in the erecting shop at the Springfield new shops, three in the machine shop, one in the blacksmith shop, two in the boiler shop and one in the tank and cab shop. These men constantly observe the progress of the work in the department which they serve, but have nothing to

ST. LOUIS & SAN FRANCISCO RAILROAD

JAMES W. LUSK, W. G. BIXBY, W. B. BIDDLE, Receivers

DISTRIBUTION OF TIME

Name Klein H. J. No. 1523 Rate .41

Day Bilks Month Jan. 31 191 4

Time On	Time Off	Detail Description of Operation	Charge	No. Pcs.	Hours	Amount		
7 30	2 00	26 holes plugged. Strap spring						
		hangers rep. 6 Patches Eng.	2003	24	5.5	2.25	✓	✓
2 00	3 00	Truck spring hangers. Gib and						
		dressed Eng.	769	4	1.	.41	✓	✓
3 00	4 30	Taking heats for 1503 S.O.	3377	2	1.5	.62	✓	✓
					8.	3.28		

Inspector Harry B. Smart. Foreman Total

Form Used by Work Checkers in Recording the Distribution of Time

do with the distribution of the work. The checker has a card for each workman, similar to the one which is reproduced in the illustration, on which he enters in detail the operations which are performed, noting the times at which the work was commenced and completed and the engine or shop order to which each job is charged. These cards are 5½ in. by 8 in. in size. In the illustration spaces have been left between the different items in order to preserve a neat appearance in reducing the size of the form; this is not done in actual practice.

The checkers were selected from among the best of the mechanics in each department, and the training which they receive in following up the work will fit them admirably for positions as foremen, if such openings occur. It should be understood

Among the most important advantages of the time checking system as it has been developed thus far, are the following: (a) The recording of the detailed progress of the work, thus making the work of supervision less burdensome for the shop superintendent and general foreman. (b) The detection of waste of time and effort at its occurrence, thus enabling the foreman to promptly take the matter in hand, eliminate delays and reduce

Boiler and Floor Work, No. 1

Engine number																					
Date in shop																					
Date expected out																					
Stripped except frames and cylinders																					
Flues removed																					
Frames and cylinders removed																					
Smoke box removed																					
Flue sheets removed																					
Door sheet removed																					
Cylinders bored																					
Valve chambers bored																					
Valve bushing in																					
Cylinder bushing in																					

Part of a Department Schedule Sheet for Boiler and Erecting Shop Work

the cost of performing the work. (c) Absolute accuracy of the charges to the various accounts or to individual locomotives or shop orders, thus making possible a correct analysis of expenditures. (d) Cost data, which permits comparisons to be made and weaknesses to be located which may be corrected by

ROUTING CARD

Engine No.

REVERSE LEVER GANG

Operation	Date Expected	Date Comple'd
Rocker boxes and arms ready		
Reverse levers ready		
Reverse levers applied		
Reach rod ready		
Reach rod applied		
Throttle lever ready		
Throttle lever applied		

ROUTING CARD

Engine No.

LINK GANG

Operation	Date Expected	Date Comple'd
Tumbling shaft and boxes ready		
Links ready		
Links applied complete		
Walschaert gear ready		
Walschart gear applied complete		

ROUTING CARD

Engine No.

STEAM PIPE GANG

Operation	Date Expected	Date Comple'd
Steam pipes removed		
Dry Pipes removed		
Throttle Box Removed		
Steam pipes applied		
Dry Pipes applied		
Throttle box applied		

Routing Cards Used by the Reverse Lever, Link and Steam Pipe Gangs

that these men check the quality of the work and accuracy of workmanship, as well as the time of performing it. They are paid practically the same as lead men, which is at a somewhat higher rate than the standard for first-class mechanics. In all cases, in making suggestions or changes, they work through the foremen.

improving the facilities or methods or by rearranging the force.

Much has been published in the past concerning the best methods of comparing the efficiency of one shop with another, the great difficult being to define and decide on a standard unit of measurement. The value of the comparisons of a shop or a department as a whole on the basis of such units as have been

suggested is questionable as far as it concerns the accurate detection of weaknesses or the relative value of different practices or methods. The most logical way of detecting lost motion or effort, and of eliminating it, is to study each operation in detail and make sure that it is the best and cannot be improved upon. The provision of work checkers on the Frisco and the way in which their efforts are being utilized is successfully accomplishing this and is very greatly increasing the efficiency of the departments and the shop as a whole in a way which must appeal to shop officers and foremen as being a most logical one.

WORK DESPATCHING

It seems strange that the railroads generally have been so slow in systematically planning the progress of the work through the shops in order to balance the strength of each of the various departments and to schedule the work of repairing the cars and locomotives in such a way that the entire staff may co-operate closely and effectively. The Chicago & North Western was one of the first roads to inaugurate such a system. This was many

ROUTING SYSTEM---CHECK SHEET
ERECTING SHOP NO. 1

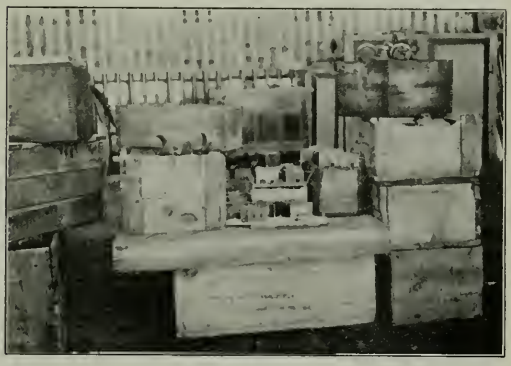
ENGINE NUMBER																			
	Date Expected																		
Engine in Shop	Date Compl't'd																		
	Delay																		
	Date Expected																		
Engine Stripped	Date Compl't'd																		
	Delay																		
	Date Expected																		
Parts Cleaned and Delivered	Date Compl't'd																		
	Delay																		
	Date Expected																		
Frames down	Date Compl't'd																		
	Delay																		
	Date Expected																		
Cylinders Bored	Date Compl't'd																		
	Delay																		
	Date Expected																		
Cylinders Bushed	Date Compl't'd																		
	Delay																		
	Date Expected																		
Frames up Complete	Date Compl't'd																		
	Delay																		
	Date Expected																		
Guides Lined	Date Compl't'd																		
	Delay																		
	Date Expected																		
Throttle Box in, Dome Closed	Date Compl't'd																		
	Delay																		
	Date Expected																		
Rocker Boxes and Tumbling Shafts up	Date Compl't'd																		
	Delay																		

Check or Delay Sheet Used With the Shop Schedule System

years ago, and in spite of the fact that it was given wide publicity and that the whole scheme was most logical, other roads took it up very slowly and even today shop scheduling in its best form is used in a comparatively few shops. The methods which are being used on the Frisco are not essentially different in a general way from those introduced on other roads but are arranged to meet the special needs of the shops on that system.

Not only are the dates set for the completion of repairs to each locomotive, but the intermediate times in which each of the numerous operations must be finished are also designated. The general plan of this scheme is indicated on the accompanying form, which is known as a date sheet, and outlines the work which should be done on the various parts of the locomotive in each of the different departments for a ten-wheel engine which is to be overhauled in 15 days, or rather 150 hours, for arrangements have been made to adjust the schedule for any lengthening or shortening of the working hours per day. This particular sheet covers an ordinary overhauling where no special work, such as firebox sheets, new cylinders or new frames, is required. Repairs of this sort necessitate lengthening the schedule by a certain number of days, depending on the nature of the special work.

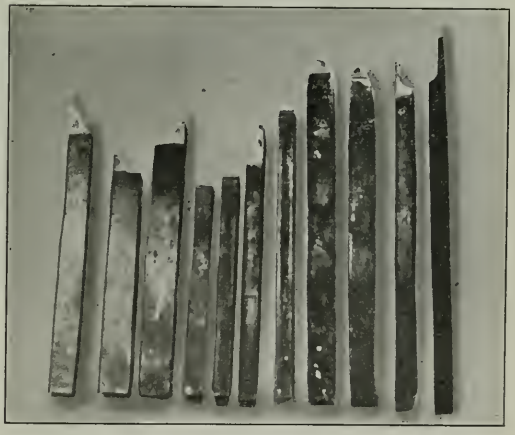
Similar date sheets have been prepared for every class of power and for every combination of repairs. As soon as a locomotive arrives at the shop a thorough inspection is made and a report is drawn up of the necessary repairs, from which it is pos-



Boxes of Surplus Tools Which Were Gathered Up and Returned to Stock

sible to determine exactly what schedule should govern. This makes it possible to set the dates for the completion of each item and routing cards are filled in and issued to each gang or department foreman as a guide for handling the work. Sample cards, such as used by the reverse lever gang, link gang and steam pipe gang, are reproduced in the illustrations.

For the use of the shop foreman who supervises the work of these gangs a special form is made out which applies particularly to the work of his department rather than to the handling



Eleven High Speed Tools Which Were Formerly Used With the Driving Wheel Lathe

of the locomotive as a whole, as on the large date sheets. A sample sheet of this sort for boiler work and the erecting department is reproduced in one of the illustrations.

The despatching system is handled by a foreman who practically becomes an assistant to the general foreman, relieving that

officer to a great extent of the detailed supervision of the progress of repairs. He makes out the despatching sheets, timing the various operations to correspond with the date sheet for the type of engine and class of repairs. It is, of course, necessary for him to maintain a master sheet covering all of the engines in the shop and arranged in such a way that he can see that the work in the various departments is properly balanced, and from such reports of the progress of the work as he receives and enters on the master sheets he can determine practically at a glance whether the schedules are being lived up to. A daily delay report is prepared each evening showing just what operations are behind schedule; provided with this the general foreman can go directly to the gang or department which is responsible for the delay and see that provision is made to overcome the deficiency.

This system, in addition to maintaining a balance between the different departments, thus eliminating annoying and costly delays and securing a maximum output consistent with the force and facilities, has the additional not inconsiderable value of insuring prompt delivery of completed locomotives at a date determined well in advance, and thus enables the mechanical department officers to more intelligently handle the problem of the distribution of power. The shop schedule system to be a complete success must have the hearty support of all of the mechanical depart-

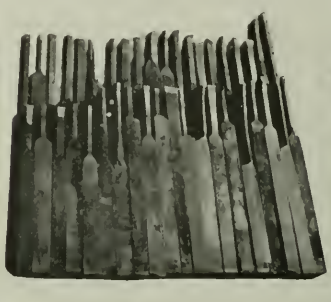
Tool Holder and Tools Now Used With Driving Wheel Lathe

ment officers and particularly of those higher officers having general supervision. If this condition does not obtain and the schedule is interfered with in order to give certain locomotives preferment, it would greatly hamper its usefulness and disorganize the entire shop.

SHOP MACHINERY AND TOOLS

No one who has ever tried to use a dull axe, saw or chisel, and who has then taken time to put them in proper condition and has marveled at their greater effectiveness, will belittle the effort to see that all of the tools and machinery in a large locomotive or car repair shop are kept in first class condition. Possibly a given amount of energy and expense invested in work of this kind has resulted in more striking improvements in efficiency and output than any other one thing that has been advocated in the general campaign for improved shop production within the past few years. Many of the more progressive roads have been prompt to take advantage of this, although some of them have not as yet fully awakened to its possibilities. It was one of the first things which were done by the Frisco in its campaign for improved shop efficiency, and the results thus far have been startling, in that the maintenance expenses for shop machinery and tools have been surprisingly decreased, although this equipment is much improved and maintained in better condition.

The problem was approached from several angles. It has involved the appointment of a supervisor of tools, who has had general charge of the work, which in general includes the standardization and centralized manufacture of small tools and a systematic method of checking them and seeing that a complete and adequate supply, but not an over supply, is maintained at all points on the system. It includes also the strengthening and speeding up of machine tools and the providing of jigs and other apparatus for the accurate and rapid handling of the work. It should be noted, however, that in this latter respect the Frisco, particularly at the Springfield new shops, has not been in the rear ranks in the past. This is indicated by the shop kinks from that system which

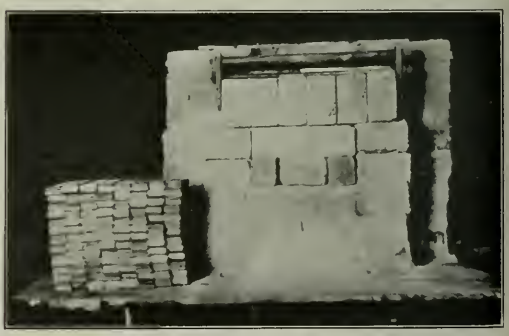


Forty-One Tools Formerly Used on Slotter

Tool Holder Now Used on Slotter

have been published in the *Railway Age Gazette, Mechanical Edition*, from time to time, and particularly in the collection which appeared in July, 1913, submitted by J. C. Breckenfeld, at that time assistant machine shop foreman, who was awarded the first prize in the shop kink competition in which it was submitted. Mr. Breckenfeld is now supervisor of tools.

One of the first steps in the campaign was to make an absolutely correct inventory of all the machinery and tools on hand at the different shops and engine houses. This resulted in the collection of a large amount of obsolete tools, which have either been worked over or sold as scrap, and also in the gathering up



Special Furnace for Making All Lathe, Planer and Similar Tools for the System

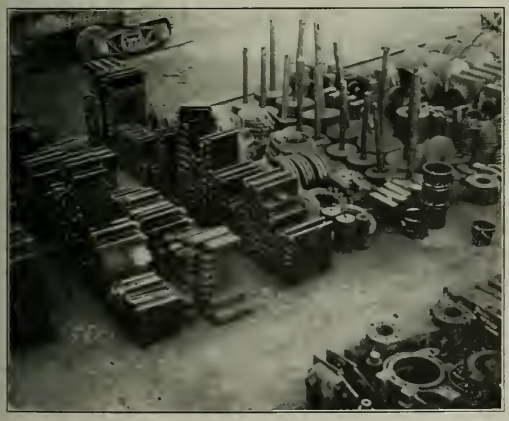
of surplus tools, which have been turned back into the stock and have been reissued as required. For instance, one of the illustrations shows a number of boxes filled with perfectly good tools, but which were in the nature of surplus stock and were turned over to the general store, the shops from which they were collected being given a credit of $2,005.41. This is only one of a number of similar lots of surplus tools which were gathered up. In another case a large number of antiquated air motors were collected and disposed of which were using 300 per cent more air

than the standard tools. Other tools were gathered which were damaged and laid aside, but which at a reasonable expenditure were put in first class condition and reissued as new tools. Meanwhile a stock book has been prepared which shows all small tools on hand each month at each point and those which have been ordered. A continuous inventory is thus provided which makes it possible for the supervisor of tools quickly and accurately to check the requisitions and thus avoid overstocking.

Not the least important of the improvements has been the selec-

Finished Tools Ready for Issuance to Shops

tion of standard designs for the different tools and the centralization of their manufacture at the main shops. As a typical example, the heavy bulky tools formerly used on the driving wheel lathes have been replaced with tool holders and high speed steel cutters, as shown in the illustrations. This has not only decreased the cost of these tools, for only the cutters are now of high speed steel where formerly the entire tool was of this material, but it has greatly increased their efficiency, because of the better design, and has made it possible to more easily maintain

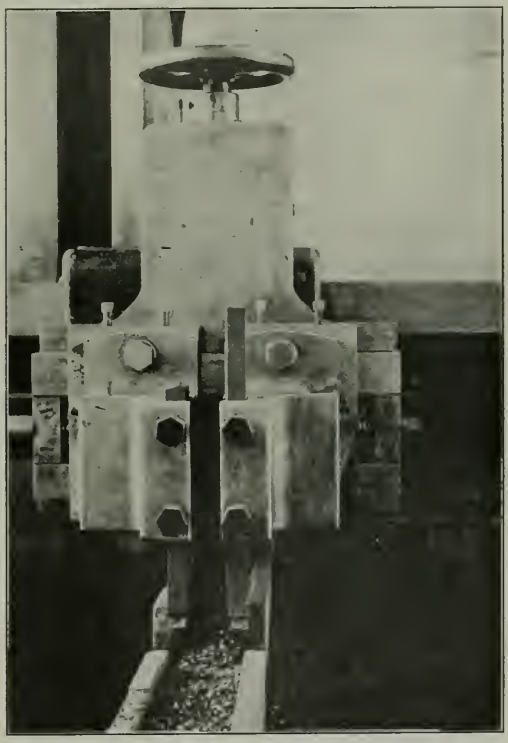


Locomotive Parts Manufactured at Central Shop

the tools in proper condition. As another illustration, one of the slotters was found to have 41 tools weighing more than 900 lb., 70 per cent of the tools being of high speed steel and representing in all an investment of over $500. These were replaced with two tool holders similar to those shown in one of the photos, and a full set of small tools of high speed steel. The total cost of these new tool holders and tools was less than 20 per cent of the cost of the old tools and they are more effective than the large clumsy ones.

In keeping a check on the small tools a record is maintained at each of the shop tool rooms showing just what tools each man has and requiring him to turn in any tools, which he may have taken from the tool room, every Saturday night for inspection and repairs. If any of the tools are found missing the man is notified on Monday morning that if he does not immediately turn them in he must get a release from the general foreman. If a tool is broken the workman must turn in a report which must be passed upon by his foreman. In this way weak or poorly designed tools are located and improved and careless handling is reduced to a minimum.

It was found that there were a great variety of makes of tools of all kinds scattered over the system. As rapidly as possible it is proposed to reduce the number of different types; in the case of jacks, for instance, from 12 to four, and to standardize four sizes of air hammers and five sizes of air motors. Manufacturing



Double Planer Head for Machining Shoes and Wedges

the small tools on a large scale at a central shop reduces their cost very greatly since it is possible to furnish special facilities and specially trained mechanics. The tools shown ready for issuance in one of the illustrations, for instance, are now made at a cost of less than one-half that under the old methods.

In brief, then, the principles which have been applied and which have resulted thus far in an increased efficiency of machine equipment with a decreased cost of maintenance are an intimate constant supervision of tool purchase, manufacture and distribution; the establishment of standards of design for all small tools; the central manufacture of these tools in quantities to insure minimum cost and adherence to standards; the designing and in-

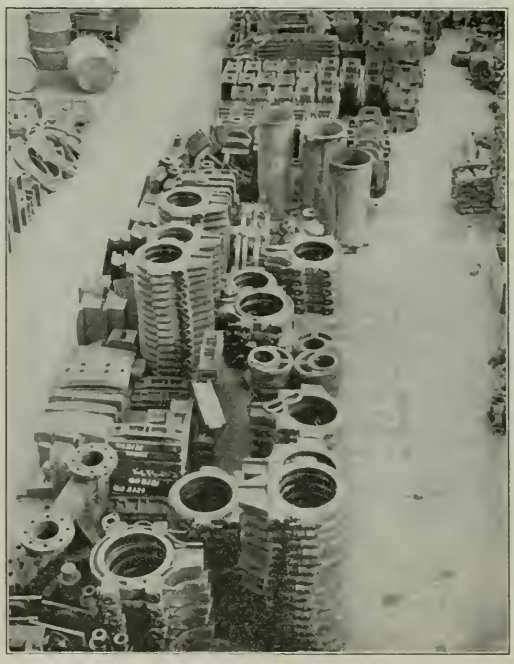
stallation of time and labor saving jigs to facilitate shop output, and the strengthening and rebuilding of machine tools to increase their capacity and their facility for turning out accurate work.

CENTRALIZED MANUFACTURE OF MATERIAL

Considerable progress has been made in the standardization of certain locomotive parts and the manufacturing of this material on a large scale at the central shops. The practice

Special Device for Holding Shoes and Wedges on Planer

of furnishing material in the rough to the small shops and engine houses is usually an expensive one because of inadequate tool equipment at such places. While the reduction in the cost of the finished material when manufactured in quantity at a central shop is an important advantage, it is not the greatest one. Where a supply of finished material is on hand



Finished Locomotive Parts on Storehouse Platform Ready for Shipment

ready for immediate application to the locomotives, the time for making repairs is very greatly decreased, whether these repairs are made at the larger shops or in the smaller shops and engine houses. Moreover, parts which are continually being worn out and broken in service may be replaced with little or no loss of time and the condition of the power is thus always maintained at a high point of efficiency. This means fewer engine failures, a reduction in running repair costs and an increase of mileage between shoppings. This is particularly important where the practice is to haul heavy tonnage trains, utilizing the full capacity of the locomotives, as has been done on the Frisco during the past year.

At present a considerable number of parts are either wholly or partially machined in large lots at Springfield and are shipped to the smaller points where the machine operations are reduced to a minimum. Many locomotive parts may be finished in quantity with special jigs and machinery at a small part of the cost which would be required at one of the smaller shops where the investment in special tools and machinery is not warranted. As an illustration, the centralized manufacture of shoes and wedges may be mentioned. When these are machined at a small shop or engine house in small quantities the labor cost runs from 40 to 75 cents apiece. With the special jig and double planer head arrangement at Springfield, shown in one of the illustrations, it is possible to machine these in lots of 40 at a cost of 10 cents each. The plan is to carry this development to a point that finished parts such a fireboxes, back ends and frames will be kept in stock, thus making it possible to return an engine requiring such repairs to service in a very much shorter time than would otherwise be necessary.

RAILWAY AFFAIRS IN OTHER COUNTRIES

The Swiss correspondent of the Railway Gazette of London has written a letter from Berne under date of September 21 which indicates that the Swiss railways are hard pressed because of the war. The following is an extract from the letter:

"The Swiss Federal Railways are economizing in every possible way. International traffic is almost at a standstill, and ordinary traffic, not to speak of the tourist traffic, is about one-fourth of what it should be normally, while freight traffic is suffering, if possible, even more heavily still. As a matter of economy, work upon the second Simplon tunnel has been stopped. Excavations on the north side ceased on August 4 and masoning over on August 22, while on the south side the work was very considerably reduced on August 3 and most of the workmen dismissed. At present only a few men are employed to insure the safety of the completed and uncompleted tunnels. As for the private railways in Switzerland, they are quite as seriously affected as the Federal lines, especially the tourist railways. There are no less than five mountain railways in the neighborhood of Lucerne. In August the Vitznau-Rigi Railway carried altogether 3,694 passengers, as compared with 39,589 in the previous year—a difference of 35,895. The Rigi-Kulm line, in the same month carried only 2,147 people, as compared with 29,271 in August, 1913—a falling off of 27,124. The Pilatus Railway, in the week from August 30 to September 5, carried only 65 persons, while the total number of travelers since it was opened this season only amounted to 21,452, as compared with 39,312 in the corresponding period of last year. In August, the principal tourist month, it can hardly have carried more than a thousand passengers, while the receipts up to the end of July had decreased by more than $6,000. The Stanserhorn and Rigi-Scheidegg Railways ceased running in August. Yet Lucerne, even in this month, was by no means without visitors, but few of them seem to have had the slightest desire to make excursions."

ENGLISH RAILWAY WILL TRANSPORT BELGIAN REFUGEES FREE.—The directors of the London & North-Western Railway have informed the Lord Mayor of Dublin that they are willing to give free transport to Belgian refugees and their escorts between London and Dublin and London and Greenore.

The Final Arguments in the Rate Advance Case

Basis for the Petition for the Modification of the Former Order; Arguments of Mr. Thorne and Mr. Brandeis

The final arguments in the rehearing of the rate advance case were presented to the Interstate Commerce Commission on October 29 and 30. George Stuart Patterson, chief counsel for the railroads, opened the argument as follows:

MR. PATTERSON'S ARGUMENT

The carriers do not urge that the commission should grant the relief which is asked for as a matter of grace. They do not claim that it is the duty of the commission to increase rates on the general principle of promoting the prosperity of those industries whose prosperity is dependent upon the welfare of the railroads, regardless of whether or not the proposed rates are reasonable. The carriers recognize that it is the function of the commission to determine what are reasonable rates, in view of all the circumstances of the case.

They do claim, however, that in this case they have shown the proposed rates to be just and reasonable in that these rates are required to supply a part of that inadequacy of the carriers' present revenue which has been found to exist and the existence of which is admittedly contrary to a sound public policy. They further urge that the plight of the railroads is one of the gravest dangers in the present situation, not only by reason of the vital importance to the community that its transportation machinery shall at all times be in a state of health and efficiency, but also because railroad credit is the very backbone of the investment structure, now so gravely threatened by the present emergency.

For this reason they consider that nothing can be done more effectively to promote the welfare of the country as a whole at this time than to relieve upon the broadest possible lines open to the commission trouble that is at the heart of the railroad industry.

The carriers, parties to this proceeding, have filed a petition asking the commission for a modification of the order made in the so-called five per cent case, so as to permit the carriers to make effective the rates specified in the tariffs, which were by said order directed to be cancelled, except so far as said rates may have been or may be superseded by advances filed in accordance with the report of the commission.

The authority of the commission to grant this relief is contained in Sections 16 and 16-a of the interstate commerce act. Section 16 provides: "The commission shall be authorized to suspend or modify its orders upon such notice and in such manner as it shall deem proper."

Section 16-a provides: "In case a rehearing is granted the proceedings thereupon shall conform as nearly as may be to the proceedings in an original hearing, except as the commission may otherwise direct; and if, in its judgment, after such rehearing and the consideration of all facts, including those arising since the former hearing, it shall appear that the original decision, order, or requirement is in any respect unjust or unwarranted, the commission may reverse, change, or modify the same accordingly."

The duty, therefore, is imposed upon the commission of considering not merely the facts arising since the former hearing, but, in the language of the Statute, "all facts, including those arising since the former hearing."

At the time (July 29, 1914) the commission rendered its opinion in this case, the commission had before it the financial statements of the carriers from the fiscal year 1898 up to and including May 30, 1914.

Since that date two fundamental considerations have developed:

1. The figures for the entire fiscal year 1914, now available, showing as they do an extraordinary reduction in the return earned on the investment, disclose the existence of a condition much worse than had been expected; and 2. The war in Europe has confronted the carriers with a problem wholly without precedent.

These facts when taken into consideration with the other facts appearing upon this record, justify the belief of the carriers that the order should be modified so as to permit the tariffs in question to become effective as requested.

It will be remembered that the statements filed by the carriers for the 35 systems showed that between 1903 and 1913 the property investment account had increased $1,980,000,000, and during that same period net operating income had increased $85,316,000, or an amount equal to 4.31 per cent on the increased property investment, while between 1910 and 1913, the property investment had increased $659,862,000, and the net operating income had showed an actual decrease of $16,311,000. During this same period, the per cent of surplus (after payment of interest and dividends) to total capital obligations, decreased from 1.83 per cent in 1903 to 1.54 per cent in 1910, and to 1.19 per cent in 1913.

So, also, taking into consideration the combined figures of the three principal systems, the Baltimore & Ohio, the New York Central and the Pennsylvania, which the commission had treated (page 420 of the opinion) as properly typical of the situation, it appeared that between 1903 and 1913 the property investment has increased $1,100,000,000, and net operating income had increased $39,745,000, an amount equal to 3.59 per cent on the increased property investment, while between 1910 and 1913 their property investment had increased 423,000,000, with a decrease in net operating income of $8,380,000, and the surplus, or margin of safety, which in 1903 had been 2.18 per cent, and 2.03 per cent in 1910, had fallen to 1.51 per cent in 1913. It was these facts, together with the result of the eleven months of 1914, which led the commission to state on page 384 of their report:

"In view of a tendency towards a diminishing net operating income as shown by the facts described we are of opinion that the net operating income of the railroads in official classification territory, taken as a whole, is smaller than is demanded in the interest of both the general public and the railroads; and it is our duty and our purpose to aid, so far as we legally may, in the solution of the problem as to the course that the carriers may pursue to meet the situation."

The commission said in its report (page 423) after considering the returns for the first eleven months of the fiscal year ending June 30, 1914: "When the returns for the full year are at hand it is not improbable that the ratio of net operating income to property investment will be found to have been as low as 4.35 per cent, or 1.01 per cent less than for the preceding year." The commission did not, of course, at that time have before it the figures showing the increase in property investment which had been made during that year, and now that those figures are available, it appears that the return on property investment for that period has fallen to 3.99 per cent, the lowest figure in the last 15 years.

The complete returns for 1914 show for the 35 systems—in round figures—

An increase in total capital obligations of $159,000,000.
An increase in Property Investment of $249,000,000.
A *decrease* in operating revenues of $48,000,000.
An increase in operating expenses of $22,000,000.
A *decrease* in net operating revenue of $70,500,000.
An increase in taxes of $3,000,000.
A *decrease* in net operating income of $76,000,000.
A *decrease* in net corporate income of $96,000,000.
A *decrease* in dividends paid of $12,000,000, and
A *decrease* in *surplus over dividends* of $84,000,000, the sur-

plus of nearly $76,000,000 in 1913 having disappeared and a deficit of $8,000,000 being shown in 1914.

A comparison of the details of the 1914 figures, not only with the corresponding figures for 1913, but also with the figures for the preceding fourteen years, seems to indicate something fundamentally wrong with the railroad industry.

The figures for the fiscal year 1914 disclose their true significance better when compared on a proper basis with similar years in the past than they do when compared solely with 1913. Looking over the fifteen years 1900 to 1914 inclusive, it is easy to discern several years of comparative prosperity—and by prosperity is meant large operating revenues—and several years of comparative depression when operating revenues actually declined or remained stationary. For example, the years 1903, 1907, 1910 and 1913, were years of comparative prosperity, and the years 1904, 1908, 1911 and 1914 were years of comparative depression. For convenience, we may term the years of prosperity "peak years" and the years of depression "valley years." In order to avoid multiplying comparisions, the years 1903 and 1904 will be taken as a starting point.

The first series of comparisons that naturally suggest themselves is comparison of "peak" years with "peak" years, and we start the series with 1903. We then have figures for the four years, 1903, 1907, 1910 and 1913. It is not necessary to consider anything more than the items of operating revenue, operating expenses, net operating revenue and net operating income, for these items will give us sufficient information as to the conditions in the transportation industry as a whole, or at least of the conditions of the industry as disclosed in the operations of the thirty-five systems.

If we take the first comparison, 1903 with 1907, we find an increase in operating revenue from $871,000,000 to $1,141,000,000 in round figures, or 31 per cent; an increase in operating expenses from $585,000,000 to $781,000,000 or 33 per cent; an increase in net operating revenue from $286,000,000 to $360,000,000, or 26 per cent; and an increase in net operating income from $251,000,000 to $318,000,000 or about 26 per cent. There is nothing in this comparison to indicate anything unfavorable in the industry from the carriers' point of view.

Taking the second comparison, namely, 1907 with 1910—I will not repeat the figures in dollars, but merely the percentages—an increase in operating revenues is shown of 8.5 per cent; an increase in operating expenses of 6.6 per cent; an increase in net operating revenue of 12.5 per cent, and an increase in net operating income of 11 per cent. Here again the conditions so far as disclosed by these figures are not unsatisfactory.

When we come, however, to the third "peak" comparison namely, 1910 with 1913, a marked change in conditions is apparent. Operating revenue increased 15 per cent; operating expenses 22 per cent; net operating revenue decreased seven-tenths of one per cent, and net operating income decreased 4.6 per cent. These results are unsatisfactory in a high degree. Nothing but the fact that 1913 was a year in which the carriers' business and operating revenues were the highest in their history could for a moment disguise the great change for the worse that had taken place in the industry, which change chiefly showed itself in the increased cost of operation.

To recapitulate: Up to 1910 so far as "peak" comparisons show, the industry was in at least a not unsatisfactory condition from the carriers' point of view. Since that time it has become decidedly unsatisfactory.

Now taking what we may call the "valley" comparisons we find a substantially similar showing. Between 1904 and 1908 operating revenue increased 22 per cent; operating expenses increased 25 per cent; net operating revenue increased 13.3 per cent, and net operating income 13 per cent, a showing on the whole not extremely unsatisfactory.

The second "valley" comparison, 1908 with 1911, shows operating revenue increased 14.6 per cent; operating expenses increased 14.2 per cent; net operating revenue increased 15.6 per cent; and net operating income increased 12.4 per cent—nothing very unsatisfactory here. When we come, however, to the comparison 1911 with 1914, we find a great change, precisely similar to that which we found in the "peak" comparison, 1910 with 1913. Operating revenue increased 9.6 per cent; operating expenses increased 17.6 per cent; net operating revenues decreased almost 10 per cent and net operating income decreased over 16 per cent. This is a very plain story, indicating something decidedly wrong with conditions.

One other series of comparisons is necessary in order to bring out the full significance of the 1914 returns, and that is a comparison of what I may call the "slump" periods, and by that I mean the period covered between a peak year and the bottom of the depression immediately following. It so happens that in the period which we are considering, the valley year was in all cases the year following the peak year—that is to say, the valley year 1908 immediately succeeded the peak year 1907; the valley year 1911 immediately succeeded the peak year 1910, and the valley year 1914 immediately succeeded the peak year 1913. The year 1911 was in one sense of the word not a true valley year, in that there was a very slight increase in operating revenues as compared with 1910, but it was a true valley year in the matter of net results, and for the purpose of this comparison may fairly be considered as constituting a "slump" period.

In 1908 operating revenues decreased 4 per cent, operating expenses decreased one-half of 1 per cent, and net operating revenue decreased 11.7 per cent, and net operating income decreased 13 per cent. Thus, with a decrease of 4 per cent in operating revenue, net operating income decreased 13 per cent.

In 1911 as compared with 1910, operating revenues increased 1.4 per cent; operating expenses increased 6.6 per cent; net operating revenues decreased 9.2 per cent, and net operating income decreased 12 per cent. It will be noted that in this slump period results were materially worse from the carriers' point of view because without any decrease at all in operating revenues the loss in net operating income was almost as great as it was in 1908 when operating revenues decreased 4 per cent.

Now when we come to consider 1914 as a slump perior following the peak of 1913, we find a decrease in operating revenues of only 3.4 per cent; an increase in operating expenses of 2.2 per cent; a decrease in net operating revenues of 17.5 per cent and a decrease in net operating income of over 22.5 per cent. Comparing this period with the 1908 period, we find that with a smaller ratio of falling off in operating revenues, the falling off in net operating income was proportionately very much larger. In other words, 1914 was much the worst of the three.

We thus have cumulative evidence from all these comparisons pointing to the most recent period in the history of these carriers as the worst of any. The nearer we come to the present day the more unfavorable do we find the conditions. Furthermore, if we consider these results with reference to the mileage of track operated, the unfavorable character of the exhibit becomes even more marked. The year 1914 showed the largest operating revenues per mile of first main track operated of any year in the fifteen that the commission took for its review, with the sole exception of 1913. The operating revenue per mile of main track in 1914 was $23,466, whereas in 1903, the starting point for my present comparisons, it was but $16,243. Yet, when we consider net operating income per mile of first main track we find that in 1914 this was $4,441, as against $4,690 in 1903.

In other words the entire growth of these systems in business and operating revenues between 1903 and 1914 amounting as it did to $7,223 per mile of first main track has vanished in increased operating expenses and increased taxes, and $249 per mile additional has gone in the same way.

It must be remembered in considering these figures that all through the entire period under consideration there has been a continuous investment of money in these properties. The property investment in 1903 was in round figures $4,300,000,000. In 1914 this property investment was $6,500,000,000. The result to the carriers is that in a year when their business was within 3.4 per cent of the highest ever recorded, the return shown on their property investment has fallen not only below the ratio of any one of the past fifteen years chosen by the commission for

its review, but as Mr. Rea pointed out, lower even than in the two years, 1898 and 1899, which were expressly excluded by the commission from its comparisons because they were not representative years, being years of great depression.

In order to save time, I shall not treat the figures of the three so-called typical systems, the Baltimore & Ohio, New York Central and the Pennsylvania, in detail similar to that of the 35 systems. The results of such comparison would be substantially the same and lead to the same conclusions. These three strong systems disclose a condition of inherent weakness, just as does the general group of railroads in official classification territory. Comparing, the complete returns for 1914 with those for 1913, the 3 systems show an increase in capital obligations of $112,800,000, an increase in property investment of $135,200,000, a decrease in operating revenue of $31,200,000, an increase in operating expense of $4,800,000 (notwithstanding the smaller amount of business handled), and a decrease in net operating income of $41,476,000. This was the smallest net operating income shown in ten years. The net corporate income decreased $46,690,000, and was the smallest since 1900. These three companies had a surplus in 1914 (after payment of dividends) of only $461,000, or .014 of 1 per cent on total capital obligations of $3,200,000,000, and that after an average rate of dividend paid of 5.53 per cent, the lowest average rate since 1906.

With regard to the returns for July and August, I can only say that they show an aggravation of the carriers' difficulties in that the tendency towards progressive diminution of operating revenues is evident. The decrease in operating revenues in July was 6.7 per cent, and that in August 5.9 per cent. The carriers have been compelled to institute economies in operations of a kind that are known as forced economies. As Mr. Willard and Mr. Rea pointed out, savings of this kind are not true savings nor can they be continued for very long. The railroads have been driven to them by stress of necessity, but in so doing they are in effect borrowing from the future and sooner or later debts now contracted in this way must be paid.

It is most unfortunate that the carriers should, while in such a condition of inherent weakness, be compelled to encounter a storm so serious as that which the war has brought upon the world. Even had their condition been fully recognizable when the commission made its report last July; even had the commission recognized that condition and granted them all the relief they prayed for, they would still have had before them a hard struggle in the future.

After finding in its opinion the inadequacy of the net operating revenues of the carriers, and specifically authorizing certain increases in central freight association territory, the commission made certain suggestions which it expressly designated as tentative and subject to further consideration by the commission as to the means which the carriers might pursue to secure additional net revenue.

As appears from the record, the carriers have been diligently at work investigating these suggested sources of revenue, the extent to which they are available, and the time in which they may be secured. Such investigation has embraced subjects such as the storage of freight; charges for the reconsignment and division of carload freight; expense of bracing shipments of lumber or other articles; the privilege of completion of loading of livestock; trap or ferry-car service; allowance for weight of dunnage; charges for refrigeration; charges for the return of containers, and for furnishing dunnage; milling in transit, elevation allowances, and many other subjects.

It should be pointed out that many of these practices, such as storage, reconsignment, trap or ferry-car service have been in existence for many years, and their curtailment, or the imposition of additional charges will meet the bitter opposition of shippers generally, and will doubtless as heretofore indicated by the commission be made the subject of separate inquiry by the commission.

In this connection, it will be remembered that following the decision of the commission in the industrial railways case, the carriers published tariffs cancelling the allowances to industrial or short lines of railroad. The most important of these cancellations have been set aside by the public service commissions of New York, Pennsylvania, Ohio and other states, and the revenue which was expected to accrue to the carriers from the decision in question has not materialized.

Following the lines as laid down by the Interstate Commerce Commission in that same case, the carriers have imposed charges for spotting cars at plants having what is known as a plant system of railways. These tariffs have been suspended by the public service commissions of New York, and certain other states, as well as by the Interstate Commerce Commission. So, also, the western trunk lines have filed tariffs imposing additional charges for the trap or ferry-car service at Chicago, which charges have been suspended by the Interstate Commerce Commission, as well as by the Public Utility Commission of Illinois.

A bare recital of these facts is sufficient to indicate that no substantial relief to the carriers can be expected in the near future from changes in practices on the lines above indicated.

The question of an increase in passenger fares has also received the earnest attention of the carriers, and an increase has been made from 2 to 2¼ cents per mile in the charge for mileage books in trunk line territory, and the Interstate Commerce Commission as well as the New Jersey commission, though complaint has been made, have declined to suspend these tariffs. Other passenger readjustments are under consideration, but it should be pointed out that there are two-cent fare laws in effect in New York on a portion of the New York Central system, and in the states of Ohio, Indiana, Illinois, West Virginia and Michigan. It may also be noted in this connection that nothing has been done by congress to remedy the conceded inadequacy of railway mail pay revenues, and there does not seem any possibility of securing any increased compensation to the railroad companies for the transportation of express matter.

The carriers propose to increase the rates on certain commodities which were particularly referred to by the commission. The proposed increases, as it appears from the testimony, are in many of these cases more than 5 per cent, and they doubtless will also be made the subject of separate investigation and determination by the commission.

It therefore appears that there is no possibility of securing from these sources, in the near future, the relief which is so urgently demanded by the carriers.

It is therefore submitted that a consideration of all facts including those arising since the former hearing show conclusively that the needs of the carriers can only be met practically by the remedy of a general advance in freight rates, such as that suggested by the carriers.

That under these circumstances the commission has the power to grant that general advance cannot be questioned, but that matter will be more specifically dealt with by counsel who will follow. It may be said, however, that the mere physical inability of the commission to consider each particular rate involved in a general advance in freight rates does not constitute a reason for not permitting that advance.

This proposition is conclusively established by the decisions of the commission in the Express Cases 24 I. C. C. 381, the Arlington Heights Case, 19 I. C. C., 148 and the Inter-Mountain Case—the decisions of the commission in the last two cases having been affirmed by the Supreme Court of the United States.

It is also quite clear that the needs of the carriers for additional revenue sustain the burden of proof in the case of a general advance in freight rates. That appears to be conceded in the opinions of Commissioners Prouty and Lane in the 1910 cases, and by the express decision of the commission in Railroad Commission of Texas vs. Atchison, Topeka & Santa Fe, 20 I. C. C., 464, where the commission sustained an advance in class rates from St. Louis to Texas common points, as well as an advance in many of the commodity rates, upon the ground of the general financial condition of the carriers and expressly declined (page 468) to investigate the reasonableness of individual rates.

Neither can it be successfully asserted that in order to justify

a general advance in all rates, it is essential to establish that the cost of transporting each perticular class of traffic has increased proportionately. This must be so for two obvious reasons.

In the first place, it is practically impossible to segregate each class of traffic and determine its cost of transportation. The inability to do this necessarily prevents any determination of the fact as to whether the cost of each class of traffic has increased proportionately. Secondly, the commission has repeatedly held (West Va. Coal Case, 22 I. C. C., page 623; Connellsville Coke Case, 27 I. C. C., page 132; Youngstown Coal Case, 29 I. C. C., page 436) that the cost of service though a possible factor in the determination of a reasonable rate, is not a conclusive factor, and, therefore, even if it were possible to determine whether the cost of transportation of each class of traffic had increased in the same proportion, the mere fact that it had not so increased would not be conclusive as against the reasonableness of a general advance in all freight rates.

These matters however will be dealt with in greater detail by other counsel.

Mr. Commissioner Lane said in the Western Advance Rate Case, 20 I. C. C., 307:

"We do not say that the carriers may not increase their income. We trust they may and confidently believe they will. If the time does come when through changed conditions it may be shown that their fears are realized, or approaching realization, and from a survey of the whole field of operations there is evidence of a movement which makes against the security and lasting value of legitimate investment and an adequate return upon the value of these properties, this commission will not hesitate to give its sanction to increases which will be reasonable."

The following is the full text of the argument by Mr. Minnis:

MR. MINNISS'S ARGUMENT.

This proceeding has been altered in substantial respects since the previous argument. At that time the commission had before it, for approval, tariffs which, exclusive of the minimum provision, carried substantially a five per cent increase in freight rates in official classification territory, except rates on anthracite coal moving to the Atlantic ports, which are before the commission in another proceeding, and the major body of the rates between points in New England, which had recently received separate consideration.

The subsequent progress of the case has drawn into it tariffs carrying an advance in passenger rates to substantially a uniform basis of 2½ cents per mile, and other tariffs carrying very substantial increases in rates on a number of commodities which were previously carried at what the commission has denominated "unremunerative rates"; and still other tariffs carrying charges for services which the commission has denominated "free services."

The carriers in central freight association territory have, in addition, filed tariffs, which have become effective, carrying substantially five per cent increases in their freight rates in that territory, exclusive of the rates on nine so-called heavy commodities, which comprise a substantial portion of the tonnage of that territory.

The case, as thus developed, embraces substantially all rates of the carriers in official classification territory.

The carriers claim that all the tariffs which have not become effective should be approved and put in force, on the ground that they are in need of all the revenue the tariffs will produce.

Now, what is the proper rule or measure for determining that claim?

Obviously the claim ought not to be determined in a haphazard way. The determination of the appropriate rule or measure which should be applied is of the gravest importance, viewed from any standpoint. It is not only important to the shippers, the consuming public, and those interested in the carriers, for the time being, but it will bcome a precedent and will be regarded as a declaration of the attitude of the government with respect to the financing of the railroads.

On the previous argument, attention was called to the doctrine often announced by our Supreme Court, that the duty to afford railroad transportation is a function of the government and one it owes to its citizens.

Attention was also called to the traditional policy of the government, and the only one compatible with our free institutions, which has been, from the early railroad era, to rely and depend upon private investors, who owe no duty in the premises and invest voluntarily, if at all, to furnish the money necessary to construct and develop our railroad transportation facilities. And it was observed that the continuation of the policy depends upon railroad investments being safe and attractive to private investors, because if they be not so investors will not furnish the money and the policy will fail and the government itself will fail in its duty to its citizens.

And attention was also called to the statutes enacted by Congress in execution of that policy, culminating in the statute under which the commission is now proceeding, from which it appears that the policy of the government, in so far as it affects the credit of the carriers, no longer reposes in statutes of fixed and definite terms which may be understood and relied upon, but manifests itself only in the rulings and decisions of this body.

At a time like this, when many of our people have lost their savings invested in railroads and the general investing public is apprehensive and more or less suspicious of railroad investments, a clear and explicit definition of the attitude of the government with respect to railroad credit is not only demanded by the public welfare, but by common honesty and fair dealings as between the government and its citizens. The people are entitled to know the attitude of the government expressed through the commission, and to determine for themselves whether they wish further to promote the railroad industry of the country by their savings, and this applies as well to those who now have investments as to those who may have a surplus to invest.

That attitude cannot be announced in mere words, but if expressed it must be expressed in the application of a rule or measure to the facts in this case.

The uniform courtesy shown by the members of the commission to every person who has appeared before them in this proceeding, and the indulgent and considerate manner in which they have received suggestions from all sources, howsoever humble, and the spirit of earnest and impartial inquiry which has characterized their deliberations throughout the trial, assures me that I shall not be regarded as altogether presumptuous if I venture to express my opinion with respect to what that rule or measure should be.

The rule so often referred to by the commission in previous cases, that a reasonable rate is one which will produce the legitimate outlays of the carrier and a reasonable return on the value of its property, is not appropriate or adequate in a case like the one we are considering, because it is inapplicable and contrary to the policy of the government to finance the railroad enterprise by private capital.

In the first place, the rule does not measure the rights of the carrier. The rule had its origin in a case brought by a carrier to enjoin the enforcement of rates on the ground that they would confiscate its property in violation of the constitutional guarantees which vouchsafe to every man that his property shall not be taken without due process of law or for public use without compensation. The evidence showed that the body of the rates of the carrier did not afford sufficient revenue to defray its legitimate outlays and a reasonable return on the value of its property, and the court held that the rates were confiscatory.

Thus the rule was promulgated as a measure, not of the rights of the carrier, but as a measure of the rights guaranteed by the constitution.

Constitutional guarantees do not limit or define the rights of persons; they were designed to limit the extreme aggressions one may be forced to suffer.

Thus the constitution, as construed by the rule, guarantees that a carrier shall enjoy the right to produce its legitimate outlays and a reasonable return on the value of its property. But it may lawfully make more, and, according to the general understanding of equity and justice, it ought to be permitted to make more.

The rule, then, is a proper measure of the rights guaranteed to the carrier, but not of the rights it may lawfully enjoy.

In the second place, the constitution does not guarantee that the carrier will make enough money to defray its outlays and pay a reasonable return on its property; so, under the rule, investors in railroads may, at the utmost, make a reasonable return on their investments. They may not make any return on their investments, or if they fail to make a return for a period they have no right during a subsequent period to recoup their losses, even if they may be able to do so.

I do not believe any one circumstance has been more harmful to railroad credit than the necessity which called for the application of that rule to protect the constitutional guarantees to the carrier, and the significance of the rule itself.

Investors say, why invest our money in an enterprise which is forbidden the right to earn more than a return on our investments, without any assurance that it will earn any return whatever, and if it fails to earn a return during one period it has not the right to recoup our losses in the event it is able to do so, when we can invest our money in enterprises whose right to earn money is unlimited?

The moral sense of right and justice of the investors has caused them to revolt, and will continue to cause them to revolt, against the suggestions that when they invest their money for the use of the public they must take all the chances and hazards, with a mere possibility of earning at the most a reasonable return on their investments, while the public who uses the product of the investment assumes no obligation or hazard whatever.

Obviously, no man of sense will invest his money on the theory that he may, in case of necessity, take refuge under the constitutional guarantees to prevent the public from destroying his investment.

In the third place, the rule is an inflexible rule of law which measures an existing situation, and takes no account whatever of the future. It, therefore, does not admit of "taking time by the forelock" or the exercise of foresight in dealing with the needs of the carriers.

Under it you cannot adjust rates to meet a foreseen change in transportation conditions which greatly enhances the cost of doing business, but you must wait not only until the foreseen event happens, but, as the rule has been applied, until your losses therefrom have continued a sufficient length of time to justify the certain belief that the changed conditions are permanent—and then the carrier may be allowed a reasonable return on its property, but nothing to recoup its losses.

No business can prosper or thrive under such circumstances, but in time must inevitably perish.

That this is true accords with the universal experience of mankind. The word "foresight" and the phrases "take time by the forelock" and "an ounce of preventative is worth a pound of cure," are by-words of the people, and were coined to express an indispensable element to the success of any enterprise or achievement in life, whether great or small.

Men who make money and have a surplus to invest have no time to theorize—they are men of practical judgment and their common sense teaches them that they cannot safely invest their money in an enterprise which cannot avail itself of foresight in the conduct of its business.

In the fourth place, the commission is an administrative body, created to administer the great railroad properties of the country. It differs from a court in this respect—that, whereas a court administers fixed and rigid rules of law without flexibility, the exercise of the powers of the commission involves a flexibility limited only by the almost numberless exigencies which arise from time to time in the conduct of the railroad business.

A judge applies his knowledge of the law, whereas the commission must apply sound business judgment in the administration of great properties.

The rule, therefore, if otherwise sound, would not be useful to the commission; in fact, no tight and fast rule of law can be of value in performing administrative functions, except in an argumentative sense.

In the fifth place, from the standpoint of the commission, there is no means at this time of ascertaining the value of the property of the carriers—an ultimate fact indispensable to the application of the rule.

The rule, therefore, in a case of this kind, not only fails to measure the rights of the carriers, but its application would be contrary to the policy of the government, in that it would destroy the credit of the carriers and, in time, the railroad industry. And, as the facts which call for its application cannot be found in the record, to attempt to apply the rule would result only in confusion, especially at a time like this, when the public interests and the property rights in a great industry involving the business structure of the country demand a declaration of a definite policy or rule which will leave no doubt with respect to the attitude of the government toward railroad credit.

My study of the question has convinced me that, as the government itself is under a duty to its citizens to afford railroad transportation, and as it has adopted the policy of discharging that duty by depending and relying on private investors to furnish the money for that purpose, it must have engaged to make railroad investments reasonably attractive as the foundation of its policy, because of a breach of that engagement would destroy the policy, either by depriving the people of transportation or necessitating its conduct by the government directly.

And that in a case of this kind, where the carriers complain of already depleted revenues and greatly impaired credit, and that the financing of the European war, which experts say will throw upon the market for some years to come, in competition with railroad securities, large government loans, naturally preferential in the eyes of investors, the safeguarding of the present and future credit of the carriers is the overshadowing question.

When we consider that the credit of the carriers is now dependent on their revenues, the true rule would seem to be that the commission ought to allow such advances in rates as, in the exercise of sound business judgment and foresight, the evidence shows reasonably necessary to make railroad investments sufficiently attractive to enable the carriers to obtain from private investors the money which they must have in order to afford facilities reasonably adequate for the transportation demanded of them by the public.

I do not mean to suggest that the rates should be advanced regardless of whether the advanced rates would be reasonable. In this proceeding the commission has before it substantially the entire body of rates of the carriers, which, presumably, sustain a proper relationship to each other in respect to service and the burden of transportation. This relationship, as to given rates, cannot be inquired into unless the examination covers each and every rate of the entire rate structure, because it cannot be said that any one rate bears, in relation to service, a greater burden of transportation than it should bear, unless a similar ascertainment be made with respect to each individual rate of the many millions of rates involved—confessedly a task impossible of accomplishment in this proceeding.

The inquiry, under the rule I have suggested, is, whether the body of rates of the carriers should be advanced in order to continue the policy of the government to conduct and develop railroad transportation by private capital. And if it be found that an advance ought to be made for that purpose,

the advanced rates would be reasonable, because reasonable rates, in view of the policy of the government could not, in the nature of things, be lower than a level of rates required to execute that policy.

If the rates are put in force, the commission has ample power, from time to time, to ascertain whether individual rates bear, in relation to service, more than their proper share of the total burden of transportation.

The rule, after all, is founded on necessity, because it is obvious that unless the rates of the carriers are high enough to make their securities attractive, under all the circumstances, the carriers will not be able to obtain the money they must have in order to discharge their public duties.

It will be noted that the rule imposes on the commission the duty of not only exercising sound business judgment, but likewise reasonable foresight in the interest of the carriers.

During the progress of the hearing, observations were made with respect to the power of the commission to deal thus with a situation like the one now before it.

If, under the legislation of Congress, the commission has not the power to exercise the judgment and foresight which may be essential to enable the carriers to obtain the capital necessary to discharge their public duties, the government has disabled itself from executing its policy and discharging its duty to our citizens, because, manifestly, the carriers have no power to exercise as a finality either judgment or foresight.

Obviously that construction involves a misapprehension, because prior to the congressional act of 1910 the carriers had the power to exercise judgment and foresight and do all things needful in the way of increasing rates to protect their credit. That act did not expressly deny any power to the carriers, but it conferred power on the commission to determine the circumstances under which rates may be advanced, and thereby inferentially denied to the carriers the power to make advanced rates effective. The act, therfore, could not have conferred on the commission less power than it took from the carriers, and as it conceded that it took from the carriers the power to determine when their rates ought to be advanced in order to sustain their credit, it follows that the power previously enjoyed by the carriers must have been vested in the commission.

The commission, therefore, has as complete power to deal with the subject as the carriers had prior to the act of 1910.

If the rule I have suggested be sound, the question then is, whether it is reasonably necessary and proper to make effective the proposed advanced tariffs in order to enable the carriers to finance their present needs and their needs in the future, which can now be foreseen, and that question must be determined on the evidence in the record.

In my view, the determination of the question involves sound business judgment, based upon the results of the operations of the carriers up to the present time, the effect of the European war, in so far as it may be relevant, and the fact that the carriers must, within the next year, raise as much as $750,000,000 in order to meet maturing obligations and keep up their properties, and all other circumstances which may have a bearing on the case.

In appears in the record that scandal and dishonesty have attended the management of a few carriers, and it has been asserted that that circumstance resulted in making private investors suspicious of railroad investments. If that be true, in determining the case we must take account of that circumstance, as well as any other circumstance which may have impaired the credit of the carriers.

Manifestly, the nature of the causes which have impaired the credit of the carriers is immaterial. If investors have become suspicious, their suspicions must be overcome if we obtain their money which we must have.

The management of the railroads is precisely where the law has placed it, and if any fault may be found on that head, it must be with the law, which cannot be corrected by the commission.

I shall not examine the evidence in the general case, as that has been or will be fully presented by my associates; but I wish now to briefly refer to some relevant facts relating to the condition of the railroads in central freight association territory:

Maxwell's exhibit 9 shows a decline in net operating income of group 1, in 1914 as against 1913, of $41,305,494, or 39 per cent; and that the ratio of net operating income to property investment in 1914 was 2.79 per cent as compared with 4.65 per cent in 1913.

That the operating ratio was, in 1913, 74.61 per cent; in 1914, 80.23 per cent.

That the net operating income of that group was equivalent to 6 per cent on $70,483 per mile of first main track owned in 1913, and $42,900 per mile in 1914, as compared with property investment of $90,940 per mile in 1913 and $92,727 per mile in 1914.

Or that the net operating income was equivalent to 6 per cent in 1913 on $32,050 per mile of all track operated, and $19,333 in 1914.

That the net operating income of group 3, which the commission held to be typical of railroad conditions in the territory in 1913, was $38,700,000, and in 1914, $19,400,000—a decline of 50 per cent.

That the ratio of property investment to net operating income was, in 1913, 2.61 per cent; in 1914, 1.29 per cent. That the operating ratio was in 1913, 79.03 per cent; in 1914, 84.48 per cent.

And that the net operating income was equivalent to 6 per cent on $32,800 per mile of first main track owned in 1913, and $16,300 in 1914, as compared with property investment of $75,500 per mile in 1913 and $75,700 per mile in 1914.

Or that the net operating income was equivalent to 6 per cent on $20,600 per mile of all track owned in 1913, and $10,183 in 1914, as compared with property investment of $47,400 per mile in 1913 and $47,200 per mile in 1914.

Or that the net operating income was equivalent to 6 per cent on $18,100 per mile of all track operated in 1913 and $8,900 in 1914.

As I have said, group 3 was adjudged by the commission typical of the railroad situation in the territory. The Illinois Central is included in that group, but its business consists largely of tonnage controlled by the southern and western classifications and intrastate rates, and is not, to a great extent, affected by the low rates in central freight association territory, and for that reason the commission did not require it to make answers to the 78 questions.

If we exclude from group 3 the Illinois Central, the group will then contain a mileage of 17,969 miles and, exclusive of the Illinois Central the group earned net operating income in 1913 of $27,200,000, equivalent to 2.24 per cent on property investment, and in 1914, $6,600,000 or 0.55 per cent on property investment. The net operating income was equivalent to 6 per cent on $30,100 per mile of first main track owned in 1913 and $7,200 in 1914, as compared with a property investment of $80,700 per mile in 1913 and $80,200 per mile in 1914.

Or the net operating income was equivalent to 6 per cent on $19,100 per mile of all track owned in 1913 and $4,600 in 1914 as compared with a property investment of $51,200 per mile in 1913 and $50,400 in 1914.

Or the net operating income was equivalent to 6 per cent on $16,300 per mile of all track operated in 1913 and $3,900 in 1914.

The Wabash, which is in the hands of a receiver, and has been heretofore regarded as among the more unfortunate roads, is as prosperous as the average of the roads included in group 3, including the Illinois Central, and very far above the average of the group if the Illinois Central be excluded.

The net operating income of the Wabash in 1913 was $3,700,000 in 1914, $2,100,000, which amounted in 1913 to 2.09 per cent on the property investment, and in 1914 1.12 per cent—as compared with 0.55 per cent, the average of group 3 exclusive of the Illinois Central.

The net operating income of the Wabash was equivalent to 6 per cent on $30,300 per mile of first main track owned in 1913,

and $17,300 in 1914, as compared with $7,200, the average of group 3, exclusive of the Illinois Central.

The net operating income of the Wabash was equivalent to 6 per cent on $19,750 per mile of all track owned in 1913, and $11,000 in 1914—as compared with $4,600 in 1914, the average of group 3 exclusive of the Illinois Central.

The net operating income of the Wabash was equivalent to 6 per cent on $15,100 per mile of all track operated in 1913 and $8,400 in 1914—as compared with the average of group 3, exclusive of the Illinois Central, of $3,900 in 1914.

The ratio of expenses and taxes to gross revenue on the Wabash was 80.58 per cent in 1913 and 84.77 per cent in 1914 or 4.08 per cent less than the average of group 3.

The great decline in net operating income, in 1914 as against 1913, of the Central Freight Association lines, was due almost wholly to the increased cost of doing business and taxes.

The figures show that the gross revenues of group 1, 1913 over 1914, declined 4.4 per cent, and of group 3, 1.9 per cent.

The evidence shows that group 3 has no unappropriated surplus, but a deficit amounting to more than $72,000,000.

These figures show that the tendencies of which the carriers complained in 1910 and again throughout the trial of this case, have culminated in central freight association territory in disaster. The same tendencies in the lines in trunk line territory are obvious and have been for some time to Mr. Willard, to Mr. Rea, and other trained railroad men who are responsible to the public and their stockholders and creditors for their proper management.

The cause of that tendency became manifest to them in 1910 when expenses increased enormously without any increase in rates. That is the disease which has almost destroyed the railroads in central freight association territory, and it is obvious to those skilled in railroad management that the same germ is at work in the lines in trunk line territory, experienced railroad men recognized the effect of that tendency, just as a physician recognizes from early symptoms a deadly disease.

Is it in the public interest that an advance in rates in trunk line territory be postponed until great lines like the Pennsylvania, the Baltimore & Ohio, and the New York Central shall have reached the present condition of the central freight lines?

While the rates have been and are now lower in central freight association territory than in trunk line territory, the evidence, I think, shows that the increase in the cost of doing business has grown out of proper relationship to the rates in trunk line territory. The lower rates in central freight association territory co-operated with the high costs to bring the disaster on them first, but it is not unreasonable to conclude that the same cause will, if not timely arrested, produce in time the same condition in trunk line territory.

The commission held, on the evidence exclusive of the 1914 figures, that the carriers had not discharged the burden of proof with respect to the reasonableness of the rates on brick, tile, clay, coal, coke, starch, cement, iron ore, and plaster.

I submit the 1914 figures for the 17,900 miles in group 3, exclusive of the Illinois Central, which produced net operating income equivalent to 6 per cent on only $7,200 per mile of first main track owned, or $4,600 per mile of all track owned, or $3,900 per mile of all track operated, discharges the burden of proof as to those commodities.

The ratio of operating expenses and taxes to gross revenues of those lines in 1914 was 90.96 per cent. The high cost of doing business demonstrates, in connection with the other testimony, that the carriers are, under present rates, transporting the above commodities—a substantial part of their tonnage—without adequate profit, and that the proposed advance on those commodities would not be unreasonable.

The evidence shows that the increase in the revenues of the Wabash from the tariffs carrying the advance of 5 per cent, which have just become effective, will, based on the figures of 1914, produce about $230,000 additional revenue per year, or $139 per mile on the lines of the Wabash in central freight association territory.

The evidence further shows that from the other tariffs carrying increases which have recently been filed, some of which have not become effective, the Wabash it is estimated will receive $320,000 per year, making in all about $550,000 per annum which the Wabash will likely receive. This estimate includes the revenue which may be derived from the proposed increase in passenger fares, and amounts to $332 per mile of road in central freight association territory.

Tariffs under consideration which the carriers will file, and which it is hoped will become effective, will, in the event they become effective, add about $110,000 to the revenues of the Wabash, making the total additional revenues now in prospect $660,000 per annum, or about $400 per mile of its lines in central freight association territory.

We are not justified in believing that the other lines, or any great number of them, will derive as much revenue from the above sources per mile of road as the Wabash, because the commodities excluded from the advance comprises only about 33 per cent of the tonnage of the Wabash, whereas those commodities comprise as much as 85 or 90 per cent of some lines of heavy tonnage, and it is estimated that they comprise more than 50 per cent of the tonnage of the territory—in fact, those commodities likely comprise as much as 50 per cent of the tonnage of group 3.

These added earnings, or the bulk of them, will be absorbed in expenses which must continue to increase.

As a rule the companies have no credit, and are, therefore, bound to pursue a "hand-to-mouth" policy, which, after all, amounts merely to wearing out their properties.

Obviously their operating expenses will continue to increase until their earnings entitle them to credit which will enable them to finance the acquisition of new equipment and other facilities necessary to operate the properties in a normal way and at a reasonable expense.

As I have said, the lines are, as a rule, without credit, and they cannot obtain credit until their earnings show they are entitled to it, and their present earnings will be largely absorbed in expenses. So an increase in rates is absolutely necessary to enable them to make a showing which will justify the financing of much-needed facilities.

As pointed out by the commission in its report, adequate relief to the lines in that territory can only come by a readjustment of the body of rates to a level with the rates in other territories, traffic density and other relevant matters being taken into account. The evidence shows that such a readjustment is well in hand, but that obstacles will likely delay its accomplishment for, say, a year. Those lines will, in due time, take up with the commisison the subject of the readjustment and earnestly invite its co-operation, which I think is necessary to its success.

But in the meantime the lines in that territory ought, if possible, to have relief and at the earliest moment.

In my judgment the restoration of railroad credit is essential to even effective temporary relief, and railroad credit cannot be established if it be true, as claimed, that the lines in trunk line territory are tending towards the present condition of the lines in central freight association territory. The unquestioned credit of the lines like the Pennsylvania Railroad is essential to establish the credit of the railroads of the country. If the credit of the Pennsylvania Railroad and lines of that kind suffers, the credit of the weaker lines will collapse.

The remedy, therefore, in my judgment, is to advance all the rates which have not already been advanced. That will not entirely relieve the situation. If the commission does not see fit to make effective all the tariffs, then I submit that the least that can be done, in view of the condition of the central freight association lines, is to authorize advances in the rates on the 9 excepted commodities and in the rates between points in trunk line and central freight association territory.

THE ARGUMENT OF MR. BRANDEIS AND MR. BROWNELL

The oral argument of Mr. Brandeis, as special counsel for the commission, is not as yet available, and since Mr. Brownell's argument was quite directly the answer to Mr. Brandeis, the two

arguments will be published in these columns next week. Below is given a brief summary of the main points of Mr. Brandeis' argument and of Mr. Brownell's answer.

Mr. Brandeis stated that the commission itself had confined the decision in the rehearing to matters which had come up since the original hearing and since the decision of the commission in the earlier case had been arrived at. He claimed that only evidence bearing on matters which had transpired during this time should be considered by the commission, that it was entirely wrong to go back and rehash the case as it was presented to the commission originally and on the facts of which the commission had already decided.

With this as his premises Mr. Brandeis claimed that the 1914 figures, which have become available since the closing of the original hearing, threw no new light on the case since they simply bore out the estimates which had been made in the original case. Furthermore, he argued that the two months since the close of the fiscal year—July and August—had shown much better returns to the railroads than the corresponding two months of the fiscal year ended June 30, 1914. He then pointed out that the one single and only factor which was new in the case was the war. The war affected everybody, he said. This being so, the stockholders of the railroads should suffer their ills in the same way in which every other investor in the country had to suffer, and he argued that it would be wholly wrong for the commission to permit the shifting of this burden of the war, which was common to everyone, completely off railroad stockholders' shoulders onto the rest of the general public.

Furthermore, he argued that the commission would be going beyond its legal powers in taking into consideration some of the matters brought up by the investment bankers. His point was that the commission's responsibility under the law was to decide in regard to the reasonableness of rates and that many of the broader general questions which had been injected into the case were not matters which were within the jurisdiction of the commission to consider. He pointed out that in his opinion no specific showing had been made as to the injustice of the existing rates and that if the commission saw fit to grant the advance, thereby modifying its previous ruling, it would exceed its legal powers and invade the province of Congress, that such invasion would amount to a declaration by the commission of governmental policies, and that it was plainly outside of the province of the commission to inaugurate governmental policies, Congress alone having that power.

Mr. Brownell pointed out that the roads were not asking that the commission undertake to exercise any powers not conferred on them by law, but that all the considerations which were presented to the commission were proper for them to take into consideration in determining the question at issue. He pointed out that until the passage of the Hepburn act in 1906 there was no express provision in the interstate commerce act for rehearings. At that time Congress, anticipating, perhaps, that emergencies might arise when the commisison clearly should have the power to grant a rehearing on all the facts, including those arising since the original hearing, added a new section to the act, 16A, providing specifically for a rehearing of the same or any matter determined in the original case, and providing further that if the commission, in its judgment after such rehearing and a consideration of all facts, including those arising since the former hearing, should find the original decision unjust or unwarranted, it might reverse, change or modify the same.

Mr. Brownell pointed out that for reasons which had been testified to by Mr. Conant, Mr. Strauss and others, there was grave danger that the financial disturbances which will occur during the process of distribution of government loans necessitated by the war to investors will cause a serious further depression in American railroad securities, and that in the judgment of competent witnesses, this apprehended liquidation of United States foreign held securities will be substantially retarded or accelerated, according as to whether the railroads are now permitted to charge such just and reasonable rates as will secure them adequate net revenues.

Furthermore, Mr. Brownell pointed out that until 1887 Congress had not assumed control and regulation of the railroads generally, except to constitute them post roads. By the interstate commerce act as amended, Congress has declared a new public policy toward the railroads and has adopted and made them instrumentalities of the federal government with new duties and obligations to which they were not subject, Mr. Brownell thought, under the common law or under the laws of the states that created them, but which have been newly imposed by Congress. By this law the railroads were required to provide and furnish on reasonable request all transportation. Mr. Brownell pointed out that this provision placed a duty on the railroads and that when the Interstate Commerce Commission was given its broad powers of regulation, one of the duties which it was clothed with was that of seeing that this section of the law was complied with. It was, therefore, Mr. Brownell pointed out, perfectly obvious that the commission must take a sufficiently broad view of any situation involving rates to include a consideration of whether or not its action would enable the roads to provide transportation or would prevent them from providing transportation, and that so far, from being illegal or extra-legal for the commission to take this broad view, it was very plainly illegal for them to take any narrower view than this.

The following is the full text of Mr. Thorne's argument opposing the rate advance:

ARGUMENT BY MR. THORNE.

Public regulation has been a great benefit to the shippers of this country, through the partial removal of discriminations in some cases. Indirectly it has been of benefit to the consumers, by making competition possible. But regulation has been of very little direct benefit to the consumer, so far as freight traffic is concerned. The introduction of the tonnage system in making up freight trains has retarded the speed of trains. The larger cars and larger trains have reduced the costs to the railroads, but not to the public.

This commission has not enabled the consuming public, the 90 per cent who foot the bills, to share the financial benefits of reduced costs on freight traffic, growing out of the marvelous inventions and improved methods that have revolutionized the railroad industry during the past fifteen years.

So long as competition lasted there was a constant decline in freight charges, as a whole. When competition ceased, that decline stopped. The average freight revenue per ton mile today is where it was 16 years ago. Now, when regulation has finally become a reality; now, just as we have given you the power and the funds to find the value of these properties, which both the courts and this commission have said shall be the basis for determining the reasonableness of an entire schedule of rates; now, these gentlemen propose to increase the freight tax on the American public. Not only are we denied the opportunity of sharing in these great benefits brought about by human ingenuity, but the tax burden is to be increased. Your net revenues have increased as much during these past 16 years, as in all the prior years since the steam engine was invented.

Stock that originally was given away as a bonus, has gradually acquired some substantial value under the kindly care and protection of a beneficient Uncle Sam. Your rate of dividends on all outstanding stock in this district averages almost double what it did 16 years ago, and almost treble what it did 25 years ago.

During the past 10 years the average rate of dividends in this district has been more than one-half greater than it has been during the same period in Great Britain, according to the official reports to Parliament.

These dividends vary slightly from year to year. Not one year during the entire 10-year period did the average rate of dividends in Great Britain reach as high as 4 per cent; not one year during the entire 10 years did the average rate in this district fall as low as 4 per cent.

During the decade immediately prior to 1898, your net revenues increased about $100,000,000, while freight charges declined 25

per cent. Today your net revenues in the United States, as a whole, are $400,000,000 greater, annually, than they were 16 years ago; while freight charges, as a whole, have not declined one iota. This is the old, old game of "heads I win, and tails you lose."

But you railroad men are not even satisfied with this. You now propose to raise American freight rates to a higher level. Not content to leave it on the same level, you propose to increase the freight tax. These freight rates have all the essentials of a tax, for they are levied on practically everything we eat or wear, buy or sell.

You propose to increase this tax burden on the American public when a world-crisis is pending which it is admitted may affect the railroads; but it will likewise affect other lines of industry and some are prostrated as a result thereof; you propose this at a time when a lull, a depression, in business generally prevails. High rates during a depression and low rates during prosperity as has been suggested by one or two of your chief witnesses would be directly contrary to the needs and welfare of the public. Your stockholders should share the results of the general financial situation. Others are doing so.

You propose to increase this tax burden when the credit of American railroads, as a class, is proved by your own witnesses to be better than that of companies engaged in any other line of business in the United States, either telegraph, telephone, electric light, street railway, industrial, public utility, manufacturing, or any other class of companies, engaged in any line of business in this whole nation.

You propose to increase this tax burden at a time when the railroads have been able to maintain their properties better than ever before in their history. Your maintenance allowances last year, right here in this district, according to your own exhibit in this case, were $9,000,000 greater than ever before. In 1913 they were not as high as in 1914, but they were $60,000,000 greater than any other year in your history.

You propose to increase this tax burden on the basis of a property investment which this commission itself has previously declared that no accountant or financial writer of any consequence would accept as any evidence of either original cost or present value.

You railroad men propose to increase this tax burden on the basis of a comparison which no recognized accountant in the United States would claim is sound, because your own records prove, and one of your chief witnesses conceded, that the method of compiling that property investment has changed during the years that are compared. Further, this record proves, and your own witnesses concede, that the method of accounting for depreciation and maintenance has changed during the years compared.

You propose to increase this tax burden on the basis of a so-called property investment which, for about two-thirds of the companies, is greater than all their bonds and all their stocks put together.

You propose to increase this tax burden on the basis of a property investment which includes all the water of that notorious example of high finance—the Erie; on the basis of a property investment which exceeds all the capitalization of twenty other great railroads in this territory.

You propose to increase this tax burden at the end of a decade of unparalleled prosperity, at a time when under ordinary circumstances you have been able to earn a return above all operating expenses and interest and taxes, ranging from 7 per cent to 9 per cent on all your capital stock, water and all, that is held by the public in any of these railroads, the strong and the weak, the Erie, Wabash, the Cincinnati, Hamilton & Dayton, the New Haven, and all the rest put together in one lump.

If you railroad gentlemen are able to put that over on the American people, I shall congratulate you, for your consummate ability. You will have earned your handsome salaries for all the rest of your days on this earth.

If you gentlemen are able to put that over, that thing which will make this epoch famous for all time, the great miracle of the twentieth century will be the transformation of water into gold. This will be done by the magic wand of the Interstate Commerce Commission. No other event in all recorded history is comparable to this, since that wedding feast two thousand years ago. The alchemists of the middle ages tried to turn metal into gold, but they failed. They should have tried water.

If the fair value of these railroad properties justified an advance in freight rates, we could not object; and, as we previously stated, even in the absence of a valuation, if they had not been able to maintain their properties as in former years, or if their credit was ruined, due to inadequate freight rates, so that in ordinary times they could not get new money for additions and betterments, we could not have a valid objection. But in the absence of a valuation, and at a time when they have been able to maintain their properties, as a whole, better than ever before, at a time when the credit of American railroads, as a class, and of these companies in particular, is admitted by all parties to be better than that of all other lines of business in the country, I believe a 5 per cent advance in freight rates to be unjustified.

NEW SOUTH WALES GOVERNMENT RAILWAYS ADVANCE RATES

The Bureau of Railway News and Statistics has issued the following:

"Increases in freight rates of 10 per cent and in passenger fares ranging from 5 to 50 per cent are the means by which the government railways of New South Wales, Australia, have undertaken to combat the world-wide advance in costs of railway operation. The annual report of these railways presents detailed outlines of the advances, and attributes them almost wholly to the expansion in wages and costs of materials. This is looked upon as the most striking recent instance of the facility with which state-owned railway systems have been adopting advances in rates to cope with the rapid rise of late years in operating expenses, and is in sharp contrast to the experience of the private transportation systems of the United States, where in spite of recognition by the Interstate Commerce Commission of pressing need, eastern railways have been refused a 5 per cent advance covering only freight rates, and under emergencies caused by the European war the roads have had to petition for a reopening of their case owing to actual threatening of their credit structures.

"Increased charges for freight transportation placed in effect by the New South Wales government roads are uniformly 10 per cent, and the estimated annual increases in freight revenue are as follows:

First and second class freight rates	$350,000
Class A, B and C mileage rates	230,000
Livestock rates	300,000
Total added freight revenue	$880,000

"Advances have been made in passenger fares despite the fact that 'cheap excursion fares' already were on a basis of 4 cents a mile first class and 2 cents a mile second class, while 'special cheap excursion week-end fares' were 3½ cents a mile first class and 1¾ cents a mile second class, compared with an average of only 2 cents a mile received for all passenger traffic by United States railways in 1913.

"The increases range from 5 per cent in the case of through fares to 50 per cent in second class excursion fares. With the percentages of increase, and the estimated annual additions to revenues the advances are as follows:

Season tickets, 20 per cent	$285,000
Through fares, 5 per cent	460,000
Cheap excursion fares from 4 cents to 5 cents per mile first class (25 per cent) and from 2 cents to 3 cents per mile second class (50 per cent); special cheap excursion week-end fares from 3½ cents to 4 cents per mile first class (14 per cent) and from 1¾ cents to 2 cents per mile second class (14 per cent)	50,000
Workmen's fares increased to basis in effect in 1907	75,000
Total added passenger revenue	$870,000

"Total new yearly revenue from both services is estimated at $1,750,000, or more than 5.3 per cent of gross operating revenues in 1913. A similar increase in the United States would amount to almost $169,000,000."

The Jersey City Passenger Station Improvements

Central R. R. of New Jersey Has Built New Ferry House and Train Shed and Remodeled Station Building

A much needed increase in capacity of the Central Railroad of New Jersey passenger station at Jersey City, N. J., has been secured by the construction of a new double deck ferry house and slips, a new 20-track Bush type train shed and a new train concourse more than double the size of the old one, and a general rearrangement of facilities in the station building. The Jersey City station is unusual in being both a through and a terminal station, since all trains terminate there, but practically all passenger, mail, baggage and express business must be transferred with the least possible delay to and from the ferry boats operating across the river to New York City.

The New Jersey Central Ferry House and Slips

TRAFFIC HANDLED THROUGH THE STATION

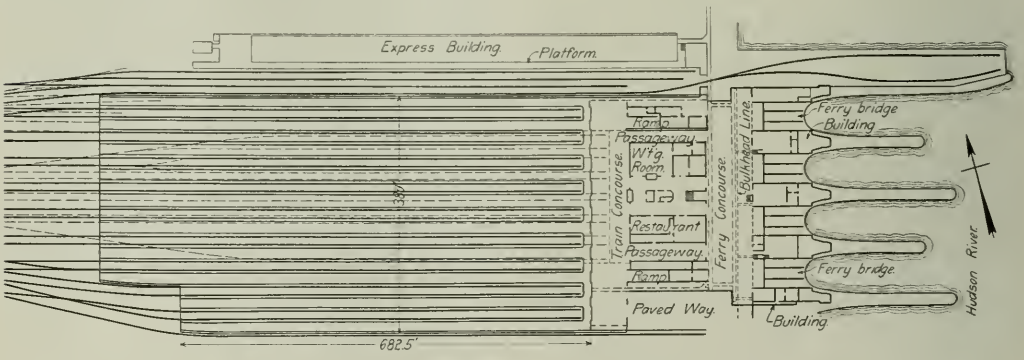
The total number of passengers using this station daily was shown by a one day's count to be between 27,000 and 28,000 in each direction, including the passengers for the Philadelphia & Reading, the Baltimore & Ohio and the Lehigh Valley, which, in addition to the Central Railroad of New Jersey, use this station as an entrance to New York City. The Lehigh Valley traffic was transferred to this station during the course of the reconstruction, adding somewhat to the difficulty of handling the work without interruption to traffic.

About 200 trains in each direction use the station daily. The Jersey Central operates the Philadelphia & Reading and the Baltimore & Ohio trains in the same manner as its own service. The Lehigh Valley operates its own trains into the station over the Jersey Central tracks for a distance of about 10 miles. This service includes about 12 trains each way. On account of the large commuting business the density of traffic is much greater during the morning and evening rush hours, the total number of passengers shown by a recent count during a one hour period in the evening rush being 8,600 outbound and 2,200 inbound. This traffic was handled by 27 outbound and 11 inbound trains between 5 and 6 p. m.

The ferry boat service consists of 129 movements per day each way between Jersey City and the foot of Liberty street, and 57 movements per day each way to Twenty-third street. The Liberty street boats run on an interval of 7.5 minutes during the rush hours and the Twenty-third street boats at 20 minutes intervals during those periods. While the baggage movement through the station is heavy, it is practically all transfer business, coming from or destined to New York. The amount of mail handled has not been very large, but this traffic is being increased by changes in the method of handling mails, especially that coming in on ocean steamers.

NATURE OF THE IMPROVEMENTS

The principal requirement for the efficient handling of passenger traffic in this station, particularly during the rushes, is the provision of an ample number of direct passageways between the ferry boats and the train platforms. In the old station all of the facilities were on a single level. A boat had to be loaded and unloaded over two gangways and a large part of the people were forced to use the main waiting room, located in the center of the station building, as a passage way between the ferry concourse and the train concourse, which seriously interfered with the comfort of passengers sitting in the waiting room and with the proper conduct of business at the ticket offices. Two passageways, one at each end of the building connected the ferry and train concourses, but in many cases these formed a less direct route for passengers than through the waiting room, and even when they were direct, they were inadequate for the maximum crowd. In the present improvement the four wooden slip houses and the wooden shed over the ferry concourse have been replaced by two-story slip houses of permanent construction and a two-level concourse structure.



Layout of Jersey City Passenger Terminal Showing Ferry House, Station Building, Train Shed and Express Building

As both of the ferry houses on the New York side were equipped for two-level operation when they were rebuilt a few years ago, and as the boats in this service were already of the two-level type, the completion of the new Jersey City ferry house made possible the immediate use of four gangways for loading and unloading boats, and by alterations in the station building

the capacity of the connecting passageways between the ferry house and the train concourse has been at least doubled. On the lower level, the two-end passageways remain unchanged, but by a rearrangement of the space in the station building, the waiting room has been removed from the central portion, which will considerably facilitate the movement of passengers who will use that space as a passageway. In addition to these improvements on the lower level, two new passageways have been provided, one at either extreme end of the building, intended primarily for trucking baggage, papers, etc., between the ferry house and the train platform. By the removal of this trucking business from the other passageways an equivalent increase in capacity of those facilities is secured.

On the upper level three new passageways are provided. Near each end of the building a ramp on a grade of 9.5 per cent leads down from the upper ferry concourse to the train concourse and a broad stairway connects the middle of the upper ferry concourse with the corridors leading through the central portion of the station building. As passengers using this stairway mingle with the passengers coming through the central corridors on the lower level, this route can scarcely be considered as adding to the capacity of the passageways. It does serve a very useful purpose, however, in allowing passengers coming in on the upper level to reach the waiting room, restaurants, or other facilities in the station building by the most direct route.

The old train shed covered 12 station tracks, 8 under the main shed and 2 under extensions, on each side. In addition to these 12 covered tracks, there were two short tracks on the south side which were not covered. The old shed was 512 ft. long, of which one 32 ft. section adjacent to the station building was used for a concourse. All of the platforms extended beyond the shed, however, the longest being about 925 ft. At the time the old shed was built the roof trusses, which were 142 ft. 7 in. long, were the longest simple truss spans in service. The new train shed will have a maximum length of 817 ft. 6 in. and a width of

Lower Level Ferry Concourse Showing Ferry House and Bridge

390 ft., covering 18 tracks. Eight of the platforms are 800 ft. long and the other two 675 ft. The approach to the station will also be improved by increasing the number of tracks in the throat from five to nine. This work is a part of the extensive yard changes, which are also now under way.

A three-story express building, extending along the north side of the new train shed, was built about three years ago. Although not a part of the station development, this building was designed to house some of the offices that had been located in the old station, which made possible the rearrangement of facilities in the station building. The following figures indicate the size of the general development:

Area of station and ferry house	102,000 sq. ft.
Area of train concourse	22,650 sq. ft.
Area of completed train shed	313,000 sq. ft.
Length of tracks in completed shed	2.96 miles.

NEW FERRY HOUSE

The new ferry house comprises four slips with pile fenders, five two-story slip houses and a two-story ferry concourse. The entire structure is founded on wooden piles with reinforced concrete pedestals, beams and girders supporting a continuous reinforced concrete floor slab and the framework of the slip houses and concourse superstructure. The building has a steel frame with concrete floors and roof and hollow tile and concrete walls. The lower concourse level is paved with creosoted wood blocks for the accommodation of a heavy teaming traffic, using the ferry boats in addition to the passengers. The teams enter the concourse at both ends as a large amount of traffic from the hill

Upper Level Ferry Concourse

section of Jersey City and Newark comes in at the north end and all teams to and from the company's team tracks use the south end.

In order to handle this business properly, the new concourse was made wider than the old by moving out the ends of the slip houses. On the two floors of the slip houses are located the railway mail service, emigrant waiting rooms, the baggage room, stationer's room, storage space for the news company, a drug store and barber shop. The lower ferry concourse is 75 ft. wide and 348 ft. long, and the upper is 50 ft. wide and 302 ft. 6 in. long. The upper level is lighted by skylights in the roof, and the lower level by two large skylights located between the station building and the upper concourse level. The accompanying illustration of the upper level shows the skylight, roof trusses and the tile wainscoting. The illustration of the lower level shows the steel framework, the girder and slab floor for the upper level, and a portion of one of the slip houses.

The bridge at the end of each slip is suspended from the ferry house structure and is raised and lowered by 20 h. p. a. c. motors at a speed of about 7 ft. per minute. A specially designed buffer is used to absor bthe shock of landing boats. The pivoted end of the bridge has its bearing near the outer end of a spring platform, 18 ft. 10 in. long, which transmits the shock through heavy coil springs to a buffer platform 23 ft. long, which is separated from the heavy concrete bulkhead by similar springs. The spring platform consists of timber piles supporting a timber deck, and the buffer platform of timber piles supporting a timber framework, which is entirely independent of the deck carrying the floor over the platform.

In order to handle the ferry boats without delay during the construction of the new ferry house, a temporary slip was built on each side of the old layout with temporary wooden concourses connecting with the trainshed concourse. The temporary slip on the south side will be maintained indefinitely for emergency use. When the two temporary slips were ready for operation the two northerly permanent slips were thrown out of service and work was started on the foundation for the north half of the ferry house and on the construction of the new bridges and racks.

The concrete in the foundation was placed from the river side, the mixer being located on a fixed platform and the material brought to it by scows. As soon as the two northerly permanent slips could be put in service again, the erection of steel for the ferry house, including the slip houses and the bridge-operating machinery, was begun. The same general course was followed for the two southerly slips. The floor of the lower ferry concourse was built in four parts in order to delay the traffic as little as possible. While each pair of permanent slips was out of service, the portion of the concourse directly opposite these slips and covering one-half its width was rebuilt. The construction of the remaining width followed as soon as the first section was ready for traffic.

A Portion of the New Train Shed

NEW TRAIN SHED AND CONCOURSE

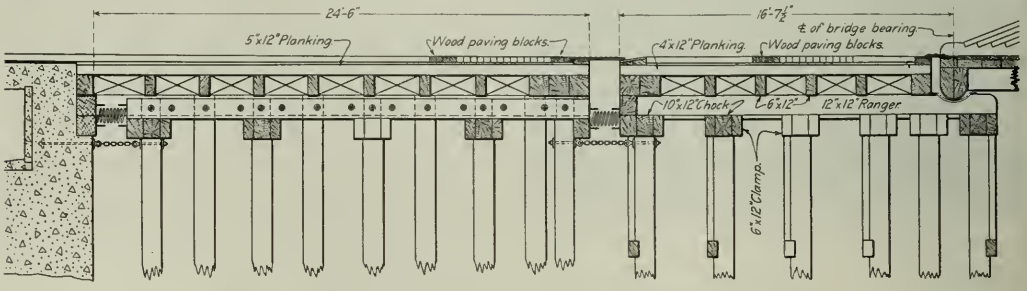
While the train shed is similar to others of the Bush type which have been built recently, a number of details have been improved. The smoke duct is tapered at the top in order to give better protection from the weather and at the same time to present a bottom opening wide enough to catch most of the locomotive gases. The width at the bottom is 3 ft., and the minimum width at the top is 1 ft. 9 in. The skylights have been made smaller than those used in earlier designs in order to reduce the amount of breakage, which in some cases has proven an expensive item of maintenance. The two side lights in each span are 4 ft. 7 in. wide, and the ridge light is 5 ft. wide. All of these are 24 ft. long. Rolled steel bars, sealed with lead, support the ¼-in. rough wire-glass. All exposed metal parts, including bolts, nuts, rivets, flashing and ventilating ridge, are of Monel metal. All skylights are raised on concrete curbs to keep out water and snow. A 3-in. water shed is provided in all gutters from the center of each panel toward both ends. The drainage is carried down the inside of the columns to drains which lead to a 24-in. outfall main. The upper ends of the downspouts are closed by cast-iron strainers.

The foundation under the train shed rests on piles, this type of construction being made necessary by the character of the surface material. The entire site of the station and approaches was originally a mud flat, partially exposed at low water. The road was first built on a timber trestle, which was later filled. Solid rock underlies the fill, and in most cases the piles were driven to this rock stratum. This made necessary the use of piles ranging in length from 50 ft. at the east end of the shed to about 90 ft. near the west end. Spliced piles were used for these long lengths, the splices being made by dowel pins, sometimes adding a wrought-iron collar over the head. Untreated piles were used which were cut off below low water level. The 6-in. reinforced concrete platforms are carried on concrete beams and girders over the pile-supported footings. Heavier footings, which support the shed columns, are located along the center line of each platform at intervals of 27 ft. The floor in each of these 27-ft. panels is supported by three longitudinal beams, a transverse beam at each column support, and one halfway between columns. An expansion joint is provided at every eighth bent. The floor slab is reinforced with No. 38 triangular mesh. The tracks are laid directly on the fill.

The roof is supported by cast-iron columns, the transverse spans varying from 39 ft. to 43 ft., depending on the width of platforms, which vary from 16 ft. along the edges of the shed to 20 ft. in the middle. The wider platforms could not be used in all cases, as the layout was limited in width by the team tracks which adjoin the station on the south. It was thought advisable, therefore, to place the wider platforms in the middle of the shed, where baggage, express and mail must be trucked to the through trains, which use those tracks. The bumping posts are of structural steel, on heavy mass concrete, supported on piles. The shed is lighted by Tungtsen lamps, with special reflectors designed to concentrate all light on the platforms and reduce the difficulty which engineers find in running into a brightly lighted shed. All wires are carried in conduits, and all pipes for water, air and steam are located in a pipe tunnel under the concourse platform, with leads out to the track platforms.

The old high train shed was removed without interruption to traffic by the use of a special traveler built up from three signal bridges. The details of the method used in dismantling the old structure were described in the *Railway Age Gazette* of July 18, 1913. Temporary butterfly sheds were erected on the old platform, as a protection for the passengers during the dismantling of the old shed and the early stages of the construction work on the new shed. Before taking any of the old station tracks out of service two new platforms, serving four additional tracks, were built on the permanent location south of the old shed and one platform and a half, serving three additional tracks, on the north side were completed. A separate interlocking machine, located in the old tower, was used to operate these outside tracks.

The construction of the new shed was carried on consecutively from the south toward the north. The general practice was to take two or three tracks out of service at a time, drive the



Details of Spring and Buffer Platforms to Absorb the Shock of Landing Boats

piles for the foundation, place the platform, erect the steel for the shed structure, place the roof concrete and connect up the tracks in the throat before taking any more tracks out of service. There were never less than 15 station tracks in service during the course of the work, and usually 16 were available. To handle the special holiday crowds the schedule of work was usually arranged to give the operating department 18 tracks on these days.

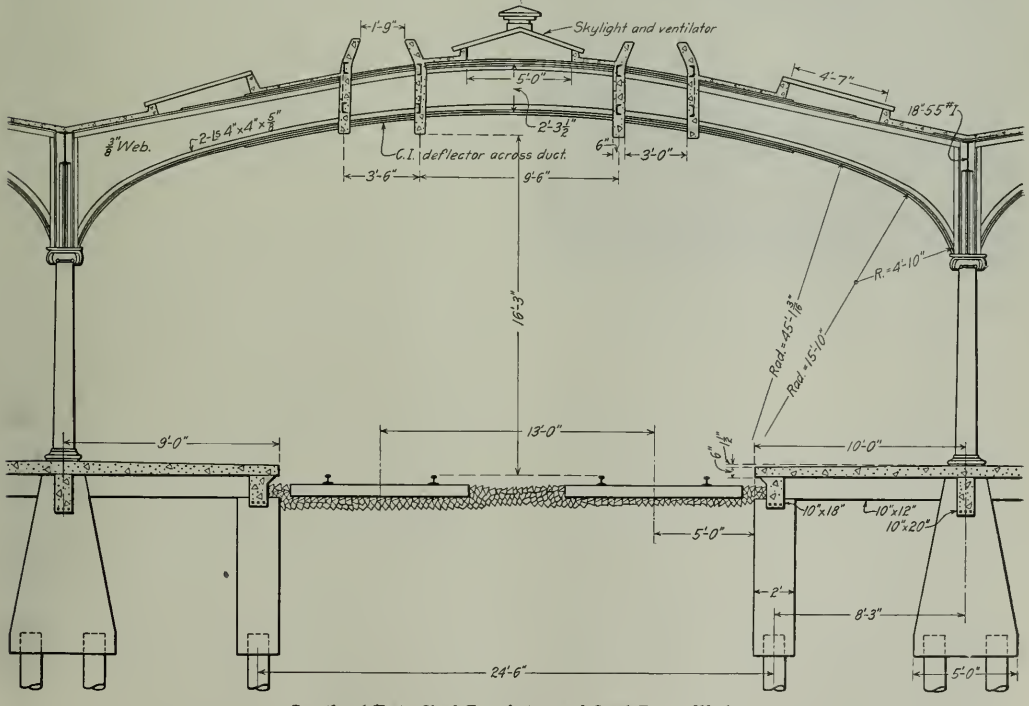
The construction plant used on the shed and concourse consisted of two pile drivers, one drop and one steam, two Ransome mixers, one of ¾-yd. capacity and one 1 yd., both mounted on flat cars, and a 10-ton locomotive crane. The foundations and the platforms were placed by chuting the concrete direct from the mixer. A high tower was impractical for placing the roof, and it was finally found best to mount a system of Insley chutes and gates on a flat car so that four or five bays of the roof could be placed from one location of the mixer. Two tracks were required for the concrete plant, one for the mixing car and placing car and one for the material. In very few cases were more than three tracks required for construction purposes. The steel work was all erected by the locomotive crane.

The old high train shed extended to the wall of the station building, one 32-ft. bay adjoining the building being used as a concourse. This concourse was 215 ft. 6 in. long, giving it an area of about 6,900 sq. ft. The new concourse is structurally independent of the shed and station building, occupying the space 63 ft. 6 in. wide and 383 ft. long between the train shed and the station. Its area is 22,600 sq. ft., an increase as compared with the old concourse of more than 350 per cent.

The floor is a reinforced concrete slab, supported by concrete girders and beams on pile bents. Structural steel columns support transverse roof girders connected by two stiffening trusses. A central monitor, with skylights of the same type as those installed on the train shed, extends for the full length of the concourse roof. A total of 116,000 sq. ft. of the multiple unit skylights, installed by the National Ventilating Co., New York, was required for the entire building. The roof on either side of the monitor is of concrete slabs.

The train platforms are separated from the concourse by sliding gates equipped with Hutchinson indicators and a system of light signals for starting trains. This system, which was worked out by the company's engineering department, differs in some respects from that used in a number of large stations, in that the tower operator receives the signals from the ferrymaster, gateman and conductor, but does not answer except by lining up the route and displaying the clear signal at the end of the shed.

The Train Concourse with Entrances to Train Platforms on Left



Details of Train Shed Foundation and Steel Frame Work

During the construction of the new concourse a temporary shed was built on the old platform as a protection for the passengers, and numerous temporary runways were built to connect the passageways with the train platforms that were in service in various stages of the construction work. The west half of the concourse floor was built first, as this did not interfere with the old platform. During the construction of the east half of the new floor, traffic was handled around the ends of the building onto the completed section. The erection of the steel work was carried on during the progress of the work on the floor, all steel being placed over the heads of the passengers without interruption to traffic. A 15-ton crane with a 70-ft. boom was used for this work, the heaviest piece handled weighing about 13 tons.

ALTERATIONS IN THE STATION BUILDING

The station building is a steel frame structure, with brick walls resting on pile foundations. In order to leave the central portion of the building free for passageways between the ferry and train concourses, new quarters were found outside of the station building for the railway offices which formerly occupied the north end of the building, and the main waiting room, ladies' rooms and smoking room were located in this space. The waiting rooms are finished with terrazo floors, tile wainscoting, plastered walls and ceiling, decorative glass skylights and oak benches and woodwork. The public space or lobby in the central part of the building is divided into two passageways by

A Portion of the Central Lobby in the Station Showing the Ticket Office in the Foreground Which Divides the Area Into Two Passageways

the new ticket office, information booth, telephone and telegraph booth and parcel checking room, which occupy the center of the space. A new tile floor was laid in this room, and it was redecorated and equipped with steam heat. The space occupied by the restaurant in the south end of the building was practically doubled, and the appearance of the room was much improved. It has a tile floor and wainscoting and plastered walls and ceiling.

A new service building, located north of the station, was also a part of this improvement. Electric power, generated at the new engine terminal at Communipaw, is transmitted to this service building, where it is transformed to a voltage that can be used in the terminal. An installation of 1,500 boiler h. p. furnishes heat for the station, and the other equipment includes an air compressor, a fire pump and a 100,000-gal. service tank. All piping and power, signal, telegraph and telephone wires in the terminal district are carried underground.

This improvement work has been carried on under the direction of the engineering department of the C. R. R. of N. J., J. O. Osgood, chief engineer. The foundation and racks for the ferry house were built by G. B. Spearin, New York; the superstructure of the ferry house and the remodeling of the old station were contracted to C. T. Wills, New York, and the train shed was built by R. P. & J. H. Staats, New York. The American Bridge Co. fabricated the steel for the ferry house and train concourse, and the Pennsylvania Steel Co. that for the train shed. The old train shed was dismantled by Terry & Tench, New York. All work was handled on a force account basis. The work was started May, 1912, and is practically completed.

THE CLAYTON BILL

The Clayton bill, to supplement the anti-trust laws, which has been under discussion in Congress for many months, became a law October 15. As adopted it consists of 26 sections; and it deals chiefly with "commerce" which word, in the Act, is used to mean interstate and foreign commerce, substantially as defined in the interstate commerce law. This law deals with carriers specifically only in sections 7, 9 and 10.

Section 7 forbids one corporation to acquire stock of another, if such acquisition will restrain commerce or lessen competition; but with certain provisos; and one of these provisos is that Section 7 shall not prohibit common carriers from aiding or buying branch lines or feeders where competition is not lessened by such action.

Section 9 makes it a felony for an officer of a common carrier to wilfully misapply funds; maximum penalty, ten years' imprisonment and a fine limited only by the discretion of the court.

Section 10 is designed to forbid collusive contracts for supplies. This section goes into effect October 16, 1916, and reads as follows:

SECTION 10. That after two years from the approval of this Act no common carrier engaged in commerce shall have any dealings in securities, supplies or other articles of commerce, or shall make or have any contracts for construction or maintenance of any kind, to the amount of more than $50,000, in the aggregate, in any one year, with another corporation, firm, partnership or association when the said common carrier shall have upon its board of directors or as its president, manager or as its purchasing or selling officer, or agent in the particular transaction, any person who is at the same time a director, manager, or purchasing or selling officer of, or who has any substantial interest in, such other corporation, firm, partnership or association, unless and except such purchases shall be made from, or such dealings shall be with, the bidder whose bid is the most favorable to such common carrier, to be ascertained by competitive bidding under regulations to be prescribed by rule or otherwise by the Interstate Commerce Commission. No bid shall be received unless the name and address of the bidder or the names and addresses of the officers, directors and general managers thereof, if the bidder be a corporation, or of the members, if it be a partnership or firm, be given with the bid.

Any person who shall, directly or indirectly, do or attempt to do anything to prevent anyone from bidding or shall do any act to prevent free and fair competition among the bidders or those desiring to bid shall be punished as prescribed in this section in the case of an officer or director.

Every such common carrier having any such transactions or making any such purchases shall within thirty days after making the same file with the Interstate Commerce Commission a full and detailed statement of the transaction showing the manner of the competitive bidding, who were the bidders, and the names and addresses of the directors and officers of the corporations and the members of the firm or partnership bidding; and whenever the said commission shall, after investigation or hearing, have reason to believe that the law has been violated in and about the said purchases or transactions it shall transmit all papers and documents and its own views or findings regarding the transaction to the attorney general.

If any common carrier shall violate this section it shall be fined not exceeding $25,000; and every such director, agent, manager or officer thereof who shall have knowingly voted for or directed the act constituting such violation or who shall have aided or abetted in such violation shall be deemed guilty of a misdemeanor and shall be fined not exceeding $5,000, or confined in jail not exceeding one year, or both, in the discretion of the court.

Charles Francis Adams' Letter to the President

The Lesson of New England's Financially Crippled Roads as Applied to the Crisis in Railroad Affairs

A letter on the railroad situation in the United States generally, but practically in New England, has been sent to the President by Charles Francis Adams of Massachusetts. Mr. Adams for ten years was a member of the Board of Railroad Commissioners of Massachusetts, and for seven years was its chairman.

The following is his letter:

South Lincoln, Mass., October 24, 1914.

My Dear Mr. President: You will excuse my troubling you with a somewhat lengthy screed; but the topic I have in mind to deal with is important, and, for reasons which will at once suggest themselves, I feel something in the nature of a "call" to express myself thereon. You need give to what I write such amount of consideration only as it may seem to you to deserve, either consigning it to the files or referring it to the Interstate Commerce Commission. For personal reasons, unnecessary to dwell on, I do not care to appear in person before that body; and so doing would necessarily involve on my part a responsibility for statements made, imply perhaps on my part an amount of investigation for which I have not time. I see also no compensating advantages, public or private, likely to ensue there. I cannot afford to get myself involved in either an inquiry or a controversy.

As I believe you are aware, in earlier life I devoted myself for twenty years to matters connected with railroad development and management. I did service, both as public official and as the head of a great railroad company. Although this experience terminated in 1890, and I have given little or no study to what has since taken place in railroad development, yet, as a member of the community, I now feel so impressed with the extremely critical condition of affairs and the significance, so far as public interests are concerned, of what is now going on in my immediate field of observation, that, as I have said, I feel moved to submit certain conclusions.

In doing so, I wish to premise I do not propose to go into details, to use exact figures, or to fortify what I have to submit by statistics or an attempt at argument. I shall deal only with generalities and conclusions, perhaps merely impressions, and that tersely.

Forty years ago I had much to do with the origin and early development of the Railroad Commission. A pioneer, I am free now to say I had little realizing sense of what was finally to result from the movement then initiated; nor has the course of development altogether commended itself to my judgment. In connection with our form of government I still question in many respects its wisdom or its practical results.

However, what now leads to the writing of this letter is the conviction I am under that the present situation is not fully appreciated, and the elements of danger involved in it are far more considerable than is commonly supposed. As that problem presents itself to my mind, I see, moreover, no effort, at once intelligent and comprehensive, made to deal with it.

Confining myself to the situation as it comes under my daily personal observation in eastern Massachusetts—though I am satisfied the conditions prevailing here are general—I am unable to escape the conclusion that so far as our transportation machinery is concerned we are rapidly falling behindhand, and getting also into a well-nigh inextricable snarl. The situation, too, while most portentous—for it is basic so far as prosperity is concerned—does not admit of solution except through treatment both drastic and comprehensive.

Let me come at once to the point: I am satisfied that here within, we will say, fifty miles of Boston, there is an immediate call for a capitalized railroad expenditure, fresh money outlay, of at least $100,000,000. Nor, comparatively speaking, is this outlay excessive; for in New York City alone within the last ten years two railroad companies have spent, or are now spending, in the neighborhood of $300,000,000. This outlay was, moreover, required; nor is there any allegation that it has been wastefully made. Had it not been made, it would not now, under existing conditions, be possible; fortunately, it has been made, and is secure. *That* we have.

In eastern New England it is not, therefore, a question of dividends or interest on existing investment, or of a restoration of credit in this respect. It far exceeds those limitations, for to bring our railroad system up to the proper standard, including a renewal and replacement of rolling stock, the reconstruction of permanent ways and bridges, the separation of grades, and the development of proper terminal facilities and connections necessary to modern competitive conditions would, on a rough estimate, unquestionably call for the amount of fresh money above named—$100,000,000. Moreover, unless that investment is made eastern New England cannot maintain itself industrially. Is the fact generally appreciated that the case thus involves not merely rehabilitation but a costly development essential to continued prosperity?

Meanwhile, from causes unnecessary to enter upon, the corporations owning and managing the railroads in eastern Massachusetts cannot remunerate the capital already invested, much less secure fresh money. They are financially crippled. This is a matter of common knowledge.

Such a state of affairs calls indisputably for prompt remedial action. The existing position is also from a common sense, business point of view impossible of long continuance. I have not time to argue the matter or to enter into details. I will merely state the fact. Here is the largest investment and active business management of the country, and those managing it control neither outgo nor income. They are told what they must do and pay, and have no voice in what they are to charge. Such a situation is economically unheard of, absurd. It needs only to be stated. It is financially impossible of long continuance.

I next find myself further forced to the conclusion that the railroad system generally has outgrown local lines, and that it is futile to expect any adequate remedial action through state legislation or control, partial or complete. The state machinery is, as respects large-scale transportation, antiquated. To indulge then even in an expectation that the problem can or will be dealt with in any comprehensive and constructive spirit through local legislation is, I submit, futile—so futile, indeed, as to be little better than puerile. This we may regret and deplore. I certainly both regret and deplore it; but the fact remains.

Moreover, as recent scandalous disclosures show, the effort to flounder along and accomplish results under existing conditions leads inevitably to indirect action and consequent legislative and other corruption—what are known as 'deals." Glaring instances of this are fresh in public memory. Yet they are mere incidents of an outgrown system, inevitable as they are morally and politically destructive. They simply cannot continue.

The remedy is obvious, even if accepted reluctantly and with apprehension. It must be sought in a system of na-

tional incorporation; and, in so far as it is required, in national supervision. Every day thoughtful consideration of this grave fact is deferred is just so much time lost, and time lost in a condition of affairs rapidly growing worse. The difficulty and consequent cost of ultimate rehabilitation is enhanced.

I do not propose here to enter into the question of public ownership and management, whether state or national. Under our system of government, personally, in whatever form attempted, I do not believe it can result satisfactorily. I am certain that under state control and authority it is simply out of the question. Its consideration is a delusion, and a mischievous one, indicating incapacity and failure to size a situation.

This, however, though it cannot be lost sight of, is remote. It involves considerations, financial, political and social, only to be dealt with as a result of long debate. What is needed immediately is manifest—a restoration of financial standing. Unless the existing situation is rapidly to grow worse, and that to an extent involving safety as well as prosperity, fresh capital on a large scale must be forthcoming.

If I am correct in all this—and daily observation confirms it—the conclusion would seem to be irresistible. The delusive idea prevails that the existing railroad managements being inefficient and extravagant as well as corrupt, only economy and good business judgment are required to produce all desirable results. Personally I have no financial interest in railroad securities. Watching the course of events and legislation, I long since ceased to feel confidence in them. While the demands for increased compensation of labor and improved facilities have been incessant, and almost uniformly complied with, the call for fresh money absolutely necessary to the conduct of the business or to meet requirements imposed by government authority has been quite as insistent and even more pressing. Meanwhile engineering and other constructive changes necessary for the convenience and safety of the public have been to a large extent at a standstill, and, under existing conditions, cannot receive attention. The necessary capital is not forthcoming. How could it be expected to come forward? The situation is unbusinesslike, illogical and absurd, as well as impossible.

Under these circumstances, personal experience advises me that the railroads are called upon to do business at less than remunerative rates; and to such a degree is this the case that I have had frequent occasion to remonstrate with traffic managers, both travel and freight, at receiving from them service at a price less than cost. That, taken as a whole, the railroad business pays, and shows a profit, goes without saying. Were it otherwise, it would stop. On the other hand, I am clear in my conviction that an inquiry by any reasonable, intelligent and judicially minded tribunal would develop the fact that the return on traffic received today is, as a whole, not sufficient fairly to remunerate the capital already invested—far less, in the case of the eastern New England system, to pay interest on the hundred million additional capital indisputably required for immediate development.

From this situation, I further admit, there is one possible escape only. The community in its own interest, and in order that it may not find itself put out of business and in physical jeopardy, must submit to pay for the service it requires what the service required is reasonably worth. This, today, it is not doing.

It is equally delusive to say that in the past, and the recent past, there have been scandals and glaring abuses connected with our railroad management. I would like to know of any business management on earth, public or private, large or small, where instances of abuse and misdoing do not occur and could not be unearthed. We all know such is the case: nor will it ever cease to be the case. When, however, such a condition of affairs as now exists forces itself on the attention there is, I submit, but one way to deal with it. Irrespective of the past or of stories of mismanagement and misdoing, whether well or ill-founded, it must be dealt with in accordance with actualities. A fresh start must be made, and in the present case that start can only be made from the basis of proper and adequate remuneration for services rendered and construction called for. Otherwise, the result is inevitable, and that result spells widespread disaster.

This letter has already run to a length I had not anticipated. The conclusion, however, as it rests in my mind, hardly needs to be set forth. The existing situation, impossible of continuance, involves danger—danger as respects both the safety and prosperity of the community. To remedy it locally calls for the command and output of a large amount of fresh capital—a hundred millions. On the present basis of remuneration for services rendered that capital cannot be obtained. It will not be forthcoming. Rates meanwhile, are unreasonably low. We all know it. We all equally know that an increase of charges for public service is never popular, much less favored politically. Nevertheless, there is, I further and finally submit, no escape from it in the present case, and to palter with the situation simply implies delay, continued stagnation and ultimate irremediable disaster.

Whether, therefore, obtained through government action or through corporate management, directly or indirectly, the service required must be secured, and to be secured must be adequately remunerated. It may be, in this matter, the community will like to be cheated, or insist on somehow deceiving itself, meeting indirectly an outlay much larger than that from which it recoils when directly imposed. This, however, I submit, will be mere self-delusion; and the one party always most dangerous to deceive is one's self. Yet the inclination thereto is politically well-nigh universal and irresistible.

The conclusion to which I have now found myself forced is, therefore, manifest and inescapable. The railroad candle has, so to speak, for some time past now been "burned at both ends." Expenses, especially for labor, equipment and construction, have increased and are still increasing; rates meanwhile have tended steadily to reduction. The calls for new development and improvements of a permanent character and most costly nature have been and now are imperative, incessant. From such a situation there is but one escape—if the community wishes safety and convenience, with a system of transportation equal to the demands and standard of the times, it must make up its mind to pay therefor; nor is the increased remuneration requisite in any respect inordinate. For Eastern New England the improved service would more than justify the increase of cost. Moreover, we must have it.

Excuse the length of this communication, but to deal with our entire railroad situation even in a most condensed fashion does require space. Believe me, Mr. President, most respectfully yours,

CHARLES FRANCIS ADAMS,

To the President, Woodrow Wilson.

CHILEAN TRANSANDINE RAILWAY.—After a long cessation of operation, resulting from the severe winter for which there was insufficient preparation, the Transandine Railway was again opened on August 20, with the passage of the first mail train in some time. The most difficult part of the journey, however, still had to be done on muleback for several weeks following and for a while the postal authorities would accept letters only, newspapers and packets being barred. Under ordinary circumstances, the Andes route should be in full running order early in October, but it is doubtful this year if it be in full running order even now. The Chilian Transandine Railway, if such things as this continue in the future as in the past, will rank as one of the most unfortunate railway enterprises ever undertaken in South America. It was also one of the most costly and difficult to build.

General News Department

The new car shops of the Chicago & Alton at Bloomington, Ill., were formally dedicated on October 29.

In a great fire at North Tonawanda, N. Y., on October 29 the New York Central and the Erie roads lost many thousands of dollars' worth of freight cars.

At the annual meeting of the Association of Manufacturers of Chilled Car Wheels on October 27, George W. Lyndon, secretary of the association, was elected president, succeeding T. A. Griffin.

The court at Buffalo has changed from November 1 to December 1 the date on which the receiver of the Buffalo & Susquehanna Railway is to discontinue the operation of passenger and freight trains.

The Atchison, Topeka & Santa Fe's California Limited train was boarded by train robbers in the yards in Chicago on the night of October 31, and several passengers who were sitting on the observation platform were robbed of their valuables.

Postal service has been established on the Grand Trunk Pacific through to the Pacific Coast, and Prince Rupert now receives mail from the east in two days' less time than before. Hitherto the mails have been carried by steamer from Vancouver. The distance from Liverpool to Yokohama by way of the Grand Trunk and Prince Rupert is 10,085 miles, said to be 773 miles less than the distance by way of New York and San Francisco.

At the third annual convention of the Investment Bankers' Association, to be held at the Bellevue-Stratford Hotel, Philadelphia, on November 12 and 13, the programme will include a committee report on "Railroad Bonds and Equipment Notes," by Samuel L. Fuller of New York, an address on the "Five Per Cent Railroad Rate Case," by Howard S. Graham, president of Graham & Company, Philadelphia, and an address on "Railroad Maintenance and Depreciation," by William H. Coverdale, president William H. Coverdale & Company, Inc., New York.

The Brown News Company, which operates on the Pacific and Atlantic systems of the Southern Pacific, and the Van Noy Hotel & News Company, operating between Chicago, Kansas City and New Orleans, have been consolidated under the name of the Van Noy Brown News Company. The headquarters will be in Kansas City, but the headquarters for the western district, including all of the Southern Pacific trains and stands, will be in San Francisco, under the management of J. J. Mobley. The policy of the new company in purchasing its supplies will be, as far as practicable, to patronize local producers and to advertise in its wares the communities through which it operates.

A report from Trenton, N. J., says that after long continued litigation the railroads of New Jersey, with the exception of the Delaware, Lackawanna & Western, apparently have withdrawn their contention that they are not obliged to honor passes or transportation certificates issued by the Secretary of State to state officers entitled under the provisions of the New Jersey laws to ride free on the railroads. A circular letter has been sent to all pass holders, signed by the Pennsylvania, the Lehigh Valley, the Erie, the Central of New Jersey, the Philadelphia & Reading, the Atlantic City and the New York Central, calling attention to the fact that these passes are not good in connection with any other form of transportation for interstate trips. There is still pending in the First District Court of Jersey City a test suit brought by the Pennsylvania against Secretary Colby, of the State Civil Service Commission, to collect from him a bill of about $70 for railroad transportation between Trenton and Camden.

Banker for Higher Rates

John J. Mitchell, president of the Illinois Trust and Savings Bank, is quoted in the Chicago Herald, as follows:

"There is every logical reason why the commission should allow the railroads the right to advance their freight rates, and there are no reasons other than political why the carriers should not be allowed the relief in the present emergency. The banks of the country came to the relief of a distressed financial situation, and it is beyond their power to help the railroads if the government of this country will not make it possible for them to do so.

"It should not be a question of whether or not higher rates are fair, but the commission should, in point of absolute necessity to keep many transportation companies out of the hands of receivers, grant temporary relief and adjust the inequitable features afterward.

"The largest shipping interests in the country are not opposed to paying more for transportation of their products. They know that the railroads must have more revenue to offset the enormous increase in their operating expense, and they know that if the carriers do not get this it will be only a question of a short time when shippers must suffer the consequence in the form of curtailed transportation facilities.

"The Interstate Commerce Commission's advisers are beating tom-toms to attract attention of the public. There is too much politics and too little application of scientific principles in handling these matters, which are widespread and vital in effect."

Missouri Full-Crew Law Defeated

By the referendum in Missouri at the election last Tuesday the "full-crew" law of that state was rejected by an overwhelming majority.

Western Economic Society

The Western Economic Society will hold a conference on American railway problems at the Hotel Sherman, Chicago, on November 13 and 14.

The program includes the following papers, with a general discussion: Friday morning: "Valuation of Railway Property for Purposes of Rate Regulation," by Pierce Butler, valuation counsel western railways; "The Investor's Interests in Valuation," by Prof. W. Z. Ripley, Harvard University; "Valuation of Railway Property for Purposes of Taxation," by Prof. T. S. Adams, Wisconsin state tax commission. Friday afternoon: "Shall Improvements Made from Earnings Be Capitalized or Included in Valuation," by A. W. Bullard, E. H. Rollins & Sons; "Cost of Service and Rate Making," by Halford Erickson, Wisconsin Railroad Commission. Saturday morning: "The Economic Significance of Interlocking Directors in Railway Finance," by Prof. F. H. Dixon of Dartmouth College; "Railway Accidents and the Safety First Program," by R. C. Richards, chairman central safety committee, Chicago & North Western; "Freight Car Surpluses and Shortages," by Arthur Hale, general agent, American Railway Association.

At the banquet on Friday evening at the Hotel Sherman, E. P. Ripley, president of the Atchison, Topeka & Santa Fe, will speak on "The Railways' Need for an Increase in Freight Rates"; Prof. John H. Gray, of the University of Minnesota, on "The Public's View of the Railways' Need for an Increase in Rates," and Samuel O. Dunn, editor of the *Railway Age Gazette*, on "Efficiency of Railway Operation in Relation to an Increase in Freight Rates."

Tickets for the banquets may be obtained by application to the secretary, H. G. Moulton, Fifty-eighth street and Ellis avenue, Chicago.

L. G. McPherson Retires from Bureau of Railway Economics

On November 1 Logan G. McPherson retired as director of the Bureau of Railway Economics, at Washington, D. C. His retirement followed the adoption of resolutions by the general executive committee of the bureau to the effect, "That the purposes and aims which the subscribers had in view in establishing

and maintaining the bureau have been largely accomplished, as is evidenced by the well deserved reputation which it enjoys as a repository of information and statistical data available for the study of general railroad questions," and that, "It is deemed inexpedient, under prevailing conditions and in view of the state of development which the bureau has attained, to further continue its present extensive organization." The committee, in deciding on this action, adopted a resolution directing, "that in notifying the director of this action the chairman be requested to express to him the appreciation of the committee of the services he has performed in inaugurating the bureau and developing it to its present recognized standard."

On October 31 the employees of the bureau at Washington joined in sending to Mr. McPherson a handsomely bound set of all the publications which had been issued by the organization under his directorship. This present was accompanied by a letter signed by all the donors in which they said: "We cannot permit the delightful relations of these last few years to cease without an expression of the genuine pleasure we have had from our association with you and the deep regret we feel at the severance of these ties. You have insisted upon and exemplified the highest standards of loyal service. You have administered wisely and justly. You have been ever courteous, unselfish and thoughtful for us all. We deeply appreciate it and we thank you sincerely."

Mr. McPherson was the originator of the plan for the establishment of the bureau, and to him is due the chief credit for the high plane on which its work has been done. He will move to New York and devote some time to work in the field of general economics which he began long ago and which his labors in recent years have interfered with his completing.

Circulars on Land Valuation and Abandoned Property

Two circulars have just been issued by the Presidents' Conference Committee, one referring to the land features of the federal valuation work now under way and the other to a valuation order of the Interstate Commerce Commission covering the scheduling of abandoned property. The committee recognizes the magnitude of the task of valuing the land owned by the railways and also the difficulty of determining various items entering into this value. In the absence of well recognized methods of determining land value the committee suggests a plan by which it is believed the experiences of the roads can be made of value to the commission in dealing with this subject. The plan suggested is based on the interpretation of the third section of the act authorizing the valuation, that a division of present value into two items is required, one of which will be the land and the other the damages and expense of acquisition.

A blank form has been prepared by the committee for scheduling the data to be used in making this separation. This form shows the record of the deed and the grantor for each piece of property, the purchase price, the naked land value ascertained by two methods and the difference between the purchase price and each of these methods. Attention is called to the fact that the purchase price should include not only money paid by the carrier, but the money value of all work done or expense incurred as a part of the consideration. Four methods are suggested to be used in determining the naked value of the land, namely: the assessment method, the opinion method, the sales method, and the enhancement method. A separate form is provided for recording the data necessary to secure the value by the assessment method and another form for scheduling vouchers covering expense of acquiring property. It is not expected that the data so collected will produce a single or uniform rate of excess of actual value over naked value, but rather a large number of such excesses from which the commission can select that which it deems best adapted to each particular case.

The other circular contains ten suggestions to the carriers intended to assist them in complying with the requirements of the commission's valuation order No. 2, which requires each carrier to file with the commission before February 1, 1915, complete schedules of all property abandoned with the original cost of such property to the date of abandonment. This order was issued after it had been found by the government parties that in many cases little or no evidence remained upon the ground of the former existence of abandoned lines and structures and was intended to secure aid from the carriers for the government parties in ascertaining the facts; also to furnish the carriers opportunity to present all the claims they desire to make on account of abandoned property. The suggestions contained in the circular include the following: Property gradually consumed in the business of the carrier and replaced in ordinary maintenance should not be included as abandoned property. Property not now in use but intended to be used in the future should not be included. The carriers may and in most cases probably should claim that the actual cost of abandoned property to date of abandonment should be included in the original cost to date which the commission is to ascertain in the report, and if abandoned property would be recreated in a reproduction of the property, the estimated present cost of the same should be included in the cost of reproduction new. Abandoned property includes all fixed physical property, whether or not physical evidence of the existence of such property now remains. The estimated present cost of temporary tracks used until the completion of a tunnel, and other structures built in aid of construction of a line or to hasten its completion, even though permanently abandoned, should be included in the cost of reproduction new and the actual cost thereof should be included in the original cost. Loss resulting from the abandonment of property should be included in the schedule, this loss being the difference between the original cost and the salvage, if any.

Opening of the Kansas City Union Station

The new Union station of the Kansas City Terminal Railway, Kansas City, Mo., which was fully described in last week's issue of the *Railway Age Gazette*, was formally dedicated last week with a two days' celebration, held under the auspices of the Kansas City Commercial Club. The mayor declared a half-holiday on Friday. The formal dedication of the station was held on Friday afternoon and the station was actually opened to traffic at 12:01 a. m., Sunday, November 1. The program on Friday began with a manufacturers' parade in the morning, consisting of 140 floats, 16 bands and motor cars carrying officers of the Commercial Club. The parade was nearly two miles long. In the afternoon was held a civic parade, including members of the principal commercial organizations of the city and representatives of the railways. Following this parade the opening was held at the station, when President H. H. Adams of the Kansas City Terminal Railway Company, formally presented the station to Kansas City. Mayor Jost responded with a speech of acceptance. In the evening a dinner was given by the Commercial Club to the officers of the railways at the Hotel Baltimore, and later in the evening a display of fireworks and a final illumination of the old station was given from the hill opposite the new Union Station. The Saturday program included a golf tournament for the visiting railway men, followed by a luncheon and a motor ride about the city.

It was estimated by the newspapers that the largest crowd ever assembled at Kansas City attended the opening of the new station. The dinner of the Commercial Club was attended by the presidents and other executive officers of the 12 roads which are partners in the new station, and by nearly 100 other prominent railway officers, and the principal city officers and business men of the city, including two former mayors of the city. Among the speakers were Hale Holden, president of the Chicago, Burlington & Quincy; B. F. Bush, president of the Missouri Pacific; B. L. Winchell, director of traffic of the Union Pacific; E. B. Pryor, receiver of the Wabash, and Gardiner Lathrop, general solicitor of the Atchison, Topeka & Santa Fe. Most of the speakers lauded the railroads for their enterprise in building such a magnificent station, adequate to the demands of a city several times the size of Kansas City; and many speakers spoke of the justice of co-operating with the railroads in the future.

Central Railway Club

At the regular meeting of the Central Railway Club on November 13, a paper will be presented by Milton L. Sims, manufacturing expert of the Sherwin-Williams Company, Cleveland, Ohio, entitled "Painting of Steel Car and Locomotive Equipment." It has also been arranged that on the afternoon of the same day the members of the club will visit the plant of the Hewitt Rubber Manufacturing Company, Buffalo, N. Y.

American Railway Association

The fall meeting of the American Railway Association will be held at The Blackstone, Chicago, on Wednesday, November 18. Reports will be presented by the committees on Transportation; on Maintenance; on Automatic Train Stops; on Relations between Railroads; on the Safe Transportation of Explosives, and on Electrical Working.

Railway Business Association

The Railway Business Association will hold its sixth annual meeting and dinner at the Waldorf-Astoria, New York, on December 10. The program of speakers, it is announced, will be given out later.

MEETINGS AND CONVENTIONS

The following list gives names of secretaries, dates of next or regular meetings, and places of meeting.

AIR BRAKE ASSOCIATION.—F. M. Nellis, 53 State St., Boston, Mass. Next convention, May 4-7, 1915, Hotel Sherman, Chicago.

AMERICAN ASSOCIATION OF DEMURRAGE OFFICERS.—A. G. Thomason, Demurrage Commissioner, Boston, Mass. Annual convention, April, 1915, Richmond, Va.

AMERICAN ASSOCIATION OF DINING CAR SUPERINTENDENTS.—H. C. Boardman, D. L. & W., Hoboken, N. J. Next meeting, October, 1915.

AMERICAN ASSOCIATION OF FREIGHT AGENTS.—R. O. Wells, Illinois Central, East St. Louis, Ill. Annual meeting, May 21-24, 1915, Richmond, Va.

AMERICAN ASSOCIATION OF GENERAL PASSENGER AND TICKET AGENTS.—W. C. Hope, C. R. R. of N. J., 143 Liberty St., New York.

AMERICAN ASSOCIATION OF RAILROAD SUPERINTENDENTS.—E. H. Harman, Room 101, Union Station, St. Louis, Mo. Next meeting, May 20-21, 1915, San Francisco, Cal.

AMERICAN ELECTRIC RAILWAY ASSOCIATION.—E. B. Buritt, 29 W. 39th St., New York. Annual convention, October, 1915, Atlantic City, N. J.

AMERICAN ELECTRIC RAILWAY MANUFACTURERS' ASSOCIATION.—H. C. McConaughy, 165 Broadway, New York. Meetings with American Electric Railway Association.

AMERICAN RAILWAY ASSOCIATION.—W. F. Allen, 75 Church St., New York. Semi-annual meeting, November 18, The Blackstone, Chicago.

AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—C. A. Lichty, C. & N. W., Chicago. Next convention, October, 1915.

AMERICAN RAILWAY ENGINEERING ASSOCIATION.—E. H. Fritch, 900 S. Michigan Ave., Chicago. Next convention, March 16-18, 1915, Chicago.

AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION.— J. W. Taylor, 1112 Karpen Bldg., Chicago. Annual meeting, June 9-11, 1915, Atlantic City, N. J.

AMERICAN RAILWAY SAFETY ASSOCIATION.—L. F. Shedd, C. R. I. & P., Chicago. Next meeting, November 10, Chicago.

AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—A. R. Davis, Central of Georgia, Macon, Ga. Annual meeting, July, 1915.

AMERICAN SOCIETY FOR TESTING MATERIALS.—Prof. E. Marburg, University of Pennsylvania, Philadelphia, Pa.

AMERICAN SOCIETY OF CIVIL ENGINEERS.—Chas. W. Hunt, 220 W. 57th St., New York. Regular meetings, 1st and 3d Wednesday in month, except June, July and August, 220 W. 57th St., New York.

AMERICAN SOCIETY OF ENGINEERING CONTRACTORS.—J. R. Wemlinger, 11 Broadway, New York. Regular meetings, 2d Thursday in month, at 2 P. M., 11 Broadway, New York.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 39th St., New York. Annual meeting, December 1-4, 1914, New York.

AMERICAN WOOD PRESERVERS' ASSOCIATION.—F. J. Angier, B. & O., Mt. Royal Sta., Baltimore, Md. Next convention, January 19-21, 1915, Chicago.

ASSOCIATION OF AMERICAN RAILWAY ACCOUNTING OFFICERS.—E. R. Woodson, 1300 Pennsylvania Ave., N. W., Washington, D. C. Annual convention, April 28, 1915, Atlanta, Ga.

ASSOCIATION OF MANUFACTURERS OF CHILLED CAR WHEELS.—George W. Lyndon, 1214 McCormick Bldg., Chicago.

ASSOCIATION OF RAILWAY CLAIM AGENTS.—C. W. Egan, B. & O., Baltimore, Md. Annual meeting, third week in May, 1915, Galveston, Tex.

ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.—Jos. A. Andreucetti, C. & N. W., Room 411, C. & N. W. Sta., Chicago. Annual meeting, October, 1915.

ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—P. W. Drew, Soo Line, 112 West Adams St., Chicago. Annual meeting, June 22-25, 1915, Rochester, N. Y.

ASSOCIATION OF TRANSPORTATION AND CAR ACCOUNTING OFFICERS.—G. P. Conard, 75 Church St., New York. Next meeting, December 8-9, Richmond, Va.

BRIDGE AND BUILDING SUPPLY MEN'S ASSOCIATION.—L. D. Mitchell, Detroit Graphite Co., Chicago, Ill. Meetings with American Railway Bridge and Building Association.

CANADIAN RAILWAY CLUB.—James Powell, Grand Trunk, P. O. Box 7, St. Lambert (near Montreal), Que. Regular meetings, 2d Tuesday in month, except June, July and August. Windsor Hotel, Montreal, Que.

CANADIAN SOCIETY OF CIVIL ENGINEERS.—Clement H. McLeod, 176 Mansfield St., Montreal, Que. Regular meetings, 1st Thursday in October, November, December, February, March and April. Annual meeting, January, Montreal.

CAR FOREMEN'S ASSOCIATION OF CHICAGO.—Aaron Kline, 841 Lawler Ave., Chicago. Regular meetings, 2d Monday in month, except July and August, Lytton Bldg., Chicago.

CENTRAL RAILWAY CLUB.—H. D. Vought, 95 Liberty St., New York. Regular meetings, 2d Friday in January, May, September and November. Annual meetings, 2d Thursday in March, Hotel Statler, Buffalo, N. Y.

ENGINEERS' SOCIETY OF WESTERN PENNSYLVANIA.—Elmer K. Hiles, 2511 Oliver Bldg., Pittsburgh, Pa. Regular meetings, 1st and 3d Tuesday, Pittsburgh.

FREIGHT CLAIM ASSOCIATION.—Warren P. Taylor, R. F. & P., Richmond, Va. Annual meeting, June 16, 1915, Chicago.

GENERAL SUPERINTENDENTS' ASSOCIATION OF CHICAGO.—A. M. Hunter, 321 Grand Central Station, Chicago. Regular meetings, Wednesday, preceding 3d Thursday in month, Room 1856, Transportation Bldg., Chicago.

INTERNATIONAL RAILWAY CONGRESS.—Executive Committee, 11, Rue de Louvain, Brussels, Belgium. Next convention, June 23 to July 6, 1915, Berlin.

INTERNATIONAL RAILWAY FUEL ASSOCIATION.—C. G. Hall, C. & E. I., 922 McCormick Bldg., Chicago. Annual meeting, May 17-20, 1915, Chicago.

INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—Wm. Hall, 829 W. Broadway, Winona, Minn. Next convention, July 14 17, 1915, Sherman House, Chicago.

INTERNATIONAL RAILROAD MASTER BLACKSMITHS' ASSOCIATION.—A. L. Woodworth, C. H. & D., Lima, Ohio. Annual meeting, August 17, 1915, Philadelphia, Pa.

MAINTENANCE OF WAY AND MASTER PAINTERS' ASSOCIATION OF THE UNITED STATES AND CANADA.—T. I. Goodwin, C. R. I. & P., Eldon, Mo. Next convention, November 17-19, 1914, Detroit, Mich.

MASTER BOILER MAKERS' ASSOCIATION.—Harry D. Vought, 95 Liberty St., New York. Annual convention, May 26 to 28, 1915, Chicago, Ill.

MASTER CAR AND LOCOMOTIVE PAINTERS' ASSOCIATION OF THE UNITED STATES AND CANADA.—A. P. Dane, B. & M., Reading, Mass. Next convention, September 14-17, 1915, Detroit, Mich.

MASTER CAR BUILDERS' ASSOCIATION.—J. W. Taylor, 1112 Karpen Bldg., Chicago. Annual meeting, June 14-16, 1915, Atlantic City, N. J.

NATIONAL RAILWAY APPLIANCES ASSOCIATION.—Bruce V. Crandall, 537 So. Dearborn St., Chicago. Next convention, March 15-19, 1915, Chicago.

NEW ENGLAND RAILROAD CLUB.—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass. Regular meetings, 2d Tuesday in month, except June, July, August and September, Boston.

NEW YORK RAILROAD CLUB.—Harry D. Vought, 95 Liberty St., New York. Regular meetings, 3d Friday in month, except June, July and August, 29 W. 39th St., New York.

NIAGARA FRONTIER CAR MEN'S ASSOCIATION.—E. Frankenberger, 623 Brisbane Bldg., Buffalo, N. Y. Meetings monthly.

PEORIA ASSOCIATION OF RAILROAD OFFICERS.—M. W. Rotchford, Union Station, Peoria, Ill. Regular meetings, 2d Thursday in month, Jefferson Hotel, Peoria.

RAILROAD CLUB OF KANSAS CITY.—C. Manlove, 1008 Walnut St., Kansas City, Mo. Regular meetings, 3d Friday in month, Kansas City.

RAILROAD MASTER TINNERS, COPPERSMITHS AND PIPEFITTERS' ASSOCIATION.—U. G. Thompson, C. & E. I., Danville, Ill. Annual meeting, May, 1915.

RAILWAY BUSINESS ASSOCIATION.—Frank W. Noxon, 30 Church St., New York. Annual meeting, December 10, 1914, Waldorf-Astoria Hotel, New York.

RAILWAY CLUB OF PITTSBURGH.—J. B. Anderson, Room 207, P. R. R. Sta., Pittsburgh, Pa. Regular meetings, 4th Friday in month, except June, July and August, Monongahela House, Pittsburgh.

RAILWAY ELECTRICAL SUPPLY MANUFACTURERS' ASSOCIATION.—J. Scribner, 1021 Monadnock Block, Chicago. Meetings with Association of Railway Electrical Engineers.

RAILWAY FIRE PROTECTION ASSOCIATION.—C. B. Edwards, Fire Ins. Agt., Mobile & Ohio, Mobile, Ala. Next meeting, October, 1915.

RAILWAY SIGNAL ASSOCIATION.—C. C. Rosenberg, Times Bldg., Bethlehem, Pa. Annual meeting, September 21-24, 1915, Salt Lake City, Utah.

RAILWAY STOREKEEPERS' ASSOCIATION.—J. P. Murphy, L. S. & M. S., Box C, Collinwood, Ohio. Annual meeting, May 17-19, 1915, Hotel Sherman, Chicago.

RAILWAY SUPPLY MANUFACTURERS' ASSOCIATION.—J. D. Conway, 2136 Oliver Bldg., Pittsburgh, Pa. Meetings with Master Car Builders and Master Mechanics' Associations.

RAILWAY TELEGRAPH AND TELEPHONE APPLIANCE ASSOCIATION.—G. A. Nelson, 50 Church St., New York. Meetings with Association of Railway Telegraph Superintendents.

RICHMOND RAILROAD CLUB.—F. O. Robinson, C. & O., Richmond, Va. Regular meetings, 2d Monday in month, except June, July and August.

ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.—L. C. Ryan, C. & N. W., Sterling, Ill. Annual meeting, Septetmber, 1915.

ST. LOUIS RAILWAY CLUB.—B. W. Frauenthal, Union Station, St. Louis, Mo. Regular meetings, 2d Friday in month, except June, July and August, St. Louis.

SALT LAKE TRANSPORTATION CLUB.—R. E. Rowland, Hotel Utah Bldg., Salt Lake City, Utah. Regular meetings, 1st Saturday of each month, Salt Lake City.

SIGNAL APPLIANCE ASSOCIATION.—F. W. Edmunds, 3868 Park Ave., New York. Meeting with annual convention Railway Signal Association.

SOCIETY OF RAILWAY FINANCIAL OFFICERS.—Carl Nyquist, C. R. I. & P., La Salle St. Sta., Chicago. Annual meeting, September, 1915.

SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—E. W. Sandwich, A. & W. P. Ry., Atlanta, Ga. Next regular meeting, January 21, 1915, Atlanta, Ga.

SOUTHERN AND SOUTHWESTERN RAILWAY CLUB.—A. J. Merrill, Grant Bldg., Atlanta, Ga. Regular meetings, 3d Thursday, January, March, May, July, September, November, 10 A. M., Candler Bldg., Atlanta.

TOLEDO TRANSPORTATION CLUB.—Harry S. Fox, Toledo, Ohio. Regular meetings, 1st Saturday in month, Boody House, Toledo.

TRACK SUPPLY ASSOCIATION.—W. C. Kidd, Ramapo Iron Works, Hillburn, N. Y. Meetings with Roadmaster's and Maintenance of Way Association.

TRAFFIC CLUB OF CHICAGO.—W. H. Wharton, La Salle Hotel, Chicago.

TRAFFIC CLUB OF NEW YORK.—C. A. Swope, 291 Broadway, New York. Regular meetings last Tuesday in month, except June, July and August, Waldorf-Astoria, New York.

TRAFFIC CLUB OF PITTSBURGH.—D. L. Wells, Erie R. R., Pittsburgh, Pa. Meetings bimonthly, Pittsburgh. Annual meeting, 2d Monday in June.

TRAFFIC CLUB OF ST. LOUIS.—A. F. Versen, Mercantile Library Bldg., St. Louis, Mo. Annual meeting in November. Noonday meetings October to May.

TRAIN DESPATCHERS' ASSOCIATION OF AMERICA.—J. F. Mackie, 7122 Stewart Ave., Chicago. Annual meeting June 15, 1915, Minneapolis, Minn.

TRANSPORTATION CLUB OF DETROIT.—W. R. Hurley, Superintendent's office, L. S. & M. S., Detroit, Mich. Meetings monthly, Normandie Hotel, Detroit.

TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, N. Y. C. & H. R., East Buffalo, N. Y. Annual meeting, September, 1915, Chicago.

WESTERN CANADA RAILWAY CLUB.—W. H. Rosevear, P. O. Box 1707, Winnipeg, Man. Regular meetings, 2d Monday, except June, July and August, Winnipeg.

WESTERN RAILWAY CLUB.—J. W. Taylor, 1112 Karpen Bldg., Chicago. Regular meetings, 3d Tuesday in month, except June, July and August, Karpen Bldg., Chicago.

WESTERN SOCIETY OF ENGINEERS.—J. H. Warder, 1735 Monadnock Block, Chicago. Regular meetings, 1st Monday in month, except January, July and August, Chicago. Extra meetings, except in July and August, generally on other Monday evenings.

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF AUGUST, 1914

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses						Net operating revenue (or deficit).	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
		Freight.	Passenger.	Total. inc. misc.	Maintenance Way and structures.	Maintenance Of equipment.	Traffic.	Transportation.	Miscellaneous.	General.	Total.			
Ann Arbor	292	$137,528	$67,084	$217,681	$23,224	$26,957	$4,303	$74,340	$655	$6,991	$136,471	$81,210	$13,880	$67,189	$5,495
Arizona Eastern	367	145,529	33,113	191,325	39,263	21,543	2,376	50,802	798	9,415	124,189	67,136	13,100	53,932	2,060
Chicago & Alton	1,033	818,898	407,491	1,328,562	118,226	265,364	35,553	401,560	9,667	28,101	858,470	470,092	45,050	425,084	—4,072
Chicago, Indianapolis & Louisville	618	416,249	173,065	636,102	89,677	106,995	18,210	213,276	150	16,641	444,719	191,383	26,650	164,733	—17,796
Delaware & Hudson Co.—R. R. Dept	881	1,570,863	405,706	2,103,526	143,634	235,452	29,378	710,124	17,191	56,267	1,189,649	913,877	56,250	857,595	.....
Louisiana Western	208	116,495	62,460	189,154	22,500	40,869	7,087	56,557	3,019	6,611	136,593	52,561	8,735	43,830	1,801
Morgan's La. & Tex. R. R. & S. S. Co.	405	246,693	94,395	368,941	49,917	61,834	11,728	140,942	2,645	12,076	279,025	89,915	20,392	69,440	18,901
Louisville, Henderson & St. Louis	200	83,974	40,167	130,836	21,998	18,650	4,679	40,825	.....	3,294	89,447	41,389	3,800	37,581	2,562
Nevada Northern	165	83,630	11,948	99,553	20,470	12,812	472	22,940	109	3,859	60,662	38,890	5,600	33,290	—37,876
Oregon-Washington R. R. & Nav. Co	1,925	983,182	449,223	1,535,609	155,735	158,125	35,310	493,976	14,427	57,533	892,488	643,121	101,195	541,794	120,229
TWO MONTHS OF FISCAL YEAR ENDING JUNE 30, 1915															
Ann Arbor	292	$257,338	$124,072	$408,793	$43,666	$51,762	$9,443	$146,608	$1,204	$13,633	$266,316	$142,477	$27,760	$114,576	$9,301
Arizona Eastern	367	340,172	66,751	432,996	78,525	43,087	4,667	109,797	1,825	18,894	256,742	176,254	26,838	149,171	17,061
Chicago & Alton	1,033	1,600,971	803,576	2,608,000	280,564	555,561	71,919	812,982	20,215	57,100	1,798,341	809,659	89,700	719,343	—19,333
Chicago, Indianapolis & Louisville	618	810,768	326,356	1,232,169	161,994	213,036	36,779	424,996	376	35,967	874,492	357,677	53,295	304,382	—16,854
Delaware & Hudson Co.—R. R. Dept	881	3,133,871	737,533	4,100,820	304,251	533,119	57,550	1,426,158	30,076	117,343	2,461,009	1,639,811	112,500	1,527,244	.....
Louisiana Western	208	233,646	122,700	377,547	45,000	81,737	13,982	112,782	6,196	13,048	272,695	104,852	17,471	87,386	10,502
Louisville, Henderson & St. Louis	200	165,002	76,761	255,545	50,879	35,634	10,019	78,725	.....	6,458	181,715	73,830	7,600	66,221	8,894
Monongahela	67	182,259	4,894	191,033	31,838	13,998	1,483	44,549	.....	3,956	95,824	95,210	4,200	91,010	—67,239
Morgan's La. & Tex. R. R. & S. S. Co.	405	472,396	185,905	709,792	99,833	123,668	22,721	274,758	5,393	24,066	550,322	159,470	40,784	117,983	53,334
Nashville, Chattanooga & St. Louis	1,231	1,369,946	522,463	2,057,652	282,314	420,409	88,317	792,464	22,607	57,934	1,664,045	393,608	54,426	339,131	36,380
Nevada Northern	165	208,169	24,754	240,842	45,429	30,481	957	53,093	131	8,558	138,650	102,192	11,200	90,992	—45,151
New Orleans & North Eastern	204	478,699	105,206	638,339	67,186	142,065	19,205	221,470	11,137	22,523	483,586	154,754	29,000	125,754	—33,390
New Orleans Great Northern	283	205,976	63,517	296,828	38,668	41,328	4,876	85,833	398	12,797	183,900	112,927	6,333	106,594	—24,972
New Orleans, Mobile & Chicago	403	258,611	65,200	342,357	60,152	51,057	8,205	108,303	—15	13,756	241,457	100,899	12,369	88,508	—32,458
New Orleans, Texas & Mexico	286	223,911	44,714	282,858	61,236	30,478	9,209	100,456	.....	15,984	217,362	65,496	3,242	62,254	143
New York Central & Hudson River	3,692	10,101,802	6,731,990	19,721,851	2,384,558	3,460,550	299,388	6,771,754	376,679	464,216	13,757,146	5,964,704	992,471	4,971,866	480,095
New York, Chicago & St. Louis	567	1,472,865	322,015	1,887,773	264,464	191,443	79,446	813,329	12,571	36,273	1,397,527	490,246	84,000	406,126	128,291
New York, New Haven & Hartford	2,003	5,204,876	5,167,797	11,512,543	1,607,806	1,589,020	85,135	4,160,066	90,728	256,308	7,787,764	3,724,779	530,000	3,193,865	—161,987
New York, Ontario & Western	568	1,106,845	621,816	1,993,291	264,316	283,738	18,165	634,693	.....	29,668	1,230,580	762,712	39,166	723,516	9,386
New York, Philadelphia & Norfolk	112	630,964	108,765	805,743	72,578	140,759	9,418	307,851	9,710	18,834	558,151	246,592	17,400	229,192	30,679
New York, Susquehanna & Western	140	345,306	101,462	494,410	58,571	56,241	4,276	209,647	.....	11,995	340,730	153,680	25,167	117,117	28,877
Norfolk & Western	2,037	6,541,471	920,313	7,734,129	1,185,718	1,492,287	117,705	2,204,087	17,825	131,684	5,065,499	2,668,630	280,000	2,388,630	66,362
Norfolk Southern	860	376,230	189,695	616,944	106,488	105,631	14,235	224,136	.....	37,745	488,235	128,708	23,000	105,708	—67,855
Northern Pacific	6,409	7,677,250	3,062,734	11,867,995	1,935,548	1,852,112	206,113	3,459,073	192,238	178,876	7,636,221	4,229,774	812,036	3,417,509	—211,295
Northwestern Pacific	401	295,651	458,475	833,243	114,823	82,068	10,166	249,591	.....	19,020	466,417	366,827	31,970	334,857	—35,671
Oahu Ry. & Land Co	109	271,687	47,813	332,028	21,355	19,460	1,242	48,460	.....	7,554	98,071	233,957	14,500	219,457	51,026
Oregon-Washington R. R. & Nav. Co	1,915	1,811,366	913,404	2,938,533	293,139	316,805	72,326	927,736	29,224	113,374	1,727,622	1,210,911	194,143	1,016,478	204,318
Oregon Short Line	2,158	2,586,763	918,015	3,784,882	594,255	450,625	60,542	883,882	62,261	109,929	2,127,086	1,657,796	233,000	1,424,470	36,849
Panhandle & Santa Fe	668	466,157	122,343	619,624	102,111	125,546	7,363	198,962	.....	18,081	452,064	167,560	18,467	148,819	90,909
Pennsylvania *Company*	1,750	7,733,386	1,903,528	10,694,561	1,465,597	1,722,655	154,556	2,517,514	75,487	220,368	7,156,177	3,538,384	553,884	2,984,307	—497,631
Pennsylvania *Railroad*	4,519	22,682,656	7,444,732	33,069,794	4,227,008	6,054,588	372,694	11,679,771	482,551	785,230	23,601,842	9,467,952	1,306,614	8,161,338	166,019
Pere Marquette	2,322	1,823,703	905,326	3,003,617	316,836	586,086	66,605	1,089,190	12,658	102,202	2,171,717	831,900	106,444	724,950	434,883
Philadelphia & Reading	1,120	6,205,028	1,243,807	7,812,588	884,753	1,460,695	97,468	2,686,078	25,735	137,731	5,292,459	2,520,129	201,318	2,317,738	—395,691
Philadelphia, Baltimore & Washington	717	1,984,445	1,416,591	3,757,065	569,758	695,308	52,159	1,555,345	29	80,004	2,952,603	804,462	112,460	692,002	180,785
Pittsburgh & Lake Erie	224	2,558,399	342,563	3,021,764	339,789	665,290	27,276	700,190	7,878	55,027	1,795,450	1,226,314	103,100	1,123,214	—344,919
Pittsburgh, Cincinnati, Chic. & St. Louis	1,472	4,777,894	1,526,318	7,061,469	936,917	1,241,642	130,112	2,385,862	49,225	153,999	4,897,757	2,163,713	328,839	1,834,754	241,111
Pittsburg, Shawmut & Northern	294	259,912	26,908	290,812	93,532	96,515	3,159	97,397	.....	8,154	298,758	—7,946	3,304	—11,250	—47,519
Port Reading	21	190,493	.....	229,960	33,612	20,027	77	74,086	.....	1,618	129,419	100,540	24,000	76,540	—1,126
Richmond, Fredericksburg & Potomac	88	270,973	142,927	465,829	41,444	61,569	7,177	172,445	754	14,041	297,430	168,399	15,274	153,103	8,744
Rutland	468	342,732	210,103	632,187	85,145	111,004	18,076	246,223	2,581	10,586	473,614	158,573	34,183	124,390	—59,372
St. Joseph & Grand Island	319	251,003	62,880	336,279	69,272	41,669	9,606	112,191	.....	11,529	244,267	92,012	14,097	77,907	21,992
St. Louis & San Francisco	4,746	4,711,484	2,117,546	7,261,623	1,005,318	1,178,116	139,721	2,442,892	.....	170,197	4,936,244	2,325,379	234,079	2,088,952	—334,775
St. Louis, Brownsville & Mexico	548	239,933	153,952	426,192	76,400	43,327	10,627	163,167	.....	21,598	311,637	114,555	13,500	101,055	—29,737
St. Louis, Iron Mountain & Southern	3,365	4,009,061	1,085,029	5,470,530	752,693	993,024	111,951	1,707,116	20,225	119,996	3,705,005	1,765,525	225,664	1,538,978	—73,339
St. Louis Merchants' Bridge Terminal	9	.....	517	312,330	39,165	12,702	1,478	149,366	.....	12,305	215,016	97,314	13,910	83,404	50,533
St. Louis, San Francisco & Texas	244	173,086	61,739	249,738	53,062	37,567	5,159	105,493	.....	10,265	211,545	38,193	2,655	35,539	—62,267
St. Louis Southwestern	943	924,588	247,917	1,240,763	148,129	212,956	50,623	322,758	7,336	46,170	787,677	453,085	59,252	393,682	—102,703
St. Louis Southwestern of Texas	811	383,333	205,387	639,547	167,288	160,451	23,504	284,565	2,228	31,429	668,282	—28,735	27,000	—55,811	—29,307
San Antonio & Aransas Pass	724	419,930	255,934	718,407	120,315	120,315	13,444	330,597	.....	23,483	608,155	110,252	24,000	86,252	—154,385
San Pedro, Los Angeles & Salt Lake	1,132	1,020,025	486,813	1,648,800	185,795	275,010	64,841	528,157	28,931	36,692	1,119,425	529,374	81,424	447,522	—8,754
Seaboard	3,098	2,268,478	869,720	3,523,999	425,137	549,411	133,646	1,316,768	13,440	108,536	2,544,680	979,318	182,000	796,967	—44,074
Southern	7,036	6,938,414	3,522,133	11,393,163	1,584,052	2,111,989	388,570	4,184,112	73,120	345,853	8,672,088	2,721,075	444,987	2,274,624	—348,105

REVENUES AND EXPENSES OF RAILWAYS

Two Months of Fiscal Year Ending June 30, 1915—Continued

Name of road.	Average mileage operated during period.	Operating revenues: Freight.	Passenger.	Total. inc. misc.	Operating expenses: Maintenance: Way and structures.	Of equipment.	Traffic.	Trans-portation.	Miscel-laneous.	General.	Total.	Net operating revenue (or deficit).	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
Southern in Mississippi	281	$92,954	$68,364	$176,995	$50,724	$18,074	$4,536	$82,748	....	$7,120	$163,203	$13,792	$15,500	—$1,757	$15,056
Southern Pacific	6,492	10,801,023	5,122,207	17,450,904	1,917,846	2,586,801	315,344	5,465,342	$288,073	457,885	11,012,626	6,438,278	851,082	5,583,429	—724,886
Spokane International	163	128,800	37,818	173,953	23,840	10,077	4,668	46,285	....	7,634	92,504	81,449	7,797	73,652	484
Spokane, Portland & Seattle	556	483,544	362,671	931,940	104,257	70,323	19,148	191,472	7,878	26,496	419,575	512,365	106,800	405,481	21,950
Tennessee Central	294	197,324	81,038	294,778	59,499	34,238	10,790	104,167	....	13,292	221,986	72,792	8,925	63,847	—17,780
Terminal R. R. Ass'n of St. Louis	35	....	368	456,664	34,339	21,831	1,774	150,987	....	9,805	218,737	237,927	54,492	183,435	75,282
Texas & New Orleans	469	449,029	213,002	743,533	124,167	154,441	14,935	325,252	27,481	20,248	666,238	77,295	31,586	45,111	10,019
Texas & Pacific	1,886	1,887,385	802,080	2,921,742	360,620	511,923	76,060	1,204,821	29,025	76,386	2,258,600	663,142	137,400	525,720	30,384
Toledo & Ohio Central	446	681,163	122,737	861,339	121,547	161,604	14,308	303,579	3,517	20,898	625,454	235,886	42,713	193,173	—36,198
Toledo, Peoria & Western	248	135,216	84,590	231,548	36,630	49,837	4,682	89,324	....	7,419	187,892	43,657	49,200	—5,543	—17,399
Toledo, St. Louis & Western	451	679,682	79,263	813,557	92,052	128,952	31,782	283,742	....	15,713	552,241	261,316	41,000	220,316	—55,084
Trinity & Brazos Valley	315	143,972	60,326	219,010	36,851	12,915	9,870	100,445	....	17,568	177,648	41,362	9,800	31,562	66,202
Ulster & Delaware	129	102,274	140,322	277,138	35,644	25,168	5,154	106,937	94	5,849	178,846	98,292	6,600	91,692	—11,151
Union Pacific	3,615	6,463,943	1,939,448	9,303,849	1,295,904	1,228,687	174,257	2,166,873	153,014	234,262	5,248,893	5,054,957	364,238	3,690,068	—60,509
Union R. R. of Baltimore	9	224,829	44,720	272,985	27,481	....	....	9,189	....	4,568	41,237	231,748	12,360	219,388	—21,741
Union R. R. of Pennsylvania	31	....	....	800,081	137,881	198,670	200	286,387	....	5,679	628,816	171,265	8,700	162,565	—163,486
Vandalia	910	1,307,032	449,589	1,961,438	289,965	375,729	45,420	710,049	24,054	42,343	1,487,559	473,879	64,582	409,297	—27,722
Vicksburg, Shreveport & Pacific	171	138,655	102,183	265,628	46,100	61,134	6,815	93,701	5,124	9,875	222,749	42,879	14,400	28,479	—22,149
Virginia & Southwestern	240	303,729	33,666	347,378	50,246	76,965	4,638	94,201	....	7,255	233,306	114,072	12,500	101,572	3,960
Virginian	503	859,279	83,235	1,005,161	131,149	177,737	11,442	231,509	20,976	19,581	583,321	421,840	45,000	376,830	—43,703
Wabash	2,518	3,651,799	1,342,006	5,442,083	676,418	880,419	180,956	1,961,671	34,320	125,664	3,854,616	1,587,467	167,039	1,420,054	58,918
Washington Southern	36	82,894	70,708	205,635	25,530	31,985	2,775	83,037	145	5,842	149,314	56,321	6,640	49,676	2,037
West Jersey & Seashore	356	349,791	1,364,897	1,841,603	205,669	200,562	24,794	553,927	6,680	24,919	1,016,550	825,053	53,919	771,134	3,962
Western Maryland	661	1,183,212	227,294	1,475,558	209,099	236,302	42,340	532,810	3,800	37,100	1,058,712	416,846	49,000	367,846	68,142
Western Pacific	943	785,597	263,443	1,115,043	275,541	135,559	50,060	332,703	26,379	45,583	865,826	249,217	60,045	188,410	—139,986
Western Ry. of Alabama	133	106,992	84,039	210,979	43,620	55,186	11,593	66,364	2,949	9,116	118,828	22,151	10,016	12,065	—9,200
Yazoo & Mississippi Valley	1,372	1,226,235	446,168	1,778,303	333,267	311,898	34,723	703,226	1,684	45,316	1,427,048	351,255	100,000	251,106	72,551
Wheeling & Lake Erie	459	828,481	130,956	1,047,635	145,449	192,661	18,381	363,758	3,136	31,495	754,880	292,755	64,667	228,088	—123,687

Traffic News

The New York, Philadelphia & Norfolk has applied to the State Corporation Commission of Virginia for authority to increase passenger fares on its line in that state.

The Official Classification in its latest supplement has followed the example set recently by the western roads in eliminating the allowance of 500 lb. for dunnage on shipments in closed cars.

Agricultural exhibit cars of the New York Central Lines began a six weeks' trip through Ohio, Indiana and Illinois on November 2, for the purpose of advertising opportunities along the New York Central Lines in New York. After the trip the entire exhibit will be taken to the Panama exposition.

The New York, New Haven & Hartford has filed new freight tariffs to go into effect December 1, making general increases, though there are some reductions. A sample change is that in the rates from Providence to Boston, 44 miles, which at present are for the six classes, 17, 14, 11, 8, 7, 6; while in the new tariffs they are 19, 16, 13, 10, 9, 8.

The Minnesota Railroad & Warehouse Commission has compiled figures to show that some railroads of that state have refunded $2,305,081 to shippers and passengers since August 1, 1913, for overcharges collected while the state rate case was pending in the courts. Of this amount $258,742 was for passenger rates and $2,046,338 for freight rates.

The Atchison, Topeka & Santa Fe last week issued a notice of an embargo on grain shipments to Galveston on account of a lack of ships at that port to take away the grain. Although shipments aggregating approximately 3,000,000 bu. were sent out from the port during the month of October, the number of loaded cars has increased from day to day, while the number of ships available has decreased. Last week it was reported that there was an accumulation of about 2,000 cars at Galveston.

The railroads entering Chicago have announced that, effective on December 1, a charge will be made for less than carload trap car service of 4 cents per 100 lb., with a minimum of 10,000 lb., or $4 a car; this in addition to the rates to or from main line freight stations. The charge must be paid by the consignor on outbound business, and by the consignee on inbound business. For quantities less than 10,000 lb. an additional charge will be made ranging from $1 for amounts between 9,000 and 10,000, to $6 for amounts less than 5,000 lb. per car.

It is reported from Galveston that approximately $80,000 in demurrage charges has accrued against export grain at Galveston for the past two months. When the European war began cars were arriving at the port at the rate of 400 to 500 a day, and when there was a delay in securing vessels for the transportation of the grain several thousand cars were tied up on the railroad tracks in the vicinity of the port, and it was necessary to impose an embargo for nearly three weeks. Ship agents are opposing the payment of the bills for demurrage because the delay was caused by unexpected conditions. Demurrage has accrued at the rate of $4 per car per day after five days' detention.

The blackstrap traffic is now the largest single contributor to the freight receipts of the Mobile & Ohio. The Cuban Molasses Company has a 2,000,000-gal. tank at Mobile which is kept filled with blackstrap molasses. Blackstrap is the waste product from the sugar refineries of Cuba. It is carried from Matanzas, Cuba, to Mobile in tank steamers which hold from 500,000 to 1,500,000 gal. Since September 15 the quantity received at Mobile has been nearly 3,000,000 gal. The Cuban Molasses Company operates 200 tank cars, with a carrying capacity of 8,000 gal. each. These carry blackstrap to St. Louis and Chicago, where, mixed with alfalfa, corn, oats and other feeds, it is made into food for animals.

The Greenbrier, Cheat & Elk River Railroad has made application to the West Virginia Public Service Commission for permission to proceed with plans for doing passenger business and with making up a tariff and time table. The line connects with

the Greenbrier division of the Chesapeake & Ohio at Cass and is now being completed to Webster Springs, 35 miles west of Cass, where connection is made with the Baltimore & Ohio. In June the company was required by the state to establish itself as a common carrier of freight and it is probable that the request of the railroad now will be granted at once. The road was built several years ago as a private line for the hauling of the company's own timber only. The passenger and freight service will benefit the residents of eighteen stations on the line, six of them being Cass, Spruce, Laurel Bank, Bergoo, Fish Hatchery and Hopkinsville. The total population now to be served by the railroad is between ten and fifteen thousand.

National Industrial Traffic League

The annual meeting of the National Industrial Traffic League is to be held at the Congress Hotel, Chicago, on November 12 and 13. The annual dinner is to be on Thursday, November 12, at the Congress Hotel, at which the speakers will be Edgar E. Clark of the Interstate Commerce Commission and Walter L. Fisher, ex-Secretary of the Interior. Among the committee reports will be those of the Executive Committee on dunnage allowances and proposed charges for trap car service, of the committee on Car Demurrage and Storage on code of storage rules, notification of consignor of refused and unclaimed freight, postal card notices of arrival of freight, and demurrage charges on refrigerator cars loaded with perishable freight; of the Special Committee on Legislation on limitation of liability of common carriers, of the Classification Committee on rate construction, and reports of the committees on Weighing and Freight Claims, the Advisory Committee on proposed charges for spotting of cars, the Special Committee on Uniform Classification and the Special Committee on Relation with the National Association of Railway Commissioners. Other subjects to be discussed include the National Traffic Conference and the establishment of an Information and Tracing Bureau. On Friday, November 13, there will be a luncheon followed by a trip through the Chicago terminals, taking in the Union Stock Yards, the Central Manufacturing District, the Union freight station of the Chicago Junction, the union boat house of the Chicago River & Indiana, Chicago river facilities and other points of interest.

Embargo on Live Stock Traffic

A widespread hoof-and-mouth epidemic is affecting cattle in the middle west. At Chicago on Tuesday Dr. S. E. Bennett of the bureau of animal industry, declared that extensive slaugther of suspected animals might be necessary. Among the packers it was said that the immediate situation should make for lower prices, as it was thought that cattle growers, rather than risk disease among their herds, would rush their live stock to market, where it must be killed immediately. A thousand men were engaged at the yards disinfecting the pens and runways. One case of the malady appeared and was isolated for complete observation by the scientists. On Wednesday the Union Stockyards, the largest cattle market in the world was ordered closed for several days because of the prevalence of the disease. New York and Maryland were added to the states in which quarantine were ordered by the government, cases being discovered at Buffalo and Hagerstown. Quarantines were already in force in Illinois, Indiana, Michigan and Pennsylvania. The first appearance of the disease, it is said, was at Niles, Mich.

Increasing Revenues by Increasing the Commercial Load

The Lumbermen's Association of Chicago, representing some of the largest lumber shipping interests of the country, is actively promoting a co-operative campaign towards increasing railway revenues on lumber traffic by securing heavier loading per car. The association is educating lumber shippers and users in the importance of heavier loading, recognizing that as the commercial load of each car is increased it decreases the dead-weight percentage of the total load—thus increasing the operating efficiency of the carriers as to net returns on the traffic as well as conserving car supply in times of shortage. These efforts are bearing fruit. The Chicago & Eastern Illinois reports an increase in average loading on lumber traffic from 22.9 tons per car in 1910 to 24.5 tons per car in 1914—an average increase of 1,600 lb. per car or 4 per cent, or 1 per cent per year. As the minimums in the tariffs naming rates on lumber have not been increased much of the improvement in the average loading must be credited to energetic missionary work.

Advances in Freight Rates on Central and Western Roads

The Western Trunk Line and Trans-Missouri roads have filed tariffs with the Interstate Commerce Commission, effective on December 1, which represent the first step in the programme for increasing a number of commodity rates which are deemed too low, and for following out the suggestions made by the Interstate Commerce Commission in the eastern 5 per cent general advance case for the elimination of free services performed for shippers. Grain, grain products, hay, packing house products and dressed meat, coke, apples and dairy products are affected by the tariffs. The tariffs provide for a general advance of one cent a hundred pounds in the rates on grain and grain products from the western grain producing territory to points east of the Missouri river, a general advance of two cents a hundred pounds in the rate on hay from the same territory, a general advance of 3½ cents in the rates on packing house products and fresh meats from western trunk line territory to Chicago, Peoria and St. Louis, and points east thereof, an advance in the minimum carload weight on flour and other grain products from 30,000 lb. to 40,000 lb., and a similar advance in the minimum weights on coke. A charge of four cents a hundred pounds, with a minimum of $4 per car, is proposed for less than carload trap car service. Another rule eliminates all arrangements for stopping cars in transit to finish loading or to partly unload carload shipments. A charge of 1½ cents a hundred pounds, with a minimum of $5 per car, is made for storing apples in transit. The storage privilege is eliminated on dairy products, such as butter, eggs and dressed poultry. The local rates on hay and grain are not advanced west of the Missouri river. The tariffs pertaining to stopping in transit, trap car service and storage apply both in Trans-Missouri and Western Trunk Line territory. Similar tariffs have been filed with the various state commissions.

The Central Freight Association roads have filed tariffs similar to the above. These make general advances in rates on grain and grain products from central freight association points to trunk line territory of one cent per 100 lb. A thorough check has been made of unremunerative rates and a large number are being transferred from exceptions back to a higher classification basis. The roads also have filed a number of changes in rules, imposing a charge of 4 cents per 100 lb for trap-car service and eliminating stop off privileges except for live stock. Charges are to be made for storage, and the charges for reconsigning and diversion are advanced from $2 a car to $5. The rate on dressed beef from Chicago to New York will soon be advanced from 45 cents per 100 lb. to 50 cents, and the minimum weight per carload advanced from 20,000 lb. to 21,000 lb. Proportionate advances will be made in live stock rates. More tariffs are to be filed November 15.

Advances in Passenger Fares in Central Territory

The railroads in the Central Passenger Association have filed tariffs with the Interstate Commerce Commission advancing interstate passenger fares in the territory west of Buffalo and Pittsburgh, east of the Mississippi river, and north of the Ohio and Potomac, to an approximate basis of 2½ cents a mile. The present rates vary from 2 to 2½ cents per mile. The tariffs are to become effective on December 1, unless suspended by the Interstate Commerce Commission. The following figures show some of the changes in through fares between Chicago and other important cities in the territory.

	Present.	New.
Cincinnati	$ 6.00	$ 7.00
Cleveland (standard)	7.75	8.55
(differential)	6.75	7.55
St. Louis	5.80	7.50
Buffalo (standard)	12.00	13.10
(differential)	10.50	11.60

The new rates do not change in any way the rates now effective between points within each state. No changes have yet been filed for increases in fares between the Central Passenger Association territory and the Trunk Line territory, although increases in these rates are contemplated, and tariffs are to be filed as soon as they can be prepared. It is understood that the standard fare between New York and Chicago will be increased from $20 to $21.10.

Commission and Court News

INTERSTATE COMMERCE COMMISSION

Examiner Gutheim of the Interstate Commerce Commission heard evidence at Shreveport, La., on October 27, on the application of the Shreveport Chamber of Commerce to have the orders of the commission in the Shreveport rate case apply to all of the Texas railroads, instead of only those that were defendants in the original case.

The Interstate Commerce Commission has announced a hearing to be held at Chicago on November 15, on the question of the absorption of tunnel and lighterage charges at Chicago by the railroads. The railroads recently filed tariffs cancelling the absorptions which were suspended by the commission on complaint of the Chicago Association of Commerce.

Examiner Dow of the Interstate Commerce Commission held a hearing at Sioux City, Ia., on October 27, on a complaint of Sioux City shippers that the low intrastate express rates in South Dakota, which are lower to South Dakota points than the interstate rates applicable from Sioux City, Ia., are discriminatory against their business and have brought about a considerable decrease in traffic

Examiner Bradley held a hearing at St. Louis on October 26, on the complaint of the Merchants' Exchange of St. Louis and the Southwestern Missouri Millers' Association on complications arising from the variation of grain rates from points in Missouri, as applied to state and interstate shipments. The St. Louis grain shippers complain that they are discriminated against by a requirement of the eastbound carriers that inbound freight bills showing an interstate rate has been paid shall be surrendered in order to secure reshipping rates on grain to eastern cities from St. Louis. Where no such inbound freight bill can be shown the roads charge a rate of 4 cents per 100 lb. higher for shipping grain and flour from St. Louis and East St. Louis to the east. The complaint of the Southwestern Millers' Association is that the railroads will not apply the low intrastate rate prescribed by the Missouri statute on shipments from points in Missouri to points outside the state, unless the shipment is delivered at a point within the state, such as St. Louis.

A hearing was held at Chicago on October 27, before Examiner Gartner on the classification rules regarding articles too long or too bulky to be loaded in box cars through the side door. The hearing was held on complaints from a large number of iron and steel manufacturers who ask the commission to reopen the case on account of the ambiguity of the present rules adopted by order of the commission. The present rules provide that when l. c. l. shipments of articles are loaded on a flat or gondola car on account of their being too bulky to be loaded in a box car through the side door thereof, they shall be charged at actual weight and l. c. l. class rates for each article, provided that in no case shall the charge for each article be less than for 5,000 lb. at the first class rate. For articles too long to be loaded through the side door of a box car the charge is not less than for 5,000 lb. at first class rate for each shipment for one consignee. Objection was made by the representatives of the shippers against the minimum on bulky articles as penalizing each article, instead of applying to entire shipments, and because the rules are open to question and to various interpretations as to when an article is too long or too bulky.

The commission in connection with its investigation in the matter of embargoes, docket 7,000, calling for a general inquiry into "the subject of the rules, regulations and practices of carriers in establishing embargoes," announces in reply to a number of communications that it is not able to outline in advance the exact scope or extent of the inquiry. In May, 1914, the Board of Railway Commissioners for Canada ordered all carriers subject to its jurisdiction to show cause why an order should not be issued prohibiting the issuing of an embargo for a period longer than four days without at least 10 days' previous notice. In November, 1912, the board issued an order requiring that any railway issuing an embargo shall, within 48 hours thereafter, file a copy of such embargo, together with a statement of the conditions rendering such embargo necessary, the action required to remove such conditions, and the probable time such embargo will be continued. The commission states that "it can not be said, of course, that the investigation to be conducted by this commission will result in any similar order. It is the desire of the commission to receive from both carriers and shippers information as to the necessity for embargoes, their frequency, their misuse (if any), their advantages, the practicability or impracticability of requiring carriers to notify the public generally as well as the commission of each embargo, either before or after it takes effect. And to receive any information which will assist the commission in determining whether or not it is advisable for the commission to take any action in the premises." The hearing in this matter will be held in Chicago on January 20.

Rates on Coal from Points on the Wabash-Pittsburgh Terminal Railway

Pittsburgh & Southwestern Coal Company et al. v. Wabash-Pittsburgh Terminal et al. Opinion by Commissioner Daniels:

The commission finds that the combination carload rates on bituminous coal from points on the Wabash-Pittsburgh Terminal in Pennsylvania to destinations in other states on and reached via the Pittsburgh & Lake Erie and the Baltimore & Ohio are unreasonable and prejudicial to complainants to the extent that they exceed by more than 10 cents per ton joint carload rates on bituminous coal for hauls to the same destinations from mines on the West Side Belt. The defendants are therefore ordered to establish joints rates from these points on the Wabash-Pittsburgh Terminal, which shall not exceed by more than 10 cents per ton the rates to the same destinations from points on the West Side Belt. (31 I. C. C., 660.)

Rates on Deciduous Fruit from California

Railroad Commission of the State of California v. Alabama Great Southern et al. Opinion by Commissioner Meyer:

Complaint is made against the reasonableness of the minimum carload weight of 26,000 lb., applying on deciduous fruit shipped under refrigeration from points in California and the reasonableness of the existing refrigeration rate on carload shipments of deciduous fruit from points in California to Denver, Kansas City, St. Louis, Chicago, New Orleans, Philadelphia, New York and points common to each of these destinations. Practically all of the deciduous fruit traffic moves under refrigeration. A very large portion of the service is furnished by the Pacific Fruit Express and the Santa Fe Refrigerator Dispatch company. The commission, following the lines laid down in the Arlington Heights case (20 I. C. C., 107), relating to refrigeration charges on California citrus fruits, finds that the present refrigeration rates on deciduous fruits are not unreasonable. In its investigation the commission made a study of costs of this service. Since over half of the traffic moves to Chicago and points east, 24 cars of the total list, destined to Chicago, were taken as typical of the entire movement.

It was found that the average ice consumption per car of the cars destined to Chicago was 13.69 tons. The total tonnage of the cars in question was 310.03. The total cost of this tonnage was found to be $785.73, giving an average minimum cost per ton of ice of $2.53. Accordingly the average minimum ice cost per car to Chicago, using this cost per ton and the proper average tonnage of 13.69 was found to be $34.64. The other charges included in the refrigeration cost were as follows: hauling cost of ice, $22.50; additional cost of supervision, $3.00; additional damage to car, $5.00; extra switching, $1.75; a total of $66.89. The present refrigeration rate to Chicago is $75 per car.

The commission also finds that the present minimum weight which was changed some time ago from 24,000 lb. to 26,000 lb., is not excessive. The commission states that while it is very probably the fact that the increase in the minimum weight with some resulting increase in the average height of the load of fruit in the car has resulted in increased deterioration, it is not warranted in prescribing a reduction on the basis of the evidence submitted by complainant, this evidence consisting mainly of statements and figures showing the difference between the selling prices of the fruit in the lower tiers and that in the top tier and the percentage of loss in the value of the latter. The commission also holds that the bare comparison of the minimum ap-

plicable to shipments of deciduous fruit from other States is not sufficient to alter the conclusion induced by a consideration of the California minimum considered by itself that it is not unreasonably high. (32 I. C. C., 17.)

California Fruit Growers' Association et al. v. Alabama Great Southern et al. Opinion by Commissioner Meyer:

Upon a complaint attacking the refrigeration rates on deciduous fruit shipped from California to destinations in other states, the freight rates on deciduous fruit from California points to points in certain southeastern states, and the present minimum weight of 26,000 lb. applicable to the deciduous fruit traffic from California, the commission finds that as to the refrigeration rates and the minimum weight there is no evidence in this case warranting a different conclusion from that reached in Railroad Commission of the State of California v. Alabama Great Southern (32 I. C. C., 17); and that as to the freight rates to southeastern destinations the meager evidence introduced is not sufficient to warrant the extensive reductions sought. Complainants are referred to the decision in Pacific Fruit Exchange v. Southern Pacific 31, 1. C. C., 159, which dealt with the rates to Tampa, Fla., and Montgomery, Ala. (32 I. C. C., 51).

Pacific Fruit Exchange v Southern Pacific et al. Opinion by Commissioner Meyer:

On a complaint against the reasonableness of the refrigeration rates paid on shipments of deciduous fruits from California points to destinations in other states during the season of 1911, and a petition for the establishment of lower rates than the existing ones adopted in 1912, the commission in accordance with the conclusions in Railroad Commission of the State of California v. Alabama Great Southern (32 I. C. C., 17) holds that the existing refrigeration rates are not excessive and that no reparation should be awarded for the difference between 1911 and 1912 rates. (32 I. C. C., 48).

Fourth Section Violations in the Southeast

Opinion by the commission:

The carriers affected by the order in "Fourth Section Violations in the Southeast" (30 I. C. C., 153) reported in the *Railway Age Gazette* of May 15, 1914, page 1067, have found that in endeavoring to check rates in response to that and various other orders, some of the restrictions have the effect of preventing them from establishing a properly related rate adjustment. They therefore ask for such modification of the order as will permit the establishment of rates that will preserve certain long-standing group relations. The commission has therefore modified the order along the following lines:

The original report contained a scale of average rates which was adopted as a basis. The supplemental report corrects this table in the case of certain rates for a two-line haul which were less than for a one-line haul of equal length.

The rates named in the corrected scale will be observed as maxima in establishing rates on both numbered and lettered classes from Baltimore to intermediate points on routes to more distant lower rated points, but the rates named in the scale when applied from New York or Philadelphia over the constructive mileage as computed in the report will be increased by the amount of the differentials on these classes by which the rates from New York or Philadelphia now usually exceed the rates from Baltimore.

In the original report it was stated that carriers operating circuitous routes at least 15 per cent greater in length than the lines described in the report, could meet the competition of the direct lines at the more distant points. It is now ordered that the distances on which the 15 per cent is to be figured will be computed from the gateways on the various routes and not from the original points of origin.

The carriers will be authorized to include Helena in the group containing such points as Valdosta, Quitman, etc., provided the rates established from Cincinnati and the other Ohio river crossings and from New Orleans are not exceeded at intermediate points on any reasonably direct line.

The carriers may continue rates from Louisville and lower Ohio river crossings to Opelika, Ala., and points in Montgomery subterritory lower than those to intermediate points south of Atlanta in Atlanta subterritory, and also rates from Cincinnati to points in Atlanta territory between Eufaula and Macon, and between the Chattahoochee river and Cordele, lower than those to intermediate points in Montgomery subterritory between Montgomery and the Chattahoochee river.

The order in Board of Trade of Carrollton, Ga., v. Central of Georgia (28 I. C. C., 154), is modified to the extent that the carriers will be allowed to establish class rates from Baltimore to Carrollton equal to those to Cedartown, Ga., and from Louisville to Carrollton the same as to Newnan, Ga.

The carriers operating certain short roads in this territory, such as the Alabama, Tennessee & Northern, the Atlanta & St. Andrews Bay, the Georgia Coast & Piedmont, the Georgia & Florida, etc., may meet the rates at their junction points established by their trunk line connections and continue higher rates to intermediate local points for two years from the date of this report.

The Southern Railway will be authorized to make changes in rates from eastern cities to points on its Memphis division necessary to correct fourth section violations.

The Yazoo & Mississippi Valley may continue for two years after the effective date of the order in this case the same rates from Memphis, Cairo and other points north thereof to Jackson that are maintained by the direct line of the Illinois Central, and higher rates to intermediate points between Memphis and Jackson, provided the rates to these points are so corrected as not to exceed the rates for like distances shown in the corrected prescribed scale.

The carriers will be authorized to establish a new scale of rates from Louisville and other Ohio river crossings to local points between the Chattahoochee river and Bainbridge, Ga.

The original order is modified so as to permit a realinement of the rates from Cairo, St. Louis and Chicago to Jackson and Meridian and points north and south thereof, so that they will accord with the fourth section. The proviso is made, however, that the rates to points south of Jackson and Meridian shall not exceed the rates for like distances shown in the corrected scale.

The order is also so modified as to permit a realinement of rates from Cairo, Cincinnati, Louisville, St. Louis and Chicago to points intermediate to Memphis.

Carriers operating routes from Chicago, St. Louis and the Ohio river crossings may continue the same rates to Jackson and Meridian that are maintained to these points by the direct lines, and also continue rates to points between Jackson and Meridian on a prescribed scale of differentials ranging from three cents on first class to two cents on class H higher than the rates concurrently applicable to Jackson and Meridian. (32 I. C. C., 61.)

STATE COMMISSIONS

The Massachusetts Public Service Commission on October 30 approved tariffs which have been filed by the railroads increasing the price of mileage tickets from 2 cents a mile to 2¼ cents. The new tariffs took effect November 1.

The Railroad Commission of Louisiana, acting on the application of commercial organizations in the city of New Orleans, has authorized all railroads entering that city to close their freight houses at 1 p. m., on Saturdays throughout the year.

A delegation of prominent negroes has appealed to the North Carolina Corporation Commission concerning the "Jim Crow" service on the railroads of that state. Their principal complaint is that the railroad companies are using old wooden cars for the "Jim Crow" service and sandwiching them between the big steel coaches for the white people and the steel express and mail cars and powerful locomotives where, in case of wrecks, they are smashed and the lives and limbs of the negroes far more greatly imperiled than those of any others on the train. They want an order requiring all steel or all wood trains.

PERSONNEL OF COMMISSIONS

If the nominations made by Governor Haines of Maine are confirmed by the executive council the new public utilities commission of that state will be composed of three lawyers. The governor has nominated for chairman (salary of $5,000) Hon. Benjamin F. Cleaves, judge of the municipal court in Biddeford, and for the two other commissionerships William B. Skelton and Samuel W. Gould, as heretofore noticed (October 30, p. 794). Judge Cleaves is one of the best-known lawyers in the state and has been prominent in Republican politics. In view of the fact that sentiment is strongly against a board of three lawyers it is thought that there may be opposition in the council.

Railway Officers

Executive, Financial, Legal and Accounting

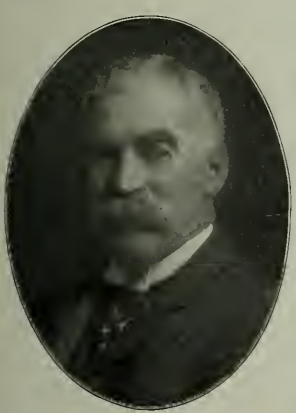
H. D. Chamberlain has been appointed acting freight claim agent of the Delaware & Hudson, with headquarters at Albany, N. Y., succeeding C. W. Nash, freight claim agent, resigned.

H. C. Pribble, freight claim auditor of the Atchison, Topeka & Santa Fe, has been appointed general freight claim agent, with headquarters at Topeka, Kan. The position of claims attorney, formerly held by the late J. D. M. Hamilton, has been abolished.

G. B. Herbert has been appointed freight claim agent of the Galveston, Harrisburg & San Antonio, the Texas & New Orleans, the Houston & Texas Central, the Houston East & West Texas and the Houston & Shreveport, with headquarters at Houtson, Tex., to succeed R. A. Taylor, resigned.

F. A. Lehman, assistant to the vice-president in charge of operation of the Atchison, Topeka & Santa Fe, has been transferred to Newton, Kan., as acting general superintendent of the eastern lines, Western district, succeeding Edward Raymond, who temporarily takes the place of Mr. Lehman, with office at Chicago.

William Hodgins Biggar, whose election as vice-president and general counsel of the Grand Trunk Pacific, with headquarters at Montreal, has already been announced in these columns, was born on September 19, 1852, at Carrying Place, Ont., and was educated at Upper Canada College, Toronto, Ont. Mr. Biggar entered the service of the Grand Trunk on February 1, 1881, and on December 31, 1902, was appointed assistant general counsel. About two years later he was appointed general solicitor of the same road. On January 10, 1910, he was appointed general counsel of the Grand Trunk and the Grand Trunk Pacific, and on September 15 he was elected vice-president and general counsel of the Grand Trunk Pacific, with headquarters at Montreal, Que. Mr. Biggar also retains the position of general counsel of the Grand Trunk.



W. H. Biggar

Operating

C. W. Fisher has been appointed chief train despatcher of the Canadian Pacific at Lethbridge, Alta., succeeding W. J. Manley.

H. W. Buskirk has been appointed assistant manager of the Continental Line and the Central States Dispatch, with headquarters at Cincinnati, Ohio.

S. T. Cantrell, supervisor of transportation of the Baltimore & Ohio, has been appointed assistant superintendent of the Monongah division, with headquarters at Grafton, W. Va.

C. M. Mitchell, trainmaster of the third district of the Cincinnati, New Orleans & Texas Pacific, at Oakdale, Tenn., has been transferred as trainmaster to the second district, and T. C. Blackwell, chief despatcher at Danville, Ky., succeeds Mr. Mitchell.

A. B. Woodward, trainmaster on the Montana division of the Great Northern at Havre, Mont., has been appointed chief train despatcher at that place; Nile Shaw, trainmaster on the Kalispel division at Whitefish, Mont., has been appointed chief despatcher at that point; F. T. Milligan, trainmaster on the Cascade division at Everett, Wash., has been appointed train despatcher at Spokane, Wash., and C. D. Meily, trainmaster on the Butte division at Great Falls, Mont., has been appointed yardmaster at Cut Bank, Mont. All these trainmasters formerly held the positions to which they are again appointed, owing to a retrenchment policy.

Traffic

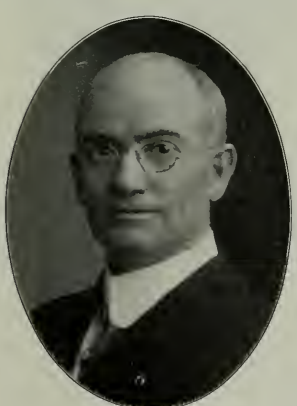
Joel L. Priest, industrial agent of the Oregon Short Line at Boise, Idaho, has been appointed general agent at that point.

John A. Miller, general agent of the freight department of the Great Northern at Seattle, Wash., has been promoted to district freight and passenger agent, with headquarters at Bellingham, a new position.

B. J. Tobron, division freight agent of the Lake Shore & Michigan Southern at Youngstown, Ohio, has been transferred to Toledo in a similar capacity, succeeding A. E. Billings, retired under the pension rules of the company. F. D. Hurst, general agent at Pittsburgh, Pa., succeeds Mr. Tobron, and J. J. Monks, commercial agent at Omaha, Neb., takes the place of Mr. Hurst.

H. C. Hamilton, who has been appointed general freight agent of the Lehigh Valley, with headquarters at New York, as has already been announced in these columns, began railway work as a clerk on the Philadelphia & Reading at Philadelphia, Pa., and subsequently was local freight agent and soliciting freight agent on that road. He then was appointed agent of the Reading Despatch Fast Freight Line, with headquarters at Philadelphia, leaving that position to become division freight agent of the Lehigh Valley, at Newark, N. J. He was then consecutively New England freight agent; division freight agent at Buffalo, and at the time of his recent appointment was assistant general freight agent of the same road.

Edward P. Cockrell, whose appointment as general passenger agent of the Chicago, Indianapolis & Louisville, with headquarters at Chicago, has already been announced in these columns, was born October 1, 1870, at Kinmundy, Ill. He was educated in the public and high schools, and began railway work April 1, 1889, with the Chicago & Atlantic. In September of the following year Mr. Cockrell went to the Chicago, Indianapolis & Louisville, with which road he has remained ever since. He was rate clerk until April, 1891, when he was advanced to chief clerk, which position he held until August, 1909. He was then promoted to assistant general passenger agent, which office he will retain until January 1, when his appointment as general passenger agent, with headquarters at Chicago, of the same road becomes effective.



E. P. Cockrell

M. V. Richards, land and industrial agent of the Southern Railway at Washington, D. C., has been appointed commissioner in charge of the industrial and agricultural department, recently formed by the consolidation of the land and industrial department, the department of farm improvement work and the live stock department. This department takes in the following roads: Southern Railway, Georgia Southern & Florida, Mobile & Ohio, Southern Railway in Mississippi, Northern Alabama and Virginia & Southwestern. H. E. Waernicke has been appointed assistant commissioner, and Z. P. Smith has been appointed immigration agent at Washington, D. C., and the following industrial and immigration agents have been appointed: O. J. Stephens, Atlanta, Ga.; T. G. Wood, Charlotte, N. C.; J. W. Paige, Chattanooga, Tenn.; H. R. Buckey, Jacksonville, Fla., and W. L. Henderson,

Mobile, Ala. C. S. Chase has been appointed western industrial and immigration agent, and F. B. Ayres, G. W. Lee and R. G. Hanson, Jr., have been appointed traveling industrial and immigration agents, with headquarters at St. Louis, Mo.

H. G. Elliott, general passenger agent of the Grand Trunk at Montreal, Que., owing to a rearrangement of the duties of the general officers of the passenger department was retired on October 31, under the rules of the superannuation and provident fund association, and his former duties have been assumed by the assistant passenger traffic manager. Mr. Elliott was born on August 22, 1860, and began railway work in 1882, as city ticket agent on the Central Vermont, at Montreal, Que. In May, 1897, he entered the service of the Grand Trunk and has been in the continuous service of that road ever since, holding various positions in the traffic department until his appointment in May, 1900, as assistant general passenger and ticket agent. He subsequently served as first assistant general passenger agent at Montreal, and later at Chicago, until March, 1911, when he was appointed general passenger agent at Montreal.

William Pittman Hinton, whose appointment as assistant passenger traffic manager of the Grand Trunk and the Grand Trunk Pacific, with headquarters at Montreal, Que., has already been announced in these columns, was born on August 30, 1871, at Ottawa, Ont., and was educated at Ottawa Collegiate Institute. He began railway work on May 3, 1887, in the auditor's department of the Canada Atlantic, and in September 1891, became rate clerk in the traffic department. From March, 1898, to July, 1901, he was assistant general freight agent, and then was general freight agent, until his appointment in February, 1903, as general freight and passenger agent of the same road. In October, 1905, when the Grand Trunk absorbed the Canada Atlantic he became general agent in the passenger department of the Grand Trunk at Ottawa, Ont., in charge of immigration and transatlantic passenger traffic, remaining in that position until January 1, 1907, when he was appointed assistant general passenger agent of the same road at Montreal. On May 1, 1909, he was appointed general passenger agent of the Grand Trunk Pacific at Winnipeg, Man., and on January 1, 1914, was promoted to assistant passenger traffic manager of the same road at Winnipeg, and now became also assistant passenger traffic manager of the Grand Trunk, with headquarters at Montreal, Que., as above noted.

W. P. Hinton

Engineering and Rolling Stock

Cyrus Miller has been appointed roadmaster of the Atchison, Topeka & Santa Fe at Moline, Kan., in place of Lee Claiborne. C. Doherty has been appointed roadmaster at Plainview, Tex., to succeed H. S. Bruce. R. B. Ball, division engineer, Coast lines, at Los Angeles, Cal., has been appointed engineer Grand division at Los Angeles. W. D. Cloud has been appointed assistant signal supervisor, Coast lines, at Los Angeles, Cal., in place of W. F. Price.

OBITUARY

Walter Lee McGill, secretary of the Southeastern Freight Association at Atlanta, Ga., died on October 28, at his home in that city, at the age of 50.

George Morrison Roberts, formerly for many years New England passenger agent of the Pennsylvania Railroad at Boston, Mass., died on October 27, at his home in Malden, Mass., at the age of 76.

Equipment and Supplies

LOCOMOTIVE BUILDING

Carr Brothers, New York, have ordered one 0-6-4 type narrow gage locomotive from the Davenport Locomotive Works for export to Cuba.

CAR BUILDING

The Rutland Railroad is planning to reinforce 4,500 wooden stock, box and flat cars.

The United States Government is in the market for 2 passenger cars to be used at the Sandy Hook Proving Grounds.

The Illinois Central recently classed a large number of its freight cars as unfit for the heavy and continuous service required of them under normal conditions, and is scrapping them at the rate of 300 a month. However, these cars are also for sale and a purchaser has the privilege of selecting any kind of car or cars in the series. A price has been affixed each car, which is approximately the scrap value of the car. The company will deliver these cars free of charge to any point on its line, desired by the purchaser. There was a total of approximately 10,000 cars, of which 5,451 are left, divided as follows: 3,567 box, 78 furniture, 605 stock, 68 fruit, 104 flat, 542 coal and 487 refrigerator cars.

SIGNALING

The Southern Railway is installing an inter-locking plant at Helena, Ga., the crossing of the Atlanta division with the Seaboard Air Line.

Railway Construction in Venezuela in 1913.—The only construction work carried on or under consideration in Venezuela during 1913 was the following: the extension of the Central Railway to its present terminus at Santa Teresa; the extension of the Tachira Railway at its southern end, and building operations on a branch of the Bolivar Railway which will extend from Palma Sola to San Felipe.

Railway Facilities in Paraguay.—Transportation between points in the Republic of Paraguay is by rail or river steamer. There is one railway—the Central Paraguay Railway. Its line is from Asuncion to Encarnacion, a distance of 230 miles. This gives rail connection with Villa Rica, the second city of the republic. Freight trains are run as needed. Almost all the important towns are on the rivers and freight can be sent by river steamers. The wagon roads are poor and travel over them said to be almost impossible.

Destruction of Railways by Warfare.—The destruction of railway permanent way, stations, plant, rolling stock and general equipment will by the end of the war have been stupendous, and manufacturers will for a long time be busy replacing the awful wastage. The Boulogne correspondent of the London Daily Telegraph writes, September 26, that "a German patrol has blown up the railway bridge across the river Ancre, at Mivaumont, Somme. This bridge is on the line to Paris, via Lille and Amiens. The railway lines have suffered greatly in the north. Sometimes it was the French who blew the bridges up to prevent the enemy's advance, and sometimes it was the enemy, as they did at Corbehem. It was, however, more often Germans than French. Up to now the Compagnie du Chemin de Fer du Nord has lost about 179 bridges." From Antwerp, it is reported that recently Belgian military engineers succeeded in passing through the German lines and blowing up a railway viaduct at Bierghes, between Mons and Brussels, and about fifteen miles from the capital. A telegram from Weihsein says that Chinese troops have blown up and destroyed a railway bridge over the Tayu-ho. These are, of course, only a few instances of the work of destruction which is going on in all parts of the vast field of hostilities.—*The Engineer.*

Supply Trade News

The American Car & Foundry Company has announced that its plants at St. Louis, Mo., and Madison, Ill., will be closed on December 1.

R. Harvey White, southern representative of the Chicago Railway Signal & Supply Company, Chicago, was promoted to the position of signal engineer of that company, October 1, 1914.

H. C. Hequembourg, who has been the general purchasing agent of the American Locomotive Company since its organization, has resigned to accept the vice-presidency of the Standard Chemical Company, Pittsburgh, Pa. This company is said to be the largest producer of radium in the world.

M. Wuerpel, assistant general manager of the General Railway Signal Company, Rochester, N. Y., has been appointed assistant to the president of that company, effective November 1. Effective on the same date S. G. Johnson, who was recently elected vice-president, will be in full charge of the sales department (including all branch and foreign offices, commercial engineering, commercial inspection and contract installation) reporting to the president and general manager. Mr. Johnson will have headquarters at Rochester. All those in the sales department formerly reporting to the president and general manager or to the assistant general manager or the sales manager will now report to and receive instructions from Mr. Johnson. A department of publicity and education has been created and H. M. Sperry has been appointed the manager of it, reporting to the president and general manager and co-operating closely with all departments. This department will take over the advertising and catalog work, and in addition will undertake an educational campaign along the lines that have proved successful in other corporations.

TRADE PUBLICATIONS

Compression Tools.—The Lutz-Webster Engineering Company, Inc., Philadelphia, Pa., has recently issued a leaflet entitled "Bulletin No. 4," illustrating and treating briefly of a number of Lutz tools, and also a leaflet describing briefly the proposed prize contest covering the use of Lutz compression tools.

Ball Bearings.—The S. K. F. Ball Bearing Company, New York, has recently issued bulletin No. 16, entitled "S. K. F. Ball Bearings Applied to Electric Motors." The catalog aims to show wherein S. K. F. ball bearings excel and to indicate their advantages for application on motors, the latter subject being treated under such heads as lubrication, maintenance charges, compactness, durability, etc. Several views are given of various installations.

Sprocket and Traction Wheels.—The Lehigh Car, Wheel & Axle Works, Catasauqua, Pa., has issued catalog No. 50, entitled "Fuller Quality Products." The booklet is primarily a price list covering the company's line of face hardened sprocket and traction wheels, but it also gives general descriptions of the company's special castings for all uses requiring resistance to abrasive wear.

Argentine Railway Construction.—On September 29 the Argentine Chamber of Deputies passed an act authorizing the Santa Fe Railway to construct and operate the following lines in connection with its system: (1) A line starting at the present station of Charadai to run westward 59 miles, this to include the branch line of 47 miles already authorized; (2) a branch line to start either at kilometer 35 or at the terminal of the small branch already built toward the north and to run 62 miles in a northwesterly direction. These lines wil be of meter gage, as are the other lines of the Santa Fe Railway. The act provides that the contract for construction must be signed within six months after promulgation of the law. Plans are to be submitted to the government within one year after the signing of the contract, and work is to commence six months after the approval of plans, and to be terminated within two years from date of commencement.

Railway Construction

Baltimore & Ohio.—The report of this company for the year ended June 30, 1914, shows that with the exception of the Magnolia cut-off the more important improvement work authorized by the company has been completed. A third track has been completed and put in operation between Green Spring, W. Va., and Little Cacapon, 7.6 miles. At Winchester, Va., a 2,100-ft. line was built to a connection with the Cumberland Valley Railroad. Progress has also been made during the year on the double tracking of the Chicago division. The second track between Defiance, Ohio, and The Bend, 8.96 miles, was completed and put in service. The Chicago division is now all double track, with the exception of 1.10 miles through the city of Defiance, Ohio, and 23.27 miles between Milford Junction, Ind., and LaPaz Junction. Work has also steadily progressed on the new double track line, and relocation of parts of the old line known as the Magnolia cut-off improvement, between Orleans Road, W. Va., and Little Cascapon, which will effect a saving of 5.8 miles in distance and 877 deg. of curvature. It is expected that this work will be completed and placed in operation during the coming fiscal year.

Cherry River Southern.—An officer writes that contracts will probably be let in February, 1915, to build a 35-mile line from Curtin, W. Va., which is on the Baltimore & Ohio. The projected route from Curtin is along the south side of Gauley river to the mouth of Hominy creek, 20 miles, thence up Hominy creek eight miles, thence along Angling creek five miles to Meadow river and along that stream two miles to Bays Ferry near the point at which the counties of Nicholas, Greenbrier and Fayette meet. About 25 miles has been permanently located, and this work is expected to be finished on the other 10 miles by December 1. About 25 miles of the work will be difficult and heavy, and the other ten miles will be comparatively light construction. The estimated cost of building the line will be $15,000 a mile. The maximum grade will be 1 per cent, and the maximum curvature 16 deg. There will be eight trestles ranging in length from 100 to 450 ft. each. The principal commodities to be carried will be lumber and timber. H. L. Kirtley, president; E. H. Venable, chief engineer, Charleston, W. Va. (October 30, p. 818.)

Chicago Great Western.—This company has awarded a contract for the construction of 1,700 lineal feet of dyke along the east bank of the Missouri river at a point just opposite Leavenworth, Kan., to Dewitt & Shobe, Glasgow, Mo. U. S. standard piles will be used. The cost will be approximately $30,000.

Illinois Central.—This company has awarded a contract for the grading work involved in the building of a 2.5 mile spur line running from Oakridge, Ill., to the Peabody Coal Company's mines No. 3, located in Williamson county, Ill., to M. H. Windham, Centralia, Ill. The yardage is estimated at 33,000 cu. yd.

Norfolk & Western.—An officer writes that a contract has been given to J. J. Boxley & Son, Roanoke. Va., to build five miles of branch lines with a short tunnel from the Dry Fork branch at Rift, near Berwind, W. Va. The new branches are to be known as the Jacobs Fork and Cucumber branches.

Piedmont & Northern (Electric).—This company plans to build an extension, it is said, from Spartanburg, N. C., north to Gastonia, about 32 miles, to complete the gap between the northern and the southern lines. The company also plans to build from the present terminus of the northern line at Charlotte north via Concord, Salisbury and Greensboro to Durham. (April 17, p. 927.)

Princeton Power Company's Line.—An officer writes confirming the report that a contract has been given to Walton & Co., Falls Mills, Va., and grading work is now under way on a line between Princeton, W. Va., and Bluefield, 12 miles. There will be five steel bridges on the line. The maximum grade will be 7 per cent in city limits and 3.5 per cent outside the cities. S. J. Evans, president, Princeton; G. H. Hill, chief engineer, Bluefield. (October 22, page 779.)

St. Paul Southern Electric.—This company has completed work on 18 miles of electric line between St. Paul, Minn., and Hastings and this section is now open for business. The plans call for building an extension south of Hastings to connect Cannon Falls, Zumbrota, Pine Island, Oronoco, Douglas, Rochester, Red Wing and Lake City. It is said that construction work is now under way on the section from Cannon Falls to Zumbrota, 36 miles. P. G. Heintz, president, Rochester, I. Todd, Jr., vice-president, Hastings, and Z. T. Hutchinson, secretary and treasurer, St. Paul.

RAILWAY STRUCTURES

Ada, Minn.—The Great Northern will build a new passenger depot at Ada, Minn., in accordance with an order of the Railroad and Warehouse Commission of Minnesota, which provides that the station shall be constructed by December 1, 1915.

Baltimore, Md.—The report of the Baltimore & Ohio for the year ended June 30, 1914, shows that at Elkridge, Md., the work of eliminating grade crossings at Washington road is well under way and at Frederick Junction, Md., an overhead bridge has been reconstructed The work of eliminating grade crossings in Baltimore, Md., Cincinnati, Ohio, and Chicago has been continued in accordance with the arrangements with those cities, and this work will extend over a period of years. Arrangements have also been made for the elimination of an important grade crossing at Lorain, Ohio. The new passenger subway under Baltimore street, Cumberland, Md., has been finished and is now in use, and at South Cumberland new engine facilities, consisting of engine house, boiler house, machine shop, coaling station, ash pit and sand house were completed and put in service. Combined passenger and freight stations were built at Lore City, Ohio, and Lexington, and the passenger station at Lexington, Va., was remodeled. Additional freight facilities, including freight houses, station tracks, etc., were built at New York City, Baltimore, Md., Clarksburg, W. Va., Cumberland, Md., Akron, Ohio, and Canal Dover. At New York City the improvements included an eight-story steel and concrete warehouse, and at Locust Point, Baltimore, Md., open pier 5 was reconstructed and extended, and is now in operation for the handling of ore and similar commodities. The new yard at Somerset, Pa., for assembling coal has also been completed and is now in operation.

Brighton Park, Ill.—The Chicago & Alton is building an eight-stall roundhouse and a small machine shop and power house at Brighton Park, Ill. The buildings are of concrete and brick construction. The work is being done by the company's own forces, and work is expected to be completed about December 1, 1914. The estimated cost is $45,000.

Brooklyn, N. Y.—The New York Public Service Commission, First district, has approved the plans submitted by the New York Municipal Railway Corporation and the form of contract for the construction of elevated stations on the Liberty avenue line at Hudson street, Boyd avenue, Rockaway boulevard, Oxford avenue, Greenwood avenue and Lefferts avenue, also for a frame building for trainmen at the Lefferts avenue station.

Portland, Oregon.—The Oregon-Washington Railroad & Navigation Company has under construction a new dock on the Willamette river. This structure is 160 ft. by 580 ft. in area and is covered with corrugated galvanized iron. The interior frame work is of timber and the roof is of asbestos. The building is served by a double track trestle. The estimated cost, including the cost of dredging, is $85,000.

Prince George, B. C.—The Grand Trunk Pacific has given a contract to Carter, Halls,& Alinger, Winnipeg, Man., at $300,000, it is said, for constructing terminals at Prince George, at Endako, at Smithers and at Pacific. The construction work has already been started and will include round houses, machine shops and other railway buildings. The company will probably let a contract soon for similar work at Prince Rupert, the coast terminus.

Toledo, Ohio.—The Cincinnati, Hamilton & Dayton is asking bids for the construction of a coal dumper at Toledo, Ohio. The machine will be of the most modern type and will cost, including the expense of incidental track changes, approximately $300,000. The new facilities will be ready for service early next spring.

Railway Financial News

Chicago Great Western.—President S. M. Felton has issued to stockholders a circular in which he says: "On September 1 the property passed from the voting trust into the hands of stockholders. The gross earnings for the year ended June 30, 1914, were the largest in the history of the road. There was a decrease in net as against the previous year, because of the general upward trend of operating expenses from which we could find no escape. . . . While the officers are doing everything in their power to secure better results, they stand in need of the active assistance of every stockholder. Agents along the line, and in the principal cities in the United States where located, will eagerly work with you toward securing any traffic you may be able to influence. Communicate with them freely or write the undersigned at any time you have suggestions to offer. There is now a general feeling that railroads have been overregulated, their rates unnecessarily reduced and that they are entitled to more consideration. The need of the country is rather for better facilities than for reduced rates. It is time that the owners of railroad property should assert themselves, and your frank discussion with senators and congressmen, and with the members of the State legislatures of matters affecting railroad operation cannot but prove beneficial. . . ."

National Railways of Mexico.—The Treasury Department at Mexico City announces that the New York banks holding the papers have granted an extension of time on the $1,000,000 interest due on the bonded indebtedness of the railway corporation. The Government has under consideration a plan to raise the necessary funds by asking the foreign mining companies to deliver $1,000,000 bullion in exchange for Mexican paper money at the rate of $4.70 paper to $1 gold. It is believed that the railway will be delivered to the stockholders by the Mexican Government within a very short time.

New Mexico Central.—The sale under foreclosure of this road, which has been set for October 14, has been indefinitely postponed. The road runs from Santa Fe, N. Mex., to Torrance, 116 miles.

New York, New Haven & Hartford.—The grand jury, in the United States district court at New York city, which has been investigating the affairs of this road for many months, finally returned criminal indictments, on Monday of this week, against 21 members of present and past boards of directors for conspiracy to monopolize interstate commerce by acquiring control of competing lines, both railroad and steamship. The directors named were William Rockefeller, George Macculloch Miller, Charles F. Brooker, William Skinner, D. Newton Barney, Robert W. Taft, James S. Elton, James S. Hemingway, Lewis Cass Ledyard, Charles M. Pratt, A. Heaton Robertson, Frederick F. Brewster, Henry K. McHarg, Edward D. Robbins, Alexander Cochrane, John L. Billard, George F. Baker, Thomas De Witt Cuyler, Theodore N. Vail, Edward Milligan, and Francis T. Maxwell.

Of the foregoing those now on the board are Messrs. Brewster, McHarg, Cuyler, Milligan and Maxwell. Former President Charles S. Mellen testified at length before the grand jury and is not indicted.

The indictment mentions about fifty other persons, some of whom are now dead, as having conspired with the directors, but who are not indicted. Among these are Chauncey M. Depew, Lucius Tuttle, John M. Hall, Richard A. McCurdy, Alexander Cassatt, J. P. Morgan, and a number of former officers of the road. The four last named are now dead.

Those of the indicted directors who have appeared in court have been released on bail bonds of $5,000 each.

The charges deal with corporate acts as far back as 1891, and 160 corporations are named in the list of lines on which the attempt to monopolize commerce has been exercised.

It is not expected that the accused directors will be brought to trial before next Spring. The maximum penalty for the offense alleged is one year in prison and $5,000 fine.

ANNUAL REPORT

BALTIMORE AND OHIO RAILROAD COMPANY—EIGHTY-EIGHTH ANNUAL REPORT

OFFICE OF THE BALTIMORE AND OHIO RAILROAD COMPANY,
BALTIMORE, MD., October 15, 1914.

To the Stockholders of The Baltimore and Ohio Railroad Company.

The President and Directors herewith submit report of the affairs of the Company for the fiscal year ended June 30, 1914.

Except where otherwise indicated, the comparisons herein shown are with the figures of the preceding fiscal year.

MILEAGE AND EQUIPMENT.

The statements in this report show the results of the operations of the lines directly operated by The Baltimore and Ohio Railroad Company, embracing:

	FIRST MAIN TRACK.	TOTAL ALL MAIN TRACKS, SIDINGS, ETC.
Miles	4,403.54	8,719.48
Trackage Rights	74.68	188.87
Total Operated Mileage	4,478.22	8,908.35

as shown in detail in Table 28.

There has been an increase of 21.89 miles in first main track, due mainly to reclassification of tracks and to remeasurement.

Your Company's equipment at June 30, 1914, consisted of 2,365 Locomotives, 1,292 Passenger Cars, 88,055 Freight Cars, 3,407 Work Cars, and 146 pieces of Floating Equipment, as shown in detail in Table 27.

INCOME FOR THE YEAR.

The General Income Account of the Company will be found in Table 1.

The total Operating Revenue (including Outside Operations), was $99,032,150.11, a decrease of $4,297,842.21, or 4.16 per cent.

The total Operating Expense (including Outside Operations), was $74,560,847.28, a decrease of $1,866,962.31, or 2.44 per cent.

The Net Railway Operating Revenue (including Outside Operations), was $24,471,302.83, a decrease of $2,430,879.90, or 9.04 per cent.

The Total Operating Revenue from Rail Operations only, was $97,411,441.48, a decrease of $4,144,690.14, or 4.08 per cent.

The revenue from Freight Traffic was $75,784,287.09, a decrease of $4,410,202.86, or 5.50 per cent.

The tons of revenue freight carried were 69,382,145, a decrease of 3,078,919 tons, or 4.25 per cent., and the tons of revenue freight carried one mile were 13,425,552,328, a decrease of 887,575,905, or 6.20 per cent. The ton miles per mile of road were 2,997,966, a decrease of 213,899, or 6.66 per cent. The average distance each ton was carried was 193.50 miles as compared with 197.53 miles the previous year. The revenue from freight per mile of road was $16,922.86, a decrease of $1,072.78, or 5.96 per cent., and the revenue per freight train mile was 3.49^{58}/_{100}$, an increase of $.02$^{46}/_{100}$, or 0.69 per cent. The average earnings per ton per mile were $^{344}/_{1000}$ cents, an increase of $^{004}/_{1000}$ cents. This increase is due primarily to the shorter average distance each ton was handled, as shown above, but applies principally to the Products of Agriculture, on which the average haul decreased 52 miles or 14.25 per cent. under last year. Freight Traffic Statistics are given in Tables 12 and 13.

From the Statement of Commodities Carried, Table 14, it will be seen that as compared with the previous year marked decreases are shown in the commodities grouped as Products of Agriculture, Products of Mines, Products of Forest, and Manufactures, with increase in Products of Animals. There was an increase in less carload shipments, which are classified in the grouping of Merchandise.

The revenue from Passenger Traffic was $15,893,721.39, an increase of $356,643.56, or 2.30 per cent.

The number of passengers carried was 22,718,932, a decrease of 160,307, or 0.70 per cent., but the number of passengers carried one mile was 826,672,210, an increase of 21,465,683, or 2.67 per cent. The average number of miles each passenger was carried was 36.39, an increase of 1.20 miles, or 3.41 per cent. The number of passengers carried one mile per mile of road was 184,598, an increase of 3,910, or 2.16 per cent. The average earnings from each passenger were $.69$^{96}/_{100}$, an increase of $.02$^{06}/_{100}$, and the average earnings per passenger per mile were $.01$^{923}/_{1000}$, a decrease of $^{1}/_{1000}$ cents. The increase in the passengers carried one mile and the decrease in the rate per passenger per mile are due chiefly to the increase in long haul passengers, principally immigrant traffic, and a decrease in short haul traffic, mainly commuter travel. Passenger Traffic Statistics will be found in Tables 10 and 11.

The revenue from the Transportation of Mails was $1,212,071.96, an increase of $6,913.01, or 0.57 per cent., and from Express Traffic $1,848,704.33, a decrease of $60,847.63, or 3.19 per cent.

The Operating Expenses—Rail Operations for the year were $72,054,892.40, a decrease of $1,724,745.58, or 2.34 per cent.

The ratio of Expenses to Earnings increased 1.32 per cent., being 73.97 per cent. for the present fiscal year compared with 72.65 per cent. for the preceding fiscal year.

The expenditures for Maintenance of Way and Structures were $12,207,191.25, a decrease of $1,812,428.32, or 12.93 per cent. These expenditures include $2,112,084.98, on account of directly locatable expenses incident to the flood damage and $493,354.49 covering replacement and revision of existing facilities. The roadway and structures have been well maintained, and the property generally is in good condition.

The expenditures for Maintenance of Equipment were $16,681,986.08, a decrease of $1,641,224.31, or 8.96 per cent. These expenditures include $2,607,881.38 covering depreciation of equipment. The equipment has been satisfactorily maintained, and is in a condition generally to better meet present operating requirements.

The total maintenance expenses for the year were $28,889,177.33, as against $32,342,829.96, for the preceding year, a decrease of $3,453,652.63, or 10.68 per cent. The total amount expended for maintenance was 29.66 per cent. of the Gross Earnings and 40.09 per cent. of the total Operating Expenses.

The total Transportation Expenses were $38,699,492.90, an increase of $1,425,093.84, or 3.82 per cent. over the preceding year. The ratio to Total Operating Revenue was 39.73 per cent. as compared with 36.70 per cent. for the preceding year. This increased ratio was due in part to the unusual distribution of the tonnage handled over the lines of your System, and to the exceptional conditions that prevailed during the year. The congestion following the flood which necessitated much detouring over longer routes, extended through the earlier months of the year, and at a time when the business was heaviest; later, when there was a heavy shrinkage in traffic, the percentage of empty car movement was disproportionately large. These conditions, together with the effects of severe weather prevailing during the winter months, are directly reflected in the increased expense. Increased rates of pay and changed working conditions of employes in train service alone, as a result of arbitration awards, caused an expenditure of $805,000 more than would have been required for the same service had the rates of pay and conditions of employment prevailing in the preceding year continued.

The increase in Traffic Expenses of $125,612.66 is due almost entirely to the expense incident to compiling and printing new tariffs which were considered in the recent application for advances in freight rates.

The increase in General Expenses of $178,198.55 is principally due to larger charges to this account for Pensions, referred to hereafter more in detail on Page 12.

The comparisons shown in Table 7 indicate the general increases and decreases in Operating Expense accounts.

The Net Revenue—Rail Operations was $25,356,549.08, a decrease of $2,419,944.56, and Outside Operations show a deficit of $885,246.25, making the Net Railway Operating Revenue $24,471,302.83; from this amount has been deducted Railway Tax Accruals for the year, $3,226,465.69, an increase of $265,560.60, or 8.97 per cent., leaving as Railway Operating Income $21,244,837.14, a decrease from preceding year of $2,696,440.50, or 11.26 per cent.

Other Income amounted to $6,017,719.18, an increase of $805,513.15, making the Gross Income for the year $27,262,556.32, a decrease of $1,890,927.35, as compared with last year.

There was deducted from Gross Income for payment of interest on funded debt, rents, etc., $18,012,531.94, as set forth in the Income Account, leaving as Net Income $9,250,024.38, being a decrease of $4,132,087.00 under that of the previous year, from which dividends were paid at rate of 4 per cent. on Preferred Stock, $2,354,633.64, and some minor appropriations made to sinking and reserve funds, leaving a balance to be transferred to Profit and Loss of $6,845,933.46. With this transfer and after deductions for interest accrued during the year on advances to the Cincinnati, Hamilton & Dayton R'y Co. and uncollected, amounting to $909,271.71, miscellaneous adjustments, and charges for discount on securities sold during the year, the net balance to the credit of Profit and Loss was $41,922,950.21, against which dividends were charged at rate of 6 per cent. on your Common Stock, aggregating $9,118,762.47, leaving a balance to the credit of Profit and Loss at June 30, 1914, of $32,804,187.74.

Largely because of the extraordinary flood expenditures of over $2,000,000, already referred to, and which were charged to operating expenses during the year, together with the recession in business, the net operating income fell short of the full amount required for the six per cent. dividend which has been paid upon your common stock for the last seven years. By reference to Table 8 in this and previous reports, it will be seen that the Company has earned and carried to surplus during the past ten years over $38,000,000, and the Profit and Loss Account this year, after necessary adjustments, showed a balance of $41,922,950. In view of these circumstances, your Board felt justified in continuing the established dividend on the basis of six per cent. In reaching this conclusion consideration was given to the application for an increase in freight rates then pending before the Interstate Commerce Commission, as a result of which it is hoped your Company may be permitted to so adjust its charges as to offset, in part at least, the increased expenses of a permanent nature, such as higher rates of pay, increased taxes, etc., and thereby he enabled to earn a fair return upon your property investment. In this connection it was shown in the rate hearing in the so-called Five Per Cent. Case, that the expenses and charges of your Company for the year 1913 were $4,712,000 greater than they would have been had the rates of wages and taxes alone remained the same as in the year 1910, an amount equal to more than three per cent. upon your entire common stock.

ASSETS.

The General Balance Sheet will be found in Table 2.

Property Investment—Road and Equipment—shows an increase for the year of $12,796,952.18

made up of the following items:

Net increase for Road (see Table 6).....	$7,021,132.62	
Net increase for Equipment (details on page 10)	5,837,208.70	
	$12,858,341.32	
Less: Sundry adjustments	61,389.14	
	$12,796,952.18	

In the grouping of Property Investment—Securities—the changes in those Pledged and Unpledged are occasioned by the transfer of securities from the latter grouping to the former. The net increase in this grouping of..... $2,279,914.00

is due to:

Purchase of additional securities of the following companies:	
Baltimore and Ohio Chicago Terminal R. R. Co., Bonds	$1,800,000.00
Hampshire Southern R. R. Co., Bonds.	388,960.00
Various subsidiary companies	90,954.00
	$2,279,914.00

Other Investments increased $11,510,425.26

accounted for in the following manner:

Acquisition at maturity, July 1, 1913, of Cincinnati, Hamilton and Dayton R'y Co., Purchase Money Collateral Notes and Coupons		$11,788,140.00
Capital Advances to Sundry Companies...		28,611.34
		$11,816,751.34
Less: Net decrease in Physical Property due to disposition of certain real estate.....	$286,137.26	
Miscellaneous	20,188.82	306,326.08
		$11,510,425.26

Working Assets show a net increase of..... $21,357,615.01.

Included in this grouping is the item of Cash, in which there is shown an increase of $22,821,608.48 over last year, which is due to the provision made for the retirement of $20,000,000.00 One Year Gold Notes, payable on July 1, 1914. The decrease in Securities Issued—Held in Treasury—of $2,017,700.00, was caused by the sale, during the year, of $2,000,000.00 par value of First Mortgage Bonds, and some minor transactions. Loans and Bills Receivable increased $1,901,084.76, included in which is $2,899,827.52 advanced Cincinnati, Hamilton and Dayton R'y Co., and secured by collateral, which amount, less payment of sundry other loans, makes the increase in question. Materials and Supplies decreased $1,420,760.35, due to heavy purchases of material late in the previous fiscal year and to retrenchment made necessary this year by general business conditions.

Deferred Debit Items show an increase of $1,117,804.40, due mainly to the increase in Special Deposits, which grouping includes an item of $1,847,648.80, representing balance of proceeds from the sale of Equipment Certificates of the Trust of 1913, to be applied to the purchase of additional equipment for that Trust. Other Deferred Debit Items show a decrease of $961,770.39, due to the adjustment of departmental accounts, including the clearance of items awaiting final distribution.

Liabilities.

It will be noted, from the Balance Sheet, that there has been no change in the Capital Stock of the Company during the year.

Mortgage, Bonded, and Secured Debt—increased..... $36,659,450.76

explained in the following manner:

Increases:		
First Mortgage Bonds.....		$1,000,000.00
Issued under provisions of the mortgage in recoupment of construction expenditures.		
One Year Collateral Gold Notes, dated June 1, 1914, and due June 1, 1915....		35,000,000.00
Issued to retire $20,000,000.00 One Year Notes due July 1, 1914, and for other corporate purposes.		
Certificates of Interest, B. & O. Equipment Trust of 1913.....		9,000,000.00
Issued for purchase of equipment:		
Real Estate Mortgages and Ground Rent Liens on property acquired and capitalized		40,800.00
		$45,040,800.00
Decreases:		
Collateral Notes dated June 30, 1913, and due September 30, 1913	$6,250,000.00	
B. & O. Equipment Trust of 1912	1,000,000.00	
Series "B" paid at maturity.		
B. & O. Equipment Trust of 1913	1,000,000.00	
Series "A" paid at maturity.		
Real Estate Mortgages and Ground Rent Liens, Liquidated	131,349.24	8,381,349.24
		$36,659,450.76

Working Liabilities show an increase of.....$16,279,108.91.

Going to make up this amount is an increase of $19,900,000.00 in Matured Mortgage, Bonded, and Secured Debt Unpaid, which is occasioned by the inclusion in this account of $20,000,000.00 of One Year Gold Notes maturing July 1, 1914, the day following that on which the books were closed (See Contra—Cash in Working Assets available for payment at maturity and as presented). There is shown a decrease in Audited Vouchers and Wages Unpaid of $4,277,631.31, which decrease partly reflects the change in pay roll settlements. With the passage of laws in several States in which the Company operates, requiring semi-monthly payment of wages, your Company adopted this practice generally with the result that the payment of one-half of the pay roll is made during the month in which the labor is performed, resulting in a lesser amount accrued and unpaid. The other increases and decreases in this grouping are of a normal character incident to the business.

On June 1, 1914, the Company issued $35,000,000.00 One Year Four and One-half Per Cent. Secured Notes, maturing June 1, 1915. These obligations were issued in part for the purpose of retiring the $20,000,000.00 Notes maturing July 1, 1914. In providing funds in advance of these maturing obligations advantage was taken of the favorable money conditions then existing, and it may be of interest that the entire issue of $35,000,000.00 was taken by the public at its par value.

Equipment Trusts.

During the year $9,000,000.00 of Certificates of Interest in the Baltimore & Ohio Equipment Trust of 1913 were disposed of.

The status of the Equipment Trusts at June 30, 1914, follows:

Baltimore & Ohio Equipment Trust of February, 1912:		
Total Issue		$10,000,000.00
Matured and paid—		
Series "A"—Paid February 1, 1913.?.....	$1,000,000.00	
Series "B"—Paid February 1, 1914.....	1,000,000.00	2,000,000.00
Outstanding June 30, 1914.....		$8,000,000.00
Baltimore & Ohio Equipment Trust of 1913:		
Total Issue $10,000,000.00		
Matured and paid—		
Series "A"—Paid April 1, 1914.....	1,000,000.00	
Outstanding June 30, 1914.....		$9,000,000.00

Making total Equipment Trusts outstanding.....$17,000,000.00

Each of these Trusts was issued in ten series of $1,000,000.00, one series of each Trust maturing annually.

Additions to Road and Equipment.

The total capital expenditures for equipment during the year aggregated $9,137,448.09, due mainly to the acquisition of equipment under the Baltimore and Ohio Equipment Trust of 1913. Table 27 shows the equipment in service and the various changes during the year.

The capital expenditures for improvements during the year amounted to $7,113,696.09, as will be seen from Table 6, where these expenditures are shown under the more important groupings of the Road and Equipment Classification.

Road.

With the exception of the Magnolia Cut-off, the more important improvement work authorized by your Board has been completed, and no extnsive new work has been inaugurated during the year.

At Elkridge, Md., the work of eliminating grade crossings with the Washington Road is well under way.

At Frederick Junction, Md., Overhead Bridge No. 35-A has been reconstructed to increased height and width to afford standard clearance.

A third track has been completed and put in operation between Green Spring and Little Cacapon, W. Va., a distance of 7.6 miles; making a continuous three-track line from Little Cacapon to Patterson Creek, W. Va., a distance of 14.4 miles.

The new passenger subway under Baltimore Street, Cumberland, Md., has been finished and is now in use. At South Cumberland, new engine facilities, consisting of engine house, boiler house, machine shop, coaling station, ash pit and sand house were completed and put into service.

At Winchester, Va., a connection 2,100 feet in length for the interchange of traffic with the Cumberland Valley Railroad was completed and put in operation during the year.

Combined passenger and freight stations have been erected at Lore City and Lexington, Ohio, and the passenger station at Lexington, Va., has been remodeled. Additional freight facilities, embracing houses, station tracks, etc., were constructed at New York City, N. Y., Baltimore, Md., Clarksburg, W. Va., Cumberland, Md., Akron and Canal Dover, Ohio.

The double tracking of the Chicago Division has progressed during the year. The second track between Defiance and The Bend was completed and put into service, adding 8.96 miles of additional second track. The Chicago Division is now all double track with the exception of 1.10 miles through the city of Defiance, Ohio, and 23.27 miles between Milford Junction and La Paz Junction, Ind.

During the year 9 new interlocking plants were built, one reconstructed and six rearranged. Automatic signals were installed on 24.7 miles of double track and 151.1 miles of single track. In addition, line control blocking system was provided for 3.8 miles of track; lock and block system for 28.5 miles of track; and a large number of safety devices were installed for protecting switches, grade crossings, etc.

Additions to Track and Betterment of Road.

Work has steadily progressed on the new double track line and relocation of parts of the old line, known as Magnolia Cut-off improvement, mentioned in the last report. It is expected this work will be completed and the line placed in operation during the coming fiscal year. As stated in the report of last year, this improvement will effect a saving of 5.8 miles in distance and 877 degrees of curvature, and in connection with the extensive improvements heretofore made, will give a continuous three-track road all of the way (and four tracks part of the way) between Patterson Creek and Cherry Run, W. Va., a distance of 57 miles. This district has the highest traffic density of the system.

Additions to Terminal Facilities.

The new eight story steel and concrete warehouse, at 26th Street and North River, New York City, N. Y., mentioned in the last report, was completed and put into operation during the year. This warehouse with 155,000 square feet of available storage space, is fireproof throughout, supplemented with a complete sprinkler system, affording storage with minimum insurance rates, and places your Company in a strong position to conveniently serve a large commercial section of the City.

Open Pier 5, Locust Point, Baltimore, Md., was reconstructed and extended and put into operation during the year, for the handling of ore and similar commodities.

The new yard at Somerset, Pa., for assembling coal in the extensive Somerset coal fields, was completed and is now in operation.

Elimination of Grade Crossings.

The work of eliminating grade crossings in Baltimore, Md., Cincinnati, Ohio, and Chicago, Ill., has been continued in accordance with the arrangements with those cities, and will, as previously stated in other reports, extend over a period of years. Arrangements have been made with the city authorities for the elimination of an important grade crossing at Lorain, Ohio.

Equipment.

Total Book Value of Equipment, June 30, 1913, was.....		$99,995,581.56
During the year there were added to the equipment the following:		
150 Locomotives, 111 all steel Passenger Cars, 2,144 Freight Cars, 23 Work Cars, and 1 Car Float, on which payments were made amounting to.....	$8,161,390.89	
And 2 Passenger Cars, 4,358 Freight Cars and 1 Work Car were reconstructed at a net cost of.....	976,057.20	9,137,448.09
		$109,133,029.65
During the year the following equipment was put out of service and credited to Property Investment-Equipment: 2 Locomotives, 9 Passenger Cars, 3,429 Freight Cars, 451 Work Cars, 1 Tug Boat, and 6 Lighters, having a book value of.....		1,376,982.93
Making the Gross Book Value of Equipment.....		$107,756,046.72
From this should be deducted:		
Accrued Depreciation on Equipment in Service, as follows:		
Amount of credit, June 30, 1913.....$13,101,814.89		
Amount charged to Expenses for depreciation, year ended June 30, 1914..... 2,652,739.43		
	$15,754,554.32	
Less: Charges to this account for depreciation accrued on equipment put out of service during the year 729,482.97		
Balance to Credit of Accrued Depreciation on Equipment in Service, June 30, 1914.....		15,025,071.35
Leaving Net Value of Equipment, June 30, 1914.....		$92,730,975.37

Continuing the policy inaugurated several years ago of strengthening certain classes of equipment, during the year 4,358 freight cars were rebuilt with steel underframes and bolsters and equipped with heavy draft gear to better meet the present operating requirements.

The percentage of steel freight cars, including cars with steel underframes and steel center-sills, to the total revenue freight equipment at June 30, 1914, was 72.77%, as compared with 38.83% at June 30, 1909.

Of the new equipment acquired during the year, 150 locomotives, 111 steel passenger cars, and 2,030 steel freight cars, were purchased under the provisions of the Baltimore & Ohio Equipment Trust of 1913. There are now under construction for this Trust thirty-one heavy freight locomotives, which will be delivered and placed in service during the coming year.

WELLS FARGO AND COMPANY EXPRESS.

The United States Express Company, which had operated over the lines of the System since 1887, having determined to retire from business, gave notice of its desire to discontinue operations after June 30, 1914. Coincident with the termination of the contract with that Company, negotiations were concluded with Wells Fargo and Company for the conduct of express service over Baltimore and Ohio Lines commencing July 1, 1914. It is anticipated that the alliance thus effected will be of mutual advantage and result in increased traffic.

The Wells Fargo Express, for a number of years, has been operating over many of the larger railroad systems of the West, and with the addition of your Company's lines is afforded new routes to New York and other eastern termini and its first direct entrance into the cities of Philadelphia, Pa., Wilmington, Del., Baltimore, Md., Washington, D. C., etc. The Wells Fargo Company now has under operation 75,028 miles of railroad lines, 4,186 miles of electric lines and 32,889 miles of steamer and stage lines, a total of 112,103 miles, with over 9,000 agencies throughout the United States, Mexico and Europe.

RELIEF DEPARTMENT.

As the stockholders may not be generally advised of the activities of this Department, it is thought well at this time to give some general review of its operations.

The Railroad Company assumes general charge of this Department; furnishes office room and furniture; gives the services of its officers and employes and the use of its facilities; becomes the custodian of its funds with full responsibility therefor, and guarantees the true and faithful performance of the obligations of the Department.

RELIEF FEATURE.

A statement of the operations of this Feature, which provides accident, sick, and death benefits for employes, are shown on the first page of Table 26. The total number of members of this Feature is 52,971. The total payments for all benefits since the inauguration of this Feature May 1, 1880, to June 30, 1914, amount to $18,680,935.81.

SAVINGS FEATURE.

A statement of the operations of this Feature will be found in Table 26, page 40. This Feature combines all the advantages of a savings and loan association, through which employes and their immediate dependents may accumulate their savings, and from which they may obtain funds to purchase homes to be repaid through reasonable monthly instalments. As an incentive to employes to save, the Railroad Company guarantees four per cent. interest on all deposits. During the past fiscal year this Feature earned sufficient from its operations to pay four per cent. on all deposits and in addition declared a dividend of one per cent., making a total of five per cent. paid on deposits, amounting in all to $407,217.60, after which there was a balance of $60,393.91 carried to the Surplus Account of the Savings Feature. This Feature loans money to employes on first mortgages on real estate only, at reasonable rates and liberal terms for repayment. As an indication of the activities of this Feature, on June 30, 1914, there were 8,949 depnsitors, with total deposits of $8,804,530.39, an average of $983.86; there were 5,020 loans, amnunting to $4,756,852.67, in effect July 1, 1913; during the year 1,321 new loans were made and 1,080 loans were paid off, leaving in force and effect at June 30, 1914, 5,261 loans, amounting to $5,110,299.68. Since the inauguration of this Feature, August 1, 1882, loans to the aggregate amount of $14,911,752.06 have been made, assisting employes in acquiring this amount of real estate.

A committee, composed of representatives of the Executive, Accounting, Real Estate, and Legal Departments, appointed to investigate the operations of this Feature with respect to loans made to employes, made a thorough and exhaustive examination and reported that all loans were supported by deeds, abstracts and other title papers, properly executed, assigned and recorded; that fire insurance policies of sufficient amount to cover unpaid loans were on file, together with papers relating to property appraisals. As the amount of a loan is based upon the appraised value of property, the committee had test appraisals made of over 400 properties, and found the loans amply secured. Such suggestions as the committee offered have been made effective.

PENSION FEATURE.

As stated in the report of last year, pensions, which are paid to superannuated and infirm employes, now constitute a special payroll and are charged to Operating Expenses, the total amount so charged during the year being $231,819.92. Heretofore these pensions have been paid in part from amounts charged to General Expenses and in part from a surplus accumulated in the past when the contributions for pensions were in excess of payments.

During the year 145 names were added to the pension roll and 84 were removed by reason of death, leaving 923 as the total number of pensioners on June 30, 1914. The total payments to pensinners from October 1, 1884, the beginning of this Feature, to June 30, 1914, aggregate $2,220,671.86. The average age of pensioners at June 30, 1914, was over seventy years.

A report of the operations of the several features will be distributed to members.

INDUSTRIAL DEPARTMENT.

One hundred and sixty-seven new industries, manufacturing and commercial, were located on or immediately adjacent to your line during the year, from which the Company should derive substantial freight revenues. One hundred and ninety-four side tracks were constructed: one hundred and four to newly located industries, and twenty-seven to industries previously located but without side track facilities; the remainder being additions to or extensions of facilities at existing plants.

INSURANCE FUND.

A summary of the operations for the year ended June 30, 1914, and a statement of the assets and liabilities are shown in Table 25. The surplus in this Reserve Fund at June 30, 1914, was $1,479,073.63.

SUBSIDIARY LINES.

The Income Accounts of the following lines, owned but operated separately and not included in the Income Account of The Baltimore and Ohio Railroad Company, are shown in the following Exhibits, viz.:—

"A"	The Staten Island Railway Company	12.65 miles.
"B"	The Staten Island Rapid Transit Railway Company	10.89 "
"C"	The Sandy Valley and Elkhorn Railway Company	30.50 "
"D"	The Baltimore and Ohio Chicago Terminal Railroad Company	77.13 "
		131.17 miles.

THE CINCINNATI, HAMILTON AND DAYTON RAILWAY CO.

Owing to a series of unusual and unforeseen circumstances, the Cincinnati, Hamilton & Dayton Railway Company (hereinafter referred to as the "Cincinnati Company") became unable to meet its various obligations and failing, on July 1st, 1914, to pay the interest on certain of its First and Refunding Mortgage Bonds and on certain bonds of which it was the guarantor, upon application of the Trustee of its First and Refunding Mortgage Bonds to the United States District Court for the Southern District of Ohio, Western Division, was, on July 2, placed in the hands of Judson Harmon and Rufus B. Smith, Receivers.

In the Annual Report of your Company for the year ended June 30, 1909, statement was made of the proposed acquisition in 1916 of the Cincinnati Company which, for convenuence in reference, is herein repeated:

"Negotiations pending during the year have been concluded recently and made effective July 1, 1909, whereby your Company will acquire, at the expiration of seven years, at a price then to be agreed upon or determined by arbitration, the controlling stock of the Cincinnati, Hamilton & Dayton Railway Company.

"In this connection a plan was effected for adjustmeat of future interest charges and the payment or adjustment of the floating debt of the Cincinnati, Hamilton & Dayton Railway Company, and providing approximately $7,000,000 for improvements and working capital. Under this plan your Company will guarantee $12,500,000 of the Cincinnati, Hamilton & Dayton Railway Company's First and Refunding Mortgage 4% 50-year bonds, dated July 1, 1909, and $11,557,000 of that Company's 4% notes, due July 1, 1913, secured by a deposit of $13,000,000 of the First and Refunding Bonds. Also, upon the acquisition under the agreement of the stock of the Cincinnati, Hamilton & Dayton Railway Company your Company is obligated either to purchase at eighty-five or guarantee $20,000,000 of that Company's General Mortgage Bonds, due July 1, 1939.

"It is expected the closer relations of the Companies will be productive of results mutually beneficial."

These negotiations were concluded in 1909 after a thorough investigation by a committee and full consideraion by your Board.

The gross earnings of the Cincinnati Company in 1909 were $7,897,000, and the committee estimated that following, and largely because of, the closer association of the two properties, the gross earnings would rapidly increase, their estimate for the year 1913 being $10,700,000. The actual earnings in 1913 exceeded $10,000,000, and but for the interruption of traffic for several months incident to the floods, no doubt would have closely approached the estimate of the committee for that year. The year 1914 was relatively much more unsatisfactory, for the Company was able only to maintain its earnings to the basis of 1913, and failed to realize the anticipated increase in gross, because of the continued interruption to traffic from the effects of the flood in the early part of the year, and in the later portion to the marked decline in general business.

The committee estimated also that there would be an additional source of profit to your Company resulting from the increased interchaage of business between your Company and the Cincinnati Company. The Committee placed the increased business to your Company from this source at an average of $1,000,000 per year, and their estimate in this respect has been exceeded by the actual figures, the revenue to your Company on interchange business with the Cincinnati Company for the calendar year 1913 being $1,753,000 in excess of that of 1909.

Because of events which were not foreseen, and some of which clearly could not have been foreseen, the costs of operation and charges exceeded the committee's estimate, so that there was not realized the net income that was anticipated. The chief causes were the increases in rates of pay, 1913 over 1909, of $507,000, increase in taxes of $130,000, and the devastating effects of the flood in March, 1913, which, in addition to severely wrecking the line, practically caused a suspension of traffic for several months and seriously affected the operations in both the fiscal years 1913 and 1914, and entailed direct property losses in excess of $1,500,000.

Of the $12,500,000 First and Refunding Mortgage Bonds of the Cincinnati Company guaranteed by your Company only $7,500,000 are now outstanding, the remaining $5,000,000 not having been sold, but instead your Company has advanced from time to time for additions and betterments $3,989,000. In addition your Compaay has advanced $1,915,227 for equipment obligations, $3,296,866 for general treasury purposes, and $1,200,000 for the reconstruction of property destroyed by the flood. For these advances your Company holds as collateral security $6,994,000 First and Refunding Mortgage Bonds, and other collateral security of an estimated value of not less thtan $3,000,000. These advances, aggregating $10,401,093 are carried in Balance Sheet grouping "Loans and Bills Receivable."

When, on July 1, 1913, following the disastrous flood, the Cincinnati Company's $11,557,000 Purchase Money Notes matured, that company found it impracticable to refinance this obligation, and your Company, in fulfilment of its guarantee, took up these Notes, which were secured by $13,000,000 First and Refunding Mortgage Bonds, and now holds the Notes and collateral, the same being carried in Balance Sheet grouping "Miscellaneous Investments—Securities Unpledged."

Among the assets in the Treasury of the Cincinnati Company on the conclusion of the negotiations in 1909 was approximately forty per cent. of the capital stock of the Pere Marquette Railroad Company, which had cost the Cincinnati Company over $13,000,000. The Marquette Company's revenues had also been seriously depleted through the increases in rates of pay, etc., and when it became evident that it would need large additional sums of money, which the Cincinnati Company could not advance, it was deemed advisable to dispose of these shares. Accordingly this stock was sold for $2,530,000, payable December 1st, 1916, at the same time The Baltimore and Ohio Railroad Company agreeing that the price of the Cincinnati Company's stock, which it had agreed to acquire in 1916, should not be less than this sum. Subsequently the Pere Marquette Railroad Company was placed in the hands of receivers. To avoid possible misunderstanding it should be stated that The Baltimore and Ohio Railroad Company is in no way obligated with respect to any of the Pere Marquette Railroad Company's securities.

In 1909, the year before your Company became interested in the operations of the Cincinnati Company, the deficit in income was $1,691,000. Following proportionate reductions in 1910 and 1911, the deficit in 1912 had been reduced to $617,000, notwithstanding the large increase in expenses due to increased rates of pay since 1910 and increased taxes. Against

these deficits your Company had the profit derived from the interchange traffic, which was constantly growing. Consequently up to the time of the flood in March, 1913, there had been justifiable expectation that the forecast of the committee would be realized, and that the road would shortly be self-sustaining. The management had been so confident as to this that in October, 1912, your Company entered into a supplemental agreement with Messrs. J. P. Morgan & Co. conditionally fixing $740,970 in addition to the $2,530,000, as the *maximum* price of the stock when acquired. This arrangement was considered reasonable and advantageous, as any improvements made to the property of the Cincinnati Company before the consummation of this agreement would enhance the value of the stock and necessarily influence the arbitrators in arriving at the price to be paid by your Company.

While your Company had advanced the funds necessary for the restoration of the property after the flood, and while this work had been done in a most substantial manner, the direct cost of the work and the increased expense due to the congestion of traffic, which it took months to overcome, resulted in the operations for the years 1913 and 1914 being so unprofitable that it became clear that the Cincinnati Company could not continue its operations and meet the increasing fixed interest charges. Consequently, under these existing conditions, and especially in view of the anticipated demand, which was subsequently made, growing out of the Pere Marquette Company's default on certain of its bonds, bearing the guaranty of the Cincinnati Company, and following consideration and recommendation of a committee, your Board decided it would be inadvisable for your Company to make further advances or payments, other than those for which it was under legal obligation. It is probable the receivership will lead to a readjustment of the Cincinnati Company's obligations and the placing of its finances on a sound basis. The ultimate effect on your Company of such reorganization cannot now be determined, but, having in mind the value of the various current assets of your Company, your Board does not feel justified at this time in making charges in anticipation of losses, other than the interest on advances made, accrued and not collected for the year ended June 30, 1914.

* * * * * * * * * * *

The President and Directors acknowledge with pleasure the loyal and efficient services of the officers and employes during the past year.

By order of the Board,

DANIEL WILLARD,
President.

THE BALTIMORE AND OHIO RAILROAD COMPANY.

CONDENSED INCOME ACCOUNT AND BALANCE SHEET, YEAR ENDED JUNE 30, 1914.

CONDENSED INCOME ACCOUNT FOR YEAR.

	1914.	INCREASE OR DECREASE.
GROSS EARNINGS, RAIL OPERATIONS	$97,411,441.48	$4,144,690.14 Dec.
TOTAL EXPENSES, RAIL OPERATIONS	72,054,892.40	1,724,745.58 Dec.
Net Earnings from Operation	$25,356,549.08	$2,419,944.56 Dec.
Percentage of Expenses to Earnings	73.97	1.32 Inc.
OUTSIDE OPERATIONS	Def. $885,246.25	$10,935.34 Dec.
Total Net Revenue	$24,471,302.83	$2,430,879.90 Dec.
Railway Tax Accruals	3,226,465.69	265,560.60 Inc.
Operating Income	$21,244,837.14	$2,696,440.50 Dec.
OTHER INCOME	6,017,719.18	805,513.15 Inc.
Gross Corporate Income	$27,262,556.32	$1,890,927.35 Dec.
TOTAL DEDUCTIONS FROM INCOME: RENTS, INTEREST, HIRE OF EQUIPMENT, ETC.	18,061,989.22	2,242,756.24 Inc.
Net Corporate Income	$9,200,567.10	$4,133,683.59 Dec.
Net Corporate Income		$9,200,567.10
Dividend payments on Preferred Stock, 4%		2,354,633.64
Income Balance Transferred to Profit and Loss		$6,845,933.46
Amount to Credit of Profit and Loss, June 30, 1913		$37,410,162.08
Less Sundry Adjustments—Net Debit Balance		2,333,145.33 35,077,016.75
		$41,922,950.21
Dividend Charges to Surplus, Common Stock 6%		9,118,762.47
Amount to Credit of Profit and Loss, June 30, 1914		$32,804,187.74

CONDENSED GENERAL BALANCE SHEET FOR YEAR.

ASSETS:	1914.	INCREASE OR DECREASE.
Total Property Investment	$361,611,592.88	$14,720,208.64 Inc.
Less: Accrued Depreciation on Equipment in Service	*Cr. 15,025,071.35*	*Cr. 1,923,256.46 Inc.*
Net Property Investment	$346,586,521.53	$12,796,952.18 Inc.
Total Securities: Proprietary, Affiliated and Controlled Companies	219,451,358.64	2,279,914.00 Inc.
Total Other Investments	46,490,749.42	11,510,425.26 Inc.
Total Property and Other Investments	$612,528,629.59	$26,587,291.44 Inc.
Working Assets—Cash, Securities, etc.	76,171,241.41	21,357,615.01 Inc.
Deferred Debit Items	5,414,683.04	1,117,804.40 Inc.
Grand Total	$694,114,554.04	$49,062,710.85 Inc.
LIABILITIES:		
Common Stock	$152,317,468.00	
Preferred Stock	60,000,000.00	
Total Stock Liability	$212,317,468.00	
Total Funded Debt	$402,333,776.47	$36,659,450.76 Inc.
Total Capital Liabilities	$614,651,244.47	$36,659,450.76 Inc.
Working Liabilities	31,156,796.63	16,279,108.91 Inc.
Accrued Liabilities not Due	8,466,226.48	214,624.36 Inc.
Deferred Credit Items	4,329,266.03	539,719.03 Inc.
SURPLUS:		
Additions to Property through Income since June 30, 1907	1,227,759.06	
Invested in Other Reserve Funds	1,479,073.63	24,217.87 Dec.
Profit and Loss Balance	32,804,187.74	4,605,974.34 Dec.
Grand Total	$694,114,554.04	$49,062,710.85 Inc.

Railway Age Gazette

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WE GUARANTEE, that of this issue 8,800 copies were printed; that of these 8,800 copies 7,409 were mailed to regular paid subscribers to the weekly edition, 250 were provided for counter and newe companies' sales, 1,078 were mailed to advertisers, exchanges and correspondents, and 63 were provided for samples and office use; that the total copies printed this year to date were 429,850, an average of 9,345 copies a week.

Volume 57 November 13, 1914 Number 20

Contents

*Illustrated.

The politicians in various state legislatures have passed and the politician governors of various states have signed so-called "full crew" bills on the assumption that such legislation would be popular. The first complete and satisfactory test of its popularity was made in Missouri at the election last week. The state legislature had passed a typical train crew law. The railways appealed to the people on the referendum ballot. The representatives of the Brotherhood of Railroad Trainmen left no stone unturned to prevent the law from being repealed, and plastered half the billboards in the state with misleading statistics intended to make the voters believe that train crew laws were needed to reduce railway accidents. The railways likewise conducted a state-wide campaign, taking the form chiefly of newspaper articles and advertisements. Their two great arguments were first, that the legislation would not reduce accidents because accidents were not due to the alleged fact that train crews were not large enough, and, second, that the legislation would add $500,000 a year to the expenses of the railways and the passenger and freight rates that their patrons must pay. The railways won. The people knocked out the law by a decisive majority. The result illustrates the fact that politicians often misrepresent what the people want and that when the railways can get before the public the facts regarding regulative measures the public can usually be depended on to decide intelligently and fairly. One great trouble has been that the railways have not tried often enough and hard enough to get their case before the public. The result in Missouri should encourage them to appeal more frequently from legislatures, commissions and courts to the people. It should also help to defeat the senseless train crew bills in states where they are pending and to secure the repeal of the laws on the subject that already are in effect in several states.

Full Crew Relerendum in Missouri

Trip passes issued by 78 railroads in 1913 represented travel, which, if paid for, would have brought in $18,520,000. This statement was one of the shining passages in the Interstate Commerce Commission's decision in the 5 per cent freight rate case, issued last July, and one which naturally elicited the loudest applause from the galleries. Less prominent was the qualifying clause that "some of these passes were no doubt issued to employees traveling on business for the carriers." Excepting specific citations of cases of undue liberality in furnishing private cars for directors' families, this looseness of statement characterized the whole of the commission's chapter on passes. The president of one of the Trunk Lines, quoted in the New York Evening Post, now says that on his road the passes issued in June (the month specially cited by the commission) numbered 8,717; of which 4,486 were for officers and employees of his own company and 3,408 were for their families. This leaves 823 for all others, including officers and employees of other roads. In other words, the abuse, insofar as it is an abuse, is of less than one-tenth the magnitude which the commission's figures, as commonly interpreted, would make out. This president further says:

Alleged Abuse of Passes

> To cut off passes for employees would not materially increase passenger traffic or revenue. Most of this travel is of a character which would not be done at all if passes were not issued, and practically all the remainder is travel the expense of which would be reimbursed by the company. Free transportation to employees induces a better feeling among them; far better results are obtained from them in a business way, and a loyalty to the company developed which brings actual results to the stockholders. They patronize the dining cars and other facilities of the road, bringing in increased revenue. . . . None of the figures here given apply to the issuance of annual passes. It is the custom of general officers to send annuals to general officers of other companies; but business of their own company, with a constant demand for travel upon their own lines, makes their journeys for pleasure on other roads very infrequent.

That the views here expressed are eminently sound, has been evidenced by long experience. Free rides for employees and their families, a large proportion of which are for pleasure trips, constitute, when properly regulated, one of the most rational expenditures of a railroad. Even the brotherhood leaders, whose wishes usually prevail at Washington, agree to this. The actual cost of this passenger service is, undoubtedly, far less than the money value of the good will which results. Free rides for employees of other roads are almost equally justifiable. Moreover, most of the interstate passes allowed by law, outside of those for railroad men, are for charitable or philanthropic purposes. Is there any public sentiment opposed to this use of railroad facilities?

Car Surpluses and Car Shortages

Arthur Hale has prepared for the Western Economic Society a very interesting paper on Freight Car Surpluses and Shortages, which we publish elsewhere in this issue. That Mr. Hale or any one else is able to discuss this subject intelligently is due to the fact that following the great car shortage of 1906, the American Railway Association began the compilation of the statistics to which Mr. Hale refers. Nobody was able before the compilation of these statistics was begun to say with any certainty whether the railways of the United States had provided enough equipment to move their normal traffic, and in consequence when a severe car shortage did come the railways were subjected to widespread and severe criticism and to drastic laws specifying the conditions under which they must furnish cars to shippers and penalties that would be imposed if they failed to do so. The compilation of the statistics since that time renders it possible for us to know just what the car situation has been fortnightly for more than seven years. We know that there have been during these years some brief and comparatively small car shortages and taht there have been numerous prolonged and very large car surpluses. In other words, the figures afford a complete answer to any criticism which may now or in future be made of the railways regarding the facilities provided by them during this period at least. Aside from their value in showing what the car situation has been and thereby serving as a protection against unjust criticism and legislation, the statistics undoubtedly have been of some value as means of increasing efficiency in the operation of the railways. For example, the comparative statistics regarding car miles per day on the different roads undoubtedly have had a stimulating effect on their managements. The statistics have been of such great and unmistakable value in numerous ways that it is to be hoped their compilation will be continued indefinitely.

CHICAGO, BURLINGTON & QUINCY

THE Burlington was fortunate in the fiscal year ended June 30, 1914, in that the crops in its territory were good and there was actually a larger movement of grain than in the previous year. The result was that although the Burlington felt the general depression to some extent in its freight business—the total tonnage carried in 1914 being 32,389,000 tons as against 33,458,000 tons in 1913—the total loss was in tonnage delivered to it by other roads, the tonnage originating on the Burlington being 22,547,000 tons in 1914 and 22,531,000 tons in 1913. Passenger business was considerably better in 1914 than in 1913, so that despite the considerably lower passenger-mile rate, due to the Supreme Court's decision in the two-cent fare law cases, passenger earnings held up. Total operating revenue in 1914 amounted to $92,751,000, compared with $94,374,000 operating revenue in 1913. Expenses decreased to a small extent, other income slightly decreased and rents increased. The result was that net corporate income in 1914 amounted to $17,114,000 as against $19,431,000 in the previous year, and after the payment of the regular 8 per cent dividends there was appropriated for additions and betterments $5,716,000, and there remained in addition $2,531,000 which was credited to surplus. This compares with an appropriation of $7,648,000 for additions and betterments in 1913 and a surplus of $2,916,000 after this appropriation.

The Chicago, Burlington & Quincy seems such a remarkably wealthy property because of three factors. It serves a rich originating territory. Its outstanding securities are at an unusually low ratio to the total property investment, this investment having been consistently added to from earnings belonging to the owners. The road is particularly well managed. Comparatively few railroads in any country combine these three factors to the extent that the Burlington does.

The company operates 9,264 miles of road, of which 836 miles has second track and 42 miles third track, with a total of 2,920 miles of yard tracks and sidings. About 140 miles of new line was opened during the year, this new line being the extension south from Laurel, Mont., to Orin Junction, to connect with the Colorado & Southern, the principal subsidiary of the Burlington. There was 72 miles of second track added during the year, and 19 miles of third track and about 66 miles of yard tracks and sidings. Since a very large proportion of the Burlington's mileage is branch line mileage, or what might more properly be called feeder mileage, it will be seen that for a road west of Chicago it has a large proportion of second track and especially of sidings.

Of the total revenue about 68 per cent comes from freight and 23 per cent from passengers. On the other hand, in 1914 the total mileage of freight trains was 17,066,000, and passenger-train mileage 17,721,000. The freight and passenger density appears smaller because of the large proportion of feeder mileage; but the density on main line is actually remarkably heavy. The average for the whole road was 126,000 passengers one mile per mile of road in 1914 and 125,000 in 1913, and 942,000 ton-miles per mile of road in 1914 and 965,000 ton-miles per mile of road in 1913.

The average passenger journey is short, 49 miles in 1914, with no change from 1913. The receipts per passenger per mile are low for a western road, 1.888 cents in 1914 and 1.921 cents in 1913, the reduction being due, at least in part, to the Supreme Court's decision upholding the two-cent fare laws.

The average length of haul of freight is long for a road with so much branch line mileage, 266 miles in 1914 and 263 miles in 1913. The receipts per ton per mile are not high for an originating road, 7.29 mills in both 1914 and 1913.

As was previously mentioned, all of the loss in freight business came from a reduction in the tonnage received from connections, the total tonnage of all commodities carried in 1914 being 32,389,000, of which 22,547,000 originated on the road and 9,842,000 was received from connections. In 1913 the total tonnage was 33,458,000 tons, of which 22,531,000 tons originated on the road and 10,927,000 was received from connections. The principal decrease in 1914 as compared with 1913 was in the tonnage of bituminous coal received from connections. The total tonnage of bituminous coal carried in 1914 amounted to 10,069,000 tons, or 31.09 per cent of the total revenue tonnage, and of this total 8,339,000 originated on the road and 1,730,000 tons was received from connections. In 1913 the bituminous coal tonnage totaled 10,349,000 tons, or 30.93 per cent of the total revenue tonnage in that year, and of this total coal tonnage 7,764,000 tons originated on the road and 2,584,000 tons was received from connections. The total tonnage of grain in 1914 amounted to 4,309,000, or 13.30 per cent of the total revenue tonnage, comparing with a grain tonnage of 3,919,000 in 1913, or 11.71 per cent of the total revenue tonnage carried in that year.

Total operating expenses in 1914 amounted to $62,148,000 as against $62,843,000. It will be seen that expenses were not reduced in proportion to the loss in revenue; the operating ratio was 67.01 in 1914 as against 66.59 in 1913. The following table shows the percentage of each class of operating expense to total operating revenues:

	1914	1913
Maintenance of way and structures	12.94	13.28
Maintenance of equipment	17.13	17.10
Traffic expenses	1.76	1.68
Transportation expenses	32.59	31.79
General expenses	2.59	2.74
Total	67.01	66.59

The reduction of, roughly, $500,000 in maintenance of way is accounted for by a reduction in the amount spent for rails, other track materials and roadway labor, and by a considerable reduction in the amount spent for buildings, fixtures and grounds, the amount on this latter account being $1,262,000 in 1914 and $1,693,000 in 1913. In part these reductions are offset

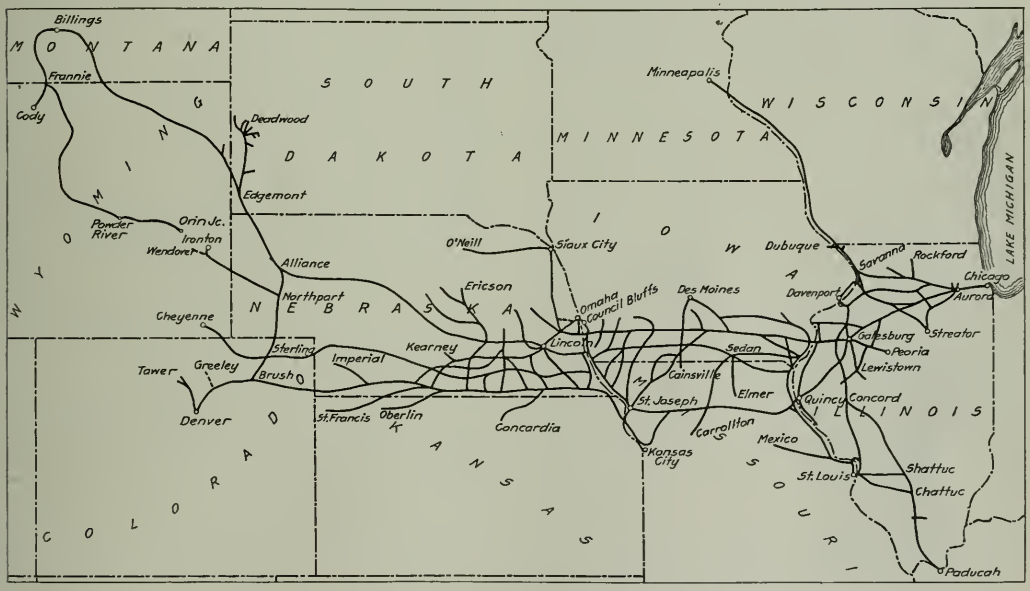
by an expenditure of $2,112,000 on ties, as compared with $1,711,000 in 1913.

In maintenance of equipment the reduction of $245,000 is entirely due to smaller amounts charged to renewals of freight-train cars, $855,000 being charged on this account in 1914 as against $1,698,000 in 1913. In part this reduction was offset by larger charges for repairs and for depreciation. Since the renewals charge represents the original cost, less salvage and depeciation on equipment retired, it is a bookkeeping matter and not a matter of actual money expenditure. In 1914 3,179 freight cars were retired as against 3,995 in 1913. On the other hand, 12,601 cars were added in 1914 as against 4,004 cars in 1913.

Transportation expenses amounted to $30,225,000 in 1914 as against $29,998,000 in 1913. This is an increase of less than 1 per cent, with a decrease of about 2 per cent in ton mileage and an increase of about 1 per cent in passenger mileage. The increase in transportation expenses is due almost entirely to increases in the amounts paid for loss and damage to freight, damage to property and injuries to persons. This may, of course, be due to more prompt settlement of claims or to the payment of claims arising out of the previous year's business. There was some saving in the expense for fuel for road locomotives, $5,771,000 being spent on this account in 1914 as against $5,935,000 in the previous year. Some of the increase in transportation expenses can be explained by a much larger empty car movement, as can also the decrease in average revenue trainload. The trainload in 1914 was 479 tons, and in 1913 484 tons. The mileage of loaded cars was 452,000,000 in 1914, a decrease of nearly 9,000,000 miles, while the mileage of empty cars was 212,000,000, an increase of about 18,600,000. The average loading per loaded car remained about the same in the two years, 19 tons.

The Burlington spent in all $19,073,000 for extensions, new equipment and additions and betterments in 1914. Of this amount $2,216,000 net was for new lines, $6,085,000 for additions and betterments to road, and $10,772,000 for equipment. Of the expenditures for road $3,719,000 was charged to property account and $2,367,000 to income, and of the expenditure for equipment $7,414,000 was charged to property and $3,358,000 to income. Since 1907 the company has charged $27,146,000 spent for additions and betterments to income, and in addition has a surplus of $93,000,000, which, however, by no means measures the surplus which would be shown if the present Interstate Commerce Commission rules had been in effect for some years previous to 1907, since before that the Burlington had been charging additions and betterments to income account without carrying these accounts as appropriated surplus on the balance sheet. Since both surplus and appropriated surplus represent excess of assets over liabilities, what this means, stripped of accounting technicalities, is that there has been something more than $120,000,000 invested in the Burlington property against which no securities have been issued, and, of course, the greater part of this excess in assets is in the form of fixed capital—property, not money.

The net increase in securities outstanding in the hands of the public was $5,825,000 during the year, there having been sold $5,000,000 general mortgage 4 per cent bonds and some additional bonds of this issue to cancel bonds paid at maturity. The unextinguished discount on funded debt amounted to $2,329,000 on June 30, 1914, as compared with $657,000 on June 30, 1913, and in addition $45,000 was charged to income of the year for discount on securities, on the other hand other deferred debit items decreased being $975,000 in 1914 and $2,593,000 in 1914. There was $4,815,000 cash on hand at the beginning of the year, with total working liabilities of $11,469,000, with no loans and bills payable, and at the end of the year $6,516,000 cash on hand and $15,180,000 working liabilities, which included $1,900,000 loans and bills payable. In other words, despite Clifford Thorne's opinion to the contrary, one of the very strongest railroad companies in the entire country could not sell 4½ per cent bonds, even to a comparatively small amount, except at a very considerable discount; and despite the fact that a very large amount of money representing surplus belonging to the stockholders is invested each year in property, nevertheless, the Burlington will have to come into the market for new capital



The Chicago, Burlington & Quincy

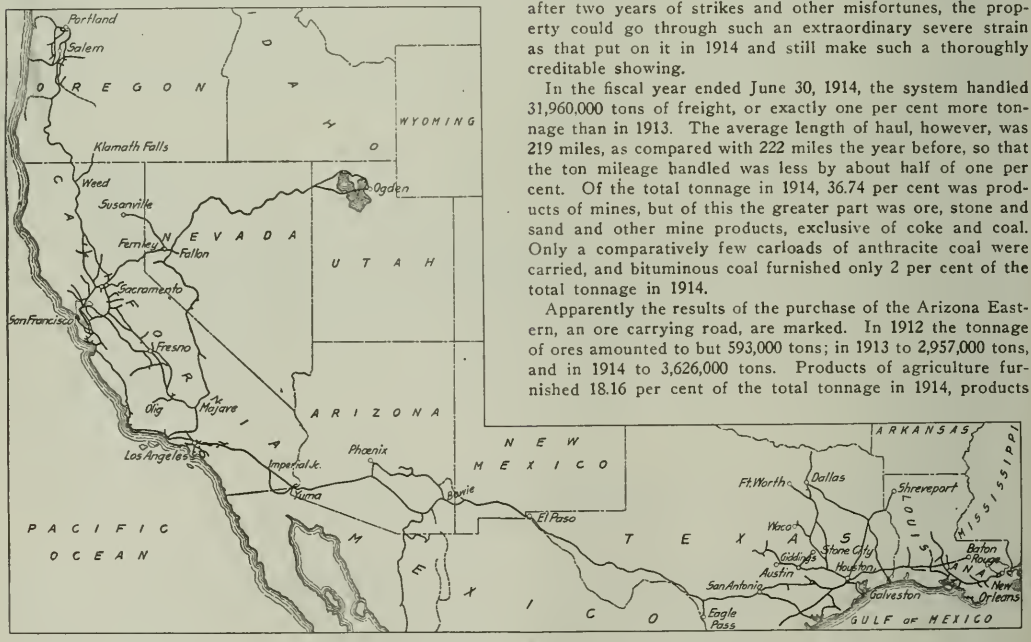
in the not distant future if it is to continue the policy of extensive expenditures on additions and improvements each year.

The following table shows the principal figures for operation in 1914 as compared with 1913:

	1914	1913
Mileage operated	9,264	9,129
Freight revenue	$62,799,188	$64,046,856
Passenger revenue	21,743,507	21,895,691
Total operating revenue	92,750,934	94,374,486
Maint. of way and structures	12,002,628	12,535,863
Maint. of equipment	15,888,686	16,133,215
Traffic expenses	1,634,672	1,586,803
Transportation expenses	30,224,524	29,997,717
General expenses	2,397,888	2,589,293
Total operating expenses	62,148,398	62,842,891
Taxes	4,028,900	3,563,359
Operating income	26,433,388	27,840,545
Gross income	27,934,465	29,800,475
Net income	17,114,407	19,430,746
Dividends	8,867,128	8,867,128
Appropriated for additions and betterments	5,715,875	7,647,743
Surplus	2,531,404	2,915,875

SOUTHERN PACIFIC

NO better measure of the equity back of Southern Pacific common stock could be given than the way in which the plant and the organization have withstood the extraordinary strain put on them in the fiscal year ended June 30, 1914. Floods, fire and unprecedented rains caused interruptions to traffic to an extent never before recorded for a railroad covering such a vast territory as does the Southern Pacific. On the 10,477 miles of road operated in this system there were 227 interruptions to traffic, with an average delay of three days each, in the fiscal year ended June 30, 1914. In every month except November, as Mr. Kruttschnitt, chairman of the executive committee, points out, damages from washouts and landslides were frequent and embarrassing. Added to the loss in both freight and passenger traffic caused by the peculiarly perverse weather conditions, there was a distinct loss in passenger traffic because of the number of passengers who might have gone to California, but who preferred to put off their trip until the Panama exhibition.



The Southern Pacific System

Notwithstanding all this, total operating revenues decreased but 2.87 per cent and expenses increased by less than one per cent. After the payment of expenses, taxes and interest charges the Southern Pacific had in 1914, $20,452,000 available for dividends, compared with $26,868,000 available for dividends in the previous year. Six per cent on the common stock outstanding calls for $16,361,000, so that there was a margin of safety back of the dividend, even last year, of $4,091,000.

The Southern Pacific system consists of the Southern Pacific Company and proprietary companies. It is divided for convenience of the operating management as between lines east of El Paso and lines west of El Paso. The lines west include, of course, the Central Pacific, running from Ogden to San Francisco.

The annual report for 1914 is the thirtieth of the company. The Southern Pacific and the Great Northern are the only two of the great transcontinental systems which have never been through a receivership. Under Collis P. Huntington, the Southern Pacific had plowed into it a huge surplus, and in the early days of the Southern Pacific especially, the Golden State was indeed a golden state for the railroad, which had so large a share of its transportation business. The Huntington regime was a generous one, both to officers and employees and in maintenance of the property. The Harriman regime which followed continued a liberal policy of maintenance and was fortunate in inheriting the Southern Pacific organization. This, then, is the reason why, even after two years of strikes and other misfortunes, the property could go through such an extraordinary severe strain as that put on it in 1914 and still make such a thoroughly creditable showing.

In the fiscal year ended June 30, 1914, the system handled 31,960,000 tons of freight, or exactly one per cent more tonnage than in 1913. The average length of haul, however, was 219 miles, as compared with 222 miles the year before, so that the ton mileage handled was less by about half of one per cent. Of the total tonnage in 1914, 36.74 per cent was products of mines, but of this the greater part was ore, stone and sand and other mine products, exclusive of coke and coal. Only a comparatively few carloads of anthracite coal were carried, and bituminous coal furnished only 2 per cent of the total tonnage in 1914.

Apparently the results of the purchase of the Arizona Eastern, an ore carrying road, are marked. In 1912 the tonnage of ores amounted to but 593,000 tons; in 1913 to 2,957,000 tons, and in 1914 to 3,626,000 tons. Products of agriculture furnished 18.16 per cent of the total tonnage in 1914, products of lumber 17.89 per cent, and manufactures 14.88 per cent. There was a large falling off in the tonnage of manufactures, 4,755,000 tons being carried in 1914 as against 5,115,000 tons in the previous year, and a considerable falling off in products of forests, 5,717,000 tons being carried in 1914 as against 5,910,000 tons in the previous year. The average ton-mile rate in 1914 was 1.110 cents; in 1913, 1.123 cents. Total freight revenue was $78,369,000 in 1914, as against $80,141,000 in the previous year.

As in the case of the number of tons of freight, the number of passengers carried decreased, being 42,745,000 in 1914, as

against 42,006,000 in 1913; but the average length of journey decreased, being 40.92 miles last year as against 43.67 miles in the previous year, a decrease of 6.30 per cent. The passenger mileage, therefore, decreased by 4.66 per cent. The average revenue per passenger per mile was 2.247 cents in 1914 and 2.248 cents in 1913. Total passenger revenue amounted to $40,486,000 in 1914 as against $42,490,000 in the year 1913.

With a decrease in the ton-miles handled of 0.66 per cent and in the passenger-miles handled of 4.66 per cent, there was an increase in total operating expenses of 0.81 per cent, a decrease of 3.02 per cent in freight-train mileage, an increase of 2.15 per cent in passenger-train mileage, and an increase in the average trainload of all freight of 2.25 per cent, the average in 1914 being 471 tons and in 1913 461 tons.

In expenses for the year an increase of $475,000 in maintenance of way was in part offset by a decrease of $361,000 in maintenance of equipment, and a decrease of $226,000 in traffic expenses was more than offset by an increase of $249,000 in general expenses. Maintenance of way and structures amounted to $16,064,000 in 1914. It is estimated that repairs of flood damages amounted to an extraordinary expense of $880,000, and in California alone $1,284,000 additional will be required to complete these extraordinary repairs. Of this amount $475,000, it is estimated, will be chargeable to operating expenses next year and $809,000 to additions and betterments.

Maintenance of equipment cost $18,934,000 in 1914. This included charges of $609,000 for depreciation of locomotives, $279,000 for depreciation of passenger cars and $1,060,000 for depreciation of freight-train cars. The Southern Pacific has never before included a charge for depreciation, but has at last acquiesced in the Interstate Commerce Commission's requirements in this respect. Besides the charge in 1914 a charge of $22,458,000 was made to profit and loss and credited to accrued depreciation on the asset side of the balance sheet for estimated depreciation between July 1, 1907, when the Interstate Commerce Commission's ruling went into effect, to July 1, 1913. The following table shows the expenditures for repairs per unit of equipment, exclusive of depreciation and renewals, in 1914 and 1913:

	1914	1913
Repairs per locomotive	$3,920	$4,721
Repairs per passenger car	838	865
Repairs per freight car	93	94

The state of repairs of locomotives was not quite so good at the end of the year as at the beginning. Thirty-eight per cent of the total number of locomotives in service were in thorough order at the end of the year, as against 40 per cent at the beginning of the year, and 29 per cent were in good order as against 28 per cent at the beginning of the year, and 32 per cent required repairs or were in shop under repair as against 28 per cent at the beginning of the year.

Transportation expenses amounted to $40,937,000 in 1914 and the principal increases are in cost of fuel for road locomotives, operating joint yards and terminals, train supplies and expenses, and injuries to persons. The increase in cost of fuel was largely due to the higher price paid for fuel oil, the cost per ton of coal being $2.87 in 1914 and $2.90 in 1913, while the cost of four barrels of oil, which is figured as the equivalent of a ton of coal, was $2.59 in 1914 as against $2.37 in 1913. Thus the average cost of fuel per ton was $2.60 in 1914 as against $2.40 in 1913. The number of miles run per ton of fuel was 14.83 in 1914 and 14.23 in 1913.

During the year the Southern Pacific sold to its own stockholders at par $54,534,000 20-year 5 per cent convertible bonds. The conversion privilege permits of exchange of bonds for stock at par at any time up to June 1, 1924. The proceeds of the sale of these bonds were used in part to pay off $26,000,000 one-year 5 per cent notes, which fell due June 15, 1914. In addition there was $7,130,000 equipment trust certificates sold and $6,000,000 one-year 5 per cent notes. The net expenditure during the fiscal year ended June 30, 1914, for equipment and additions and betterments was $19,756,000. As of June 30 the company had on hand $19,170,000 cash and deposits, about $148,000 less than at the beginning of the year, and in addition to the expenditures on its own property mentioned above, had advanced to affiliated companies during the year $14,578,000, making the total now $105,525,000. There are no loans and bills payable, and audited accounts and wages payable at the end of the year amounted to $8,259,000, a decrease of $4,588,000 in this account during the year.

The Southern Pacific has an enormous asset which is not carried at any money value on its balance sheet. This is the title to oil lands belonging to the Southern Pacific Railroad Company and the Kern Trading & Oil Company. The Supreme Court held in June, 1914, that except where title to these lands had been obtained by fraud, the title could not be attacked because they were now found to contain oil. In Mr. Kruttschnitt's opinion the Southern Pacific's title to the valuable lands may now be regarded as unassailable.

There is, of course, the Central Pacific merger suit, which is now slowly being fought through the courts.

Mr. Kruttschnitt, like the late E. H. Harriman, is by nature an optimist. His remarks, therefore, in regard to the present state of the railroad business are particularly impressive:

"Your Board repeats the suggestion made last year that you take an active part in repelling the attacks of demagogues on your property. Unfair treatment of railroads is due in great part to the belief of politicians that only financial magnates suffer therefrom. The surest remedy for the evil is for railroad investors to give unmistakable evidence of their numbers and of their resentment of unfair legislation or regulation. You now number over 30,000, and with the stockholders of other railroads and with investors in their securities you form a body of a million or more voters, whose protests, backed up by ballots, can lawfully exert sufficient force to compel fair treatment by your servants in Congress, in legislatures, and on commissions. The common interests of railroad shareholders and of investors in every community, no matter how small, should cause them to actively participate in every election and to perform faithfully all other duties of citizenship, in order to secure proper representatives and protection for their interests. While your company has cheerfully made such expenditures as were required by Federal or State commissions or by legislation, many unreasonable laws have been enacted, which serve no public good, and which add unnecessarily to the cost of operation. . . .

"The reduction of our surplus over fixed and other charges, due to causes largely beyond control, has imposed on your company the necessity of reducing the expenditures for new construction, additions to and betterments of the property, to the lowest possible limits. The uncompleted work, listed above, is being slowly carried on to protect the investment already made, but no extensions or improvements of any description, not imperatively needed for protection of the property, are being authorized or even considered."

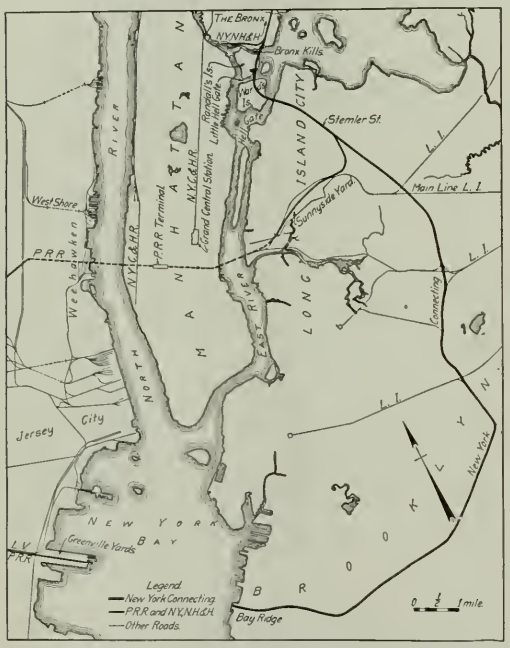
The following table shows the principal figures for operation in 1914 as compared with 1913:

	1914	1913
Average mileage operated	10,422	10,311
Freight revenue	$78,369,414	$80,141,499
Passenger revenue	40,485,949	42,389,837
Total operating revenue	126,614,537	130,353,693
Maint. of way and structures	16,064,457	15,589,027
Maint. of equipment	18,934,335	19,295,725
Traffic expenses	2,889,419	3,115,079
Transportation expenses	40,936,821	40,408,954
General expenses	3,975,035	3,726,326
Total operating expenses	82,800,068	82,135,109
Taxes	7,162,625	5,697,286
Operating income	37,695,367	44,208,009
Gross income	51,799,058	56,558,542
Net income	20,452,216	26,867,807
Dividends	16,361,088	16,360,932
Surplus	4,091,127	10,506,875

Construction of the New York Connecting Railroad

Ten Mile Line Involving Large Bridges and Viaducts Will Connect the Pennsylvania and New Haven

Construction work has now been in progress for more than two years on the New York Connecting Railroad, which will provide a direct connection between the New Haven and the Pennsylvania Railroad Systems, and the first section of the new line, which will be used for passenger traffic only, is nearing completion. On account of the location of this line in well-improved sections of the boroughs of Queens and the Bronx, and the heavy structures required to span the East river, Little Hell Gate, and the Bronx Kill, the cost of this 10-mile road will probably approximate $30,000,000, or $3,000,000 per mile. It will form an important link between two great systems, however, making possible direct connections for both freight and passenger traffic between New England and the central west and the south. The northern end of the new line, which is



Map of New York and Vicinity Showing Location of the New York Connecting Railroad

being built at present, will have four tracks—two for passenger and two for freight traffic. On the completion of this section it is expected to operate through trains between Boston and Chicago, Cincinnati, New Orleans, Washington, and southern Atlantic coast points, over this connecting line. Former President Mellen of the New Haven estimated that the new line would handle at least 40 passenger trains a day.

The road will leave the New Haven's Harlem River branch, at 142nd street in the Bronx, cross the Bronx Kill to Randall's island, then across Little Hell Gate to Ward's island, then turning sharply to the left will cross Hell Gate to Long Island City on an arch bridge having the longest span in the world. A connection is made in Long Island City with the Pennsylvania System through the Sunnyside yard, which is the end of the present work. Passenger trains will use this connection, passing under the East river, Manhattan Island, and the Hudson river in the Pennsylvania's tunnels, and connecting directly with the main line for the west. The freight line, which is also a part of this project, but is not yet under construction, will continue east and south to a connection with the old Manhattan Beach road of the Long Island system, over which freight trains will be operated to Bay Ridge, directly opposite the Greenville, N. J., freight yards of the Pennsylvania. A ferry service connects these points.

The construction of this connecting road is a joint enterprise of the New Haven and the Pennsylvania. The portion known as the East river bridge division, extending from the New Haven connection in the Bronx to Stemler street in Long Island City, is being built by the New York Connecting Railroad, of which Gustav Lindenthal is chief engineer, and the portion from Stemler street to the end of the passenger connection at Sunnyside yard, known as the Southern Division, is being handled by the engineering department of the Pennsylvania Railroad, A. C. Shand, chief engineer, and H. C. Booz, assistant chief engineer.

The new line is elevated for practically its entire length in order to reach the necessary height at the crossing of the East river, and also to eliminate grade crossings with the streets in

Erecting the Superstructure of the Bronx Viaduct

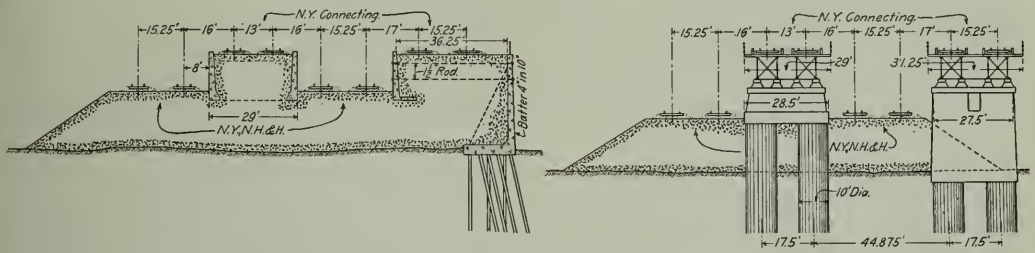
the Bronx and in Long Island City. The grade is continually rising from the New Haven connection to the Hell Gate bridge, the maximum being 1.2 per cent. The grade is level over the arch bridge, and then descends on a maximum grade of 0.72 per cent to Stemler street. The maximum elevation attained is over the East river, where the base of rail is about 145 ft. above mean high water.

Beginning at the New Haven connection at 142nd street, the first section of the line, known as the Bronx viaduct, extends to the Bronx Kill bridge about seven-eighths of a mile. The section over Randall's island, known as the Randall's island viaduct, is about three-eighths of a mile long, and from 75 to 100 ft. high. After crossing the Little Hell Gate bridge another viaduct is used to cross Ward's island, a length of about one-half mile. This viaduct reaches a maximum height of about 135 ft. The line makes a 3 deg. 10 min. curve to the left over Ward's island, approaching the Hell Gate arch bridge, the central angle being nearly 90 deg. The section south of this bridge includes the Long Island viaduct and the Eastern viaduct, having a combined length of a little over one mile. With the exception of short sections at the two ends where retaining walls and earth fill are used, the entire line is carried on steel and concrete viaducts and bridges. About 150 viaduct piers were required, the masonry work containing 450,000 cu. yd. of concrete,

with about 5,000 tons of steel reinforcement. The steel superstructure will total about 90,000 tons.

BRONX VIADUCT TO HELL GATE

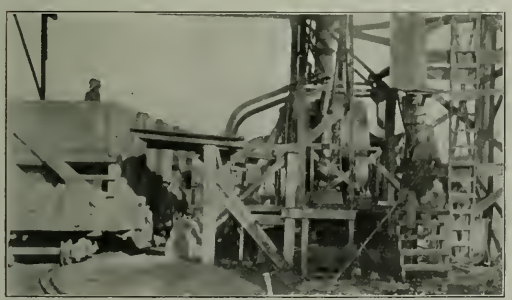
The four New York Connecting tracks join the four New Haven tracks at 142nd street in the Bronx, the New Haven tracks being spread to allow two of the new tracks to be located in the middle of the old layout. The other two new tracks are constructed on the east side of the old line, all four tracks being laid on earth fill between retaining walls as far south as 138th street. The retaining walls and the additions to the bridge



Cross Sections of Roadway Near Connection of New Haven and New York Connecting Railroad in the Bronx

abutments at street crossings, which are necessary to carry the additional tracks, are founded on spread footings supported by piles. About 900 ft. of retaining wall was required for this work, the fill between the walls being furnished by the New Haven.

From 138th street to 132nd street, where the difference in elevation between the new tracks and the old is too great to allow the use of the retaining walls and earth embankment, rectangular concrete piers are used under each of the two double-track portions of the line. Each pier is supported on two cylindrical columns, 10 ft. to 13 ft. in diameter, extending up to the ground level. These piers are placed about 64 ft. apart, the superstructure consisting of two lines of deck plate

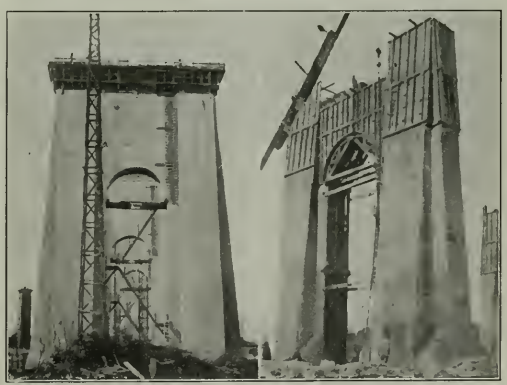


The Mixer Plant for Placing the Viaduct Piers

girders under each track. Between 133rd and 132nd streets the two new tracks, which are carried in the middle of the layout to that point, swing over the two easterly New Haven tracks, and join the other two Connecting tracks to form a four-track line, which is carried from that point to the Bronx Kill bridge on a viaduct consisting of deck girders on concrete piers. These piers, which have an arch opening at the base, rest on cylindrical concrete caissons at each end carried down to hardpan. Since the average pier height was less than 50 ft. it was found more economical for placing the concrete in these piers to use guyed derricks in preference to distributing towers, as the derricks could also be used for handling the sections of the steel forms and other material required around the work.

The Bronx Kill bridge consists of two 175-ft. through truss spans designed for a double-leaf bascule bridge, but built temporarily as fixed spans. While this channel is not navigable at present an improvement is contemplated which will deepen it in order to relieve the severe tidal current in Hell Gate. The center pier and the tower spans at each end for the operating machinery of the proposed bascule bridge are of concrete with granite facing at the water level. The center pier and the southerly abutment are founded on rock, which dips rapidly to the north, necessitating spread footings under the northerly abutment.

The Randall's island viaduct consists of 24 deck plate girder spans, varying in length from 80 ft. to 87 ft., supported on concrete piers. These piers are founded on rock which was comparatively close to the surface on this island, and are designed with buttresses or pilasters at each end with an arch between. For the lower piers derricks supported on raised platforms were used for handling concrete into the forms on account of the economy effected in the handling of other material, as mentioned above. The contractor located a con-



One of the High Piers on Ward's Island

Arrangement of Forms for Building High Viaduct Piers

struction dock on Randall's island for handling the material used in the work.

The new line crosses Little Hell Gate at a sharp skew on a four-span steel structure consisting of inverted bowstring trusses. Two spans are 292 ft. 6 in. long each, and two spans 280 ft. 3 in. The water is very shallow in this channel, rock outcropping at frequent intervals. The three piers are skewed parallel to the channel and consist of two circular piers connected by a reinforced concrete arch. A granite facing is

provided at the water level. The foundations were built in open cofferdams, the excavated material and concrete being handled on a construction trestle across the stream.

The viaduct over Ward's island consists of 30 spans, varying in length from 86 ft. to 93 ft., the design being the same as that on Randall's island, except that the continually rising grade makes the piers from about 80 ft. to 120 ft. high. Practically all of these piers are founded on hardpan, although in a few cases the footings were located on rock. The contractor built a dock on the island with a storage capacity of 1,200 cu. yd. of stone and 600 cu. yd. of sand. Derricks were used to unload the materials from barges lying at the dock onto a belt conveyor, which transported them to covered storage bins. Cement was also handled in the same manner and chuted down to the cement house, adjacent to the storage bins. The bins were constructed at a height sufficient to permit of charging, cars being pushed under the bins and there filled with sand, stone and cement. Each of these charging cars carried sufficient material for about 12 cu. yd. of concrete. Two cars were used, one being loaded at the bins, while the other was discharging at the mixer plant. The concrete was mixed in one-yard Lakewood mixers, located at the base of high distributing towers, serving three piers on each side. The sand and stone were kept separate in the charging car, allowing the proper amounts to be drawn off with the least delay into the charging hopper of the mixer. The towers supporting the hoist and steel chutes were built of timber in interchangeable sections, which could be arranged to give any desired height. The maximum height required was about 224 ft. The form sections were handled by tackle attached to the guy lines supporting the concrete chutes.

HELL GATE ARCH BRIDGE

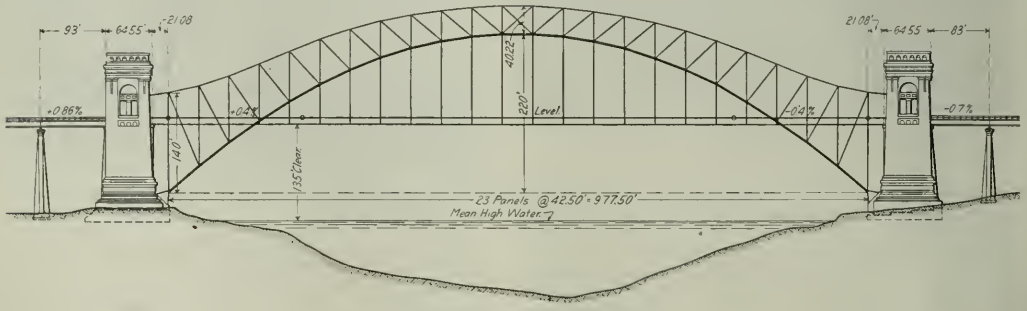
The crossing of the East river, even at its narrowest point in Hell Gate, was the most difficult problem in the construction of the entire line, its solution calling forth the design of a steel arch bridge with the longest span in the world. A single span structure over the river at this point was necessary on account of the depth of the water and the strength of the current, and for the same reason the structure had to be designed for erection without false work. A cantilever bridge, involving anchor spans at the ends, was not feasible on account of the 3 deg. 10 min curve over Ward's island, which commences approximately at the end of the bridge.

The structure is unusual in a number of respects, in addition to the length of span. The adoption of an arch bridge usually presupposes excellent foundations, but at the Ward's island end of the Hell Gate bridge the surface material and underlying strata were of such a poor quality that pneumatic caissons were used to support the tower. This is also the first long span bridge to be designed for four railway tracks. A loading practically equivalent to Cooper's E-60 was used in the design, the dead load amounting to 53,000 lb. per lineal foot of the bridge. Other noteworthy points in design are the use of special rocker joints at splices between chord members, the specification of high carbon steel and large rivets, and the use of girders in the floor at the intersection of the roadway with the arches, to transmit the load from the stringers to the arches, due to braking trains.

The towers are 125 ft. by 140 ft. in area, and are of a hol-

The Construction Plant Used in Building the East Abutment of the Hell Gate Arch

low concrete construction, faced with Maine granite, above the ground, and extending to a height of about 220 ft. The roadway is carried through the arches of these abutment towers. In addition to their architectural value the weight of these towers serves to decrease the size of foundation necessary and increase the stability of the arch structure. The two arches are spaced 60 ft., center to center, and each consists of two chords 140 ft. apart at the ends, and about 40 ft. at the crown. The rise in the lower chord is 220 ft. The roadway level is



Elevation of the Hell Gate Arch Bridge

between the two chords at the end post, crossing the lower chord three panels out from the end, and being suspended more than 150 ft. below the crown of the arch in the middle of the span. The arches are two-hinged, although they will be erected as three-hinged, and maintained in that way until all dead load has been placed. The clearance above mean high water is 135 ft. On account of the enormous dead load the chord members are never in tension, and the sections required are unusually heavy. The lower chord is a box section with a middle diaphragm having a width of 6 ft. 6 in., and a maximum depth at the lower end of 10 ft. 6 in. The upper chord is an inverted U section, and is of course considerably lighter. Continuous ballasted tracks are carried across the structure on concrete slabs, this construction being standard over the entire elevated portion of the line.

The Caissons in the West Abutment of the Hell Gate Arch

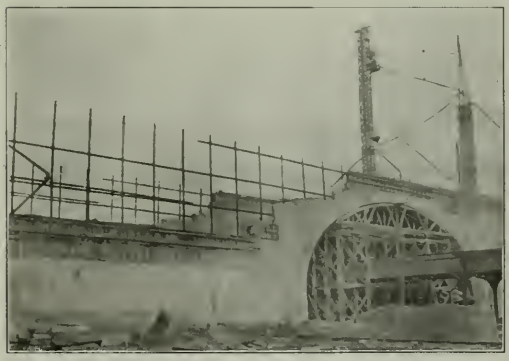
The tower on the Long Island side is founded on rock at a depth of about 20 ft., the foundation being placed in open cut. The westerly tower, however, is founded on rock at depths varying from 58 ft to 120 ft. below the ground surface. Twenty-one pneumatic concrete caissons were used in the construction of the foundation. These caissons were arranged in five groups, extending across the tower area parallel to the line of the arches. Three of these groups consisted of five 18-ft. cylinders each, and the other two, located in the vertical planes passing through the arch ribs, consisted of three rectangular caissons, 30 ft. by 40 ft. in plan under each arch. The three caissons under each truss are interlocked by keys, extending from the top to within 10 ft. of the cutting edges. The material through which these caissons were driven consisted of sand, coarse gravel and boulders, some of the latter being very large in size. On account of the difficulty which was expected in handling this material, and the uncertainty of the exact depth to which the caissons would have to be sunk, it was decided to build this particular part of the tower with company forces under the direction of the engineering department. The plant consisted of five compressors, boilers, electric light, etc. Each circular caisson was provided with two shafts, and each rectangular caisson with three shafts, with separate material and men locks. The material was handled by four derricks and one hoist tower for concrete. The excavation was wasted behind the sea wall, built along the edge of the island. The sinking of the caissons was accomplished in seven months.

A Portion of the Long Island Viaduct Showing Concrete Towers Used in its Construction, Eastern Viaduct in the Background

In the construction of the approaches to the arch bridge six piers are being omitted on each side to provide space for the back stays and counterweight, which will be necessary in the erection of the arches by the cantilever method. An important economy will be effected in this erection by utilizing for the back stays and counterweights a large portion of the steel designed for the superstructure of the arch and of the approach viaducts. It is expected that erection of the arch span will be commenced early in 1915.

HELL GATE TO SUNNYSIDE YARD

The Long Island viaduct is of the same type as that on Randall's and Ward's islands, the only difference in construction being that the piers are founded on gravel or sand, the footings being carried to a depth of from 10 to 30 ft. The rock was at too great a depth along this section to be reached by these footings, and this fact was an important consideration in the adoption of the concrete pier and plate girder type of structure for all viaducts. As the bearing pressure could not exceed three tons per square foot on the gravel and sand under the Long Island approach, it was impossible to secure at a reasonable cost suitable foundations for concrete arches or other heavier types of construction. The footings of the concrete piers were necessarily made wide to secure the required bearing, and this is even more important, as the strata in which the footings are located are water bearing and are above tide level, although with the future development of this district they may be completely drained.



One of the Street Arches in the Eastern Viaduct Showing Also Thin Retaining Wall Construction

The Eastern viaduct, which extends from Lawrence street to Stemler street, adjoining the Long Island viaduct on the east, consists of thin, high concrete retaining walls heavily reinforced, with an earth fill placed in thin, convex, well-compacted layers. Some streets are crossed by reinforced concrete arches, others by deck truss bridges of from 120 ft. to 166 ft. span. The retaining walls reach a maximum height of 72 ft. and are spaced 57 ft. 6 in., back to back. The outer face of the walls is battered 1 to 40, and the back is plumb. The thickness of the wall under the coping is 3 ft. They are reinforced with 8 in. 16-lb. channels, spaced 10 ft. apart, vertically and hori-

zontally, and bolted together at the intersections. Tie rods are provided to connect the two side walls at each point of intersection of the reinforcing channels. Short pieces of these rods were attached to the reinforcement before the concrete was poured, and turnbuckles are used to connect these short ends with the 2¼-in. rods, extending through the fill, which are being placed as the filling progresses. Solid concrete cross walls, which also contain tie rods, are provided at intervals of about 70 ft. Provision is made to carry the drainage down the backs of the walls and through holes near the surface. The filling material for this section of the work is being secured from the Sunnyside yard, the estimated quantity being 180,000 cu. yd. The fill is made with narrow gage equipment from a track laid on timber trestles supported on the tops of the walls, and is being carefully tamped in place in order to secure a fill that will exert practically no lateral pressure on the retaining walls. The design of these walls presupposes a fill of this character, the walls serving rather as facing for the fill than as actual retaining walls.

The reinforced concrete arches over the streets are all built on a skew, the maximum being 57 deg. In one case an elevated railway structure is carried under the arch, the span in this case being 102 ft. In two cases three-centered arches were used where a flatter ring was desired. The arch rings are heavily reinforced with 1-in. rods and wire mesh, the lower face of the arch is bush-hammered, and the upper surface is waterproofed by the membrane method, with a protective layer of brick laid over the waterproofing. High distributing towers were used in placing the concrete on this section, the concrete material being hauled in motor trucks from a dock on the river, about two miles away.

The section between Stemler street and the Sunnyside yard involves no work of unusual nature or of great size. The streets are crossed by concrete arches, or plate girder spans, and the tracks are carried on earth embankments without retaining walls between the streets. The material used for these embankments was secured from the Sunnyside yard, the total fill amounting to about 500,000 yd.

The masonry and foundation work was contracted to three firms as follows, beginning at the south end: Arthur McMullen, New York City; the Patrick Ryan Construction Company, New York City, and the T. A. Gillespie Company, New York City. The Snare & Triest Company, New York City, is building the towers of the Hell Gate bridge above the bases. The American Bridge Company has the contract for fabricating and erecting the superstructure of the arch bridge, the Long Island viaduct and the Ward's island viaduct, and the McClintic-Marshall Construction Company is fabricating and erecting the remainder of the steel superstructure.

In addition to Mr. Lindenthal, we are indebted to O. H. Ammann, assistant chief engineer, and H. W. Hudson, construction engineer, of the New York Connecting, for the foregoing information.

Car Lighting in India.—It is reported that the Railway Board of India has decided to install electric lights on all the passenger cars of the lines operated by the state. This official announcement will also mean that other lines eventually will have to do the same.

New Railway in Corea Opened.—A British consular report states that the entire Keigen (Seoul-Gensan) line was thrown open to traffic on August 16 last, on the completion of the Seoul-Kozan section, 17 miles in length. The railway has a total length of about 138 miles, and it traverses the provinces of Kyeng-Ki, Kang-Won, and South Hamgyeng. There are 22 intermediate stations, and through trains from Seoul accomplish the journey in about eight hours. Gensan occupies the third place in the foreign trade among the open seaports of Corea, and is the chief port on the east coast.

INDUSTRIAL RAILWAYS CASE*

The following is an abstract of the commission's supplemental report given by Commissioner Clark in the Industrial Railways Case, dealing with allowances to short lines of railroad serving industries, the language of the commission being preserved in so far as possible:

This proceeding is an investigation instituted by the commission on its own motion. The original report, held that all allowances to, or divisions of rates with, any of the so-called industrial roads were unlawful. No distinction was made between the industrial roads, although their physical characteristics and the conditions surrounding them varied widely.

As a result of that report, although no order was entered, the line-haul carriers promptly withdrew all allowances, divisions and demurrage and per diem arrangements with the industrial roads in the proceeding, and also with other similar roads. Protests against such cancellations led the commission to suspend them in a number of instances. In so far as the industrial roads that were before the commission are concerned no such allowances, divisions or demurrage or per diem arrangements are in effect.

After our original report was issued, the Supreme Court handed down its decision in the Tap Line cases, 234 U. S., 1.

In its opinion the Supreme Court referred to decisions of the commission, such as the *General Electric Company* and *Solvay Process Company cases,* 41 I. C. C., 237 and 246, and said:

> It thus becomes apparent that the real question in these cases is the true character of the roads here involved. Are they plant facilities merely or common carriers with rights and obligations as such?
>
> It is insisted that these roads are not carriers because the most of their traffic is in their own logs and lumber and that only a small part of the traffic carried is the property of others. But this conclusion loses sight of the principle that the extent to which a railroad is in fact used does not determine the fact whether it is or is not a common carrier. It is the right of the public to use the road's facilities and to demand service of it rather than the extent of its business which is the real criterion determinative of its character.

The court said that it was doubtless true that abuses existed in the conduct and practices of these lines and in their dealings with other carriers, which resulted in unfair advantages to some tap lines and discrimination against others. It pointed out that because the conclusion was reached that the tap lines were common carriers of both proprietary and nonproprietary traffic, and therefore entitled to participate in joint rates with other common carriers, it did not follow that divisions of joint rates might be made with them at the will of the carriers and without power of the commission to control the same.

In fundamental principles the instant case does not differ from the Tap Line cases. There may be a distinction as to the application of the commodities clause, but that can not properly affect the conclusions or action of the commission. If the commodities clause is violated, that infraction of law is not to be corrected or punished by rate adjustment.

Our findings in the original report in the instant case have been given general and substantial effect by the trunk line roads. The withdrawal of allowances to many of these industrial roads seems to have been accepted as proper without much question, but as to a few of them there is insistence that our findings invade the legal rights of the so-called industrial roads, and we are urged to issue an order so that those questions may be tested in the courts. We have concluded, however, that it is our duty to refrain from issuing an order and to avoid the delay which would be attendant upon such litigation. We think that in the light of the decision of the Supreme Court in the *Tap Line cases* it is our duty to so modify our findings in the original report herein as to permit the trunk line roads, if they so elect, to arrange by agreement with any of the industrial roads mentioned in our former report which are common carriers under the test

*The original decision (29 I. C. C. 212) was abstracted in the *Railway Age Gazette* of January 30, 1914, page 233.

applied by the Supreme Court in the *Tap Line cases,* and which perform a service of transportation, for a reasonable compensation for such service in the form of switching charges or divisions of joint through rates. Each road that becomes party to such an agreement must file with us immediately upon the consummation thereof a full statement of the arrangement entered into showing specifically the allowances or divisions granted thereby. We shall, in the exercise of the duty pointed out by the Supreme Court, undertake at the earliest available opportunity to inquire carefully into any of these allowances or divisions which may seem to be unwarranted or unreasonable or to effect unjust discrimination. What we have here said relative to establishment of allowances or divisions with the industrial roads referred to is not to be understood as a finding by us that those industrial roads can resume these relations with the trunk line carriers without transgressing the provisions of the commodities clause. If infractions of that law come to our notice, we shall in the proper way bring them to the attention of the Department of Justice.

We shall expect the trunk line roads, under the modification here made of our original findings, to re-establish allowances, divisions, or demurrage or per diem arrangements with industrial roads only in instances in which the transaction is *bona fide,* and in which it is clearly lawful and proper. Each case must be judged by its own facts and merits. Each of the industrial railways is or is not a common carrier. If it is a common carrier, it is entitled to all the rights and subject to all of the limitations provided in the act.

Commission Harlan in a dissenting opinion says:

In the original report we condemned the allowances and the advantages enjoyed by the industries in question in the elimination of demurrage and in the benefit of reclaims; we also condemned the furnace allowances and the free services, and held upon the fact before us that in each of the cases dealt with in the report the industrial railway was a part of the plant facilities of the industry and performed no service of transportation. Subsequently petitions for rehearing were filed by several of the parties in interest, which after due consideration were overruled. Although no order was entered the carriers later filed tariffs to give effect to our findings and conclusions. The results have been accepted and recognized as proper by nearly all of the industries operating plant railroads under conditions that made the general principles of the original report applicable also to them. More recently, however, several of the larger industrial lines, as well as some shippers served by them, have expressed a desire that an order might be entered so as to give them an opportunity, by application to the courts, to test the legality of our findings.

In my judgment an order should be entered on the basis of the original report so that the matter can be taken into court, and some definite principle established by which we may be guided in the disposition of the many similar cases now pending before us and that may hereafter arise. The propriety of so burdening the revenues of the trunk lines is not only a matter of importance to the trunk lines themselves, but to the general shipping public by which all such burdens must ultimately be borne. It is important also that other industries not receiving these benefits and privileges at the hands of the trunk lines should know what their rights are; and it is most important that this commission, in its administration of the law, should know the views of the court of last resort on these great questions. The majority report, however, while modifying the original report, establishes no rule for the future guidance either of the carriers, or of the industries, or of ourselves with respect to any of the questions involved. The facts are all before us. Before the hearings were undertaken the examiners of the commission spent some months in the field making investigations, and many days were subsequently given to the hearing of testimony at different points. The record so made consists of some thousands of pages of testimony and hundreds of exhibits. With the entire situation before us the original report undertook to determine whether any of these industrial lines were performing a service of transportation as a common carrier. The supplemental report closes with the statement that each of these industrial railways "is or is not a common carrier. If it is a common carrier it is entitled to all the rights and subject to all the limitations provided in the act."

This statement is coupled with an expression of the expectation of the commission that the carriers will re-establish allowances "only in instances in which the transaction is *bona fide* and in which it is clearly lawful and proper." The line carriers are not required, but are permitted, if they so elect, to re-establish allowances with any of the industrial roads mentioned in the original report "which are common carriers . . . and which perform a service of transportation." A statement of any arrangement so entered into by a line carrier with any such industrial road must be filed with the commission which undertakes *at the earliest opportunity* to inquire whether the allowance is "unwarranted or unreasonable or effects unjust discrimination." This was precisely the object of the whole investigation, and so far as I can see we are thus brought back by the supplemental report practically to the point where we started nearly four years ago. (32 I. C. C., 129.)

RAILWAY AFFAIRS IN OTHER COUNTRIES

The Railway News of London has compiled figures showing the number of railway employees of great Britain that have enlisted for the war, a total of over 35,000 for eleven companies. Allowing for the figures of other companies not yet published, the total must be at least 40,000 for the United Kingdom. The North Eastern men were formed into a special battalion. This company's contribution of 5,000 represents about one-tenth of the company's force. The figures for the principal companies are as follows:

Great Central	1,300	London Brighton	1,300
Great Eastern	1,500	Midland	3,000
Great Northern	2,500	North-Eastern	5,000
Great Western	7,600	S.-Eastern & Chatham	1,500
London & N.-Western	9,400	Tube Lines	150
London & S.-Western	2,000		
		Total	35,250

* * *

Since the declaration of war on Germany by Great Britain early in August, completely equipped ambulance trains have been prepared by a number of the railroads of Great Britain and turned over to the war office for use in transporting wounded soldiers from the cost to hospitals at various inland points. These trains were made up of existing rolling stock, the interior of which was altered and refitted in accordance with plans approved by the war office; the work of conversion was conducted with such despatch that some of the trains were ready for service by August 14. Each train is made up of from nine to ten vestibule coaches and in effect constitutes a completely equipped hospital capable of caring for about 100 wounded men, together with accommodations for the necessary staff of doctors, nurses and orderlies. Each ward car will accommodate from 16 to 20 men on spring cots, which are arranged in two tiers on either side of the car. A treatment car is provided, one end of which contains a well equipped pharmacy. Next to the pharmacy is an operating room opening from a side corridor, in the fitting of which special care has been taken to provide for proper sanitation. A third compartment is fitted up as an office, and the remainder of the car is arranged for the storage of clean and dirty linen. The trains all include dining or kitchen cars, and ample mess room and sleeping accommodations for the entire staff. Everything possible has been done to promote comfort and convenience, some of the trains having telephone installations for communication between the various cars.

Somaliland Railway Shelled.—A German cruiser is reported to have bombarded and destroyed part of the railroad, which is being built by a French company, between Jibuti and Addis Abeba, Somaliland.

THE PROGRESS OF PUBLIC ENLIGHTENMENT

By Frank W. Noxon
Secretary, Railway Business Association

Some manufacturers and wholesalers have been surprised to find commercial travelers' organizations to which their salesmen belong circulating protests against the advance in price of mileage books, when the concerns themselves had gone on record as favoring larger income for the roads. They find that a representative may not know the policy of the company unless he is directly informed of it. The executive of a very large enterprise sometimes sniffs at the heads of smaller institutions for obstinately clinging to the anti-railroad habit in conversation and thus tending to restrain the restoration of general prosperity by continually stirring up political antagonism; yet this same manufacturer may have in his employ numerous men with whose line of conversation he does not make himself familiar, and men, too, of stature equal to that of the small shipper criticized and of equal or greater influence in their neighborhoods and among other business men. Some concerns in the United States employ as many as 500 or more salesmen each. Not only is there danger of serious damage, but a great opportunity is lost, when an institution sends men over the country without placing in their hands facts about questions upon which public opinion must be set right if anybody is to sell goods at all.

An Interstate Commerce Commissioner, since retired, confided to a visitor soon after the denial of rate advances in 1911 that the railroads would never obtain an increase in freights until public opinion should be in favor of it. "I don't mean shippers," he added. "I mean the general public." Some of those directly responsible for railway prosperity or deeply interested in it exerted themselves accordingly in the months following. An interesting account could be made of the gradual enlargement of horizon as the gospel was carried to wider and wider circles.

Heads of large shipping enterprises in the principal cities were the first inner circle. Generally they had not stood up to be counted for the advance in 1910. They desired it granted, but felt that much harm had been done by controversial attacks upon the railroads in connection with rates and that organized advocacy of advances might evoke a renewal of such assaults. They believed, too, that the advance would almost certainly be sanctioned. They therefore refrained from public approval. Traffic commissioners of bureaus and of individual concerns were permitted to participate in the hearings, to present statistics and arguments in rebuttal and to cross-examine the railway witnesses. Their surprise at the failure of the advance was unmistakably genuine.

By these executives of large institutions, therefore, after 1911 a more public acquiescence in rate advances was made. The result was that practically all the larger shippers went on record and before the end of 1912 many thousands of others had followed their example. Where industrial traffic commissioners gathered in their organizations there was a sudden and marked absence of anti-rate advance conversation. It was the abstention of these men from entering appearances before the commission in 1913 in connection with the 5 per cent advance case that is understood to have led to the retention of Mr. Brandeis by the commission to present "the other side."

The next wider circle was the shippers in the smaller cities and towns. Railway officials visited towns throughout the territory for exchange of views face to face with shippers. Business men particularly earnest in advocacy of higher rates laid the reasons systematically before fellow members of local and trade organizations. One analysis of the result was given by a magazine, the Railway World, which asked secretaries of business organizations throughout the eastern territory what their communities thought about the advance. Out of 261 commercial organizations heard from, only 11 were unfavorable. Of the others, 127 were undecided and 123 actually favorable. The most significant feature was the much more numerous bodies not sufficiently wrought up against advances to reply at all. The compiler, however, states that "those taking a negative position belong more largely to smaller communities."

Here then in the smaller communities was a circle not yet fully reached; and the business men who had communicated their policy to the traffic commissioners find in 1914 that their salesmen, talking weekly with scores of tradesmen and others, have been so little solidified as a craft that the officials of salesmen's mutual benefit associations see no reason for not starting a propaganda against the very increase in income which manufacturers and merchants have advocated and the Interstate Commerce Commission sanctioned.

Transportation questions are more promptly discussed and understood in large cities. By sheer force of numbers organizations can be supported there without a heavy tax upon any individual, and bureaus maintained to study and report upon such problems. The business man in the large city, too, comes into direct relation with the railway officials at headquarters, who speak with authority upon matters of policy and show forth at first hand whatever spirit of conciliation and accommodation may animate the management. Business men located in the smaller cities and meeting railway representatives a good way down the line do not absorb a situation as quickly or as clearly.

Every manufacturer, merchant or railway manager has his own organization—the men whose livelihood depends upon the same economic and governmental factors as his own. Every man lives somewhere, and in that place, wherever it is, there is a business organization and a press. Nearly every business man is a member of a trade which is organized on national or regional lines and has its journals. Every man may have in addition acquaintances influential for this, that or the other reason. It is the conscientious and systematic effort to share with all these people whatever knowledge may be had about any important public question affecting business that is enlisting the energy of more and more men of affairs.

One merchant, employing several hundred salesmen, sends them periodically information upon issues related to prosperity and instructs them to report daily what they hear on these subjects. One large organization encourages its leading officials in the acceptance of invitations to write articles or deliver addresses. The themes are the subject of company conference, while the resources of the concern are put in behind to push dissemination.

Men who up to a short time ago paid their dues in the board of trade and let others "not so busy" frame the policy and do the work now take the time for personal participation. The same is true in trade and other national bodies.

Presidents of companies often have nowadays a special list of concerns with which they do business or with whose officers they are personally acquainted and from time to time send such concerns literature, originating on the premises or elsewhere, and accompanied by a letter requesting perusal. This work is made a part of the business, and some one is made responsible for carrying it out.

Each man may cover his circle as far toward the circumference as he can. A great deal of the time it is not a simple operation of A driving something into B's head. The matter with B may turn out to be gray matter. He may have a different point of view which A needs to understand. Too much talking has been done in America standing up facing a crowd; not enough sitting around a committee table and giving dignity to what shall be said by conferring about it. Hiring a ready writer with instructions to prepare anonymous material and "put it across" is a fossil of the next age back but one. If the business man expects to exchange views with other business men and with the general public he must do it himself.

The Chilean Longitudinal Railway.—The Minister of Public Works, of Chile, is reported to have formulated a contract subject to further approval, with the Howard Syndicate, whereby the latter will undertake the exploitation of the Longitudinal Railway for a period of 30 years.

The Arguments of Mr. Brandeis and Mr. Brownell

Special Counsel for the Commission Seeks to Narrow the Issue; the Vice-President of the Erie's Answer

The following is the final argument of the special counsel representing the Interstate Commerce Commission in the rehearing in the rate advance case:

ARGUMENT OF LOUIS D. BRANDEIS

The course which the evidence and the arguments took in this case indicates that, in the opinion of other counsel, the issues and the powers of the commission are much broader than I conceive them to be. I had supposed, from the form in which the order was entered, that the question before the commission was whether, in view of the new evidence to be introduced, which was strictly limited to "presentation of facts disclosed and occurrences originating subsequently to the date upon which the record previously made in these cases were closed," such new evidence constituted a reason why the conclusions reached by the commission should be modified.

But counsel have argued not alone or mainly that certain alleged new evidence afforded a reason for changing the opinion, but that, upon the evidence which the commission had before it originally the conclusion then reached was incorrect. That was particularly the burden of Mr. Butterfield's objections to the finding in respect to the coal rates. Although in my opinion such considerations are not properly before your Honors, I think I ought to say a few words on that subject because, inadvertently, no doubt, Mr. Butterfield has misstated what I conceive to be the situation.

He said, many times, that the commission gave no reason for its finding in regard to coal rates except that larger cars were used, involving, presumably, less expense. That is not correct. Your Honors will find, on page 392 of the opinion, that attention is called specifically also to this fact:

"While the heavier train loading of the slow trains in which the heavy or bulk freight usually moves has tended to decrease cost."

Your Honors will also remember that in the evidence the cost of fast freight, as distinguished from slow freight, was very particularly referred to, and among other things there was introduced the schedule, being the estimate prepared by the Baltimore & Ohio Railroad, showing that "if 25 per cent of the present fast freight trains were continued for the purpose of handling stock and perishable fruit on present schedule, and the schedules of the remaining 75 per cent of the fast freight trains were lengthened only 24 hours, the saving to that system, conservatively estimated, would be over $400,000."

Now, it was the fact not so much of large cars, but the fact of the heavy trains and that they were slow trains, which was particularly dwelt on as the reason why coal stood in a different position from much other freight.

And that evidence was supplemented by much general evidence, which your Honors referred to on pages 392-3 of the opinion, of a more comprehensive nature. There was shown, the financial condition of those railroads known as coal roads; and the railroads selected for this purpose were not the anthracite coal roads, with which we are not concerned in this proceeding, but the coal roads in Official Classification and, in part, in Central Freight Association territories. Those coal roads were selected, and the particularly prosperous condition of those roads as compared with other roads was pointed out; and a comparison was made by your Honors between the coal subsidiaries of the New York Central and the Pennsylvania. In addition to this your Honors had before you specific testimony as to the cost of moving coal which also showed that the coal traffic was particularly profitable.

That discussion, it seems to me, was one marked example of a tendency to disregard the terms of the order under which this case has been reopened, and to have involved practically a reargument of the original case on the original evidence, instead of confining the hearing to a discussion of the effect of the new evidence.

Now, what are the conclusions which this commission reached and which it is now sought to modify? In the first place, take the Central Freight Association territory. The first proposition was a denial of an increase of the rates on coal and other heavy or bulky articles. There has not been introduced, as I see it, a particle of evidence bearing specifically upon the correctness of that finding. There is no contention that any of the elements entering into cost of operation are higher in price today than it was prior to the date of the decision. Mr. Rea testified he knew of no increase in the rate of wages, or any increase in the price of materials or supplies, or any new governmental regulations imposing additional burdens. There is, of course, evidence bearing upon the general question as to the railroad needs, to which I will call attention later.

Then the next ruling in respect to Central Freight Association territory was that all tariffs bearing a minimum of five cents a ton on commodities moving under rates stated in cents per ton less than one dollar should be cancelled, because, as the commission found, "this would work hardship and discrimination."

Of course there has been no evidence bearing specifically upon that issue or showing that hardship or discrimination therein referred to would not result.

The third finding was that tariffs involving "increases exceeding five per cent by varying amounts" be cancelled because the carriers "failed to justify such variations from the five per cent rate." I have found no evidence bearing specifically on that issue.

The fourth finding was that certain rates controlled by force of unexpired orders of the commission, entered after specific investigation in former cases, be cancelled because carriers failed to introduce any evidence why they should be raised. There has not, so far as I know, been any evidence introduced specifically upon that issue.

There remains, then, only the question, so far as the Central Freight Association territory is concerned, as to whether the great need of the carriers, as to which much evidence has been presented, presents a new fact which should lead to a modification of the findings above referred to in regard to Central Freight Association territory; your Honors found not only what you had found generally in respect to the Official Classification territory, taken as a whole, that the income was less than was demanded in the interest of the public as well as of the railroads, but you found, by very specific statements and a very specific exhibit of facts, that the Central Freight Association lines were greatly in need of additional revenue, and of revenue more, as I read the opinion, than could be hoped to be gained by an increase of five per cent in all freight rates.

The facts which have been exhibited in the complete reports for the year 1914 add practically nothing to the evidence before the commission. Taking the territory as a whole, I mean the whole Official Classification territory, the figures show just about the same reduction in net revenues as had been estimated on the eleven-months basis as to which the commission had the figures

before it. You had, for the whole territory, as I recall it, $68,000,000 fall in net revenue, in eleven months. The exhibit now filed shows the drop to be $76,000,000 in twelve months, which amounts to about the same. Indeed the last month as to which the commission had the figures (May) showed over $8,000,000 fall in net revenue. If that same rate had been assumed by the commission for the month of June, it would have given for the year just the amount which is found now upon the final figures, to have been the reduction in the net revenue. So that the commission has before it in that respect now, substantially what it assumed were the facts at the time of the writing of the opinion. There remains, of course, the question of the effect of the war upon credit and upon interest rates, to which I will refer later.

So much for the Central Freight Association territory.

Now as to the Trunk Line and New England territories, the commission found that the carriers had failed to show either that the existing rates in Trunk Line or New England territories "are too low, or that the increased rates proposed for those territories were just and reasonable."

Again, no specific testimony or evidence of any kind has been introduced as bearing upon this issue. There has been nothing introduced except the general testimony as to the needs of the railroads.

Then the commission found the tariffs which increased inter-territorial rates between the different sections of Official Classification territory should be cancelled "because the carriers failed to prove that the existing inter-territorial rates in Official Classification territory are too low, or that the proposed increases in those rates would be just and reasonable."

Here, again, we are without any specific testimony bearing upon the finding.

As to the lake and rail rates, your Honors found that the tariffs should be cancelled "because carriers have not met the burden of justifying the proposed increase of the lake and rail rates"; also, "because those increases must necessarily fall with the fall of the all-rail rates."

No evidence has been introduced bearing specifically on that subject except one exhibit, to which, undoubtedly, Mr. Butler will specifically refer.

We come, then, to a consideration of the general evidence as to the needs of the railroads and railroad credit. The evidence as to results of operations in the year 1914, I have already referred to. The showing for that year certainly confirms the conclusions that your Honors reached, that the incomes of the railroads, taken as a whole, are not such as are required in the interests of the public and the railroads. The specific evidence as to the period since June, 1914, does not indicate any greater expense of doing business, except in this respect: If the amount of the traffic grows less, and there is a smaller use of the plant, the capital cost per unit of transportation necessarily increases with the reduction of business. As to that, I will speak later. But the operating ratio does not necessarily increase; and in the current year, that is, since June 30, 1914, in spite of losing business, there has been a smaller operating ratio.

I call attention to the figures for July and August for the Eastern District. Taking the month of July, 1914, the figures for 58,585 miles of road show that the operating ratio was 70.05 per cent, as against 71.28 per cent in 1913 for 58,671 miles. In August, 1914, the operating ratio on 58,673 miles was 66.58 per cent, as against 69.72 per cent in 1913 on substantially the same mileage.

Now, Mr. Willard and Mr. Rea have both said that their decreased operating ratios did not properly represent decreased cost of operation, because a less charge had been made for maintenance of way and equipment; and that the expenditures of less for maintenance was practically deferring during those months a part of the cost of operation.

The figures submitted, and to which I referred in the cross-examination of Mr. Shriver, as contained in the Burnside Exhibit, do show a lesser expenditure for maintenance of way and for maintenance of equipment in 1914 as against the corresponding month of 1913; but it also is clear that the other expenses of operation have become less, that is, the railroad managers have been able to reduce—doubtless through greater efficiency—those elements in cost which were not maintenance, and this is particularly large in the month of August, the latest for which we have the figures.

In these Eastern District roads, in the month of August, the operating revenues fell from $124,000,000 to $116,000,000; that is, there was a loss of over $8,000,000 in operating revenues. The reduction in the amounts expended for maintenance was less by nearly $3,000,000. But the figures show an actual increase in net revenue of $614,000. It thus appears that with $8,000,000 less gross revenue and under $3,000,000 less expenditure for maintenance, the railroads have been able to earn more net revenue in that month, than they did in the preceding year; and this greater earning represents an improvement in operating efficiency in part of about somewhere in the neighborhood of $5,000,000.

The showing for July is not as favorable, but it indicates the same tendency. This shows clearly that with a lessened business the managers, or those who are operating these railroads, have been able to reduce expenses other than maintenance. The reduction of those other expenses was a pure gain to the road and not a deferring of expenses.

It is true, however, that while with the diminishing business, the operating costs have been reduced, the fact that the business has diminished in volume has increased the capital cost per unit, and certainly is considerable evidence that at least up to the present time that reduction is in large part the result of the war. That raises the question whether a reduction of traffic which adds to the unit capital cost which by failure to utilize the plant to its full capacity (though it be temporary and may pass almost at any moment, or may continue for a long time), whether such lessening of traffic is an element to be considered in determining the reasonableness of rates. Of course, that is not a question as to which there is any evidence before the commission one way or the other, unless your Honors consider as evidence the opinions expressed by the various witnesses.

There is also evidence that the capital cost per unit has increased through an increase in the prevailing rate of interest due to the war; and there is evidence that this increase in the rate of interest may be expected to continue for some years at least. The question therefore arises: To what extent will that increase in the rate of interest increase the cost of doing the transportation business?

There was evidence tending to show that there would be in this present year—within 12 months or 15 months, certainly—$500,000,000 of obligations which would have to be issued, for renewals and new money and that on those obligations there would, presumably, be some increase in the rate of interest. Some of those obligations are bearing rates of interest which are very high now, and the rate would probably be a good deal less if long-time obligations were substituted for short-term notes; but there is evidence that the rate of interest will, owing to the war, be higher than it has been recently. If, in all, the amount of money required for funding and other purposes amounted to as much as $500,000,000 in a year, and the rate of interest becomes one per cent higher than it otherwise would have been, that would mean $5,000,000 added to the year's burden, and that $5,000,000 would reasonably be spread over the whole revenues of the railroads, and the revenues of the railroads in Official Classification Territory, are, roughly, $1,500,000,000. Of course, if that higher value continued for a series of years, each year's new issues would add to the railroads' burdens. That is, the burden would accumulate from year to year.

Aside from the element of increased capital cost due to an assumed continuation of these two causes, diminished traffic and increased rates of interest, it was urged most strongly

upon the commission that rates should be increased in order to maintain the credit of the railroads; and the new fact that was introduced in this respect, was the war. The facts in regard to the war, except so far as they might result in reduced traffic and an added burden, do not affect the question of credit in itself; but there was much evidence, particularly from the bankers, that the alleged impaired credit of the railroads would become a very serious factor, by reason of the war; that is, that those abroad who hold securities would, if rates were not raised, have an added incentive to sell them. It was further argued that if they did sell, did dump their securities on this market, it would have a very disastrous effect not only on the railroads, but on our financial institutions and on business generally.

Now, it has seemed to me that those considerations led us quite far beyond the powers of this commission, that they had in no proper sense a bearing on what are just and reasonable rates, but very properly a bearing upon what might be the national financial and economic policy, which another branch of the government is called upon to deal with.

There was introduced considerable evidence concerning the additional revenue which might be expected to accrue within a reasonably short time from following the suggestions made by the commission as to other sources of revenue.

I am not clear as to the purpose of the carrier in introducing that testimony. This proceeding began as an inquiry whether the railroads had adequate revenues, and if not, what course they might pursue to meet the situation. It was only four months later that the railroads filed their tariffs, after which the two proceedings were consolidated. Now, as to the first proceeding, the inquiry as to the adequacy of the revenues and as to the possible means "of meeting the situation," if revenues were found to be inadequate: In that proceeding the commission made no formal order. It merely made certain suggestions. There is no application to modify those suggestions; and it is difficult to see how such a request could have been made. That proceeding has not been closed. I am inclined to think, therefore, that the purpose of introducing the estimates of additional revenues to be expected was introduced as tending to show that, in spite of the following suggestions, the railroads could not expect to get, in the immediate future, relief sufficient to satisfy their great needs. If those words "immediate future" are strictly defined, there is perhaps no need of challenging the accuracy of the estimates. But it is clear that, if any other meaning is to be given to them, the probabilities of greater value have not been fully stated.

Take, for instance, the situation in regard to passenger rates. Mr. Butterfield gave as his estimate of passenger increases $3,000,000. The passenger train revenues last year were $302,000,000 in Official Classification territory, of which $200,000,000 were in Trunk Line territory and in New England territory, wherein there is practically no legislative limit to passenger rates. If, as the commission found and set forth in considerable detail in its opinion, these passenger rates are unremunerative—not only unremunerative in that they fail to pay a reasonable return upon the capital, but in some instances, to cause an actual loss in operating costs—there would appear to be no good reason why those rates should not be largely increased, as, in fact, they have been in some communities. They have as to the mileage rates quite generally. That rate has been increased 12½ per cent already, and in some territories—certainly in the New England territory—there have been a great many individual passenger rate increases.

In Central Freight Association territory, there is in most of the states the obstacle of two-cent fare laws; and that brings up also properly the question which Mr. Patterson raised in regard to the mail pay. What is to be the position of this commission if it is to determine the reasonableness of rates according to the financial needs of the carriers, and those needs result from what would appear to be erroneous or unjust action on the part of some other bodies which regulate rates of pay for railroad services? If it be true, as the evidence indicates, that those two-cent fare laws in Central Freight Association territory take out of the railroads a very large amount of money, and if it be true, as is contended, that the Ohio law affecting freight is depriving the carriers of a great deal of money, and if it be true that the State commissions by their rulings are depriving the carriers of a great deal of money, and if it be true that the federal government is withholding from them a great deal of money by reason of inadequate mail pay; if it be true that by reason of these various amounts withheld, or which the railroads are denied the opportunity of earning, the railroads are in need of additional revenues, can this commission say that the existence of such need makes increases of interstate rates reasonable because it is necessary to bring up the net revenue to the point of an adequate return on the investment. And in another way—of course, in an entirely different way—the same question is presented in the consideration of other causes of inadequacy of revenue. If, for instance, inadequacy of revenue was due to past mismanagement, to grave defects in capitalization or similar causes, can it be true, as Mr. Minnis contended, that your Honors must allow increases because of existing need, regardless of how that need arose; and that it is immaterial whether that need arose from mismanagement, or bad judgment, or a war, or through the erroneous decision of some other co-ordinate tribunal? Does mere need force the decision of your Honors so as to compel a finding that rates are just and reasonable, because only with such increases can the necessary amount of money be raised? It seems to me that that question is directly raised by the evidence which Mr. Maxwell and Mr. Shriver introduced in connection with what the Illinois and Indiana commissions have done in the way of holding up the increases which were proposed.

Of course, if your Honors have occasion to consider at all the estimates of increased revenue to be derived from following the different lines of suggestion made by the commission, your Honors will bear in mind that, in very large part, those suggestions have not been acted upon, and have not been taken into consideration in making the estimates.

For instance, there was considerable testimony in the case and a good deal of discussion as to the heavy drain upon the revenues of the carriers by reason of the terminal services, or what are called free services or special services at terminals, and particularly in New York Harbor. That was discussed at very considerable length. In these estimates which are presented, that matter is not at all taken into consideration.

Then there were very many other different lines suggested by which there might be other savings of expenses. For instance, one was the private cars. Again, there was a possible increase of passenger revenue through the abolition of passes, and a good many other suggestions in the way of savings in operation.

Mr. Shriver stated, undoubtedly most correctly, that it would be extremely difficult to estimate, and that he had found it impossible, in the absence of one of his associates, to make any estimate of those savings. All that I want to do is to ask your Honors to bear that fact in mind, if your Honors should deem the amount of these estimates to be important.

Of course, it is also true that in regard to the proposed increases on certain commodities and in certain rates, that it by no means follows that the increases proposed are the only increases that should be made. It may be that the rates should be raised more; and that rates should be raised on many more articles of commerce on which rates are now unremunerative. Your Honors will bear in mind the testimony that a very short time has elapsed since the decision,

that it is a very big task to make the revision of these rates, that it will involve a great many conferences, and the carriers have not proceeded, certainly in many respects, very far.

There is one other matter bearing upon credit, or as to the causes of the lack of credit, which, perhaps, ought to be called to your Honor's attention. Credit may be impaired in many ways, and among the things that may happen is an exhaustion of credit. Your Honors found one element of exhaustion, one means by which credit might have been exhausted; that is by the use of the credit of the carrier for the acquisition of properties not used as a part of its system. There was the finding that in Official Classification territory there were $684,000,000 of such properties held by these carriers. One of the suggestions made by your Honors was that these carriers consider the disposition of these properties. Of course, they could not be sold out under present conditions; but still the fact that they were bought was one of the factors in exhausting credit. It accounts in part for the fact to which attention was called by several of the witnesses, that the railroads in raising money must often raise it on junior securities or on bonds with stock as collateral, rather than by mortgage on the roads.

The following is the argument of George F. Brownell, vice-president of the Erie, in answer to Mr. Brandeis.

ARGUMENT OF GEORGE F. BROWNELL

I share the view expressed by Mr. Thorne that the railroads are now at a parting of the ways. Like him, I see them, in this case, where two ways diverge, with the commission at the switch. To my vision, one of those ways marks the continuance and extension of the public policy under which the railroads heretofore have had their remarkable development and progress—a public policy which has permitted and invited their construction, maintenance, and operation under private ownership and management with governmental regulation, and through capital secured from private investment. But the other way to which he asks you to divert the railroads would subject them and the public alike to serious dangers and difficulties, with the ultimate goal, which I believe is his desire, of government ownership.

I judged that from the substance of the views he has expressed here and what I have understood to be views publicly advocated by him; and that, at least, is what seems to me where the way he advocates would lead as its ultimate goal. In reply to those views I quote these words of Commissioner Daniels in this case:

"Eventually it may come about that railroads will be owned and operated by the government. That is a matter of public policy which it is not the province of the commission to consider. But that such a departure from the present policy of private ownership and corporate operation should be materially hastened by the reluctance of new capital to invest in these properties would seem to be a grave indictment of our present system of regulation and control."

In various other respects I cannot share the vision of my friend from Iowa. I cannot see the prosperity which he seems to think these railroads now revel in. I do not think that prosperity of that character has been seen before since Alice roamed with wondering eyes in Wonderland. . . . There seems to be a misconception on the part of some of the counsel for the opposition as to the scope of this rehearing. Mr. Brandeis, as I recall it, stated his understanding that the rehearing is strictly limited to the question whether the new evidence, limited strictly to the new facts, constitutes a reason why the former conclusions of the commission should be modified. . . . . I think that his view would unduly restrict the scope and character of this rehearing.

Counsel for the opposition have also fallen into error with respect to the contentions of the carriers as to the power of the commission to do what is asked of them. We are not asking that the commission undertake to exercise any powers not conferred upon them by law, but we assert that all the considerations which we have presented to the commission are proper for them to take into consideration in determining the question at issue. We think our views in that regard are amply supported by both reason and authority, and that it is unnecessary to look beyond the provisions of the interstate commerce act itself and the rulings of this commission under it to support them.

Since the former hearing, and indeed even since the decision of July 29 was made, facts and circumstances have arisen which have materially changed the situation of the carriers and the conditions affecting them from those existing at the time of the former hearing, and which, taken in connection with the facts produced at the former hearing, we believe will fully justify the granting of the relief asked for. We believe that had the conditions at the time of the former hearing been what they now are, the decision of the commission would have been very different. We applied to the commission to grant a rehearing in view of such new facts and changed conditions, and the commission granted the rehearing. We are therefore now here, not asking that the commission assume to exercise any power beyond its lawful authority, but that, pursuant to the express provision for such case made and provided by Congress, it fully consider on this rehearing not only the facts and circumstances arising since the former hearing, but all the facts, *including* those arising before as well as since the former hearing.

Until the passage of the Hepburn act in 1906 there was no express provision in the interstate commerce act for rehearings. At that time Congress, anticipating, perhaps, that emergencies might arise when the commission clearly should have the power to grant a rehearing on all the facts, including those arising since the original hearing, added a new section to the Act—Section 16*a*, providing that after any decision has been made by the commission, any party may make application for a rehearing of the same or any matter determined therein, and it shall be lawful for the commission to grant such rehearing if sufficient reason therefor be made to appear. It further enacted that if in its judgment, after such rehearing and *a consideration of all facts, including those arising since the former hearing,* it shall appear that the original decision or order is in any respect unjust or unwarranted, the commission may reverse, change, or modify the same accordingly.

For a rehearing and consideration such as that contemplated and provided for by Congress, it is essential that all the existing facts and conditions be considered with open mind and unprejudiced by the former decision made under other conditions.

On such a rehearing the question should be considered and determined upon all the facts as they now exist and brought down to date.

Among the new developments bearing upon the case is the great war, which was unforeseen when the former decision was made. To use the apt words of the President, the mighty forces of war and of change have disturbed the world. It has already involved most of Europe and a large part of Asia, Africa, and British North America. It has brought about an unparalleled destruction of wealth and dislocation of credit throughout the civilized world. It is probably the most momentous event in modern history, and no one can yet clearly foresee its boundaries, its limits or its consequences. The sun never sets on the countries now involved, or, in fact, even on the present warfare. It is too early to estimate its effects, but it cannot be doubted that they will be world-wide, great and long-continuing. Probably what has already transpired is but the first shadow of what is yet to come. The old order of things has been shattered, and all the king's horses and all the king's men cannot restore the conditions existing a few months ago when the former hearing occurred. The effects of the war are not limited to the countries directly engaged, but they extend to neutral countries. They have already, in many ways, changed conditions in this country and have affected and will continue

to affect the situation of these railroad companies in important ways pertinent to this inquiry.

The credit facilities of the civilized world have broken down. Moratoria have been declared in many countries, stock exchanges have been closed, foreign exchange has been seriously disarranged, and the world's machinery of credit, international, national and corporate, is endangered.

Wealth and property are being destroyed upon an enormous scale. The price of capital has already materially increased, and will continue to increase. Securities have already declined to a disturbing extent, and there is grave danger of a further serious decline.

As shown by Mr. Conant, an international authority of high repute, the direct cost of the war, if it lasts approximately a year and does not extend to other countries, will not be materially less than fifteen billion dollars. This estimate of the appalling destruction of capital for war purposes is based upon the experiences in other recent wars, and includes only a conservative allowance for the cost per man per day of the millions of men engaged. It is supported by known facts as to actual disbursements already made and the estimates of some of the most eminent European economists. Even this vast sum does not take into consideration the loss of other vast sums resulting from destruction of property, the impairment of the industrial production, and the derangement of the machinery of distribution. Even if the duration of the war should happily prove to be less than a year, a large portion of the direct expense would continue during the process of reducing military forces to a peace basis, and a considerable time would be required for restoring to former conditions the industrial and economic fabric. So that, even if an early cessation of the war should permit some reduction in the cost based upon the estimates for a year, it would still leave great sums—probably not less than ten billion dollars—to be raised by loans and taxation in the countries involved.

The amount of annual savings of capital throughout the world for investment, that is to say the amount of capital annually available for investment, is shown to be not much in excess of four billion dollars, so that, as shown by Mr. Conant, the demand for capital for purely war purposes and for the settlements which will succeed the war, will be so great as to absorb an amount equal to the entire savings for investment made in all civilized countries for a period of at least several years. Apparently some of the powers at war are already exhausting the moneys which were available to them for war purposes at the beginning of the war, and have already commenced to offer war loans. Germany has already offered loans amounting to more than one billion dollars for war purposes, and is contemplating the raising of two and one-half billion dollars to furnish employment for her people at home on internal improvements. England, France and other European countries, including some that have mobilized, but are not at war, have commenced to offer war loans.

Under these circumstances it would seem practically certain that the greatly diminished supply of capital in Europe available for investment will, because of patriotic and business and other considerations, be invested at home, and there is no reason to hope that for a long time to come any considerable amount of European capital can be diverted, as it has been heretofore, to the purchase of new securities which the railroad companies must issue in order to refund maturing obligations and to make necessary betterments and improvements. The demand for new capital will surely be much greater than the available supply. It inevitably follows that this great demand for capital resulting from the war and war loans will largely raise the rental price for the use of capital or interest rates, for many years to come, *and even then many who seek new capital will have to go empty-handed.* Already rates have largely risen, both at home and abroad. The new German loan bears 5 per cent interest. and it is understood is being put out at less than par. In this country, rates for call money and commercial paper have risen to from 6 to 8 per cent, and borrowers of such undoubted credit as the city of New York, and one of the United States, have been obliged to pay as high as 6 per cent or more for short time accommodation. Railroads, such as the New York Central and the Erie, have been unable to refund maturing short time notes, except by the issue of other short time notes, and even then only with great difficulty and upon an interest basis of about 7 per cent in the one case and about 8 per cent in the other.

It is clear that one of the effects of the war will be to raise the interest rates on investment securities much higher than it has been for many years, and that these railroads will have to pay for any new capital they may be able to obtain, interest at a rate considerably higher than that paid by governments.

In the judgment of competent witnesses, this apprehended liquidation of our foreign-held securities will be substantially retarded or accelerated according as to whether the railroads are now permitted to charge such just and reasonable rates as will secure them adequate net revenues.

The suggestion has been made by counsel that the railroads can remedy their situation by curtailing or suspending dividends. It would hardly seem that such a suggestion will receive serious consideration. Unless the railroads as a whole are able to receive rates for their transportation services that will produce net revenues sufficient to meet reasonable dividend requirements and leave a reasonable surplus as a margin of safety to help defray "the cost of progress" and secure the future stability of rates, establish confidence in the continuation of dividends, and otherwise maintain credit, there is but little ground to believe that private investors will afford the necessary new capital.

Curtailment of dividends would aggravate the situation, while suspension of dividends would make it increasingly difficult to obtain any capital, even by the sale of bonds. Total suspension of dividends by the railroads, though it would produce a panic, would not produce the amount of new capital required.

Moreover, such a suggestion is impossible of application by a large number of railroads in Official Classification territory which are most in need of relief and which are now unable to pay any dividends. Out of 73 roads, a list of which is filed with the commission, having stock outstanding in the aggregate of $2,500,000,000, 40 roads pay no dividend upon capital stock amounting to over $687,000,000, or 26.8 per cent of the whole. Also, five roads pay dividends of less than 4 per cent upon a capital stock of over $220,000,000, or 8.6 per cent of the whole, and that 16 of these roads pay dividends of less than 6 per cent upon capital stock aggregating about $482,000,000, or 18.8 per cent of the whole.

In this connection it is worthy of note that a number of the roads that appear in the table as paying some dividend last year and as being in the dividend-paying class, like the New Haven, have now passed into the non-dividend paying class and have no dividends which they can reduce for any purpose.

It is not contended by these carriers that the commission have the power to, or should undertake to, approve rates that will be unjust or unreasonable, or that the commission have the power to or should undertake to, approve rates irrespective of their being just or reasonable, merely on the ground that such action would "stimulate business" or "restore confidence in the financial and business world" or accomplish any other such result, although such accomplishment might be very desirable in itself. I do, however, contend that in determining whether the carrier's charges for its transportation services are just and reasonable, the commission have the right, and it is their duty, to take into consideration, among other things, the adequacy of the net operating income derived therefrom, its sufficiency to enable the carrier properly to perform its important quasi-public functions, and to secure the new capital necessary therefor, and for the other related matters of public interest and welfare to which reference

has been made in this case, and that this view is amply supported by both reason and authority.

In addition to all these considerations, which properly should be taken into account in determining the maximum rates which would be just and reasonable, there are other considerations of public and private interest which properly should be taken into consideration in determining the method and time of relief, if not the amount. *If there are several methods by which the commission lawfully can enable the carriers to find relief from the existing inadequacy of their revenues, and one of these methods will also promote the welfare of, or safeguard public or private interests, while the adoption of the other method will either not accomplish that result or be doubtful in its effect, then I say the commission should take these matters into consideration and should adopt the method of relief which will inure to the benefit of all.*

Until the passage of that act of 1887, Congress had not assumed the control and regulation of the railroads, generally, except to constitute them post-roads. *By the interstate commerce act, as amended, Congress has declared a new public policy toward the railroads and has adopted and made them instrumentalities of the federal government, with new duties and obligations to which they were not subject under the common law, or under the laws of the states that created them, but which have been newly imposed by Congress.*

The basic, and I think by far the most important provision of that act, is that contained in section 1, by which it is made the duty of every carrier subject to the provisions of the act *to provide and furnish, upon reasonable request, all transportation,* as broadly defined by the act, over all the railroads, owned or operated, as broadly defined; and to establish through routes and just and reasonable rates applicable thereto; and to provide reasonable facilities for operating such through routes.

This is one of the provisions which, by section 12, the commission is broadly authorized and required to execute and enforce.

Another such provision is that contained in section 5, which requires that "in time of war or threatened war, preference and precedence shall, upon demand of the president of the United States, be given, over all other traffic, to the transportation of troops and material of war, and carriers shall adopt every means within their control to facilitate and expedite the military traffic."

Thus Congress has declared its policy that the railroads remain under private ownership and continue to be maintained by private capital, and—except as otherwise provided in the Act—operated under private management. It has, moreover, made them public instrumentalities, charged with the duty of performing, and being ready and prepared to perform, upon any reasonable request therefor, all transportation services which the public or government may call upon them to perform on any reasonable notice, either in time of peace or war. Congress has recognized that the carriers cannot perform the duties so imposed unless permitted to charge rates just and reasonable to enable them to accomplish what is involved in such performance; and the commission should take the requirements of these provisions into consideration in passing upon the question of the propriety of the proposed rates. The railroads must be given strength to accomplish—and to be prepared to accomplish—the task so imposed upon them—and remunerative rates, and adequate revenues, are the very sinews of that strength.

I think this principle has been recognized in previous decisions of the commission.

In the Western Advanced Rate case, decided February 22, 1911, the commission, speaking by Commissioner Lane, said:

"We do not say that the carriers may not increase their income. We trust they may and confidently believe they will. If the time does come when through changed conditions it may be shown that their fears are realized or approaching realization, or from a survey of the whole field of operations there is evidence of a movement *which makes against the security and lasting value of legitimate investments and an adequate return upon the value of these properties,* this commission will not hesitate to give its sanction to increases which will be reasonable."

In the majority report on the former hearing in this case, Commissioner Harlan said that railroads, although constructed with private capital, are public highways subject to public control, and that in constructing and maintaining such a highway under public sanction, the railroad company really performs a function of the state; that, "unlike most other countries, we have committed the performance of this public function to companies of private ownership"; that "the policy of inviting and authorizing the performance of this public function by privately owned companies involves obligations on the part of the public to the owners of these properties." In the same connection it is further said that "the *public interest* demands not only the adequate maintenance of existing railroads, but a constant increase of our transportation facilities to keep pace with the growth and requirements of our commerce. If, however, that development is to be accomplished with private capital in conformity with our traditions, nothing can be more certain than that the facilities will not be provided except under such a system of regulation as will reasonably permit a fair return on the money invested."

In the light of these considerations of public interest and welfare, as well as that of the railroads, the commission found that "the net operating income of the railroads in official classification territory, taken as a whole, is smaller than *is demanded in the interest of both the general public and the railroads;* and it is our duty and our purpose to aid, so far as we legally may, in the solution of the problem as to the course that the carriers may pursue to meet the situation."

When the decision was handed down in July the commission, although finding that the revenues of the carriers, taken as a whole, are inadequate from the standpoint of the interest of both the public and the railroads, concluded that the carriers were not facing a crisis and had no cause for alarm, and that their need of relief was not so urgent as not to permit of the investigation of the possible sources of additional revenue other than by the proposed rate increase.

It was said in that connection that the railroad executives insisted that grave and serious responsibilities would be incurred if the commission failed to relieve the situation by at once approving the five per cent increase; that the principal danger suggested was that the carriers would incur great difficulty in refunding their maturing short-term notes and other obligations, unless the investors were assured that the carriers' revenues would be increased immediately, but that "subsequent developments have shown that there was little foundation for any such view."

The majority report further expressed the opinion that "the earning capacity of our railroads is so great that their credit will soon be restored if their revenues are conserved. The crop estimates give promise of greatly increased gross revenues for the current fiscal year."

That a crisis now exists in the affairs of these railroads, and that their credit, seriously impaired as we believe before the war started, principally because of inadequate operating income, is now confronted by a grave emergency, would seem to be but plain truths. If this be so, we submit that the commission should aid, so far as they legally may, in the solution of the problem by permitting the carriers to secure a more nearly adequate net income through the proposed increased rates.

The crisis which confronts the railroads has been emphasized, has been aggravated and has been made more clear and certain by the war, but the war does not constitute and did not alone create the existing crisis in our affairs. That crisis existed before the war and is reflected in the records of their operations and the long-continued increase in expenses and accompanying reduction in net revenues and income, whereby the railroad industry has been forced to become an industry of constantly decreasing returns.

The nature and extent of the public interest involved and the occasion for co-operation of those in private or in official position in aiding to meet the situation in every proper and legitimate way are clearly indicated in the letter recently sent by the President to Mr. Frank Trumbull as chairman of the Committee of Railroad Executives, who had presented to him some aspects of the situation.

The various departments of the Government are now engaged in doing whatever they properly and legitimately may to aid in the restoration of normal financial and credit conditions and to protect investors and business interests generally and the public interests involved against the disasters that are threatening them. The comptroller of the currency has just instructed national bank examiners to pass unquestioned all collateral loans based on the closing prices for securities on the New York Stock Exchange July 30, and to recognize those prices as determining the value of securities held as collateral for loans by national banks, notwithstanding that since that time the securities may have sold at considerably lower prices and the prices of July 30 could not now be obtained. This action is in line with the policy which has been pursued by the New York state banking department. The treasury department is co-operating to the best of its ability and the extent of its authority to the same general end, and the Federal Reserve Board has entered earnestly upon the task of aiding the effort to relieve the cotton situation through the proposed "cotton loan fund."

It is obvious that the railroad and transportation interests of the country lie at the basis of our industrial and financial fabric, and that unless those interests can be made reasonably prosperous through adequate revenues, their financial necessities relieved, and confidence in the stability of their securities restored and maintained, no permanent relief from existing conditions can be expected. It is also obvious that the confidence of the investing public, both in this country and abroad, in the value and stability of our railroad securities has been impaired. That this is the situation has been established by the testimony, among others, of financial authorities, bankers, and economists of national and even of international standing and repute, and in their judgment, as well as in the judgment of those in responsible charge of these railroad properties, unless these conditions are promptly remedied, the effect must be disastrous to all interests, public as well as private.

In the majority report delivered by Commissioner Harlan on the former hearing, it was stated that the credit of our railroads has undoubtedly suffered in recent years, but that this was largely from causes that were independent of their rates. The majority were inclined to attribute this loss of credit and impairment of the confidence of the public in the stability of railroad securities largely to the mismanagement of some great railroad systems of international repute, to the circumstances leading up to the appointment of receivers for certain other companies, to the interlocking of railroad systems with weak lines, and other causes not related to the adequacy of rates or revenues.

However, *upon the rehearing it now appears by the uncontradicted testimony of Mr. Strauss and others, that in their opinion and in the opinion of others who are best qualified to judge,* while the considerations referred to in the majority report have operated to a relatively slight extent, yet *the principal cause for the impairment of railroad credit and the impaired confidence in the value and stability of railroad securities has been the inability of the railroad companies to increase their rates to the extent necessary to secure to them reasonably adequate net revenues.* As stated by Mr. Strauss, this is the view entertained by Sir George Paish, an eminent British authority upon the subject, and similar views have been publicly expressed both here and abroad by Herr von Gwinner, the managing director of the Deutsche Bank of Berlin, and himself one of the most eminent continental authorities upon the subject.

In the early stages of this case there was presented to the carriers the prospect of large additional revenues other than from increased rates, such as extra charges for so-called free services to industrial roads, charges for the spotting of cars on industrial sidings, charges for lighterage and switching services in New York Harbor and elsewhere, and it was urged that the carriers could and should increase their revenues from such sources so as to render them adequate without resorting to increased freight rates.

At the first sight the glitter of the profit it was thought might result to the carriers blinded the eyes of many. In the light of recent events we have a clearer vision, and now we realize again the force of the familiar truth that "all that glitters is not gold."

The majority report of the commission also made certain tentative suggestions as to measures which might be taken by the carriers to secure additional revenues and thereby "to meet the situation" otherwise than by resorting to a general advance in their freight rates.

As shown in the carriers' petition and by the evidence of Mr. Willard and other witnesses, the carriers have given and are giving earnest attention to the recommendations and suggestions of the commission in those regards, but *one of the new factors in the case which we think the commission should take into consideration is that the hopes of increased revenue from most of these sources instead of having an early realization will not end in fruition in time to afford a relief for the present situation and crisis,* even though they happily may at some more remote period result in partial realization.

It is believed by those responsible for the management of the carriers that they cannot safely rely upon any expectation that the additional revenues which may ultimately be secured by the adoption of means other than a general advance in freight rates can be obtained in the near future; or that when secured any such additional revenues will be adequate to meet the reasonable needs of the carriers for increased revenues in the present situation.

It was asserted by Mr. Brandeis as special counsel for the commission in his brief on the former hearing that the commission's only function is to refuse to permit increased rates except upon proof that they are just and reasonable, *"and in the absence of such proof, to prescribe a rate that will be just and reasonable."*

In the Eastern Advanced Rate case of 1910, the commission, speaking through Commissioner Prouty, held that the commission's authority is limited to inquiring into the reasonableness of a challenged rate *"and establishing the rate or practice which is found lawful in place of one condemned as unlawful,"* and again "the question before the commission is still the same and is upon the reasonableness of the rate in effect if the advance has taken place, or upon the proposed advanced rate if the tariff has been suspended. . . . *If, in our opinion, the rate is unreasonable, we must find what would be a reasonable rate and order the observance of that rate."*

It is worthy of note in this connection that the commission, at the conclusion of its report in that case, required the defendants to cancel their advanced tariffs *and to restore their former rates,* which are the rates then and (substantially) for a long time prior thereto and now in effect. It is submitted that this necessarily involved a finding by the commission that the rates so restored were not more than just and reasonable rates. Apart from other considerations the changed conditions since 1910 would seem to be more than sufficient in themselves to justify the comparatively small increase now asked for.

The views so expressed by the commission in the 1910 case, and by Commissioner Daniels and by counsel for the commission in the present case, with respect to the power and the duty of the commission to themselves determine and prescribe the maximum reasonable rates to be charged by the carriers in case the commission determines that challenged rates are unjust and unreasonable, would seem to be fully borne out by the provisions of the Interstate Commerce Act with respect thereto.

Section 15 of the Interstate Commerce Act provides that when-

ever after full hearing the commission shall be of opinion that any rates or charges charged by any carriers subject to the act for the transportation of persons or property are unjust or unreasonable, "*the commission is hereby authorized and empowered to determine and prescribe what will be the just and reasonable individual or joint rate or rates, charge or charges, to be thereafter observed in such case as the maximum to be charged, . . . and to make an order that the carrier or carriers . . . shall not thereafter publish, demand or collect any rate or charge for such transportation in excess of the maximum rate or charge so prescribed.*"

It is further provided that all orders of the commission shall continue in force for such period of time, *not exceeding* two years, as shall be prescribed in the order of the commission.

By a further provision the commission may, as they have in this case, enter upon a hearing concerning the propriety of rates before they go into effect, and may, as therein provided, suspend the operation of such new rates, but the order which, after full hearing, whether completed before or after the new rates go into effect, the commission are authorized to make in reference to such new rates is only such as would be proper in a proceeding initiated after the rates had become effective.

The officers of the carriers who are responsible for the management of these railroads, conscious of the responsibilities devolving upon them and of their duties to shippers, to the public at large and to the holders of their bonds, capital stock and other securities, filed with the commission, in the manner prescribed by Congress, the advanced rates in question. They believed then, and they now believe, that such advanced rates were and are well within the limits of what would be just and reasonable. They have endeavored to present to the commission as fully and as fairly as possible the facts bearing upon the propriety of these advanced rates in the effort to satisfy the commission that they are just and reasonable, and in order to aid the commission to determine what will be the maximum just and reasonable rates in case the commission finally shall be of the opinion that such advanced rates are unjust and unreasonable.

Under the law and the facts in this case, in the event that the commission are finally of opinion that the rates are unjust and unreasonable, or in the event that they do not feel justified in allowing the rates to go into effect without exercising their power of suspension, should not they themselves presently determine and prescribe the maximum reasonable rates which the carriers will be permitted to charge and which will produce the adequate net income which the existing rates do not produce?

We hope and believe that, upon all the facts which the whole record now contains, the commission will find that the proposed rates are no more than just and reasonable and allow them to become effective, before it is too late; but in case the commission determine to the contrary, should they not, in that event, as a matter of sound discretion (even if they are of opinion that the provision of the statute in that regard which I have quoted is not mandatory) adopt the course indicated by the statute, instead of requiring the carriers to await the outcome of the attempted application of the tentative suggestions as to substituted measures which might be taken by them to secure additional revenue? Would not that be the better, proper and safer course to pursue in such contingency—*particularly* in view of the fact that the carriers believe that what can be accomplished through such suggested substitute measures will be too inadequate in amount, and too remote in point of time, to provide necessary relief, and that the record justified that belief, *and in view of the further fact that the carriers, and the great public and private interests dependent upon their future welfare, otherwise would be subjected to the great risk of such alternative measures proving to be inadequate or ineffective?*

It may be said that even conceding the correctness of the rule that the carrier is entitled to charge just and reasonable rates that will produce adequate revenues, it is difficult to apply the rule in practice, or to ascertain or in terms define it. It is true that the results cannot be determined with the ease and certainty of the application of a mathematical rule or the weighing of a commodity; but that affords no reason for abandoning a proper and logical rule, which is as definite as the constitutional guarantee that property shall not be taken without just compensation or without due process of law, or as the rules with respect to the taking of property by eminent domain. Though it were as difficult to express and define all the elements which constitute this standard, as the star by which the mariner steers his ship is unattainable, it none the less affords as safe and sure a guide.

FREIGHT CAR SURPLUSES AND SHORTAGES*

By Arthur Hale
General Agent, American Railway Association

Eight years ago, in the fall of 1906, the country suddenly awoke to the fact that there was a great shortage of freight cars. No one knew just how great the shortage was; no one knew just where the shortage was, although it was widely stated that it was the greatest car shortage in history and was felt everywhere. The car shortage was coincident with serious congestions of loaded cars in many parts of the country. No one knew whose fault it was, although it was widely stated that it was the fault of the railways.

There was an investigation of the subject by the Interstate Commerce Commission, but the report contained no positive recommendations.

The railroads of the country, however, took up the question very seriously and arranged to secure current information as to car shortages and their causes and effects. They also, with the help of the interstate and state commissions, revised their demurrage rules, making them stronger, fairer and more uniform. We are still far from perfection, but possibly as a result of this action by the railways, we have since 1907 had no shortages or congestions comparable with those of 1906. The statistics which the railways have gathered have enabled them to foresee coming shortages, and to take such steps that when a period of car shortage does come it is met, so far as may be, by an improvement in car efficiency. There have been some congestions of loaded cars but wherever any marked congestion has occurred it has usually been composed of cars loaded to a point where there has been some defect in the demurrage rules or in their administration.

The statistics are collected by the American Railway Association. They include not only the car shortage and car surplus figures, but also figures showing the location of cars on the various roads, the average number of miles the cars make in a day, and comparisons of this daily car mileage with the earnings and the ton mileage. Most previous car statistics had been based upon the performance per mile. These new statistics introduced a time factor, and showed the car performance by the day. And much light has been thrown on the subject by these statistics, chief of which are the mileage per car per day, the percentage of loaded mileage, the tons per car and the ton-miles per car per day. Some of these terms and the situation which they deal with may seem abstruse. The car shortage is plain enough. It is reported whenever a shipment is offered for transportation and there is no car for it. It may be that the car shortage is only for a day or so and the shipment is merely detained at loading point until the cars arrive. On the other hand, when car shortages are serious and long continued, a shipper may send his shipment in via some other route so that it is lost to the railroad. Worse than this it may be that the order for the goods is cancelled in which case the shipment is not made at all.

A car surplus is reported whenever an empty car stands more than one day without a load. A reasonable car surplus is an advantage both to the shipper and the railroad, because

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it enables the railway to fill unexpected orders. Railways try to get shippers to order their cars a day ahead, but even the shipper himself cannot tell just what cars he will need until the very day of shipment and if there is not a certain amount of surplus unexpected shipments may be delayed.

The location of freight cars on the various railways is necessary if we are to know whether a railway or group of railways is supplying its proper quota of freight cars. The location is simply a report of the number of cars in use on a railroad and when this number of cars is compared with the number of cars which the railway itself owns we know at once whether the railway is using cars in excess of what it owns, or on the other hand, is forced to get along with a deficit in cars.

If for any period a railway reports a car shortage and for the same period is using cars in excess of what it owns, it is quite evident that that railway does not own enough available cars. It would seem to be the duty of such a railway either to purchase more cars or to improve its other facilities so that the cars which it owns can do more work.

It is to give the railways a standard for the work done by their cars that the other figures alluded to are compiled. Every railway ought to know every month the average number of miles per day its freight cars travel. To know whether or not this is a good showing, it must be in position to compare its own records with the records of other railroads. Again it helps a railway very little to know how many miles a day its cars are moved if it is not assured that a proper proportion of these miles is made under load. A high percentage of loaded mileage is an indication of good performance.

But this is not enough. Unless the cars are loaded as nearly as possible to their full capacity, a high percentage of loaded mileage may be altogether deceptive, and to ascertain whether proper loads are being secured, the ton miles are counted up and are compared with the car miles, so that each road may know for itself and its neighbors the average load per car, and what is better yet, the number of ton miles per car per day.

Perhaps this may be clearer if we investigate in the same way the economies of a man's automobile. Its first duty is to take the man to work and back. It is five miles from the man's house to his office. The man is taken alone into town. The car returns empty and in the afternoon the operation is reversed, making 20 miles a day. During the interval the automobile travels 30 more miles with members of the man's family; 10 of these miles are empty and the other 20 it carries, on an average, two people. We will then have for the car 50 miles a day of which 60 per cent is loaded; one passenger per car mile and 1⅔ passengers per loaded car mile and 50 passenger miles per car per day. We can hardly say that there is even a car surplus except at night. We may conceive that there is an automobile shortage for certain periods of the day. For instance, soon after the man has gone into town in his automobile, his wife may want it. Then there is a shortage of one car until it returns from town. In the same way the husband may need the car during the day or he may want it earlier than usual in the afternoon. He is short a car for these hours, because the automobile is not available. When the man cannot get the automobile for his return home, he may go back on the trolley. The automobile may be sent for him in error and may then make a round trip of 10 unnecessary empty miles, which would bring down the percentage of loaded mileage for that date from 60 per cent to 50 per cent, a bad showing. This would be a case when a car shortage actually resulted in the loss of a shipment. Ordinarily the automobile shortage would result merely in the delay to the man's movements. This, as above, is exactly what generally happens in a freight car shortage.

We can conceive that the delay to this automobile might lead to an approach to a demurrage system. If the wife holds the car an hour too long, the man might perhaps withhold $1 of her allowance. This would be the equivalent of demurrage. If, on the other hand, the man kept the automobile in town too long in the morning, his wife might be in a position to inflict some penalty upon him, possibly in the quality of his dinner.

When the automobile breaks down and has to be sent to the garage for repairs, we have 100 per cent cars in shops and a constant car shortage.

Suppose that the inconvenience of the arrangement is such as to induce the man to buy another automobile, and suppose the two cars now divide the work formerly done by one. We will then have a surplus of one car at one or another point most of the day, but normally there will never be any shortage, except when one of the cars is in the garage for repairs. It may happen that the work will be done with less total mileage, as the husband will be able to keep one car in town all day until he uses it back home in the evening. The total mileage for the two cars will then be only 40 miles, only 20 miles per automobile per day, apparently a bad showing; but the percentage of loaded mileage will be increased from 60 per cent to 75 per cent with the same 1⅔ passengers per loaded mile. The passenger miles per automobile will, however, drop to 25.

We have not the data to show whether or not this new arrangement is economical as compared to the old. One can conceive a man's friends accusing him to extravagance in keeping two automobiles to do the work of one, and of his explaining that he saves the gasoline necessary for ten miles of unnecessary empty movement. While his two machines will undoubtedly depreciate more through obsolescence than did the one, they will depreciate much less by use. The man may indeed conclude that the extreme convenience of the new arrangement is worth all that it costs.

In the same way the public is pleased with the railways when they can supply them promptly with cars, though it is unfortunately a fact that when there are no car shortages the mileage per car is low and frequently the percentage of loaded mileage as well.

Perhaps the most economical arrangement for our friend of the automobile would be to confine himself to one machine to take his family down town with him and make them stay in town until he was ready to go home. Here we would get more favorable looking automobile statistics from an economical point of view, but this would be at a sacrifice of a great deal of convenience. There would be frequent losses of tonnage when one party was not ready for another. Here again when our car statistics are most favorable economically it is always during a period of car shortage when shippers are sometimes obliged to wait a day or so for cars before they are able to make their shipments.

Taking another case, a little more technical. Let us suppose that some small railway has 100 stock cars which are regularly occupied in hauling stock a distance of 100 miles to make a Saturday market. We will suppose that these cars leave the point of origin on Friday, that they make the market on Saturday and that the stock cars are utilized with a return load which with its necessary delay for loading and unloading and slow freight movement occupies the rest of the week. Here we have a record of nearly 29 miles per car per day. There is a 100 per cent loaded mileage, the cars average 10 tons of stock and 30 tons with return load, so that the average tonnage per loaded car is 20 and the tons per mile per day are 429, all very good figures. Suppose that through some technicality or other mischance it is discovered that there are no demurrage rules in effect on the return load. The consignee finds that he need not unload the cars at destination on arrival but can await until his men are

through with certain other work. He then takes four days on an average to unload the cars instead of the two that it took before.

Now, you will remember the cars are in the stock trade two days in the week. The day after they are released is Sunday, and they have been occupied for the other four days of the week with the return load. Just as soon as the consignee begins to use four days in unloading, the cars will not be ready on Friday for the regular stock movement, and there is a serious shortage of stock cars unless they are supplied from some other source. There may also be a congestion at the unloading point. The facilities have probably been arranged for unloading the cars in days. If four days are occupied on each car there will be twice as many cars as there were. Suppose that this extra delay makes the round trip average a week and a half instead of a week. Then 150 cars will be needed to do the work of 100. They will average only 19 miles per day instead of 29. The mileage will still be 100 per cent. loaded, but the ton miles per car day will drop from 429 to 286, a low figure.

As is shown in the diagram the various figures have a distinct relation to each other. When there is a car surplus the percentage of loaded mileage falls, so does the mileage per car per day. The percentage of loaded mileage remains low until a car shortage comes, when at once the cars move faster and are loaded heavier. The car mileage applying as it does to all the cars is, of course, directly affected by the car surplus inasmuch as a surplus car does not move, but it is quite evident that the cars in motion do not move as fast as they did under the pressure of a car shortage. This is shown in the diagram by the two curves representing the ton miles per car per day, one of which excludes surplus cars and the other includes them.

It cannot be said that the introduction of these statistics has made any marked change in the practice of American railways. Their use has only confirmed transportation men in their old conviction that freight cars should be moved as fast as practicable, that they should be loaded as heavily as practicable and that empty mileage should be avoided. These are the principles on which the good car distributor has always worked on the division and the good superintendent of transportation at headquarters. The statistics are chiefly useful to them as a record which enables them to foresee coming shortages and to tell them whether or not they have handled their equipment well as compared with previous years or with other railroads.

Whatever conclusions are derived from the statistics must always be modified by traffic considerations. An attempt to handle cars too economically will discourage traffic and it is for this reason that the car surplus figures are of such great importance. If one railroad has a car surplus while its neighbors have occasionally car shortages, it is well to examine the situation and make sure that it is not attempting undue economies in the handling of its freight cars.

REPORT ON TIPTON FORD COLLISION

The Interstate Commerce Commission has issued a report by H. W. Belnap, Chief, Division of Safety, dated September 19, on the butting collision of passenger trains on the Kansas City Southern near Tipton Ford, Mo., on August 5, in which 38 passengers and 5 employees were killed and 34 passengers and 4 employees were injured. The collision was reported in the *Railway Age Gazette*, August 7, and in an editorial in the issue of August 14, the problem of the prevention of collisions and the relation thereto of the gasolene fire hazard were briefly discussed.

The collision occurred on a straight line where there is a view, from curve to curve, of about 900 ft. The tangent is 550 ft. long, and the collision occurred about 100 ft. south of the middle of it. Each train was running about 35 miles an hour. The operator at Joplin who handled the train order which figured in this collision, an employee of the Joplin Terminal Company, had been in the service of that company only about two weeks.

The conductor of the train which ran past the appointed meeting station was killed. There was a suggestion that the conductor's signature, on the copy of the order produced by the operator, was not genuine, but Mr. Belnap throws little or no light on this point, nor does he say who made the charge of forgery.

After stating these and the other facts, already known to the reader, he concludes his report as follows:

"This accident was caused by southbound train No. 209 failing to wait at Tipton Ford for northbound train first No. 56, as directed by order No. 84.

"While at the hearing before the Public Service Commission of Missouri the question was raised as to whether or not the name 'Nicholas' on the carbon copy of train order No. 84, furnished by Operator Hadley, was the signature of Conductor Nicholas, there was no positive or direct evidence that the signature was not genuine. While a number of persons saw Conductor Nicholas with papers in his hand at the train register book and when leaving it, no person saw him sign or receive train order No. 84 except Operator Hadley, who is positive in his statements that Nicholas signed and received this order at Joplin. On account of the entire crew of train No. 209 being killed in the collision and their bodies cremated, no evidence is procurable as to the reason why the direction contained in order No. 84 was not obeyed by them.

"Conductor Nicholas entered the service of the Missouri & North Arkansas as a brakeman on January 17, 1901, and was promoted to conductor on April 1, 1901. In June, 1901, he left the service, but was reinstated as conductor in April, 1902. On November 15, 1906, he was promoted to superintendent, but resigned that position September 12, 1908, and resumed work as a passenger conductor. His record was good.

"Operator Hadley is 29 years of age and secured his first position as an operator in 1903, since which time he had been in the employ of eight different railroad companies. It further appeared that when he first became a telegrapher he was discharged by the Atchison, Topeka & Santa Fe at Holly, Colo., for failure to deliver a train order. He entered the employ of the Joplin Terminal Co. about July 22, 1914, and had been rendering satisfactory service.

"This is the first accident investigated by the commission wherein a gasolene motor car was involved. On account of the fire caused by ignition of this highly inflammable substance, the casualty list in this accident was much larger than it otherwise would have been. The rapidly increasing use of these motor cars, carrying large quantities of gasolene, introduces such an additional element of danger as to demand extraordinary precautions against the possibility of collisions wherever such cars are used.

"As previously noted, no block-signal system is in use on the Kansas City Southern. It appears also from the facts developed in this investigation that even the inherently weak train-order system is not used at its highest degree of efficiency on this railroad. Rule No. 208 provides for the placing of a meet order at the designated meeting point 'when practicable.' It was obviously not practicable to use the middle order in this case, for the reason that no operator was stationed at Tipton Ford.

"The 20 miles of track between Joplin and Neosho is used jointly by trains of the Kansas City Southern and the Missouri & North Arkansas. Four first-class and two third-class trains of the latter road are scheduled to pass over this section of track daily, subject to the operating rules of the Kansas City Southern. There are two passing tracks between Joplin and Neosho and it must frequently become necessary to require trains to meet at those points; yet no operator is employed at either place, and it is thus rendered impossible to use the middle order at meeting points on this section of track."

Convention of Railway Electrical Engineers' Association

Electric Headlights, Wireless Telephones, Industrial Trucks and Head End Equipment Were Discussed

The seventh annual convention of the Association of Railway Electrical Engineers was held at the Hotel LaSalle, Chicago, October 27 to 30, C. R. Gilman, chief electrician, Chicago, Milwaukee & St. Paul, presiding. The secretary-treasurer reported a cash balance of $1,125 and 541 members.

DATA AND INFORMATION

This committee sent a list of questions to 67 of the most prominent roads, 50 of which replied in considerable detail. In regard to the car lighting systems, it was found that in the United States and Canada there are 18,936 electric lighted cars, of which 12,458 are lighted by axle generator sets and 2,707 by straight storage. There are also 259,842 lead battery cells, 31,883 nickel iron cells and 273 head end generator sets in service. Within the past two years there has been a falling off in the use of the head end equipment. In regard to electric headlights, the returns from the circulars show that 12,432 arc lights and 1,287 incandescent lights are now in use. This is a material increase in the use of incandescent lights over the roads reporting last year. Under the subject of Shop and Station Equipment it was found that about 25 per cent of all the lighting units reported were 250 watt Tungsten lamps, and about 21 per cent alternating current arc lamps. The use of the Tungsten filament lamps greatly predominates in the shops of the railroads reporting. The total capacity of the generators in use by those roads replying to the circular is 123,401 kw. alternating current and 65,077 kw. direct current. Of 415 shops reported, 42 per cent, representing 30 per cent of the total power, purchased power from local central stations, while 58 per cent of the shops, representing 70 per cent of the total power, generated their own power. The horsepower of the motors reported in use in the shops amounted to 176,954, or 5.37 hp. per locomotive handled in those shops. The following table shows the number and total power of the various types of motors reported:

Type of motor.	Number	Total horsepower	Average horsepower	Horsepower of the greatest number
Direct current	4537	70,234	15.5	5
A. C. single phase.....	177	527	3.0	¼
A. C. two-phase.....	1118	17,150	15.3	10
A. C. three-phase.....	5601	96,595	17.3	10

The direct current motors are very much more numerous in the smaller sizes than the a. c. motors, and constitute 40 per cent of the total number and 38 per cent of the total horsepower of motors in use on the railroads reporting.

The information gathered on shop traveling cranes showed that there is a wide difference in the motor horsepower used for the same capacity cranes. For instance, the main hoist motors of 108 cranes of 10-ton capacity, as reported, varied from 7 h.p. to 50 h.p., with an average of 26.5 h.p. The committee recommended that a committee be appointed to establish standard sizes of motors and motor mountings for the cranes, as it was believed that much cheaper equipment could be obtained and the cost of maintenance would be much less.

The report is signed by: E. Wray (Elec. Eng.) chairman; T. V. Buckwalter (Penn.); C. J. Causland (Penn.); B. F. Bilsland (Gen. Elec. Co.); A. J. Farrelly (C. & N. W.); J. E. Gardner (C. B. & Q.), and W. M. Wiggins (Pullman Co.).

STANDARDS

The committee on Standards restricted its work this year to the following three subjects: Axle pulleys, generator pulleys and generator pulley fits on armature shafts. It emphasized particularly the necessity of establishing standards for generator pulleys. At the present time there are more than 20 different types of generator pulleys and more than 10 different pulley fits. Two sizes of axle pulleys were recommended, one having a maximum diameter of 21 in. on the crown of the face and the other 16 in. Two sizes of generator pulleys were also recommended, the large pulley to be 10½ in. in diameter and the smaller pulley 8 in. in diameter, both being measured on the crown of the face. While the committee recommended a generator pulley fit with a ¾ in. in 12 in. taper, a 1½ in. shaft, and a 2⅝ in. hub, it was finally decided to make the generator pulley fit with a 1½ in. in 12 in. taper, a 1⅝ in. shaft and a 4 in. hub. It was believed that by doing this the larger pulley bearing obtained on the shaft would be of value and the longer hub would permit of having the web of the pulley nearer the center. It was also suggested that the 1½ in. taper would correspond with the taper recommended for roller bearings, and thus keep the recommendations of the association standard.

The report is signed by: D. J. Cartwright (L. V.) chairman; J. H. Davis (B. & O.); E. W. Jansen (I. C.); Ward Barnum (L. & N.), and C. H. Quinn (N. & W.).

ELECTRIC HEADLIGHTS

It was believed that wiring from the generator to the headlight through the hand rail was more costly in the long run than where a separate conduit was provided. The use of a one inch conduit with condulets at the outlet with a special connection box at the cab so that the cab or conduit can be removed without interfering with the wires offers the best solution of the wiring problem. It is expected that within a short time the lamp manufacturers will be able to produce a lamp with a concentrated filament of high candle power that will prove very serviceable for the incandescent headlights of high power. Attention was also called to the battery headlights which are used with good results on the Southern Pacific. The lamps have a candle power of 140, and are of the nitrogen-filled Tungsten type, requiring 13 amperes at 6 volts. The headlight lamps are mounted in standard oil lamp reflectors and in addition to these three cab lamps and two blizzard lamps are used. The batteries have a capacity to run the entire lighting equipment for 13 hours. They are mounted on top of the boiler and are removed each trip with a jib crane for charging.

The report is signed by: C. R. Sugg (A. C. L.) G. E. Murray (C. & N. W.); J. J. Hack (So. Pa[illegible]man; Gardner (C. B. & Q.), and L. C. Hensel (St. L. & S. F.).

Discussion—J. L. Minick, Pennsylvania Railroad, w[illegible]ticipated in the tests of locomotive headlights conducted Pennsylvania Railroad for the Master Mechanics' Assoc spoke of these tests and suggested that this committee co-op with the committee of the Master Mechanics' Association the Lamp Committee of the Association of Railway Electri Engineers for the purpose of establishing standard methods rating the different lamps, and of obtaining standard voltages.

WIRELESS TELEGRAPH AND TELEPHONE

Dr. Frederick H. Millener of the Union Pacific, presented an illustrated talk on the wireless telegraph and the wireless telephone as an adjunct in the operation of a railroad. Doctor Millener spoke of the experiments he had made on the Union Pacific towards finding a method of signaling the cab of a locomotive or communicating with a train. While experimenting he used a storage battery electric truck weighing 5,500 lb. He was able to control the movements of this truck throughout the narrow gage railway on which it was installed by means of the wireless, but he found that this method was not reliable as atmospheric conditions will sometimes interfere with the correct operation. It was therefore decided to discontinue the work on the mechanical wireless cab signal, as it would not be reliable. The next work taken up was the wireless telegraph between stations. These experiments were made for 600 miles west of Omaha, where it was found that in the summer the static electricity causes disturbances. On account of this the best results

could only be secured by using a higher frequency than 60 cycles, for when there is static electricity prevalent the musical note in the receiver is so low that it is confused with the atmospheric or static electricity. For this reason a frequency of about 550 cycles, transformed up to 12,000 volts in an open core transformer, was used.

It was found absolutely necessary to have the aerials close and compact, and they should be of simple construction and easy to repair. It has been found that the use of the flat top aerial is much more practical than the umbrella type. It should be elevated by two self-sustaining towers, the height of which should be at least 210 ft., and it should be constructed so as to stand a wind stress of 90 miles an hour. The aerial should be placed close to the tracks, as the wireless wave will be rendered directional by the track and will travel farther with the rail than in other directions. For more than three years the Union Pacific has been ready to install a wireless telegraph, but for various reasons not connected with the wireless, it has been postponed.

In the meantime, experiments have been made with the wireless telephone. The apparatus that has now been designed at the Union Pacific shops is a composite telephone. By that is meant, it is possible to talk by wireless and also to use part of the same apparatus to talk by wire between the cars, or, when at stations, to talk over the local or long distance wires by making connections between the cars and the local exchange. When used as a wireless telephone it will be possible to talk with the train ahead, the train behind, or the station. The device is so arranged that while talking from car to car it is selective talking and selective signaling. While talking on the long distance wire only one person at a time can talk from the train. The wireless system is placed in operation by first calling the attendant in the baggage car and requesting him to start the wireless generator. The aerial on the train sends the messages to the telegraph lines along the side of the track; part of these wires have been balanced up and equipped with condensers around the telegraph instruments and are used as an aerial for the station.

INDUSTRIAL TRUCKS

The committee on this subject recommended a standard capacity of 4,000 lb. for industrial trucks. A lower rating was not considered advisable for the reason that the industrial trucks are years loaded to about 4,000 lb., or slightly in excess of that ... and this condition would result in overloading. It was recommended that a speed of 5 m. p. h. be made standard, ... an exception of 7 m. p. h. for operation under special conditions where the runs are comparatively long and the runways free from workmen.

A standard voltage of 24 volts was recommended for general industrial truck service, and a battery consisting of either 12 cells of lead battery, with jar sizes 5 13/16 in. by 6 3/16 in., with a high bridge and a 5/32 in. wall; where Edison batteries are used, it was recommended that 21 A-6 cells assembled in three trays of seven cells each be used. It was also recommended that the motor voltage be rated at 24 volts.

The report is signed by: T. V. Buckwalter (Penn.) chairman; C. E. F. Ahlm (Elwell-Parker Elec. Co.); F. H. Fildes, (Penn.); A. H. G. Grorer (C. W. Hunt Co.); J. E. Hale (Goodyear Tire & Rubber Co.); H. G. Thompson (Edison Storage Battery Co.), and Dr. W. E. Winship.

ELECTRIC TRACTION

The committee on Electric Traction reviewed the present status of electric traction as applied to steam roads, the ordinary urban and interurban line not being considered. A short description of the various railroad electrifications, both in this country and many European countries, was included in the report.

Direct Current Installation.—In regard to the use of direct current on railroad lines the committee stated that the low voltage system is extremely flexible and is particularly desirable for its range of operating speed, but it cannot be considered economical for long lines carrying heavy traffic, as expensive substation installations are required in such cases, and the distribution system will be unduly expensive. The potential used for these installations varies from 500 to 750 volts, and for traction work a third-rail system of distribution is almost universal, as it is not practicable to collect the heavy currents taken by the locomotive from a trolley wire. It has been a natural step in the progress of electric traction to increase the voltage and thus reduce the amount of current to be transmitted for a given load requirement. The voltage of 2,400 and 3,000 volts is now considered standard for high voltage, direct current, heavy traction installations. It is doubtful if a third-rail system of distribution will be desirable for this high voltage direct current due to the necessity for considerable insulation coupled with the requirement of obtaining sufficient clearances for the installations.

Alternating Current System.—The attractive feature of the single-phase commutating motor type system has been its facility to supply electricity direct to the locomotive at high voltages, the only limit being the practical insulation of the locomotive equipment. It has not been found necessary to go beyond 12,000 volts up to the present time, and this potential provides for heavy power supply with 20 to 30 miles between generating stations, or transformer sub-stations if the power is taken from a transmission system. It has been the standard practice in America to use 25 cycles for this system as a higher frequency is not practicable. The advantages of this system consist in the elimination of sub-stations with rotating apparatus, an extensive electrification only requiring outdoor sub-stations containing transformers and switching equipment, and the smaller amount of copper for feeder requirements.

The three-phase system of distribution, operating induction motor equipment on locomotives, has been used considerably in Europe. A double trolley and track circuit is used for the three legs of the system. The only installation of this kind in this country is through the Cascade tunnel of the Great Northern and has been in successful operation for about five years.

Electric Braking.—In the case of the electrification of roads having heavy grades, such as occur on mountain divisions, the use of dynamic braking is an important consideration, as it saves the wear and tear on the mechanical braking equipment and adds to the safety of operation.

The report is signed by: H. M. Van Gelder (Westinghouse, Church, Kerr & Co.), chairman; J. H. Davis (B. & O.); D. C. Woodbury (N. Y. C. & H. R.); Paul Real (N. Y. N. H. & H.); C. P. Kahler (O. S. L.), and C. B. Keiser (Penn.).

AXLE EQUIPMENT

The committee on this subject found that almost without exception roads operating in the northwest quarter of the United States favor the head-end system on long runs for through trains. On the other hand, owners of practically all cars in the eastern half of the country and in the southwestern quarter, as well as the owners of all cars in Canada and England, favor the axle system exclusively for train lighting. From statistics obtained from various roads in the United States, Canada and England, it was found that on July 1, 1914, 23,472 cars were equipped with the axle lighting plant, while 4,627 were equipped with the head-end equipment. During the years 1913 and 1914, 3,642 cars were equipped with the axle lighting plant, whereas only 169 cars were equipped with the head-end system. The average cost for maintaining the axle-light equipment on one road operating 166 cars for the year ending December 31, 1913, is included in the following table:

Item	Road maintenance	Shop maintenance	Total maintenance	Cost per 1,000 car-miles
Generators	$3,171.49	$651.62	$3,823.11	$0.3192
Batteries	875.19	1,332.07	2,207.26	.1843
Labor	8,365.08	2,522.56	10,887.64	.9092
Total direct charge	$12,411.76	$4,506.25	$16,918.01	$1.4127
Lamp renewals	1,995.83	162.92	2,158.75	....
Miscellaneous	309.18	488.05	797.23	....
Credit	55.00	369.11	424.11	....
Grand total	$14,661.77	$4,788.11	$19,449.88	$1.6241

The total mileage made by these 166 cars was 11,975,599 miles.

From the information obtained from other roads, the average cost per 1,000 car-miles for this road is somewhat below the average of all the roads from which the information was obtained. The average maintenance cost per 1,000 car-miles of those roads reporting in the United States was $1.78, which corresponds to a cost per car per month of $14.51. Attention is called to the high cost of maintaining dynamos as compared with all other parts of the equipment. The battery maintenance seems to be a little more than one-half that of a dynamo.

The report is signed by: H. R. Bucks (O. S. L.), chairman; R. L. Smith (Gt. West., Eng.), and E. M. Cutting (Edison Storage Battery Co.).

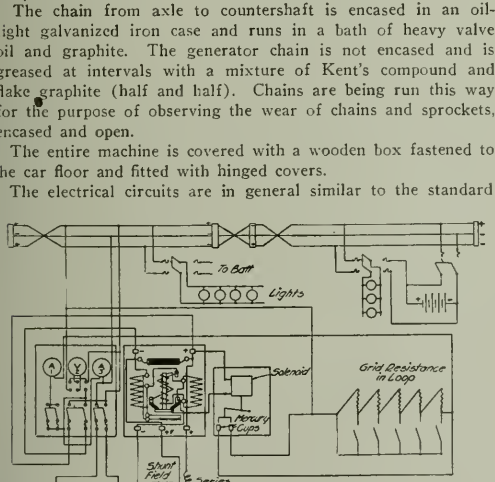
HEAD-END EQUIPMENT

The report of this committee was restricted almost entirely to the history and description of the axle-driven head-end generator as used by the Northern Pacific. In 1909 this railway experimented with an axle machine designed to light an entire train and the machine now in service is known as the Gould axle train lighter. It is a 20-kw., 6-pole commutating pole, compound-wound, 80-volt, 300 to 2,100 r. p. m. generator mounted on a cast-steel base, arching the center sills and extending into the car through two rectangular holes in the car floor. The machine is driven by a Morse silent chain from a countershaft, which in turn is chain-driven from the forward axle of the forward truck. The wheels on this axle do not have a brakebeam. The machine itself is ring oiled but the counter shaft is equipped with ball bearings.

The chain from axle to countershaft is encased in an oil-tight galvanized iron case and runs in a bath of heavy valve oil and graphite. The generator chain is not encased and is greased at intervals with a mixture of Kent's compound and flake graphite (half and half). Chains are being run this way for the purpose of observing the wear of chains and sprockets, encased and open.

The entire machine is covered with a wooden box fastened to the car floor and fitted with hinged covers.

The electrical circuits are in general similar to the standard



Wiring Diagram of Generator, Regulator Batteries and Train Line for Unit Axle System

head-end system of the Chicago, Milwaukee & St. Paul. The lamp current at present passes through a temporary variable resistance, causing a drop from charging voltage to 64 volts. A large lamp regulator of 125 amperes capacity is being constructed to take the place of the hand operated variable resistance and other test equipment now in the car.

The generator controlling apparatus consists of a regular Gould generator panel constructed on a large scale. The current coil limits the current to 125 amperes, while the voltage coil limits the generator voltage to 80 volts. The current coil is equipped with a shunt resistance that causes it to limit the current to 250 amperes if this is desired. The main switch closes at 66 volts, or when the train speed reaches 18 m. p. h.

Temporarily there is installed a solenoid which short circuits the variable loop or lamp resistance when the main switch drops out. The new lamp regulator, which will be large enough to take care of the entire train, will take care of this feature.

The Gould axle lighter has made the following mileage to date without a light failure:

	No. of trips	Miles
From St. Paul to Glendive, Mont., and return	2	2,668
From St. Paul to Seattle, Wash., and return	1	3,808
From St. Paul to Winnipeg, and return	32	30,796
Total miles		37,272

The equipment is practically hand operated at present.

The distribution of the batteries on the train equipped with the unit axle system is a point to be considered. It is the practice on the Northern Pacific to place 9 plate, 200 ampere hour batteries under the postal car, if any, the dynamo car, the standard sleepers and the observation car.

One fundamental difference between a steam head-end system and a unit axle system is that with the latter system the lamp load is carried by the batteries at every stop the train makes. For this reason steam head-end experience cannot be used as a basis for determining the exact relation that should exist between the connected lamp load in the train, the current output of the generator and the total battery discharge current at the eight-hour rate.

Following is a statement showing comparative costs of operating the steam head-end system and the unit axle system on the Northern Pacific:

	Steam Head End	Head End Axle
Current consumed per day (all cars), per actual check of electric lighted trains	1,300 kw. hr.	1,300 kw. hr.
Pounds of steam consumed by General Electric Company's turbine per kw. hr. delivered, for average load, per actual test N. P. and C., B. & Q.	160 lb.	.....
Pounds of steam consumed by axle generator per kw. hr. delivered (average load), based on 40 lb. of steam per drawbar h. p. (N. P. test), and 95 per cent efficiency in chain drive	.....	59.5 lb.
Total pounds of steam consumed per day for lighting of cars	208,000 lb.	77,300 lb.
Pounds of coal required per day for lighting of cars, based on 7 lb. of water evaporated per pound of coal (N. P. test)	29,700 lb.	11,042 lb.
Cost of coal per day @ $3 per ton	$44.56	$16.56
Cost of coal per year @ $3 per ton	$16,300	$6,045.50
Wages per year:		
24 baggagemen @ $5 per month, 36 train electricians @ $85 per month	$38,160	.....
Total cost per year, fuel and wages	$54,460	$6,045.50
Cost of current production per kw. hr. (fuel and wages above mentioned)	11.5c	1.27c
Actual saving per year in favor of head end axle light system	.....	$48,414.50

The saving on other roads of course depends on the wages paid to train electricians and other details of operation, but in any case it would no doubt be considerable. This is because the efficiency of the locomotive is approximately four times that of the turbine at one-third load and also because with the unit axle system all manual attention on the road is unnecessary. It has also proved unnecessary on the Northern Pacific to add local or terminal inspectors due to the use of this system. The men who have taken care of the steam head-end sets have no trouble taking care of the unit axle machines. In fact, due to the fact that no terminal charging is necessary with the unit axle system, they have more time to spend on inspection of machines.

The absence of excessive heat in baggage and express cars practically eliminates the claims for damages to baggage and express due to this cause.

The report is signed by: K. R. Hare (N. P.), chairman; Jos. A. Andreucetti (C. & N. W.); C. R. Gilman (C. M. & St. P.), and J. J. Hack (So. Pac.).

ILLUMINATION

From the results of the day coach tests reported at the last convention this committee recommended the following positions for the 2¼ in. shade holder; 1⅛ in., ½ in. and 0 in. above the top edge of the reflector, and one position for the 4½ in. shade holder which is 1 in. above the top edge of the reflector. With some of the postal car lighting units, however, other positions

are required to give the proper distribution of light. The committee also recommended 65 deg. as the limiting screen angle of reflectors in car-lighting service—that is, no portion of the bare lamp filament or bare mantle should be visible to the eye when the unit is observed at an angle of 65 deg., or greater, from the nadir.

The committee also presented a progress report of the work they are doing on the illumination of classification yards, especially pertaining to track scales.

The committee believes that the incandescent lighting will eventually supersede arc lighting in the railway field, with possibly a few exceptions, although improvements have been made in the arc lamp that should not be overlooked.

In the incandescent lamp field the most important improvements have been made in the development of the high candle power, high efficiency Mazda lamp. With the larger sizes of multiple gas-filled Mazda lamps, the reduction feature is approximately 90 per cent as contrasted with about 78 per cent for the other Mazda lamps—that is, in comparing the lamps on a horizontal candle power basis for the same candle power in each case, the total light flux of the improved lamp is 90 per cent compared with 78 per cent for the other class. The reports of the earlier installations of multiple lamps have shown widely varying results. With the improvements that have been made in the past few months in obtaining more uniform life performance of gas-filled lamps, as well as that which can be expected in the coming months, the committee feels that there should be no hesitancy in adopting this type of lamp as far as life performance is concerned.

The report is signed by: L. S. Billan (B. & O.), chairman; J. L. Minick (Penn.); H. C. Meloy (L. S. & M. S.); L. Schepmoes (Safety Car Heating & Lighting Co.); D. P. Morrison (P. & L. E.); W. H. Robinson (West. Lamp Co.); P. S. Millar (Elec. Test. Lab.), and C. W. Bender (Nat'l Lamp W'ks.).

SHOP PRACTICE

This year the committee on Shop Practice considered the subject of the electrical equipment of cranes, hoists, transfers and turntables. There is a very strong sentiment in favor of direct current motors for crane and hoist service. This is due not only to the lower maintenance costs of direct current motors, but also to the increasing use of dynamic braking. The most interesting development in connection with transfers and turntables is the operation of tractors instead of mounting the motors on the platform direct. Here, also, preference is given to the direct current motors.

The series wound direct current motor possesses the characteristics which make it ideal for the requirements of overhead crane service. The service requirements are such that crane motors must have a high starting torque, but it also permits the use of motors rated on an intermittent load basis, so it has become customary for most manufacturers to use motors which are really too small for the work.

Of the controllers for crane motors the drum type is preferred by most engineers because of its simplicity, ease of repair, interchangeability of parts, magnetic blow-out, and being enclosed.

Transfers and Turntables.—Where direct current is available it is considered preferable by a large number of shop men for this class of service, and series wound, railway type motors are generally used. If alternating current only is available motors with wound rotors and drum type controllers are generally used, although high torque induction motors have also been tried with some success.

The report is signed by: C. W. Cravens (C. & C. Elec. & Mfg. Co.), chairman.

YARD FACILITIES FOR CHARGING STORAGE BATTERIES

In order to determine the size of generating units for charging storage batteries the number of cars to be charged at one time must be known, the length of time they can be placed for charging and the approximate amount of charging required. It will be found that abnormal conditions caused by extremely cold weather interruptions to the service, etc., will at times cause a much greater demand and the committee recommended, therefore, an allowance of at least 50 per cent above the normal load. It was also suggested that the dependence for service should not be placed on a single unit, as in case of a breakdown the source of power will be entirely disrupted.

Platforms erected throughout a passenger yard are an economical investment in taking care of the storage batteries so that quick repairs and changes to the batteries and axle generators may be made in the shortest possible time. Electrically-operated trucks of sufficient capacity to carry a 30-volt set of standard car-lighting batteries and of a height to reduce the lift both at the cars and the battery racks to a minimum, was strongly recommended.

The report is signed by: D. B. Pastorius (Penn.), chairman; J. A. Andreucetti (C. & N. W.); E. S. M. MacNab (C. P. R.). and N. H. Keirn.

OTHER BUSINESS

Other reports were presented on Wire Specifications, Standard Rules for Car Wiring, Outside Construction and Yard Lighting, giving detailed information and specifications which are of direct interest to electrical engineers.

The following officers were elected for the ensuing year: President, H. C. Meloy, Lake Shore & Michigan Southern; senior vice-president, E. W. Jansen, Illinois Central; junior vice-president, J. L. Minick, Pennsylvania; secretary-treasurer, Joseph A. Andreucetti, Chicago & North Western.

Germany's Interrupted Railway Traffic.—The Swiss correspondent of an English contemporary, writing from Berne under date of September 1, says of conditions in Germany that "Germany's loss in railway traffic can hardly be estimated. Her railways are now carrying certain goods at reduced rates because if they did not do so German merchants, owing to heavy war risk insurance, would not be able to bring any goods at all on to any neutral market at a price which anyone could afford to pay. The other day the Hamburg Merchants' Association appealed to the government to allow them to carry goods on German railway lines at 50 per cent reduction, because such goods had now to be taken a long and expensive railway journey to a neutral port in order to be shipped."

Financial Returns of the Malay States Railways.—The Federated Malay States Railways' Administration has the control of the railways in the Malay Peninsula (including the Johore State Railways leased since January, 1912), and in the adjacent islands of Penang and Singapore. During 1913 the Singapore Railway (20 miles), which had been leased to the administration from the colonial government as from January, 1912, at a rent of $150,000, was purchased for $4,136,000. The total length in operation by the administration is now 771 miles, including 37 miles opened in 1913. In the recently published report it is stated that there was a steady development of railway business during 1913, but comparison with previous periods is difficult, as the expenditure covers a period of 12½ months and the revenue a period of 12 months only. Expenditure was previously dated from December 16 of one year to December 15 of the next, but commencing with the 1913 report it has been decided to include expenditure from January 1 to December 31 of each year to correspond with the period for revenue. This has reduced net profits for 1913 from $3,050,184.41 to $2,722,946.41 and the consequent interest on capital from 4.41 per cent. to 3.93 per cent. Gross earnings, including those from motor services, amounted to $9,548,374, an increase of $1,127,357, of which $640,746 came from passengers and $526,630 from freight and live stock. Apart from the additional $327,238 due to the change in accounting the expenditure increased by $758,768. Locomotive fuel was mainly responsible for this increase.

Convention of the Railway Development Association

Ways and Means of Creating Traffic by Improving Farm Production and Promoting Industries are Discussed

The semi-annual convention of the Railway Development Association was held at the Hotel La Salle, Chicago, on November 10 and 11. F. H. LeBaume, agricultural and industrial agent of the Norfolk & Western, presided, and an address of welcome on behalf of the Chicago Association of Commerce was presented by J. D. Shoop. H. H. Gross, president of the National Soil Fertility League, also addressed the convention.

Abstracts of some of the principal papers presented at the meeting are as follows:

PERSONAL WORK WITH FARMERS ON THE SOUTHERN

M. V. Richards, of Washington, D. C., industrial and agricultural commissioner of the Southern and associated lines, discussed the subject of personal work with farmers in part as follows:

The efforts of the railway development man should be for a well-rounded development in the territory his lines cover. While the manufacturing city or district may be developed to the fullest extent with accompanying agricultural development in the nearby regions, it is poor policy to attempt such urban development without the corresponding attempt to advance the interests of the farm. A well sustained and prosperous agricultural community feeds the nearby manufacturing town at the lowest cost and, more than this, it does its part in furnishing efficient labor for industrial establishments.

Nearly all railroads which have maintained industrial departments, have at the same time maintained immigration departments; very often the industrial and immigration work being carried on by the same people. In this way they have sought to build up both the urban and the farm population. Within the last few years, railroad development work has been extended, through direct effort, to reach the farmer already settled in the company's territory and so increase the quantity and quality of farm products and in other ways help the farmer to a better conservation of his land and better returns from his efforts. This, of course, is carrying to the furthest the policy of enlightened selfishness which has been behind so much of the railroad work. During the last few years, the Southern and associated lines have undertaken to carry on to the greatest possible extent a personal work among their farmers, with the idea that the products of our southern lands can be very greatly diversified and that, acre for acre, these lands can be made much more profitable than they ever have been. When the boll weevil first threatened the territory of our company, agents were put into the field under what then was called the "cotton culture department," whose duties were primarily to work with the growers of cotton in an attempt to combat the ravages of the weevil and to overcome, through the diversification of crops, the losses resulting from it. This work has since then been greatly extended.

During the past three years, the Southern and associated lines have carried on, with a force of from fifty to sixty men, direct work with the farmers in their territory, which covered a very large portion of the activities of farm life. This work was carried on through separate departments—the land and industrial department, which had a force of dairy and poultry agents, and also one or two horticultural agents; the department of farm improvement work, with a large force of field agents, who spent their time directly with the farmer; and live stock agents, whose attention was given entirely to the building up of the general live stock industry. This work has now all been consolidated under the industrial and agricultural department of the railroad. The agents working with the farmers, must, of course, first of all, get close to them and obtain their confidence. Our field agents constantly move among the farmers, consulting and advising with them about their crops, helping them in selecting seeds, advising in regard to the preparation of the soil and its conservation, and in every way doing what they can to secure a better agricultural development. The same method of work has been followed by the livestock and the dairy agents. All of these agents have been preachers of advanced agriculture, and have endeavored to convince the farmer that better methods must be adopted and that these better methods will pay. The work so far has, we believe, been profitable.

In the year 1913, the agents of the department of farm improvement work made demonstrations with 2,409 farmers. By demonstrations, I mean that that number of farmers raised their crops under the direction of these agents, using the methods they advocated. These were generally the same methods advised by the fields agents of the United States Department of Agriculture and of other advanced agriculturists. In these demonstrations, 38,256 acres were planted to cotton, 15,755 acres to corn and 4,584 to miscellaneous crops, the entire work covering 58,595 acres. Returns from these acres showed at the end of the season that the average cotton production per acre was 1,130⅞ lb. of seed cotton, which was about twice the average production of the entire territory. The average yield of corn per acre on these fields was 40 13/16 bu., while the average corn yield for all the states covered was only 19 3/10 bu. Individual farmers made as high as 110 bu. of corn to the acre and 2,600 lb. of cotton to the acre, not on single acres only, but on good sized fields. During the winter months these agents turn their attention to personal work among the farmers in consultation regarding coming crops and in holding meetings, in which various farm and crop problems are discussed. Last year 804 of these meetings were held, at which there was a total attendance of 95,721.

Some years ago we began making educational exhibits at local fairs along our lines. These exhibits included demonstrations in dairying, horticulture and domestic science. Through them we were enabled to reach many farmers and their families. We have found that, as a rule, the farmers have welcomed the assistance thus given them and that, outside of those who made demonstrations under our agents, large numbers have used the same crop methods. The work which our field agents are doing is also carried on in the southern states by the county field agents of the Department of Agriculture. Between these agents and our own there has been co-operation, the railroad company endeavoring to cover, so far as possible, fields which the government agents did not reach. It is largely to this personal demonstration work among farmers that acre-corn-crop yields in the southern states are growing larger, and also that there is a steady advancement in the diversification of crops and, therefore, progress in general agriculture.

In the dairy and poultry work, we have maintained a dairy instruction car, which has been constantly at work along our various lines, usually making a stop of a day at a station. At these stops our own agents and state dairy agents have made demonstrations of dairy equipment, delivered lectures on dairy cattle and on the dairy problems which the farmer has had to meet. The agents in their travels have preached the necessity for more attention to dairy cows, to the introduction of first-class stock, the building of silos, good dairy barns and milk houses and proper cleanliness in handling milk. During the past year our agents report the purchase, through their instrumentality, of 1,000 pure-bred bulls, cows and heifers, and 926 grade animals. For the same time, they report the building of 713 silos, 131 modern dairy barns and 48 milk houses, and the establishment of 78 dairies and four creameries.

To some of you this may not appear as a great work. Remember, please, that the South has not heretofore been a dairy

section, except perhaps in two or three isolated paces. The silo has almost been an unknown thing, and under our system of devoting the farm to mostly cotton or tobacco, dairy farming has been neglected, notwithstanding the conditions for its success which so largely prevail. The same methods of work have produced like results in the introduction of better grades of beef cattle and increased attention among farmers to general live stock raising. It is evident to anyone who has made a study of the farmers' problems that a great deal of loss has come to farmers in all sections of the country through the inability to properly market farm produce. This has caused many farms to be unprofitable. Our company now maintains a market bureau, with market agents, who work with the grower and the buyer seeking to solve the problem of better markets for our farmers. This bureau has so far been successful.

Personal work among the farmers, whether carried on by the railroad company, the government, local or other associations, is a success, and its results prove that it is a necessity.

IMMIGRATION.

L. J. Bricker, general immigration agent of the Northern Pacific, read a paper on "Securing Desirable Immigration." Some extracts from his paper follow:

If only one person located at some point on our road, though he may have no means, he has to be fed and clothed, and the money expended for this purpose inures to the benefit of the local merchant or tradesman, and some per cent of it reaches the railway company, directly or indirectly. When one of our representatives has induced a farmer to locate in our territory, he has done what will prove to be a lasting benefit to the company. When an immigrant learns that he can get better results in a new field, he informs his friends, and others will follow him later on. A small farm in the eastern or middle states will sell for enough cash to enable the owner to double or treble the acreage in a new country, and still have sufficient cash left for all modern conveniences and utilities.

The desirable foreign settler is the industrious, God-fearing, liberty-loving man, who will readily assimilate and quickly become a loyal American citizen. I believe we still have plenty of room for this type of immigrants. In this connection it seems to me that the work of eliminating the *undesirables* should be done as much as possible on the other side, rather than waiting until they reach our shores.

With reference to our domestic settler—the man who, by his unfailing industry, indomitable courage and will power, has wrested a livelihood for his family from poor and often rocky land—is the man who will make a phenomenal success when located on fertile soil in a congenial climate. That man will not expect a fortune to spring up over night, like Jonah's gourd; but he will patiently and cheerfully await the natural returns from his labors.

The immigration agent, above all else, should possess patience. The agent who, in his eagerness to show results, quickly, tries to hustle settlers along his line without taking into consideration whether the settlers in question are at all adapted to that particular territory, is liable to bring his company more grief than prosperity; for one discontented man can do a locality more harm than a ton of advertising matter can do it good, whereas a little time and patience expended in finding out the man's special fitness for certain lines of work, and directing him to the locality best adapted to his needs, would make of him a "booster" instead of a "knocker." In other words, it pays, and pays big, in immigration work, to "make haste slowly" and do your work thoroughly.

DIVERSIFIED FARMING.

Diversified farming and its relation at this time to the cotton grower was discussed by J. C. Clair, industrial and immigrationer of the Illinois Central, and J. F. Jackson, agricultural agent of the Central of Georgia. Mr. Clair said in part:

Today the southern cotton crop will reach upward of 15,000,000 bales and millions of acres of land could be cleared that would produce many more millions of bales. Heretofore cotton has been as good security as a bank-note. Today, however, with the largest crop ever produced on the southern farmers' land, and produced at the greatest expense, he finds this cotton is without a demand, and while the war continues the crop must be reduced. There has been a campaign of education for the past 10 years for the diversification of crops. Agronomists, business men and industrial men have foreseen the awful plight which the one-crop system would some day bring the south. Only an occasional planter has had the temerity to leave off some cotton and grow fruit on his own farm. Whenever we find a farmer who has been practicing long enough that system of making his farm self-supporting we find a prosperous farmer, but the one crop farmers today are helpless as a result of their folly. Notwithstanding the fact that he has on his hands the largest crop of cotton ever grown, the very prospect of a war or of hard times puts him on the verge of bankruptcy. This shows the false economies of the southern farmer, yet the farmer has not been altogether to blame, for the business man, the banker, the merchant and manufacturer have required the southern farmer to grow crops in order to receive the backing necessary to make the crop, in spite of the adaptability of the country for other crops.

It has been found by actual test on the demonstration farms established by the Illinois Central, which have been under the supervision of three expert agriculturists, that within three years' time we can increase the production of cotton, by diversified farming, 300 per cent from the average production. Take the other great portion of Mississippi and Louisiana, and of the entire cotton growing states, by diversifying their crops—I mean by growing all of the hogs on the farms that are required to feed the men who work that farm; all the cows required to give an abundant supply of milk and butter for the tenants and proprietor to use; all the beef cattle that can be raised upon his worn-out and wasted lands and all the horses or mules that can be used in the farming operations, the planter can still produce as much cotton on one-third of the land formerly cultivated. A highly intelligent and educated class of people will not long grow one crop for all the money they receive in a country that is so well adapted for so many profitable crops. The farmer who grows foodstuffs that are rich in feeding value and who grows his land richer instead of poorer, who makes the greatest and most profitable crop on the most economical basis and leaves the land in better condition to grow a crop next year, is the kind of a farmer that we must look to to develop the South and to put into practice the system of diversified farming, which is going to make the Southland the beacon light of all agricultural sections.

It is my judgment the result of the war now going on across the seas is going to make every southern planter realize to the fullest extent the value of diversified farming, which will place the so-called cotton growing territory of the southern states 10 years ahead in agricultural progress.

Mr. Jackson said in part: The agricultural colleges, the farm demonstration agents, the railroad agricultural departments, and all forces working for better agriculture, now have a greater opportunity than they have ever dared to hope for, to preach the gospel of diversified farming to willing listeners. Many cotton planters who have for years sneered at "book farming methods" are now eager to accept any instructions or assistance offered them. This is particularly noticeable in the increased interest shown by those who visit the Central of Georgia exhibit tent at the state and county fairs this fall. Over our literature table is a sign which reads, "Mr. Cotton Planter, now is the time to consider the importance of legumes, lime, and live stock. Pamphlets free, help yourself." This creates a great deal of comment and demand for the pamphlets on the subjects of better beef cattle, vegetable matter, lime, the boll weevil, reports of test farm work for last year, etc. Expressions such as "We sure need something besides cotton," and "We must grow something we can eat," are frequent. In one of the cases containing products grown on the test farms, with some oats and cow-pea hay is a placard which strikes a popular chord. It reads: "Oats and hay make greater

profits than cotton under normal conditions. On the Central of Georgia test farms in 1913, the double crop made a net profit of $25.92 an acre, or $2.51 more than cotton, and cost $4.06 an acre less to produce." It's a common thing to have a man who reads this, add, "And they're better for the land." Literature and pamphlets will be more effective now than ever before, but real demonstrations of proper farming methods, something the farmer can see with his own eyes, are, as always, the most effective methods of encouraging better farming. While we are very well pleased with the results of our test farm work heretofore, we are confident its effectiveness will be more than doubled next year, and we are having a great many more applications for the establishment of test farms than we can grant.

The present experience of having to trade low-priced cotton for high-priced food will advance several years the date when the farmers of our section will be the most prosperous in the United States, for they will grow at home all of the more important food products for which they have been sending away money to other sections.

RAILWAY TERMINALS

"The Railway Terminal and Its Relation to Industrial Development" was discussed by F. A. Spink, traffic manager of the Chicago & Western Indiana and the Belt Railway of Chicago, who said in part: The railroad terminal was originally looked upon as solely an instrumentality for handling trains and cars in the ordinary dispatch of business. With a change in commercial conditions and the demand for track connection by industries many roads were found hampering their operation by the encroachment of industry tracks in the territory which should have been reserved for transportation uses only. This is a short-sighted policy that results in restricting the operation of the industry and curtailing its scope and possibilities, and in the end defeats the object sought to be gained. Recently a broader vision on the part of railroad managers, coupled with decisions of the Interstate Commerce Commission on the use of terminals by competing lines, has resulted in throwing open for more general use the terminals of the country on the basis of a reasonable charge for use. The day of exclusive terminals is at an end, and in the future we may see the individual road terminals giving place to general locality terminals.

In the Chicago terminal district to-day there are 38 railroads terminating, 24 of them trunk lines, 4 belt lines, and 10 so-called industrial roads. The total single-line mileage of the rails within the Chicago District is said to be 4,000 miles; approximately 1,300 passenger trains enter and depart from this terminal daily carrying something like 200,000 passengers; into and through these terminals are daily hauled 12,000 loaded freight cars and some 10,000 cars are dispatched from it; 15,000 tons of less-than-carload merchandise are brought into Chicago and 10,000 tons sent out each 24 hours. A graphic statement of the movement of cars interchanged between the various roads shows a most bewildering mass of criss-cross lines and the amount of empty engine mileage due to present operating conditons means a waste of hundreds of thousands of dollars per annum. Would not the co-ordination of these terminal facilities and their operation on a more co-operative basis, if not as a separate unity, mean a great saving to the owners in actual cash outlay and to the industries and business of Chicago in improved service and elimination of delays.

In the past little thought was given to the location of industry tracks in such a manner as to offer the least obstruction to operation. As the volume of tonnage has increased this encroachment of industry tracks on main line and yard facilities has become more and more undesirable and troublesome, so that in the evolution of the problem the industry center has come into being bringing about a segregation of industry business, giving better service at less cost and affording both industry and railroads scope to further develop without hampering or being hampered by the transportation uses of the terminal.

Roads with extensive and expensive terminals feel they are inadequately compensated for their use by competitors; on the other hand roads without terminal facilities feel they are having an undue burden placed upon them in many instances by the payment of existing terminal charges; and the industries are declaring they are not getting adequate service for the money they are paying.

If the writer may set forth his own personal thought on the subject the solution of the problem would be this, unify all terminals and operate them as a separate facility under separate management. Let the road haul carriers' duty cease at the junction with the terminal. Then, to met the suggestions of the Interstate Commerce Commission, make the rates apply to and from the terminal, assessing a separate charge for terminal service; or, operate the terminal on a cost basis, preserving the present basis of rate construction. For the present, and for the purposes of this paper, the method of handling the terminal charges is unimportant. The point which it is sought to bring out clearly is the separate and unified operation of the terminals themselves.

THE BANQUET

The semi-annual banquet of the association was held on Tuesday evening at the Hotel La Salle. The speakers were W. L. Park, vice-president of the Illinois Central, and Samuel O. Dunn, editor of the *Railway Age Gazette*. Edith Loring Fullerton, vice-president of the Women's Horticultural and Agricultural Association, also spoke on country home development.

MR. PARK'S ADDRESS

An abstract of Mr. Park's address follows:

The progressive achievement of the American railroads is the greatest industrial achievement in the world's history. There has been, concurrently, with it, a similar achievement in all branches of industry and general development wherever the railroads have reached. Notwithstanding the fact that for more than four hundred years we had reveled in a wealth of natural resources, our agricultural lands, mineral beds and forests were practically untouched before the advent of the railroad.

The Illinois Central followed the Chicago & Northwestern into this city, its charter permitting it to enter along the river, where there was some little prospect of business development. The mayor owned a home on the corner of Madison and Michigan avenue; the waves of Lake Michigan cut up his front yard, and for other reasons the Illinois Central was driven to the marsh on the east side and compelled to protect the city from the lake until the present time at enormous expenditures and great loss of business opportunities. Mark the irony—it is now frequently accused of having stolen the lake front! It is a fact that there was at this time no little speculation as to the benefits of a railroad to the city; there were many prominent people who contended that it would interfere with and retard its prosperity.

Surmounting many obstacles, the railroads gradually increased the mileage. From 1850 to 1870 the Civil War and the period of reconstruction held them back; the next half century witnessed the tremendous achievement of more than 225,000 miles of construction. In the light of subsequent events they were, perhaps, built too fast. The successes were few compared with the opportunities opened up and embraced in all other lines of business. The financial methods necessary at the time to carry on these stupendous undertakings are the subject today of unfair criticism. The people were most willing to vote bonds and offer other strong inducements to secure transportation, knowing they would get it back many times over in the enhancement of their property and increased business. The roads in Great Britain and Continental Europe found a country already made. Those of America were built in advance of its development as they stretched across the plains, over the mountains and through the valleys; they were compelled to create their business by developing the resources of the country.

The first officials who performed the duties you gentlemen are now delegated with were the general superintendent and the

general freight agent. In connection with their other duties they sought out industrial locations, opened up mines, located saw mills, established cattle ranches and packing houses. Immigration was encouraged by low rates, both passenger and freight. By their indomitable energy and perseverance, the tide of empire turned toward the west, to the north, to the south. As the growth of the railroads increased it was necessary to specialize the work of industrial development. Departments were created to expedite this line of railroad activity. But the work of development was never for a moment lost sight of. If, as General Sherman said, an army traveled on its belly the railroad certainly did. It was fed, however, by what it created. Its development agents were alive to every commercial activity that meant present or prospective revenue. The wise builders never lost sight of this essential to their prosperity.

While the opportunity for industrial development is greater than ever before, the most important of all at the present time is unquestionably the scientific use of the soil. Perhaps the most prominent one feature of agricultural development is the reclamation of waste lands. A large percentage of this land cannot be reclaimed by state, corporate or individual effort; the work should be done by the federal government. The United States government promises to take over from the railroads a part at least of the agricultural development work they have so extensively been engaged in. The lever bill, with which you gentlemen are familiar, is one of the most valuable legislative enactments passed by the congress. It is the means by which a scientific agricultural demonstrator can ultimately be placed in every township in this country.

We, as railroad men, are apt to think that our development work is not fully appreciated by the public. I do not take this view. The best asset we have in these troublesome times is our investment in development work. We are hampered, it is true, with unnecesary and unwise laws, rules, regulations and orders from congress and the legislatures, commissions and municipalities. I have the most sanguine expectation that the well-known official efficiency of the railroads will ultimately throw them off where they encumber and profit by that which is needed in such regulation. There can be brought about another era of prosperity similar to that of the decade previous to the present era of "progressiveness" by the thinking public deprecating any attempt to make political capital out of investigations of business methods.

The work you gentlemen are engaged in has been more pleasant than that of some of the other officials who have been compelled to take the brunt of adverse sentiment. You have been continually welcomed in good society; your part of the railroad work is unquestionably universally appreciated; your services are sought after. If there is any turning down of your schemes by the executive officers, you are as much aggrieved as your client. Nevertheless, you must all feel keenly the effect of the present hampering regulations. If you are not moving ahead, you are not moving at all. You must not be discouraged by present conditions. Your work is constructive and the benefits growing out of development work must receive the thanks of posterity. There is a reward in seeing things grow, in the advancement of our commercial interests; the location of industries and the development of new resources are monuments to your energy and efficiency; the obstacles encountered make them the more conspicuous.

OLD AND NEW WAYS OF DEVELOPING TRAFFIC

Mr. Dunn spoke in part as follows: Formerly, the means almost universally employed to get business were solicitation, superior service, rate-cutting or rebating, and new construction. Most of these means of getting business are still in use. But co-operation between the railways themselves, and more especially public opinion and public regulation, have largely destroyed competitive rate-making. Likewise, new railway construction has practically ceased.

While competitive rate-making and railway construction have been declining as means of developing traffic, new and important means have been developing. Your work is not entirely new in all its phases. But in most of its phases it is new. You are first getting people and industries located on your lines; and then you are doing all you can to make them prosper so that your railways may prosper with them.

That is creative work of the highest order. The railways and the country should rejoice that the old competitive methods are to such a large extent giving way to creative methods. A system under which there would prevail open co-operation between the railways themselves in respect to service and rates; under which creative methods of getting business would be developed in the most varied forms and to the highest degree, and under which government regulation would protect the public in its right to good service at reasonable rates and the railways in their right to fair profits, would be infinitely superior from the standpoint of both the public and the railways, to the old cut-throat system.

We need a revival of new railway construction; I mean of construction in territory not now provided with railways. The construction of this new mileage would attract a larger population into the territories in which it was built; it would increase production in those territories; it would afford traffic not only directly to the new lines, but indirectly to the railways for which they would serve as feeders and to connecting lines throughout the country. The most effective means which could be adopted to cause a revival of new construction would be to make our regulation of railways fairer.

In order that industrial concerns may produce at the least cost and at the highest profit, they must be located as advantageously as practicable with reference to natural resources, supplies of labor, transportation facilities and markets. Who could be better, or even as well, situated to study thoroughly the natural resources and market conditions of a territory and to advertise them, and to advise business men regarding them, than a competent railway industrial agent whose company gave him all the opportunity and facilities needed to carry on such work?

Two of the most important problems confronting the people of this country are that of maintaining a healthy ratio between our urban and rural populations, and that of increasing the output of our farms.

Not only has our farming population not been increasing fast enough, but the efficiency with which those on the farms have worked the acreage under cultivation has left much to be desired. The failure of the growth of the supply of agricultural products to keep pace with the demands for them is the main cause of the general and heavy increase in the cost of living. Continued increases in the value of farm lands and in the wealth of the farmers can be made consistent with the welfare and prosperity of the nation as a whole only if these increases ceased to be caused chiefly by increases in the price of agricultural products, and begin to be caused chiefly by increases in the amounts of corn, wheat, hogs, cattle and so on produced *per acre*.

I do not say that too much of the resources and energies of the traffic departments are used up in the solicitation of business and in the struggle with shippers, with competing lines and with public authorities over the rates charged on existing traffic. But it is certainly as important to develop the largest practicable traffic as to get reasonable rates for transporting it; and after one has surveyed the entire situation in a broad way it would seem that he is apt to conclude that if as much money, energy and thought were devoted to the creation of entirely new traffic as are expended in soliciting and dealing with the rates on existing traffic the results gained would be quite remarkable.

I have no doubt that our railways will adapt their methods of developing traffic as skillfully and effectively to the new conditions as they did to the old, and that if not too much hampered and burdened by government regulation they will be in the future as in the past, the most potent agency in the country for promoting production along all lines and increasing the national prosperity.

OTHER BUSINESS

H. B. Fullerton, director of agricultural development of the Long Island Railroad, presented a paper illustrated with lantern slides on "Ways and Means of Increasing a Railroad's Agricultural Tonnage." An abstract of this paper will be published in a later issue.

F. H. Labaume, agricultural and industrial agent of the Norfolk & Western, read a paper on "Getting City People Back to the Country," which will also be published in abstract form in a later issue.

William Gourlay, of the American Express Company, described some of the plans the express companies are now trying to work out to bring the producer and consumer more closely together and facilitate the marketing of farm products.

R. W. Cooke, industrial agent of the Pennsylvania Lines, presented a paper on "The Effect of War on American Business," which was followed by a general discussion.

Anderson Pace, industrial commissioner of the Chicago Association of Commerce, made an address on the commercial association in its relation to industrial development.

H. M. Bainer, agricultural demonstrator of the Atchison, Topeka & Santa Fe, read a paper on "Personal Work with Farmers on the Santa Fe."

D. G. Mellor, manager of the order, commission and food products department of Wells, Fargo & Company, described methods recently adopted by his company for increasing the returns from farm produce. An abstract of this paper will be published in a later issue.

An exhibit was held in connection with the convention showing photographs and advertising literature which have been used in development work. The members of the association also made an inspection trip through the Chicago terminals on Thursday.

ACCIDENT STATISTICS ON THE PENNSYLVANIA*

By R. H. Newbern

Superintendent of the Insurance Department of the Pennsylvania Railroad System

On the Pennsylvania System, employing normally over 225,000 men and carrying over 185 million passengers and with a freight movement exceeding 385 million tons annually, there are 60,000 reports of accidents to employees and 10,000 reports of injuries to passengers and others forwarded to the company's insurance department. In order to simplify the handling of this large number of reports, the Hollerith tabulating machines are used, and items are classified by causes, nature of injuries, occupations, locations, days of disability and other features. As the reports are received they are codified, each item of information being marked with its designated code number and a permanent record of the accident is transferred to a card by means of a punching machine, and when statements or data are needed for the information of the executive or operating department or for the guidance of the safety organization, the cards are sorted by means of machines and the desired information obtained quickly, accurately and economically.

For statistical purposes employees are separated into two classes: one, employees in the maintenance of equipment, commonly known as shopmen, and the other, all other employees, such as trainmen, maintenance of way men, station men, etc., designated as road and yard men.

The statistics show the number killed and injured by—

Detailed causes.	Time of day or night.
Nature of injury by cause and occupation.	Weather conditions.
Length of disability.	Division.
Occupations.	Grand Division.
Length of service.	Shops.
	Large stations and yards.

The statistics are compiled on the same basis for shop and road and yard accidents, excepting as to detailed causes, there being 360 shop causes and 340 road and yard causes, making 700 separate causes of accidents. The causes in turn are classified under 36 general readings which indicate the nature of the work at the time of the accident.

By comparing the number of accidents under each general heading, we ascertain what kind of work is the most hazardous and the specific cause under which the accidents are reported. The primary cause of every accident is indicated. The records are kept by divisions, shops, stations and yards, and it is, therefore, easily seen at what points any particular kind of accident is most frequent.

There are included in the statistics additional information bearing an important relationship to accident frequency, such as the average age of employees, length of service, etc. Regarding the length of service, it was found that during the year 1913 there were 90,000 new men employed, although the total increase in the number of employees for the year was less than 9,000, the greater number of transient employees being in the maintenance of way department. The statistics developed the fact that during the year 25 per cent of the men killed and injured had less than six months' experience and that 28 men were killed and 2,391 injured who had been in the service less than 30 days. Assuming a similar experience on all the other railroads of the United States, at least 360 men were killed and 15,000 injured last year having less than one month's experience, and many met death during their first week's work—not because they were careless or foolhardy, but because they were ignorant of the hazards of the work.

A business employing men in more than 100 occupations will be unable effectively to teach the doctrine of safety unless some means are provided to discover the number of injuries sustained by men in each specific occupation. The statistics, therefore, are so arranged that the number of injuries and fatalities can be shown in each department and to each occupation of the various departments, also the reports are tabulated to show the specific cause for each occupation.

The number of accidents occurring during each hour of the day or night is shown as the time of the accidents suggests various preventives, such as improved lighting facilities and rearrangement of working hours.

A statement of a certain number of men injured during a certain period does not convey a proper meaning; it is the loss of time that shows what the employee really suffers. Therefore, the statistics provide for the number killed, the number injured, the number of indefinite injuries and the actual number of days lost. Our statistics include all accidents resulting in a disability of one day and over. It was found that 18 per cent of all the injuries involved less than four days' disability, and the number of "15 days or over" accidents (the minimum period covered by liability laws) amounted to 50 per cent of the total days' disability.

Our statistics also show the nature of the injury; this information embodies 141 different kinds of injuries, included under the following general headings:

Amputation	Fractures
Eye Injury	Electrical Shocks
Sprains and Strains	Burns
Bruises	Dislocations
Incised Wound or Laceration	Injuries not included above

This information enables the management to study methods of treatment to reduce the length of disability. Take the subject of fractures for example: There were 758 cases last year resulting in 19,190 days of disablement, 87 indefinite disability cases and 53 fatalities. The medical profession recognizes the necessity for the best treatment of these injuries, as fractures may result in extended disablement on account of improper treatment.

Our experience clearly indicates that comprehensive accident statistics furnish a most effective means of suggesting remedial measures in accident prevention work.

*From an address before the National Council for Industrial Safety at Chicago, October 15.

General News Department

Track foremen of the Philadelphia & Reading have been appointed fire wardens by the Pennsylvania State Department of Forestry.

The general offices of the Wabash at St. Louis will be moved from Seventh and Chestnut streets to the Railway Exchange building about December 15.

On the middle division of the Pennsylvania cup vending machines are being installed, to supply passengers with drinking cups at one cent apiece. Hitherto flat, folded cups have been furnished, free; but with the new machines paper cups shaped like common glass tumblers will be furnished.

The Wabash is printing on all of its working timetables a large "Safety Always" emblem and the following in large type: "Safety should be the first consideration of every employee. Every employee should report promptly to his foreman, some member of the safety committee or other proper person, every unsafe condition."

There are 77 men who have worked for the Pennsylvania Railroad 50 years or more and are young enough to be still busily working. Two of them have records of more than 56 years; two others have served 55 years; two, 54 years; seven, 53 years; six, 52 years, and twenty, 51 years. Of the 77 men five are conductors and eight are enginemen.

Four locomotives on the Louisville-St. Louis division of the Southern Railway are to bear the names of the enginemen who run them. The names will be painted in gilt letters, along with the number of the engine. The men who have been thus recognized are Frank Busching, William Hanafee, Robert Greenlaw and Daniel Shine. The requirement for the distinction is 25 years of efficient service.

The Railroad Commission of Georgia, realizing the present serious financial predicament of the railroads, has written a letter to the Southern Railway to the effect that in view of the material decrease in the revenues of carriers the commission, until the present financial situation is relieved, will not impose on any of the roads any expenditures for new stations, warehouses, terminal facilities, etc., except such as are absolutely necessary.

To reduce unnecessary use of the telegraph wires, the Lehigh Valley has extended its censorship of railroad telegrams temporarily to all messages. A carbon copy of every telegram sent by an employee is to be sent immediately to the superintendent of telegraph, in whose office the "censor" will scrutinize every message from every office, from the highest to the lowest. Men who waste words will be advised concerning their uneconomical habit.

Following the election at which the voters of Missouri decisively defeated the full crew bill by referendum vote, the St. Louis & San Francisco announced that its shops at Springfield, Mo., would immediately be placed on a working basis of six days a week and eight hours a day. The main shops have been on a five-day schedule for several months and other shops have been operated only intermittently. Additional men also were given employment.

The golden spike marking the closing of the last gap in the line of the Northwestern Pacific from San Francisco to Eureka, Cal., 283 miles, was driven at Cain Rock Crossing, Cal., 80 miles southeast of Eureka, on October 21, with appropriate ceremonies, and the first through passenger train was run over the line on the same day. Regular service will be started on November 15. The road is owned jointly by the Southern Pacific and the Atchison, Topeka & Santa Fe.

The Baltimore & Ohio, by a circular which has been issued to station employees and others who come in contact with the public, calls attention to the inelegance of using tobacco during working hours. It is believed by the management that a man using tobacco while at work renders inferior service. In larger stations and behind ticket counters the employees are required to refrain from using tobacco, and the same is also true of passenger trainmen; but the circular is an appeal to personal pride rather than mandatory.

At the safety congress of the National Council for Industrial Safety, held in Chicago on October 14 and 15, there were present from the Chicago & North Western one delegate from each division, terminal shop and local safety committee, all making the trip as the guests of the company, 52 men in all. The delegates have adopted resolutions stating that they obtained much valuable knowledge and information at the meeting, which will be a great help in promoting the safety first work on the North Western; and thanking President Gardner and Vice-President Aishton for arranging the trip.

The United States Civil Service Commission announces an examination, for which applications will be received up to December 1, for the position of examiner of accounts, positions being vacant both in the division of valuation and the division of carriers' accounts, of the Interstate Commerce Commission; salaries from $1,860 to $2,100. The commission desires applications from men of large experience in this kind of work. Also, examinations will be held throughout the country, on December 2, for the position of freight rate clerk for the quartermaster of the army, at Chicago; salary $1,200.

The Buffalo & Susquehanna Railway, extending from Buffalo, N. Y., southeastward to Wellsville, 90 miles, which has announced that business will be suspended on December 1 because of insufficient income to keep the road in operation, may possibly be bought by the Lackawanna Steel Company, which owns the South Buffalo Railway. It is reported that a fair offer has already been made. A recent decision of the Interstate Commerce Commission has removed doubts as to whether the South Buffalo Railway could be classed as a common carrier or was only a plant facility. The commission holds that it is a common carrier.

The National Transcontinental Railway, over which trains are running from Moncton, N. B., northwest to Escourt, 56 miles beyond Edmundston, is shortly to be put in operation between Moncton and Levis, opposite Quebec. Trains between Moncton and Escourt are operated by the Intercolonial, and the Intercolonial will manage the extended service. The whole of the National Transcontinental is now finished, so as to be ready for use, but the arrangement by which the Grand Trunk Pacific was to operate the road appears to have encountered some obstacle. According to the Toronto World, the line west of Levis is likely not to be put in use until next spring.

H. K. Gilbert, well known in the railway and supply business in Chicago, has just returned from a year's traveling in Europe and England. While in England this summer, he had an unusual experience for a railway supply man. On account of his familiarity with organization problems his services were availed of by the Medical Service Corps of the British Army in the recruiting department, and afterward in connection with the visiting of wounded, etc., at base hospitals. Mr. Gilbert was for several years vice-president of the Sargent Company, which later was merged in the American Brake Shoe & Foundry Company, and also for a number of years, vice-president of the Buda Company.

President Wilson has awarded a medal of honor to W. A. Holley, of Greenville, Tex., for saving the life of Mrs. Sallie Griffin, on the Missouri, Kansas & Texas Railway of Texas at Greenville. The lady became confused or did not realize the danger, and started across a main track at Greenville station directly in front of an approaching train. Switchman Holley was standing near the building, and, realizing that Mrs. Griffin had not time to cross the track, ran forward, lifted her bodily, and carried her out of danger. He was struck by the hand railing on the front end of the engine, but neither he nor Mrs. Griffin

was injured. This is the fifteenth medal of honor which has been bestowed under the Act of February 23, 1905.

In Louisiana, the special trains bearing traveling teachers who give instruction in agriculture and in "safety-first" are not allowed a complete monopoly of the railway-social-service news columns; there is a third propaganda, Instruction in Hygiene. Dr. Oscar Dowling, president of the Louisiana state board of health and his "Health on Wheels" train has been noticed heretofore in these columns; and now it appears that the doctor is extending his activities into other states. The Birmingham (Ala.) Herald says that he is to appear in that city with his exhibit, remaining throughout one day. He has displays in his car classified under four heads; namely, Prevention of Disease; Food Products; Community Hygiene, and Care of the Baby and School Hygiene.

Those independent conductors of the St. Louis Southwestern were successful in their application to the court, at St. Louis, for an injunction forbidding the brotherhood to call a strike on that road; and the injunction is directed against three brotherhoods; those of the conductors, the brakemen and the firemen. The judge said that the injunction did not prevent the unions from taking a strike vote. The threat of a strike was made because the railroad company refused to reinstate a conductor, dismissed because of intoxication, when the brotherhood claimed that the charge against the conductor was unfounded. Press despatches of November 9, telling of the granting of the injunction, say that the brotherhood had accepted mediation, as asked for by the railroad company, but that the mediators have not yet finished their work.

Credit for Saving Scrap

Bulletins telling of specially meritorious acts on the part of employees have an added interest where the persons named in them are known; and the smaller the territory covered by a bulletin, the more likely are the employees generally to recognize the names published. W. T. Lechlider, superintendent of the Cleveland division of the Baltimore & Ohio, issues bulletins, once a month, or as often as may be found desirable, which are confined to happenings on his own division. One of the things noted in a recent bulletin was the commendation of a baggage master for making neat and comprehensive reports. The station forces at three places, and a dozen individual trainmen and section foremen were commended for saving scrap, the value of which, in two weeks, amounted to $218.

Northern Pacific Efficiency Bureau

On the Northern Pacific the promotion of what is commonly called the "safety-first" habit is in the hands of the "Bureau of Efficiency," of which a special representative of the first vice-president is the chief officer. The organization of this bureau was noted in the *Railway Age Gazette* of January 24, 1913; and in the issue of December 19, 1913, page 1196, some of the doings of the bureau during the year then ending were briefly noted.

In a sketch of the activities of the bureau for the year 1913, which was prepared by Mr. Banks, the officer in charge of the bureau, but which has only recently been made public, 38 subjects are deemed of sufficient importance to be specially mentioned; and up to December 4, 1913, about 80 circular letters had been sent out to the division superintendents calling attention to dangerous conditions or practices.

In the removal of dangerous or objectionable structures at the side of the tracks, marked improvement was made. A standard card was adopted for use in giving authority to yard engines to enter on a repair track, the card to be issued by the repair man. A new blue flag device was adopted. A standard squirt hose and connections, adopted early in the year, will prevent many scalding accidents. An improved bar for shaking locomotive grates has been adopted. The railings of cabooses have been made safer and each caboose will have a permanent air-brake valve and whistle at each end, making a back-up hose unnecessary. New tank spout ropes were provided throughout the company's lines, where needed. A superior grade of tool handles has been made standard. Turntables have been floored at the ends with plank the height of the rail, thus removing the danger of shearing off a man's foot between the rails on the table and the rails on the circle. The standard clearance of switch stands has been changed from 6 ft. to 7 ft. from the rail.

The standard clearance for company's buildings has been made 12 ft. from the track; where this distance cannot be obtained doors of such buildings must be in the end or the back side and not open toward the track. Gravel has been filled in around trunking used in connection with signals, so that workmen will be less liable to stumble over the trunking. A standard brake club has been designed. Torpedoes are now made with red tops so that they will be more surely seen, especially by employees using hand cars. The walls of turntable pits are being whitewashed so that the men will be less likely to walk into them.

The doors of shelters for crossing flagmen are being changed so as to open toward the street and not toward the track. An order has been issued forbidding the use or occupancy of kitchen cars when such cars are being moved; cooks and helpers must ride in cabooses or on passenger trains. Superintendents are required to pay personal attention to the location of poles belonging to telephone and other outside companies, so as to prevent the setting of these poles where they will obscure fixed signals.

Fewer Mules in Mines

The anthracite coal operators of Pennsylvania report that in the last decade, from 1902 to 1912, the horse power developed at the mines increased from 354,237 to 680,700, or 326,463 horse power; but electric power is used and the number of mules in the mines has fallen off. A good mule is now worth $240. If this 326,463 additional horse power had been added in mules, supposing such a number obtainable, the investment since 1902 in power alone would have been nearly $80,000,000, without replacing any mules that died during that period. As a matter of fact, the number of mules decreased from 16,139 in 1902 to 15,187 in 1912. On the other hand the number of electric locomotives increased from 53 to 951, and the number of steam locomotives (on the surface) from 373 to 575. Steam and electricity are saving millions of dollars annually.

But the increase in other necessary forms of energy makes the problem of operating the mines at a profit one of careful selection of the most economical means. In 1912 the consumption of powder was 41,401,015 lb., and of dynamite 13,685,062. There has been since 1903 an increase of over 9,000,000 lb. of explosives used, an increase wholly disproportionate to the amount of coal produced, due mainly to the great amount of rock work which now has to be done.

A Dishonest Claim Agent Punished

In the United States District Court at Baltimore last week, George Elmer Long was convicted on five counts of defrauding the Baltimore & Ohio Railroad by bogus claims paid by Long while in the employ of the road. Long will serve three years in the federal penitentiary at Atlanta. He entered the employ of the Baltimore & Ohio about three years ago as a claim adjuster in the freight department, having had previous experience with southern roads. For some time after securing the position he was establishing himself in the confidence of superiors, after which, through the medium of confederates, a scheme of filing fraudulent claims was undertaken. The accomplices represented themselves as shipping concerns and made claims for losses or damage to shipments never shipped, and others which were shipped and contained only junk. In his confession Long admitted shipping four boxes as the property of different concerns. In most instances, however, no shipment was even made, the plan having been that where legitimate claims were adjusted the waybills were stolen and changed to cover shipments to firms existing only in the minds of the gang and on the stationery which they used. The claims varied usually in amounts ranging from $200 to $500. Long was tracked by Edmund Leigh, chief of the railroad detective force, the chase having been conducted in Pittsburgh, Niagara Falls, Hamilton, Chicago and Detroit. Long was arrested in Detroit while calling for mail at the post office.

MEETINGS AND CONVENTIONS

The following list gives names of secretaries, dates of next or regular meetings, and places of meeting.

AIR BRAKE ASSOCIATION.—F. M. Nellis, 53 State St., Boston, Mass. Next convention, May 4-7, 1915, Hotel Sherman, Chicago.

AMERICAN ASSOCIATION OF DEMURRAGE OFFICERS.—A. G. Thomason, Demurrage Commissioner, Boston, Mass. Annual convention, April, 1915, Richmond, Va.

AMERICAN ASSOCIATION OF DINING CAR SUPERINTENDENTS.—H. C. Boardman, D. L. & W., Hoboken, N. J. Next meeting, October, 1915.

AMERICAN ASSOCIATION OF FREIGHT AGENTS.—R. O. Wells, Illinois Central, East St. Louis, Ill. Annual meeting, May 21-24, 1915, Richmond, Va.

AMERICAN ASSOCIATION OF PASSENGER TRAFFIC OFFICIALS.—W. C. Hope, C. R. R. of N. J., 143 Liberty St., New York.

AMERICAN ASSOCIATION OF RAILROAD SUPERINTENDENTS.—F. H. Harman, Room 101, Union Station, St. Louis, Mo. Next meeting, May 20-21, 1915, San Francisco, Cal.

AMERICAN ELECTRIC RAILWAY ASSOCIATION.—E. B. Burritt, 29 W. 39th St., New York. Annual convention, October, 1915, San Francisco, Cal.

AMERICAN ELECTRIC RAILWAY MANUFACTURERS' ASSOCIATION.—H. C. McConnaughy, 165 Broadway, New York. Meetings with American Electric Railway Association.

AMERICAN RAILROAD MASTER TINNERS, COPPERSMITHS AND PIPEFITTERS' ASSOCIATION.—W. E. Jones, C. & N. W., 3814 Fulton St., Chicago. Annual meeting, Chicago.

AMERICAN RAILWAY ASSOCIATION.—W. F. Allen, 75 Church St., New York. Semi-annual meeting, November 18, The Blackstone, Chicago.

AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—C. A. Lichty, C. & N. W., Chicago. Next convention, October 19-21, 1915, Detroit, Mich.

AMERICAN RAILWAY ENGINEERING ASSOCIATION.—E. H. Fritch, 900 S. Michigan Ave., Chicago. Next convention, March 16-18, 1915, Chicago.

AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION.— J. W. Taylor, 1112 Karpen Bldg., Chicago. Annual meeting, June 9-11, 1915, Atlantic City, N. J.

AMERICAN RAILWAY SAFETY ASSOCIATION.—L. F. Shedd, C. R. I. & P., Chicago. Next meeting, November 10, Chicago.

AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—A. R. Davis, Central of Georgia, Macon, Ga. Annual meeting, July, 1915.

AMERICAN SOCIETY FOR TESTING MATERIALS.—Prof. E. Marburg, University of Pennsylvania, Philadelphia, Pa.

AMERICAN SOCIETY OF CIVIL ENGINEERS.—Chas. W. Hunt, 220 W. 57th St., New York. Regular meetings, 1st and 3d Wednesday in month, except June, July and August, 220 W. 57th St., New York.

AMERICAN SOCIETY OF ENGINEERING CONTRACTORS.—J. R. Wemlinger, 11 Broadway, New York. Regular meetings, 2d Thursday in month, at 2 P. M., 11 Broadway, New York.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 39th St., New York. Annual meeting, December 1-4, 1914, New York.

AMERICAN WOOD PRESERVERS' ASSOCIATION.—F. J. Angier, B. & O., Mt. Royal Sta., Baltimore, Md. Next convention, January 19-21, 1915, Chicago.

ASSOCIATION OF AMERICAN RAILWAY ACCOUNTING OFFICERS.—E. R. Woodson, 1300 Pennsylvania Ave., N. W., Washington, D. C. Annual convention, April 28, 1915, Atlanta, Ga.

ASSOCIATION OF MANUFACTURERS OF CHILLED CAR WHEELS.—George W. Lyndon, 1214 McCormick Bldg., Chicago.

ASSOCIATION OF RAILWAY CLAIM AGENTS.—C. W. Egan, B. & O., Baltimore, Md. Annual meeting, third week in May, 1915, Galveston, Tex.

ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.—Jos. A. Andreucetti, C. & N. W., Room 411, C. & N. W. Sts., Chicago. Annual meeting, October, 1915.

ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—P. W. Drew, Sou Line, 112 West Adams St., Chicago. Annual meeting, June 22-25, 1915, Rochester, N. Y.

ASSOCIATION OF TRANSPORTATION AND CAR ACCOUNTING OFFICERS.—G. P. Conard, 75 Church St., New York. Next meeting, December 8-9, Richmond, Va.

BRIDGE AND BUILDING SUPPLY MEN'S ASSOCIATION.—L. D. Mitchell, Detroit Graphite Co., Chicago, Ill. Meetings with American Railway Bridge and Building Association.

CANADIAN RAILWAY CLUB.—James Powell, Grand Trunk, P. O. Box 7, St. Lambert (near Montreal), Que. Regular meetings, 2d Tuesday in month, except June, July and August, Windsor Hotel, Montreal, Que.

CANADIAN SOCIETY OF CIVIL ENGINEERS.—Clement H. McLeod, 176 Mansfield St., Montreal, Que. Regular meetings, 1st Thursday in October, November, December, February, March and April. Annual meeting, January, Montreal.

CAR FOREMEN'S ASSOCIATION OF CHICAGO.—Aaron Kline, 841 Lawler Ave., Chicago. Regular meetings, 2d Monday in month, except July and August, Lytton Bldg., Chicago.

CENTRAL RAILWAY CLUB.—H. D. Vought, 95 Liberty St., New York. Regular meetings, 2d Friday in January, May, September and November. Annual meetings, 2d Thursday in March, Hotel Statler, Buffalo, N. Y.

ENGINEERS' SOCIETY OF WESTERN PENNSYLVANIA.—Elmer K. Hiles, 2511 Oliver Bldg., Pittsburgh, Pa. Regular meetings, 1st and 3d Tuesday, Pittsburgh.

FREIGHT CLAIM ASSOCIATION.—Warren P. Taylor, R. F. & P., Richmond, Va. Annual meeting, June 16, 1915, Chicago.

GENERAL SUPERINTENDENTS' ASSOCIATION OF CHICAGO.—A. M. Hunter, 321 Grand Central Station, Chicago. Regular meetings, Wednesday, preceding 3d Thursday in month, Room 1856, Transportation Bldg., Chicago.

INTERNATIONAL RAILWAY CONGRESS.—Executive Committee, 11, Rue de Louvain, Brussels, Belgium. Next convention, June 23 to July 6, 1915, Berlin.

INTERNATIONAL RAILWAY FUEL ASSOCIATION.—C. G. Hall, C. & E. I., 922 McCormick Bldg., Chicago. Annual meeting, May 17-20, 1915, Chicago.

INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—Wm. Hall, 829 W. Broadway, Winona, Minn. Next convention, July 14-17, 1915, Sherman House, Chicago.

INTERNATIONAL RAILROAD MASTER BLACKSMITHS' ASSOCIATION.—A. L. Woodworth, C. H. & D., Lima, Ohio. Annual meeting, August 17, 1915, Philadelphia, Pa.

MAINTENANCE OF WAY AND MASTER PAINTERS' ASSOCIATION OF THE UNITED STATES AND CANADA.—T. I. Goodwin, C. R. I. & P., Eldon, Mo. Next convention, November 17-19, 1914, Detroit, Mich.

MASTER BOILER MAKERS' ASSOCIATION.—Harry D. Vought, 95 Liberty St., New York. Annual convention, May 26 to 28, 1915, Chicago, Ill.

MASTER CAR AND LOCOMOTIVE PAINTERS' ASSOCIATION OF THE UNITED STATES AND CANADA.—A. P. Dane, B. & M., Reading, Mass. Next convention, September 14-17, 1915, Detroit, Mich.

MASTER CAR BUILDERS' ASSOCIATION.—J. W. Taylor, 1112 Karpen Bldg., Chicago. Annual meeting, June 14-16, 1915, Atlantic City, N. J.

NATIONAL RAILWAY APPLIANCES ASSOCIATION.—Bruce V. Crandall, 537 So. Dearborn St., Chicago. Next convention, March 15-19, 1915, Chicago.

NEW ENGLAND RAILROAD CLUB.—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass. Regular meetings, 2d Tuesday in month, except June, July, August and September, Boston.

NEW YORK RAILROAD CLUB.—Harry D. Vought, 95 Liberty St., New York. Regular meetings, 3d Friday in month, except June, July and August, 29 W. 39th St., New York.

NIAGARA FRONTIER CAR MEN'S ASSOCIATION.—E. Frankenberger, 623 Brisbane Bldg., Buffalo, N. Y. Meetings monthly.

PEORIA ASSOCIATION OF RAILROAD OFFICERS.—M. W. Rotchford, Union Station, Peoria, Ill. Regular meetings, 2d Thursday in month, Jefferson Hotel, Peoria.

RAILROAD CLUB OF KANSAS CITY.—C. Manlove, 1008 Walnut St., Kansas City, Mo. Regular meetings, 3d Friday in month, Kansas City.

RAILROAD MASTER TINNERS, COPPERSMITHS AND PIPEFITTERS' ASSOCIATION.—U. G. Thompson, C. & E. I., Danville, Ill. Annual meeting, May, 1915.

RAILWAY BUSINESS ASSOCIATION.—Frank W. Noxon, 30 Church St., New York. Annual meeting, December 10, 1914, Waldorf-Astoria Hotel, New York.

RAILWAY CLUB OF PITTSBURGH.—J. B. Anderson, Room 207, P. R. R. Sta., Pittsburgh, Pa. Regular meetings, 4th Friday in month, except June, July and August, Monongahela House, Pittsburgh.

RAILWAY ELECTRICAL SUPPLY MANUFACTURERS' ASSOCIATION.—J. Scribner, 1021 Monadnock Block, Chicago. Meetings with Association of Railway Electrical Engineers.

RAILWAY FIRE PROTECTION ASSOCIATION.—C. B. Edwards, Fire Ins. Agt., Mobile & Ohio, Mobile, Ala. Next meeting, October, 1915.

RAILWAY SIGNAL ASSOCIATION.—C. C. Rosenberg, Times Bldg., Bethlehem, Pa. Next meeting, March 15, 1915, Chicago. Annual meeting, September 21-24, 1915, Salt Lake City, Utah.

RAILWAY STOREKEEPERS' ASSOCIATION.—J. P. Murphy, L. S. & M. S., Box C, Collinwood, Ohio. Annual meeting, May 17-19, 1915, Hotel Sherman, Chicago.

RAILWAY SUPPLY MANUFACTURERS' ASSOCIATION.—J. D. Conway, 2136 Oliver Bldg., Pittsburgh, Pa. Meetings with Master Car Builders and Master Mechanics' Associations.

RAILWAY TELEGRAPH AND TELEPHONE APPLIANCE ASSOCIATION.—G. A. Nelson, 50 Church St., New York. Meetings with Association of Railway Telegraph Superintendents.

RICHMOND RAILROAD CLUB.—F. O. Robinson, C. & O., Richmond, Va. Regular meetings, 2d Monday in month, except June, July and August.

ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.—L. C. Ryan, C. & N. W., Sterling, Ill. Annual meeting, September 14-16, 1915, Chicago.

ST. LOUIS RAILWAY CLUB.—B. W. Frauenthal, Union Station, St. Louis, Mo. Regular meetings, 2d Friday in month, except June, July and August, St. Louis.

SALT LAKE TRANSPORTATION CLUB.—R. E. Rowland, Hotel Utah Bldg., Salt Lake City, Utah. Regular meetings, 1st Saturday of each month, Salt Lake City.

SIGNAL APPLIANCE ASSOCIATION.—F. W. Edmunds, 3868 Park Ave., New York. Meeting with annual convention Railway Signal Association.

SOCIETY OF RAILWAY FINANCIAL OFFICERS.—Carl Nyquist, C. R. I. & P., La Salle St. Sta., Chicago. Annual meeting, September, 1915.

SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—E. W. Sandwich, A. & W. P. R. R., Atlanta, Ga. Next regular meeting, January 21, 1915, Atlanta, Ga.

SOUTHERN AND SOUTHWESTERN RAILWAY CLUB.—A. J. Merrill, Grant Bldg., Atlanta, Ga. Regular meetings, 3d Thursday, January, March, May, July, September, November, 10 A. M., Candler Bldg., Atlanta.

TOLEDO TRANSPORTATION CLUB.—Harry S. Fox, Toledo, Ohio. Regular meetings, 1st Saturday in month, Bondy House, Toledo.

TRACK SUPPLY ASSOCIATION.—W. C. Kidd, Ramapo Iron Works, Hillburn, N. Y. Meetings with Roadmaster's and Maintenance of Way Association.

TRAFFIC CLUB OF CHICAGO.—W. H. Wharton, La Salle Hotel, Chicago.

TRAFFIC CLUB OF NEW YORK.—C. A. Swope, 291 Broadway, New York. Regular meetings last Tuesday in month, except June, July and August, Waldorf-Astoria, New York.

TRAFFIC CLUB OF PITTSBURGH.—D. L. Wells, Erie R. R., Pittsburgh, Pa. Meetings bimonthly, Pittsburgh. Annual meeting, 2d Monday in June.

TRAFFIC CLUB OF ST. LOUIS.—A. F. Versen, Mercantile Library Bldg., St. Louis, Mo. Annual meeting in November. Noonday meetings October to May.

TRAIN DESPATCHERS' ASSOCIATION OF AMERICA.—J. F. Mackie, 7122 Stewart Ave., Chicago. Annual meeting June 15, 1915, Minneapolis, Minn.

TRANSPORTATION CLUB OF DETROIT.—W. R. Hurley, Superintendent's office, L. S. & M. S., Detroit, Mich. Meetings monthly, Normandie Hotel, Detroit.

TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, N. Y. C. & H. R., East Buffalo, N. Y. Annual meeting, September, 1915, Chicago.

WESTERN CANADA RAILWAY CLUB.—W. H. Rosevear, P. O. Box 1707, Winnipeg, Man. Regular meetings, 2d Monday, except June, July and August, Winnipeg.

WESTERN RAILWAY CLUB.—J. W. Taylor, 1112 Karpen Bldg., Chicago. Regular meetings, 3d Tuesday in month, except June, July and August, Karpen Bldg., Chicago.

WESTERN SOCIETY OF ENGINEERS.—J. H. Warder, 1735 Monadnock Block, Chicago. Regular meetings, 1st Monday in month, except January, July and August, Chicago. Extra meetings, except in July and August, generally on other Monday evenings.

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF SEPTEMBER, 1914

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses							Net operating revenue (or deficit).	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
					Maintenance										
		Freight.	Passenger.	Total. inc. misc.	Way and structures.	Of equipment.	Traffic.	Transportation.	Miscellaneous.	General.	Total.				
Alabama & Vicksburg	143	$83,757	$39,262	$135,213	$21,420	$29,894	$3,555	$51,047	$3,525	$5,595	$115,036	$20,177	$7,240	$12,937	—$22,580
Alabama Great Southern	309	278,019	94,734	407,422	58,981	116,582	13,950	136,005	2,527	9,983	338,027	69,395	15,493	53,896	—42,021
Atchison, Topeka & Santa Fe	8,470	6,197,713	2,031,055	8,973,243	1,314,208	1,466,993	164,942	2,308,397	.....	154,672	5,407,649	3,565,594	399,106	3,164,419	512,626
Atlanta & West Point	93	50,286	35,853	99,262	16,687	23,060	5,314	30,155	1,464	4,304	80,984	18,278	7,125	11,150	—12,673
Atlanta, Birmingham & Atlantic	646	145,083	45,009	209,494	35,150	44,999	11,916	99,637	.....	9,781	201,484	8,010	14,337	—6,327	—51,728
Atlantic & St. Lawrence	167	60,200	35,164	106,687	26,919	16,386	4,187	48,328	.....	2,574	98,394	8,293	10,800	—2,507	7,574
Atlantic City	170	71,219	167,479	245,421	28,111	26,775	2,445	113,897	103	1,006	172,337	73,085	13,500	59,567	12,849
Atlantic Coast Line	4,664	1,425,797	601,311	2,186,558	445,958	475,023	60,795	893,187	6,765	81,713	1,956,206	230,351	138,000	91,676	—386,143
Baltimore & Ohio—System	4,516	6,784,553	1,372,332	8,782,332	906,225	1,684,913	156,693	3,145,556	49,424	205,391	6,148,203	2,634,129	269,180	2,363,925	—66,834
Baltimore & Ohio Chicago Terminal	80	.....	592	151,412	16,111	26,703	918	57,639	2,119	4,433	107,924	43,487	19,021	24,466	—719
Bangor & Aroostook	631	207,729	65,964	289,645	48,502	46,901	2,431	90,000	1,204	9,839	198,877	90,768	8,750	82,018	—33,746
Belt, Ry. Co. of Chicago	24	.....	.....	277,807	18,610	22,827	1,018	84,803	.....	6,094	133,352	144,455	10,458	133,997	63,384
Bessemer & Lake Erie	204	1,114,837	50,167	1,179,904	73,954	149,935	9,532	206,834	2,633	11,797	447,762	732,143	18,000	714,138	277,607
Bingham & Garfield	27	78,183	3,500	82,606	12,417	14,882	1,106	14,878	78	2,054	45,414	37,193	1,238	35,955	—61,388
Birmingham Southern	43	43,631	1,106	77,525	28,660	14,347	480	29,298	.....	3,660	76,444	1,081	3,150	—2,069	—38,257
Boston & Maine	2,252	2,316,466	1,625,613	4,277,688	782,595	611,706	39,943	1,727,002	18,281	88,544	3,268,070	1,009,618	161,570	848,048	18,228
Buffalo & Susquehanna R. R. Corporation	253	112,109	7,028	122,142	24,704	40,173	1,201	36,787	.....	5,566	108,431	13,711	2,600	11,111	.....
Buffalo & Susquehanna Railway	91	16,370	8,130	27,225	6,008	10,705	536	12,522	34	2,288	32,136	—4,911	1,600	—6,511	13,524
Buffalo, Rochester & Pittsburgh	586	729,346	108,108	867,942	136,777	193,581	10,610	269,786	1,346	16,990	629,091	238,851	20,000	218,850	—109,301
Canadian Pacific Lines in Maine	233	56,308	21,178	84,171	20,217	14,173	5,892	36,662	.....	3,524	80,469	3,702	12,000	—8,298	17,422
Carolina, Clinchfield & Ohio	248	175,265	16,969	197,287	15,753	23,004	6,969	35,995	.....	8,740	89,531	107,755	14,250	93,505	—29,493
Carolina, Clinchfield & Ohio of S. C.	18	9,111	1,351	10,680	760	98	1,820	2,043	.....	582	5,302	5,378	750	4,628	—2,548
Central New England	304	272,336	46,489	332,735	63,744	38,611	1,001	106,906	.....	4,044	214,201	118,534	4,000	107,501	—36,888
Central of Georgia	1,924	622,635	254,253	975,442	165,501	196,198	34,382	352,276	1,196	33,340	771,175	204,267	49,475	154,436	—178,734
Central of New Jersey	678	1,991,842	590,978	2,725,379	242,223	393,540	36,778	859,674	14,902	49,172	1,596,103	1,129,276	126,781	1,002,495	174,145
Central Vermont	411	228,237	98,470	351,296	51,624	57,416	5,987	148,781	3,027	6,393	273,228	78,068	15,760	62,308	23,408
Charleston & Western Carolina	341	101,293	27,369	136,150	30,797	32,731	3,879	52,706	.....	4,022	124,135	12,016	5,000	7,016	—16,677
Chesapeake & Ohio Lines	2,367	2,738,818	567,575	3,514,144	423,729	733,872	57,725	1,085,939	22,145	67,961	2,391,370	1,122,774	109,922	1,012,619	62,126
Chicago & Alton	1,033	819,977	385,183	1,307,854	146,166	273,659	35,143	439,495	10,689	29,960	935,112	372,742	44,850	327,547	—503
Chicago & Eastern Illinois	1,282	920,008	252,816	1,277,667	153,009	263,423	20,462	460,560	7,653	35,764	940,803	336,864	56,900	279,867	113,742
Chicago & Erie	270	432,161	56,513	530,161	86,401	—365,520	19,585	223,741	2,183	11,607	—23,003	553,164	12,895	540,269	564,697
Chicago & North Western	8,108	5,255,276	2,027,910	8,030,464	1,207,282	1,173,147	107,627	2,572,419	53,603	142,126	5,256,204	2,774,260	375,000	2,398,386	23,050
Chicago, Burlington & Quincy	9,264	5,891,332	1,979,728	8,579,305	946,244	1,366,030	144,913	2,494,492	70,585	169,542	5,191,806	3,387,499	332,528	3,054,971	—110,290
Chicago, Detroit & Can. Gd. Trunk Jctn.	60	50,527	19,849	79,555	12,014	12,872	1,976	43,163	—509	1,313	70,828	8,727	2,870	5,857	—2,249
Chicago Great Western	1,427	934,414	306,149	1,346,757	191,847	202,968	44,952	420,005	6,855	35,294	899,445	447,312	48,668	398,563	28,637
Chicago, Indiana & Southern	359	343,647	30,449	387,599	51,415	57,725	7,065	118,660	1,822	10,812	247,498	140,100	20,085	120,012	94,030
Chicago, Indianapolis & Louisville	618	396,374	158,529	609,006	80,831	121,399	17,379	205,265	120	18,047	442,047	166,959	26,683	140,220	—15,223
Chicago Junction	12	.....	.....	168,837	23,711	18,173	1,028	85,323	.....	5,137	133,373	35,465	2,186	33,279	—25,715
Chicago, Milwaukee & St. Paul	10,036	6,444,635	1,885,904	9,240,208	1,162,732	1,116,015	150,563	3,281,835	67,485	151,542	5,631,370	3,608,837	399,892	3,205,773	584,665
Chicago, Rock Island & Gulf	477	176,671	52,133	250,065	32,362	38,577	10,454	94,083	1,771	7,353	184,600	65,465	8,815	56,579	5,315
Chicago, Rock Island & Pacific	7,852	4,498,120	1,703,299	6,631,028	947,636	1,027,106	142,243	2,354,176	43,638	130,550	4,641,253	1,989,774	284,033	1,705,409	197,100
Chicago, St. Paul, Minn. & Omaha	1,753	1,075,829	510,172	1,698,869	272,429	206,904	28,884	563,909	15,658	35,825	1,123,610	575,260	95,492	479,435	—7,932
Chicago, Terre Haute & Southeastern	375	183,295	17,443	206,434	29,366	55,753	3,064	58,887	934	8,971	156,974	49,460	11,500	37,960	10,623
Cincinnati, Hamilton & Dayton	1,015	687,275	156,668	939,903	125,750	152,752	16,975	382,405	.....	19,453	697,335	242,568	40,042	202,519	66,116
Cincinnati, New Orleans & Texas Pacific	337	580,079	146,997	775,157	90,881	248,165	25,024	246,484	7,720	22,540	640,814	134,343	31,000	103,343	—167,057
Cincinnati Northern	246	125,729	19,721	151,582	23,818	23,993	3,032	43,445	.....	3,258	97,547	54,035	6,000	47,889	39,891
Cleveland, Cincinnati, Chicago & St. L.	2,361	2,287,709	790,612	3,369,280	397,842	605,021	75,419	1,188,825	23,915	57,101	2,344,805	1,024,475	130,000	894,166	392,687
Colorado & Southern	1,127	513,869	144,994	703,447	98,582	154,289	10,155	207,622	4,559	18,095	493,303	210,144	35,625	174,325	—45,373
Colorado Midland	338	166,742	23,240	205,468	31,257	37,451	7,518	73,322	1,113	5,373	156,074	49,394	8,530	40,864	9,722
Cumberland Valley	164	192,384	66,306	272,995	41,211	33,299	4,172	95,320	762	8,890	183,653	89,342	5,910	83,432	—4,188
Delaware, Lackawanna & Western	960	2,697,268	807,284	3,857,125	465,707	620,960	67,847	1,099,904	34,227	74,172	2,337,168	1,519,957	185,000	1,334,847	87,587
Denver & Rio Grande	2,562	1,646,428	502,812	2,288,259	349,477	380,410	37,185	624,603	32,420	61,386	1,480,908	807,351	90,000	717,314	—19,372
Denver & Salt Lake	256	124,496	32,923	166,783	17,682	29,916	2,489	52,157	.....	4,917	105,084	61,699	5,000	56,699	—1,138
Detroit & Mackinac	400	64,013	25,947	96,953	12,241	15,685	1,783	33,905	214	2,750	66,579	30,374	9,100	21,274	2,918
Detroit & Toledo Shore Line	79	129,229	.....	129,572	21,709	7,790	1,525	33,822	.....	2,595	67,441	62,132	5,900	56,232	—6,056
Detroit, Grand Haven & Milwaukee	191	118,000	72,000	221,797	41,723	35,111	8,144	116,787	972	5,016	207,753	14,044	3,360	10,574	—31,281
Detroit, Toledo & Ironton	441	166,240	20,638	197,975	12,971	19,336	3,611	102,203	.....	5,797	143,917	54,059	6,000	48,059	106,303
Duluth & Iron Range	292	547,614	17,414	583,633	87,042	75,218	905	107,668	4,525	8,357	283,714	299,919	30,856	269,062	—304,189
Duluth, Missabe & Northern	364	734,112	28,663	774,627	64,040	74,198	2,194	125,812	2,829	9,062	278,136	496,491	40,942	455,549	—360,850
Duluth, South Shore & Atlantic	628	150,701	91,490	271,566	54,933	35,949	8,309	96,293	4,107	10,993	210,583	60,983	19,000	41,965	22,684
Duluth, Winnipeg & Pacific	185	82,119	18,045	104,211	27,730	18,745	1,110	38,371	1,391	5,851	93,197	11,014	5,211	5,803	—2,133
El Paso & Southwestern Co	1,027	411,336	104,543	574,102	72,377	82,359	16,944	150,356	5,937	22,170	350,143	223,960	38,211	185,698	13,277
Elgin, Joliet & Eastern	777	815,633	12	863,643	67,518	134,897	5,061	226,980	.....	17,822	452,137	411,506	32,833	378,673	—22,162
Erie	1,988	3,718,992	828,121	4,976,196	560,258	1,440,128	89,654	1,709,929	32,898	102,590	3,919,049	1,057,147	138,547	913,562	—238,727
Florence & Cripple Creek	87	81,138	15,662	98,745	15,168	9,335	2,557	27,266	.....	3,969	58,294	40,451	5,677	34,774	—13,684
Florida East Coast	696	170,268	98,023	314,405	61,296	50,043	6,591	118,229	5,476	40,119	279,786	34,619	20,000	14,597	27,325
Fort Worth & Denver City	454	272,207	134,469	433,299	44,417	54,224	6,880	165,883	4,195	13,598	289,197	144,102	10,758	133,261	42,417
Galveston, Harrisburg & San Antonio	1,338	781,226	296,234	1,128,403	108,803	154,564	27,105	415,770	8,897	36,827	751,646	376,757	33,425	337,265	15,395
Georgia	307	162,233	61,998	241,082	27,221	51,170	11,303	108,603	.....	7,173	205,470	35,613	3,439	32,125	—28,327
Georgia, Southern & Florida	395	115,652	55,976	197,215	27,620	40,128	7,658	78,104	23	10,481	164,015	33,200	10,943	21,966	—3,906

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF SEPTEMBER, 1914—CONTINUED

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses							Net operating revenue (or deficit).	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
		Freight.	Passenger.	Total. inc. misc.	Maintenance Way and structures.	Maintenance Of equipment.	Traffic.	Transportation.	Miscellaneous.	General.	Total.				
Grand Rapids & Indiana	575	$260,933	$212,222	$521,315	$59,323	$68,123	$9,933	$195,729	$4,558	$13,450	$351,117	$170,199	$24,270	$145,929	—$419
Grand Trunk Western	347	393,000	175,000	611,489	89,162	115,465	22,347	253,826	8,168	14,546	503,515	107,975	35,920	71,897	7,142
Great Northern	8,038	5,989,868	1,464,117	8,081,032	642,910	630,273	97,475	1,774,720	82,217	100,527	3,318,731	4,762,302	423,664	4,338,193	284,370
Gulf & Ship Island	308	100,037	27,371	135,686	16,437	28,850	2,518	37,087	217	7,532	92,640	43,046	7,284	35,762	—31,402
Gulf, Colorado & Santa Fe	1,937	955,968	279,474	1,302,190	179,510	179,209	28,166	450,651	.....	32,842	870,376	431,814	51,055	379,929	93,003
Hocking Valley	353	617,199	87,060	750,945	86,556	146,166	8,416	202,698	.....	13,335	457,171	293,774	38,800	254,974	—20,579
Houston & Texas Central	857	397,549	133,346	567,493	141,829	100,396	14,992	221,404	1,642	18,380	498,111	69,382	24,047	45,337	—172,773
Houston East & West Texas	191	67,862	27,447	102,009	35,714	34,326	1,948	46,055	.....	3,273	121,316	—19,308	4,249	—23,607	—72,843
Illinois Central	4,769	3,934,644	1,193,198	5,529,432	762,165	1,182,351	100,428	1,841,262	30,747	120,896	3,993,832	1,535,600	275,000	1,259,722	131,576
Indiana Harbor Belt	105	.....	.....	297,665	33,266	27,854	2,766	116,179	.....	7,586	187,651	110,014	7,785	102,101	57,407
International & Great Northern	1,160	524,651	176,925	761,257	160,679	127,412	21,688	286,824	3,276	26,227	626,107	135,150	30,000	105,048	—289,756
Kanawha & Michigan	177	268,191	33,888	308,767	44,130	74,403	2,311	83,983	3	7,229	212,059	96,708	11,800	84,896	—2,227
Kansas City Southern	827	642,440	130,231	859,165	100,734	111,641	26,972	282,061	.....	40,328	560,137	299,029	48,010	250,753	—47,571
Lake Erie & Western	906	437,282	74,518	537,832	66,885	83,527	12,407	196,391	.....	11,726	370,935	166,897	24,500	142,371	38,138
Lake Shore & Michigan Southern	1,852	2,920,630	1,171,014	4,694,381	547,777	884,899	71,287	1,509,738	54,156	96,926	3,164,783	1,529,598	196,500	1,332,676	—60,339
Lehigh & Hudson River	97	146,448	10,849	160,217	26,198	18,108	1,344	57,064	.....	3,428	106,142	54,075	4,150	49,925	20,374
Lehigh & New England	294	234,768	1,935	246,432	29,125	31,047	1,619	56,157	.....	5,624	123,572	122,860	5,670	117,190	48,494
Lehigh Valley	1,444	3,295,718	411,586	3,915,827	397,712	843,038	73,553	1,267,183	13,767	69,689	2,664,941	1,250,886	140,000	1,110,038	26,173
Long Island	398	340,839	795,050	1,299,929	139,535	103,226	12,653	526,400	7,098	20,848	809,761	490,168	64,987	424,789	132,563
Louisiana & Arkansas	279	105,689	18,474	128,434	33,116	24,583	2,718	36,172	.....	4,617	101,083	27,351	6,250	21,101	—20,310
Louisiana Ry. & Navigation	351	121,444	21,633	155,212	32,154	16,449	5,945	63,449	.....	5,299	123,295	31,917	7,500	24,417	—1,474
Louisiana Western	208	119,071	59,414	188,912	15,766	20,761	6,579	41,272	2,959	6,477	93,813	95,099	8,735	86,305	10,076
Louisville & Nashville	5,034	3,291,528	999,012	4,602,027	768,460	913,568	110,688	1,552,954	15,189	103,095	3,456,603	1,145,424	184,275	960,126	—432,172
Maine Central	1,209	597,022	382,945	1,056,376	139,845	153,555	21,855	376,471	7,794	28,826	728,347	328,029	52,129	275,899	8,049
Michigan Central	1,800	1,934,239	850,199	3,140,684	295,386	448,122	66,617	1,152,358	51,337	55,218	2,069,040	1,071,645	134,000	937,641	312,830
Midland Valley	380	80,174	36,682	125,692	26,482	27,401	2,083	41,175	.....	5,803	102,944	22,748	6,582	16,164	—5,231
Minneapolis & St. Louis	1,646	723,006	198,513	975,008	109,677	136,413	17,539	334,663	174	22,850	621,316	353,693	39,144	314,549	22,207
Minn., St. Paul & Sault Ste. Marie	4,102	2,119,903	614,852	2,929,601	350,840	362,452	45,983	805,785	16,173	49,715	1,614,986	1,314,615	130,813	1,183,802	143,320
Missouri & North Arkansas	365	63,219	35,415	108,135	28,154	18,447	3,177	53,867	.....	5,670	109,315	—1,180	6,000	—7,196	—23,073
Missouri, Kansas & Texas System	3,865	1,746,165	734,424	2,692,740	373,988	483,248	61,690	952,084	27,607	83,887	1,963,862	728,878	109,616	618,943	—182,972
Missouri, Oklahoma & Gulf	332	66,333	21,092	93,185	21,922	16,963	4,204	43,422	111	5,235	91,856	1,329	6,462	—5,184	670
Missouri, Oklahoma & Gulf of Texas	19	5,961	388	6,522	802	—3,043	210	4,855	.....	491	9,401	197	—3,076	—416	
Missouri Pacific	3,920	2,198,054	443,287	2,857,656	356,560	443,038	61,497	948,367	8,273	59,399	1,877,523	980,133	98,590	881,122	487,725
Mobile & Ohio	1,122	752,217	117,652	923,904	120,835	232,523	41,708	373,197	2,554	28,930	799,747	124,156	33,245	90,905	—110,733
Monongahela	67	86,484	2,058	90,310	21,785	5,958	563	21,857	.....	2,028	52,190	38,119	2,100	36,020	—37,058
Morgan's La. & Tex. R. R. & S. S. Co.	405	259,845	95,542	381,269	43,433	117,264	10,924	157,907	2,596	11,782	343,906	37,363	20,392	16,696	—62,014
Nashville, Chattanooga & St. Louis	1,231	590,571	241,514	909,055	128,340	197,214	43,676	360,853	8,283	29,784	768,151	140,904	27,213	113,528	—91,221
Nevada Northern	165	66,394	8,747	79,255	14,087	14,098	419	19,475	48	3,345	51,472	27,784	5,725	22,059	—43,438
New Orleans & North Eastern	204	212,240	46,436	285,286	32,986	61,012	9,705	104,103	6,297	12,126	226,228	59,058	15,700	43,358	—9,169
New Orleans Great Northern	283	95,916	24,893	132,294	12,560	20,823	2,815	41,038	185	6,390	83,812	48,483	3,167	45,316	—13,877
New Orleans, Mobile & Chicago	403	113,659	27,690	149,630	29,797	24,447	3,839	52,069	—2	6,954	117,105	32,526	6,180	26,343	—39,179
New Orleans, Texas & Mexico	286	98,988	19,450	124,383	25,840	17,835	4,361	51,439	.....	7,424	106,899	17,485	1,621	15,864	13,858
New York Central & Hudson River	3,692	5,527,143	3,196,638	10,249,164	1,181,810	1,818,795	164,605	3,265,270	189,302	230,835	6,850,618	3,398,546	542,977	2,855,078	86,171
New York, Chicago & St. Louis	567	752,985	129,095	928,828	138,592	118,143	40,954	408,972	5,455	21,438	733,553	195,276	42,000	153,103	—91,048
New York, New Haven & Hartford	2,003	2,633,781	2,530,405	5,802,378	734,642	808,324	29,461	2,075,814	48,221	126,114	3,817,609	1,984,769	205,000	1,779,607	95,203
New York, Ontario & Western	568	561,755	148,179	821,968	123,523	158,934	7,124	308,731	.....	15,651	613,963	208,005	19,583	188,422	—24,144
New York, Philadelphia & Norfolk	112	222,816	49,029	300,960	35,186	62,220	4,396	128,411	4,525	9,645	244,384	56,576	8,700	47,876	—9,251
New York, Susquehanna & Western	140	180,213	48,096	252,439	21,239	28,766	1,989	108,721	.....	5,243	165,906	86,533	12,583	73,950	16,487
Norfolk & Western	2,038	3,479,000	465,700	4,096,891	694,217	740,131	60,332	1,099,242	10,355	68,152	2,616,405	1,480,486	140,000	1,340,485	107,612
Norfolk Southern	900	189,870	91,984	306,922	42,045	41,885	7,249	114,714	.....	19,461	225,355	81,567	12,000	69,567	—1,428
Northern Pacific	6,409	4,753,891	1,437,492	6,733,845	1,037,721	912,656	90,849	1,737,422	88,901	85,723	3,839,284	2,894,561	421,765	2,472,590	—310,572
Northwestern Pacific	401	157,853	174,375	369,457	68,464	38,311	4,331	123,606	.....	8,999	237,797	131,660	15,985	115,675	—3,966
Oregon Short Line	2,163	1,401,860	439,208	1,993,886	262,050	244,746	26,886	488,817	29,412	53,922	1,094,867	899,019	116,500	782,318	—266,097
Oregon-Washington R. R. & Nav. Co.	1,973	1,022,093	453,808	1,601,555	175,410	174,481	39,782	473,138	14,231	54,752	919,482	682,073	97,071	584,939	—26,502
Panhandle & Santa Fe	668	262,361	60,370	338,013	67,330	61,641	3,890	97,015	.....	8,530	238,405	99,608	9,234	90,289	55,151
Pennsylvania *Company*	1,750	3,820,549	957,389	5,271,507	715,959	900,806	67,924	1,782,900	40,597	109,134	3,617,319	1,654,188	264,624	1,389,447	—296,907
Pennsylvania *Railroad*	4,519	11,794,444	3,552,640	16,768,404	2,084,004	2,962,009	196,231	5,857,822	241,373	427,321	11,768,761	4,999,643	663,807	4,330,890	338,905
Pere Marquette	2,319	1,182,048	421,920	1,743,780	135,624	305,620	28,856	580,933	5,355	50,621	1,106,811	636,968	53,107	583,853	396,646
Philadelphia & Reading	1,120	3,422,398	609,111	4,219,307	429,077	730,197	41,834	1,394,303	14,320	66,706	2,676,437	1,542,869	101,049	1,441,418	134,529
Philadelphia, Baltimore & Washington	717	886,918	750,534	1,812,969	271,151	293,622	25,002	715,125	12	50,879	1,355,792	457,177	58,009	398,996	60,436
Pittsburgh & Lake Erie	224	1,150,784	151,941	1,359,223	196,618	315,876	12,623	351,476	3,234	27,871	907,698	451,525	52,250	399,275	—319,061
Pittsburgh, Cincinnati, Chic. & St. Louis	1,472	2,525,690	804,900	3,719,088	462,980	639,949	60,466	1,242,992	28,019	77,360	2,511,767	1,207,321	170,922	1,036,135	145,832
Pittsburgh, Shawmut & Northern	294	153,065	11,012	167,150	46,241	57,722	1,384	52,148	.....	4,226	161,720	5,430	1,649	3,782	—1,919
Port Reading	21	99,811	.....	125,942	16,809	13,039	38	38,625	.....	122	68,634	57,308	12,000	45,308	1,766
Richmond, Fredericksburg & Potomac	88	102,600	82,982	218,213	20,721	28,921	3,789	82,825	3,358	6,858	146,472	71,741	7,637	64,098	13,048
Rutland	468	167,330	129,467	336,039	39,306	57,376	8,484	118,420	1,400	5,721	230,707	105,331	17,373	87,959	—9,119
St. Joseph & Grand Island	258	104,302	26,016	141,119	30,727	17,792	5,040	47,765	.....	5,563	106,887	34,232	7,034	27,198	21,649
St. Louis & San Francisco	4,746	2,344,379	927,336	3,511,628	416,987	527,717	62,229	1,119,956	.....	85,634	2,212,524	1,299,105	117,039	1,181,661	48,917
St. Louis, Brownsville & Mexico	548	122,855	66,717	210,201	38,003	18,974	5,093	74,927	.....	10,102	143,638	66,563	6,750	59,813	—21,735
St. Louis, Iron Mountain & Southern	3,365	1,904,470	469,015	2,570,190	384,064	468,598	49,622	778,955	8,777	59,275	1,749,292	820,898	113,432	706,260	—92,168

Traffic News

A single shipment of 3,000,000 eggs from western states was exported to England from Boston last week. The reduction in England's egg supply from Russia on account of the war is said to have brought about the shipment.

The committee on relations between railroads of the American Railway Association reports that on November 1, 1914, the total freight car surplus was 172,325, as compared with 154,342 on October 15. The total shortage was 2,229 cars.

Of 2,457 passenger trains run on the New York, New Haven & Hartford in the last two weeks of July, 1914, five had earnings of only one cent a mile; 88 earned ten cents a mile or less; 619 earned fifty cents a mile or less, and more than half of the whole (52.1 per cent) earned one dollar a mile or less. Only 22.7 per cent of the trains showed earnings of more than two dollars a mile. The time tables now in force show 256 fewer trains on week days, and 83 fewer on Sundays, than the tables in effect a year ago. These figures represent unprofitable trains taken off. The total reduction, in train miles, is 5,817 on week days and 1,478 on Sundays.

F. R. Stevens, agriculturist of the Lehigh Valley, has issued warnings to farmers regarding the outbreak of foot-and-mouth disease among cattle in the west. The symptoms are mainly inflammation about the hoofs and in the tissues of the mouth, causing a froth to appear in the mouth. These symptoms may come from other causes, but any suspicious case should be reported immediately to the nearest veterinarian. Stock owners in sections without a veterinary close at hand are told that if they have the slightest doubt as to the presence of the disease to notify the nearest station agent of the Lehigh Valley, and he will get word to its agriculturist at once.

The steamship Pleiades, of the Luckenbach line, arrived at Galveston November 5 from San Francisco by way of the Panama Canal, with a cargo of 66,000 cases of fruit and wine. The Oregonian arrived recently at Poughkeepsie, N. Y., 75 miles above New York City, on the Hudson river, direct from South Bend, Wash., through the Panama Canal, with a cargo of 4,500,000 ft. of lumber. Shipments of grain from the Pacific coast, formerly carried around Cape Horn, are now moving freely through the Panama Canal. The value of shipments from San Francisco by way of the canal in the month of August was $1,376,000, and in September, $4,248,000. In October the total was about 25 per cent higher than September. The freight going to New York embraced not only wheat, but also barley, onions and prunes.

W. L. Ross, president of the Toledo, St. Louis & Western, and formerly vice-president of the Chicago & Alton, was indicted by a grand jury at Chicago on November 6, on a charge of violating the interstate commerce law relating to passenger rates, on the ground that he allowed the late Edward Morris, the meat packer, and members of his family, to ride in a private car as his guests on a trip to Hot Springs in January, 1912, while Mr. Ross was vice-president of the Alton. The railroad also was indicted. It is charged that the Chicago & Alton and Mr. Ross violated the law by permitting Mr. Morris and family to travel without purchasing the full number of fares (18) required by tariff for the use of a car. The Alton officers explained that Mr. Morris had bought tickets for his family and as Mr. Ross' car was attached to the train Mr. Ross invited Mr. Morris and his family to ride in his car as his guests.

New tariffs which have been filed by the Trunk Lines reduce from ten days to five days the length of time which flour will be stored without charge at New York City terminals. The flour dealers say that, because of the irregularity in the arrival of shipments, it will be impossible for them to do business under the new arrangement. Flour is sold on such a small margin of profit that the seller "cannot afford to take any risk of having his profits eaten up by storage charges." Moreover, the amount to be charged after the expiration of the free time is increased from one cent a barrel to 1 cent per 100 lb. A new baggage tariff which has been issued by the Pennsylvania Railroad, prescribing the usual charge for storage of baggage at passenger stations after 24 hours, makes this rule universal, with no exceptions for Sundays or holidays.

Car Location

The accompanying table, which was taken from bulletin No. 23 of the American Railway Association, gives a summary of freight car location by groups on October 1, 1914.

Car Location on October 1, 1914

	New England.	N.Y., N.J., Del., Md., Eastern Pa.	Ohio, Ind., Mich., Western Pa.	W. Va., Va. No. & So. Carolina.	Ky., Tenn., Miss., Ala., Ga., Fla.	Iowa, Ill., Wis., Minn.	Mont., Wyo., Neb., Dakotas.	Kans., Colo., Okla., Mo., Ark.	Texas, La., New Mexico.	Oregon, Idaho, Nev., Cal., Ariz.	Canadian Lines.	Grand Total.
Total Cars Owned	87,589	687,750	282,620	216,272	181,519	503,728	25,286	123,705	22,354	137,574	140,562	2,408,959
Home Cars on Home Roads	50,578	442,382	120,110	139,797	112,990	360,125	12,728	80,002	13,556	85,031	93,103	1,510,402
Home Cars on Foreign Roads	37,011	245,368	162,510	76,475	68,529	143,603	12,558	43,703	8,798	52,543	47,459	898,557
Foreign Cars on Home Roads	41,257	248,916	191,445	58,393	50,777	172,017	11,952	39,194	17,693	56,201	21,649	909,494
Total Cars on Line	91,835	691,298	311,555	198,190	163,767	532,142	24,680	119,196	31,249	141,232	114,752	2,419,896
Excess or Deficiency	4,246	3,548	28,935	*18,082	*17,752	28,414	*606	*4,509	8,895	3,658	*25,810	10,937
Surplus	2,299	8,557	26,453	11,993	8,527	22,888	2,771	8,394	2,465	19,326	19,709	133,382
Shortage	869	84	428	215	75	30	0	469	44	135	6	2,355
Shop Cars—												
Home Cars in Home Shops	8,067	59,081	26,045	19,904	16,103	32,242	739	11,198	2,635	6,426	5,740	188,180
Foreign Cars in Home Shops	700	5,621	6,372	903	1,168	4,495	556	1,082	594	3,127	132	24,750
Total Cars in Shop	8,767	64,702	32,417	20,807	17,271	36,737	1,295	12,280	3,229	9,553	5,872	212,930
Per Cent to Total Cars Owned—												
Home Cars on Home Roads	57.74	64.32	42.50	64.64	62.25	71.49	50.34	64.67	60.64	61.81	66.24	62.70
Total Cars on Line	104.85	100.52	110.12	91.64	90.22	105.64	97.60	94.87	139.79	102.66	81.64	100.45
Home Cars in Home Shops	9.21	8.59	9.22	9.20	8.87	6.40	2.92	9.05	11.79	4.67	4.08	7.81
Foreign Cars in Home Shops	.80	.82	2.25	.42	.64	.89	2.20	.78	2.65	2.27	.10	1.03
Total Cars in Shops	10.01	9.41	11.47	9.62	9.51	7.29	5.12	9.83	14.44	6.94	4.18	8.84

*Denotes deficiency.

How to Get Freight

On the St. Louis & San Francisco the plan of making each local freight agent responsible for securing traffic within his territory has now been in operation about 18 months, and the officers of the road are agreed that it is a decided success. With a view to making still further progress toward the high standard which has been set, Chief Traffic Officer W. B. Biddle has issued a circular, the gist of which is as follows:

"Every agent should know every shipper or receiver of freight in his community.

"He should get his full share of the business of each and every one or know the reason for his failure.

"He should know what business is not controlled by his people and advise the proper representative.

"Time is the essence of success and advance information will often get the business.

"His slogan should be—*routing on the order for the goods.* Other forms of advices are important when this cannot be obtained, but at best they are supplementary. The *routing on the order* will usually bring home the bacon.

"Cultivate the traveling salesman. He is an important factor and can frequently give valuable information; and if he is a friend of the road, will go out of his way to help, so long as it does not conflict with his duty to his house or his customer. Where a purchaser does not express preference the traveling salesman frequently inserts the name of the road."

Commission and Court News

INTERSTATE COMMERCE COMMISSION

The Kansas Public Utilities Commission has filed a complaint with the Interstate Commerce Commission against new tariffs filed by the western railways, eliminating the storage privileges on poultry, butter and eggs.

Reconsignment Privileges on Less-Than-Carload Freight

Opinion by Commissioner McChord:

The commission finds that the Atchison, Topeka & Santa Fe and other respondent carriers have justified a proposed withdrawal of the privilege of reconsignment of less than carload freight west of Albuquerque and Belen, N. Mex. (32 I. C. C., 85.)

Westbound Lake-and-Rail Knit Goods Commodity Rates

Opinion by Commissioner Meyer:

The commission finds that the carriers have justified a proposed restoration to the class rate basis of the present commodity rail-and-lake rates on knit goods from Albany, N. Y., and Albany rate points to Chicago, Ill., St. Louis, Minneapolis and other points, the change being intended to eliminate a departure from the general rate structure. (32 I. C. C., 54.)

Reparation Awarded

Schrager Coal Company v. Delaware, Lackawanna & Western, et al. Opinion by Commissioner McChord:

The commission finds that the rates on anthracite coal from complainant's washery on the tracks of the Delaware, Lackawanna & Western to tidewater points on the Central of New Jersey are unreasonable to the extent that they exceed the joint rates to the same destinations from Taylor, Pa.

Rates on Produce from Pittsburgh

Cranford & Bunce et al. v. Pittsburgh, Cincinnati, Chicago & St. Louis et al. Opinion by Commissioner Clark:

The commission finds that the carriers have justified a proposed cancellation of commodity rates and a resulting restoration of class rates on general produce from Pittsburgh to points within about 150 miles east of that city. A similar change in the rates to points west and north of Pittsburgh was made some time ago and approved in *Kochler Produce Company v. Pennsylvania Railroad* (27 I. C. C., 635), decided June 9, 1913. (32 I. C. C., 12.)

Rates on Granite from Points in Vermont to Nebraska

Nebraska State Railway Commission v. Central Vermont et al. Opinion by Commissioner Meyer:

The commission finds that the carriers have not justified the present differences in classification and the considerable difference in rates applicable respectively to dressed and polished granite used for building purposes and granite used for monumental purposes shipped from points in Vermont to points in Nebraska. It is therefore held that the carriers should establish on the monumental granite a classification rating and a rate not in excess of those applicable to dressed and polished granite. (32 I. C. C., 41.)

Charge for Cleaning Cars Made Necessary by Government Quarantine

New Orleans Live Stock Exchange, Limited et al. v. Louisville & Nashville et al. Opinion by Commissioner Clark:

The commission finds a charge of $2.50 per car for cleaning and disinfecting cars imposed by carriers upon the owners of cattle moved in such cars from territory quarantined because of cattle tick to New Orleans, La., is not unreasonable in itself or discriminatory to New Orleans as compared with points at which no charge is made for a like service required by the same regulations. The commission states: "The carrier's tariff rates are presumed to provide reasonable charges for the service ordinarily or normally required and performed. If the shipper or receiver demands an additional service, the carrier has a right to assess a reasonable charge therefor. If, because of the nature or condition of the shipper's freight, the federal government or the state finds it necessary or appropriate to require extra precautions in connection with such shipments, which precautions impose upon the carrier an additional service, it is entitled to a reasonable compensation for that extra service." (31 I. C. C., 609.)

Rates on Knitting-Factory Products to Texarkana, Tex.

Opinion by Commissioner Meyer:

The commission finds that the carriers are not justified in canceling certain commodity rates on knitting-factory products from points in North Carolina to Texarkana, Ark., and nearby points, thereby leaving in effect much higher class or commodity rates. The decision in the case of Texarkana Freight Bureau v. St. Louis, Iron Mountain & Southern. (28 I. C. C., 569) makes necessary further revision of these rates to Texarkana. The commission, therefore, does not make an order that the present rates be maintained for the future. (31 I. C. C., 669.)

Transit Privileges on Lumber a North Carolina Points

National Casket Company et al. v. Southern Railway. Opinion by Commissioner Clark:

This case relates primarily to the transit privileges on lumber at Asheville and other points in western North Carolina applying on traffic originating in that territory on the Southern Railway west of Asheville from which lumber shipped to the east may be given transit privileges at the points involved herein and all territory on the Southern east of Nashville, Tenn., from which lumber may be drawn to the points in question, there given transit privileges and reshipped west, or to the north of the Ohio river. These privileges with respect to destination are limited to traffic to Ohio and Mississippi river crossings, for beyond; to Virginia cities, for beyond; and to the south Atlantic ports. The commission finds that the present charge of two cents per 100 lb. is neither unreasonable nor discriminatory, it being held that the decisions in the *Spiegle & Company* cases (19 I. C. C., 523; 25 I. C. C., 71) and Bristol Door & Lumber Co. v. Norfolk & Western (25 I. C. C., 87) in which a charge in excess of 1.5 cents for similar privileges at Bristol, Johnson City and Newport, Tenn., was held unreasonable, do not mitigate the controlling effects of the evidence in this case.

In like manner the commission finds defendant's rules and regulations governing the transit arrangements not restrictive or burdensome. The commission upholds the regulations of the carrier which do not permit substitution of one kind of lumber for another, except in certain cases. It is also held, however, that certain unreasonable practices in connection with the transit privileges are to be corrected. (31 I. C. C., 678).

Rates on Wheat from Montana

Board of Railroad Commissioners of the state of Montana v. Butte, Anaconda & Pacific et al. Opinion by Commissioner Daniels:

The commission finds that the rates on grain, especially wheat, and flaxseed from stations in Montana to St. Paul and Minneapolis, Minn., and other eastern primary markets, and also to Seattle and Tacoma, Wash., and Portland, Ore., are not unreasonable. In the case nearly all the railroads in Montana except the Oregon Short Line are made defendants, and it is argued mainly that, although Montana is fast becoming one of the leading wheat producing states, it is unable to realize the full advantages of that fact, because of the high freight rates to the wheat consuming centers. In its decision the commission observes that the price of wheat in Montana is now lower than it has been for a number of years, and states that the reasonableness or unreasonableness of freight rates can not be gaged solely by the ability or inability of shippers under depressed prices to market their products at the existing rates with a reasonable margin of profit.

With reference to a statement that the Chicago, Milwaukee & St. Paul, which is a comparatively new carrier in this territory,

should have established lower rates than those of the older and less direct lines, it is noted that the present ton-mile rate via the St. Paul is not unreasonable and that the line operates in a region comparatively undeveloped.

The commission also holds that the rate on flaxseed, two cents higher than on wheat, is not unreasonable, and that there is justification for differences in rates on the two commodities. The commission also states:

"It was strongly urged by the complainant that a public interest was involved in this case. It was averred that the extension of the Montana wheat-growing area and the increased immigration and settlement thereof would both be promoted by the establishment of rates that would afford the grower a chance of reasonable profit. It was also forcibly urged that the growing necessity of raising breadstuffs for the supply of our own people instead of importing them from abroad warranted this reduction in the national interest. However this may be, it is clearly a question of national policy and one which this commission can hardly consider in gaging the single question of the reasonableness and the justice of existing railroad rates." (31 I. C. C., 641.)

The Manufacturers Railway Case

Manufacturers Railway et al. v St. Louis, Iron Mountain & Southern, et al. Opinion by Commissioner Clements:

The complainant railway, operating 2 miles of main line and 23 miles of branches and sidings in St. Louis connects the Anheuser-Busch Brewing Association, owned by the same interests, with the trunk line carriers and also serves other industries and shippers. The original report in this case (21 I. C. C., 304), later modified in a supplemental report (28 I. C. C., 93), held that trunk line carriers did not discriminate against the complainant in withdrawing allowances, averaging $4.50 per car, to the Manufacturers Railway, while continuing to absorb charges, averaging $3 per car, made by the Terminal Railroad Association of St. Louis, owned by the carriers themselves. It was held that the allowances made to the complainant were voluntary charges and could not be considered as divisions of joint rates. It was further held, however, that the carriers might voluntarily participate in joint rates, provided that in the final division of the through charge received from the shipper they did not pay to the complainant for its service more than was reasonable and did not thereby in the amount of the excess indirectly refund to the brewing association a part of the through transportation charges paid to them by the brewing company. The allowances of $4.50 per car were found excessive. In the supplemental report in addition it was stated that the reasonable division to the complainant out of any joint rate which might be established should not exceed $2 a car. Upon further consideration it is now held that the division should not exceed $2.50 a car.

The present case was brought up partly because it was alleged that the former decision was not in strict accord with the Supreme Court's findings in the Manufacturers Railway case. The commission, however, does not agree with that contention.

In the supplemental report it was stated that an order would be entered on October 1, 1913, if the findings had not been complied with by that date. This has since been extended. An order will now be entered requiring the establishment of maximum joint rates to and from points on the complainant railway which shall not be more than $2.50 in excess of the trunk lines' rates to and from St. Louis. If the carriers are unable to agree on divisions the commission may be called upon to decide in the matter; it is its present opinion that the proper division would be $2.50 per car. The commission also reserves the right if necessary to institute an inquiry upon its own motion under those provisions of the act which forbid the giving or receiving of rebates or undue concessions directly or indirectly by any device whatsoever, having in mind particularly in connection therewith the fact of the common ownership of railway and brewery association stock. "There must, in any view taken of this case, be some point at which the fact of this common ownership of stock becomes importantly significant; and immediately beyond the limit of reasonableness in allowances, divisions, or concessions of any kind whatsoever granted by the trunk lines to the complainant railway, comes, in the commission's view, that point. If this be not so, then gross discriminations must thrive, notwithstanding the inhibitions of the act against undue preferences and discriminations." The report also states: "We are confident in the belief that we have decided the issues raised by it in accordance with both the letter and the spirit of the law. If our conclusions are not sound, we desire that the courts settle definitely the question of what the proper interpretation of the law applicable in this and similar cases is. Cases of this nature involving payments by trunk lines to short terminal lines of railroad which were once only appurtenances to private industrial plants served by them have been the causes of much investigation by and concern to us in our efforts to effectively administer the law under which we act, and the sooner any doubtful constructions of that law with respect to such matters are clearly settled by judicial decisions the better."

Commissioner Harlan in a dissenting opinion states that he is unable to see wherein the complainant railway should receive different treatment from other industrial railways. "Notwithstanding our ruling in the cases last cited that the movement of traffic between a plant and the plant interchange tracks in such cases is a shipper's service and not a carrier's service, a principle that seems, when applied to like conditions, to have been accepted as sound with practical unanimity by railroads, industries, and the courts, the commission here permits the trunk lines out of their rates to pay the shipper for performing an entirely similar service."

He also says: "It is certain that the great privileges enjoyed by large shippers in the form here recognized as proper by the majority will not be tolerated by the general shipping public, which must bear the burden, when they are more fully understood; and the present law, which in my judgment is entirely adequate to enable us to cope with the evil, must either be more strongly construed in the public interest or must promptly be amended by the Congress."

STATE COMMISSIONS

By an order of the Railroad Commissioners of North Dakota rates for excess baggage carried on the railroads of that state have been reduced about one-third; and, according to a St. Paul paper, wholesale merchants of that city expect by this reduction to save $30,000 a year on the expense bills of their traveling salesmen in North Dakota.

The Public Service Commission of Massachusetts has authorized the establishment of a six-cent fare unit throughout the Middlesex & Boston Street Railway system. In a long opinion the board emphasizes the right of capital to earn a living income; urges investment value as the proper basis of rates rather than the cost of reproduction; affirms the broad powers of the commission with respect to rate making, irrespective of previous franchise agreements between constituent companies and municipalities; condemns the holding company plan; contends that money prudently invested and lost in the earlier stages of a public utility's life should not be irretrievably lost to the stockholder, and sets forth the importance of adequate depreciation allowances. The commission says that the policy of the state is to afford a fair return to capital by the imposition of rates for transportation capable of providing first-class service and a margin of profit sufficient to attract investors into the field. Without such a return, says the opinion, the whole experiment of private ownership and public regulation will fail.

COURT NEWS

The Court of Appeals of Kentucky has declared unconstitutional the law of that state passed by the legislature at its last session limiting passenger fares throughout the state to the basis of 2½ cents a mile. The statute has no enacting clause.

Judge Davis of the Circuit Court at Marshall, Mo., has issued a decision sustaining the demurrer filed by the Chicago & Alton against a suit filed by the attorney-general of Missouri to recover $2,000,000 in overcharge claims, covering the time when the state freight and passenger rates were in litigation. Of nine demurrers filed in different counties by the different railroad companies against similar suits filed by the attorney general, this is the first that has been sustained. The railroads contended that the suits should have been brought in the federal court.

Railway Officers

Executive, Financial, Legal and Accounting

The office of F. E. Connors, assistant to vice-president of the Atchison, Topeka & Santa Fe, has been removed from Topeka, Kan., to Chicago, Ill.

A. W. Lefeber, general manager of the Midland Valley at Muskogee, Okla., has been appointed vice-president and general manager, with headquarters at Muskogee.

C. G. Austin, general attorney of the Chicago & Western Indiana Railroad and the Belt Railway of Chicago, has been appointed general solicitor, with headquarters at Chicago.

Operating

W. L. Schneider has been appointed inspector of transportation of the Delaware & Hudson, with office at Albany, N. Y.

W. E. Cline has been appointed chief train despatcher of the Canadian Pacific, with headquarters at Edmonton, Alta., succeeding C. W. Fisher, transferred.

Walter T. Spencer, trainmaster of the New York, New Haven & Hartford at Providence, R. I., has been appointed superintendent of the Old Colony division, with headquarters at Taunton, Mass., succeeding H. C. Oviatt, promoted.

A. N. Stroud, examiner of rules for trainmen, enginemen and yardmen, on the Oregon Short Line at Pocatello, Idaho, has been appointed trainmaster of the Utah district of the Utah-Montana division, with headquarters at Salt Lake City, Utah, succeeding M. A. Pond, assigned to other duties.

C. A. Grimsley, acting superintendent of the Florida East Coast at Miami, Fla., has been appointed superintendent of the Northern division, with headquarters at New Smyrna, succeeding C. G. Wakeley, who has been appointed a special agent, with headquarters at St. Augustine, and E. L. Cline has been appointed acting superintendent of the Southern division, with headquarters at Miami, succeeding Mr. Grimsley.

Traffic

C. B. Michelson, immigration agent of the St. Louis & San Francisco, has been appointed marketing agent, with office at St. Louis, Mo.

L. R. Everett has been appointed general agent of the Atchison, Topeka & Santa Fe at Santa Barbara, Cal., succeeding W. B. Frisbie, transferred.

S. A. Story, who has been appointed assistant general freight agent of the Lehigh Valley, with headquarters at Buffalo, N. Y., as has already been announced in these columns, began railway work as a clerk in the general freight office of the Pennsylvania Railroad at Philadelphia, Pa., later becoming stenographer to the freight traffic manager. He was then successively chief clerk to the president of the Central New England; New England agent of the Poughkeepsie Bridge Route; eastbound freight agent of the Lehigh Valley at Boston, Mass., and New England freight agent of the Lehigh Valley. He subsequently served as manager of the Lake Shore-Lehigh Valley Fast Freight Line, and the Michigan Central-Lehigh Valley Fast Freight Line, later becoming through freight agent of the Lehigh Valley at Buffalo, N. Y., which position he held at the time of his recent appointment as assistant general freight agent of the same road as above noted.

Engineering and Rolling Stock

J. J. Sullivan has been appointed superintendent of machinery of the Nashville, Chattanooga & St. Louis, with headquarters at Nashville, Tenn., to succeed A. G. Kautman, who recently resigned to devote his time to private affairs.

Purchasing

A. E. Yuill has been appointed tie and timber agent of the Canadian Northern, with jurisdiction over eastern lines, with headquarters at Toronto, Ont.

OBITUARY

Charles L. Atterbury, formerly assistant and attorney to the president of the New York, Lake Erie & Western, now the Erie, died on November 10, at his home in New York. He was born on December 3, 1842, at Detroit, Mich. After graduating from Yale in 1864, he studied law in Detroit. He was in the legal department of the Erie for many years down to about 1885.

Thomas Eedson, formerly auditor of freight accounts and freight claim agent of the Michigan Central, died at his home in Detroit, Mich., on November 1. Mr. Eedson was born January 4, 1842, at Niagara, Ont., and began railway work in 1872 in the treasurer's office of the Canada Southern, then under construction. He continued with that company as cashier from the commencement of its operation up to the time of its operating agreement with the Michigan Central on January 1, 1883, when he became a clerk at St. Thomas, Ont. In September of that year he was transferred to Detroit, Mich., as clerk in the auditor's office, and subsequently was chief traveling auditor, freight accountant and freight claim agent, until July, 1905, when he was appointed auditor of freight accounts and freight claim agent. He held the latter positions until February, 1912, when he was retired under the pension rules of the company.

Will George Van Vleck, vice-president and general manager of the Sunset-Central lines in Texas and Louisiana, with office at Houston, Tex., died on November 10, at his home in Houston.

W. G. Van Vleck

He was born on March 5, 1857, at Elbridge, Onondaga county, N. Y. He received a common school education, and began railway work in August, 1873, as a telegraph operator with the Grand Rapids & Indiana, remaining with that company for two years. He went with the Galveston, Harrisburg & San Antonio in October, 1875, where he until 1885 was consecutively, for one year telegraph operator, four years despatcher, one year chief despatcher, one year trainmaster of the Mexican & Pacific extension, and two years division superintendent. For over two years from March, 1885, he was superintendent of the San Antonio division; he was then transferred to the Louisiana division of the Southern Pacific Company, and six months later was made general superintendent of the lines in Texas. From October, 1895, he was manager of the Galveston, Harrisburg & San Antonio, and the Texas & New Orleans, and for a number of years was also second vice-president of those lines, until his election in December, 1911, as vice-president and general manager of the Sunset Central lines.

Indian Railway Accident.—Press despatches report that on October 15 eight persons were killed and eight injured as the result of a collision between two freight trains on the Ghats Mountains, 70 miles from Bombay.

Wire Ropeway Construction in India.—It has been proposed to construct a wire ropeway from Rajpore, in the territory below Mussoorie, in the northwest Provinces of India, into that city. Mussoorie is a large hill station to which people of the plains and other hot districts go in the heated term. The railway stops at Dehra, just south of Mussoorie, and merchandise is carried up part of the way in carts and partly by coolies. Under the present system above five hours is required to bring goods from Rajpore to Mussoorie. It is believed that the rates will be about the same by wire ropeway as at present, but the saving in time and proper handling of goods will be great.

Equipment and Supplies

LOCOMOTIVE BUILDING

The Maine Central is inquiring for prices on 7 Mikado type locomotives.

The Central Vermont has ordered 3 ten-wheel type locomotives from the American Locomotive Company.

The Chicago, Milwaukee & St. Paul has ordered one 50-ton electric locomotive from the General Eectric Company.

The Russian Government Railways are reported to have ordered 30 locomotives from the Baldwin Locomotive Works

The A. Guthrie Construction Company, St. Paul, is said to be in the market for one or two locomotives. This item has not been confirmed.

CAR BUILDING

The Illinois Southern is in the market for 300 freight cars.

The Northern Pacific has ordered 21 sleeping cars from the Pullman Company.

The Union Pacific is said to be preparing specifications for 2,000 fruit cars. This item has not been confirmed.

IRON AND STEEL

The Paducah & Illinois has ordered one 70-ft. through plate girder span, weighing 103 tons, from the American Bridge Company.

The Armored Train "Simba" in Uganda.—The armored train "Simba," which forms part of the rolling stock of the Uganda Railway stock in war time, was constructed in the Nairobi locomotive shed within a week, work being carried on night and day. The sides of the cars employed are about 5 ft. high and of one-quarter inch steel. To the outside of these are riveted one-half inch steel plates, which bring the total height of the sides of the wagon up to something over six feet, thus affording ample protection to the 40 men accommodated in each car. The steel plates are further covered with a thickness of wood which is painted a slate color. The engine is armored in the same way as the cars.

The Sara Bridge Over the Lower Ganges.—There is now in process of construction in India a bridge over the lower Ganges which ranks as one of the most costly engineering schemes now in hand in India and the Far East. The bridge is being built at Sara Ghat, about 118 miles northeast of Calcutta. When completed it will carry the main line of the Eastern Bengal State Railway across the river at that point, thereby connecting the broad gage system of that road south of the river with the roads north of it. As part of the scheme, also, a line will be built from Sara to Sirajgunj on the Brahmaputra river. Many of the present lines to the north of the Ganges are now of meter gage. For the present, therefore, traffic through to and from Calcutta will have to be transshipped at Santahar, where large yards will be established for that purpose. In the course of time, however, these meter gage lines may be broadened first from Santahar to Parbatipur and then beyond to Siliguri, the southern terminus of the Darjeeling-Himalaya Railway. The bridge has been under discussion for over 20 years and was sanctioned in 1908, as now being constructed it will have 15 main spans of 345 ft. center to center of bearings on piers spaced 359 ft. apart, and at each end there are three land spans of 75 ft. The total length of the bridge will be about 5,900 ft. from abutment to abutment. The main girders have an over all depth at the center of 52 ft.; the width from center to center will be 32 ft., and the total width of the bridge, including the footway will be 48 ft. 6 in. There will also be extensive training works to confine the river to its proper channels. The estimated cost of the work is about $15,500,000.

Supply Trade News

The Power Specialty Company, New York, has moved its Chicago office from the Peoples Gas building to the Harris Trust building.

Ralph H. Wilson, southeastern representative of the Walter A. Zelnicker Company, St. Louis, has been appointed advertising manager of that company, and has been succeeded by E. F. Prichard, formerly auditor of the St. Louis Car Company, St. Louis, Mo.

The American Locomotive Company announces that it is not its intention at this time to appoint a successor to H. C. Hequembourg, who has resigned, effective November 15, to become vice-president of the Standard Chemical Company, Pittsburgh, Pa. Until further notice the purchasing and stores department will be under the jurisdiction of Leigh Best, vice-president.

George W. Lyndon, whose election as president of the Association of Manufacturers of Chilled Car Wheels, with headquarters at Chicago, was announced in the *Railway Age Gazette* of last week, was born at Rochester, N. Y., February 16, 1859. Mr. Lyndon attended the Kewanee, Ill., high school, graduating in 1877. He was then a law student with Charles K. Ladd, Kewanee, and Turner A. Gill, Kansas City, Mo., until 1880, when he entered railway service with the Kansas Pacific at Kansas City, Mo. Shortly thereafter he was transferred to Omaha on account of the consolidation of the Kansas Pacific with the Union Pacific. He remained with the Union Pacific as chief clerk of freight accounts until 1885, then accepted a position as traveling auditor of the Kansas City, Fort Smith & Memphis, with headquarters at Kansas City. In 1887 he was appointed freight auditor, resigning in 1889 to accept a position as freight auditor of the Chicago, Kansas City & St. Paul, now the Chicago Great Western. In 1890 he resigned to take a position as general auditor of the Griffin Wheel Company and Ajax Forge Company. Later he was made manager of the improvement and review departments, which position he held until 1907. In 1908 he was made western secretary of the Railway Business Association, and in the same year he accepted a position as secretary and treasurer of the Association of Manufacturers of Chilled Car Wheels, which position he held until his election as president on October 27.

George W. Lyndon

Dr. J. A. L. Waddell and John Lyle Harrington announce the dissolution of the firm of Waddell & Harrington, consulting engineers, Kansas City, Mo. The firm's business will be conducted as usual till the conclusion of its affairs in July, 1915, except that it is accepting no new commissions. Dr. Waddell will give his attention to special engineering and financial matters, and to important advisory work. Mr. Harrington will become a member of the new firm of Harrington, Howard and Ash, as noted elsewhere.

Charles Dyer, vice-president of the National Dump Car Company, died November 8, 1914, at his home in Denver, Colo. Mr. Dyer was born April 30, 1845, at Springfield, Vt. He entered railway service in 1863 with the Rutland & Bennington. From 1868 to 1870, he was with the Boston & Albany, and from November 1, 1870, to February 1, 1900, with the Atchison,

Topeka & Santa Fe, successively as clerk and operator, agent, chief despatcher, trainmaster and division superintendent; from February 1, 1900, to January 30, 1903, he was general superintendent of the Colorado & Southern, and in May, 1903, he accepted the position of second vice-president of the National Dump Car Company, Chicago.

Colonel H. G. Prout has been elected president of the Hall Switch & Signal Company, and William P. Hall is now vice-president and chairman of the executive committee. W. J. Gillingham, hitherto western representative of the company, with office at Chicago, has been appointed general sales manager, with headquarters at the main office in New York City. W. A. Peddle has been appointed acting chief engineer, in charge of engineering and production, and W. H. Lane, chief engineer, has been granted leave of absence until January 1, on account of ill health. Colonel Prout in July last resigned as president of the Union Switch & Signal Company. A sketch of his life was published in the *Railway Age Gazette*, March 27, 1914.

John Lyle Harrington, E. E. Howard and Louis R. Ash have established the firm of Harrington, Howard & Ash, with office in the Orear-Leslie building, Kansas City, Mo., and will conduct a general consulting practice relating to hydro-electric developments, advisory municipal engineering appraisals, examinations, and reports upon engineering projects, giving special attention to foundations, bridges—particularly movable spans—and other structures in steel and reinforced concrete. Mr. Harrington spent many years in bridge and structural shops, two of which he designed and operated, in the service of railroad companies, and in mechanical and electrical work. For three years he was the executive engineer of the C. W. Hunt Co., New York, and for two years chief engineer and manager of the Locomotive & Machine Company of Montreal. For the past eight years he has been a member of the recently dissolved firm of Waddell & Harrington, consulting engineers, Kansas City, and has directed the design and construction of many bridges. Mr. Howard has been associated with Dr. J. A. L. Waddell for fourteen years, for many years as principal assistant engineer, and later as associate engineer of Waddell & Harrington. His experience covers every phase of the firm's work. Mr. Ash has had many years' experience in engineering work, and from July, 1910, to April, 1913, was city engineer of Kansas City, in which capacity he was responsible for the design and construction of sewers, paving, grading, flood protection work, etc. He also made an appraisal of the property of the Metropolitan Street Railway Company, and was engineering adviser for the city in the street railway franchise negotiations. Mr. Ash resigned from the position of city engineer to become associate engineer and office manager of Waddell & Harrington.

TRADE PUBLICATIONS

Light and Ventilation.—The David Lupton's Sons Company, Philadelphia, Pa., has just issued specialty catalog No. 8. This book contains 84 pages and gives in considerable detail the design of the various types of steel sash, steel partitions, steel tube doors and jambs, Pond and sawtooth trusses and various kinds of operating devices manufactured by this company. It also contains a description of rolled steel skylights, sheet metal fireproof windows and Waldmire louvers. Numerous illustrations clearly show the details of construction and the method of installation of these products. Many prominent structures equipped with Lupton products are also shown, together with a list of recent installations.

Gas-Electric Motor Cars and Locomotives.—The General Electric Company recently issued bulletin No. 44,300, which illustrates and describes some gas-electric motor cars and locomotives adapted to branch line service on steam roads and also for interurban service. The power equipment is described in considerable detail, and the average cost of operation of the standard car is given, in addition to other data relative to weights, dimensions, etc. It has also issued bulletins Nos. 44,403 and 44,405, describing its ventilated commutating-pole railway motors for 600 and 600/1,200 volt service. Bulletin 44,403 is devoted to the GE-222-G railway motor, which has a rated output of 140 h. p. at 600 volts, and, having modified windings, can be supplied for operation with two in series on 1,200 volts, at which voltage the rating is 150 h. p. Bulletin 44,405 describes the GE-233-A motor for operating two in series on 1,200 volts.

Railway Construction

Central Canada.—This company, which filed route maps with the Alberta Government early this year for a line to be built from a point on the Edmonton, Dunvegan & British Columbia, at or near Round lake, Alta., through the North Hart river valley to Peace River Crossing, is asking permission to build a line also from Sucker creek, on the E. D. & B. C., to Grouard, Alta. J. D. McArthur, Winnipeg, Man., is interested, and Short, Woods, Biggar & Collison, Edmonton, Alta., are solicitors for applicants. (May 1, page 1,011.)

Chicago, Burlington & Quincy.—The report of this company for the year ended June 30, 1914, shows that during the year the line extending southerly from Laurel, Mont., was almost completed to Orin Junction, Wyo., at which place, since the close of the year, it has been connected with the Colorado & Southern. Construction has been carried on for a connection of the Northport-Guernsey line with the Colorado & Southern at Wendover, Wyo., and work was started on the construction of the Chalco-Yutan line, which is to be a cut-off connecting the Omaha line with the line to Sioux City. There was placed in operation during the year 135.15 miles of new road, 73.81 miles of second track and 87.69 miles of other tracks. Additional land for needed facilities has been bought at Chicago, at Aurora, Ill., and at other points, and a number of freight houses and passenger stations were built.

Florida Roads.—According to press reports plans are being made to build a municipal railway in Jacksonville. The proposed belt line is to connect the municipal docks with the railroads entering the city.

Gadsden, Bellevue & Lookout Mountain (Electric).—An officer of this company, which operates an electric line connecting Gadsden, Ala., with Noccalula Falls, 3.1 miles, writes regarding a report that an extension is to be built between Gadsden and Center, that the company expects to start surveys for the extension in about 60 days.

Glenn Rose & Walnut Springs.—According to press reports grading work has been finished on two miles and track laying will be started soon on the line building from Glenn Rose, Tex., south to Walnut Springs, 14 miles. S. Lewis, secretary, Waco; F. B. King, general manager, Glenn Rose, and L. J. Wright, construction foreman. (See Texas Roads, September 4, p. 452.)

Kentucky Southwestern Electric Railway, Light & Power Company.—An officer of this company, which was incorporated in 1911, writes that contracts will be let and construction work started soon, on the line projected from Paducah, Ky., south through Lone Oak, Melber and Fancy Farm to Mayfield, thence east via Sedalia and Lynn Grove to Murray, 57.75 miles. The work will be easy and calls for cuts and fills involving the handling of about 1,000,000 cu. yd. The maximum grade will be 2 per cent, and the maximum curvature 8 deg. There will be one 1,800-ft. trestle and a number of smaller ones. The plans include: a power house, three sub-stations, stations, carbarns and repair shop. H. C. Rhodes, president; Paducah.

Lula-Homer.—Application has been made in Georgia for a charter by this company, with a capital of $200,000, to build a line from Lula, Ga., on the Southern Railway southeast to Homer, 14 miles. S. S. Carter, E. Chapman and J. Coffee, Lula, are interested. (See Georgia Roads, October 2, p. 624.)

Mercer Electric.—Plans are being made, it is said, to build an electric line from Athens, W. Va., southwest to Princeton, about seven miles. R. G. Meador, president, Athens.

Monongahela Railroad.—The River division has been extended from Martin, Pa., south to Vanzandt, 9.1 miles.

Niagara River & Eastern.—An officer writes that the plans call for building from Lockport, N. Y., west to the Niagara river. At Lockport connections will be made with the Buffalo, Lockport & Rochester and the International Railway. The company plans to carry out the work with its own forces and to use both steam and electricity as the motive power. Charles Hickey, president, Lockport, N. Y. (October 30, p. 818.)

Ontario Municipal Electric.—We are told that contracts will probably be let next summer to build from Toronto, Ont., northeast to Port Perry; also from St. Catharines northwest through Hamilton and Guelph to Owen Sound. The grading work will involve handling an average of 15,000 cu. yd. to the mile. The maximum grades will be 2.5 per cent, and the maximum curvature 6 deg. The plans also call for building an interurban terminal at Toronto. F. A. Gaby, chief engineer, Continental Life building, Toronto, Ont. (See Canadian Roads, October 30, p. 818.)

Orleans-Kenner Electric.—An officer writes that work is now under way by Johnson & Co., Inc., New Orleans, La., building a line in Louisiana from St. Charles parish line east, to connect Hanson City, Kenner, Harahan, Shrewsbury, West Carrolton, Southport and New Orleans, about 14 miles, and that track laying is about 90 per cent finished. A contract has also been let for building a sub-station. E. A. Stanford, president; H. K. Johnson, chief engineer. New Orleans. (October 23, p. 779.)

RAILWAY STRUCTURES

Albany, Pa.—The Philadelphia & Reading has given a contract to M. & J. B. McHugh, Philadelphia, Pa., for building a concrete bridge over Maiden creek at a point south of Albany. The bridge wil have six spans each about 23 ft. long.

Bridge End, Ont.—The Railway Commission of Canada has approved the locations of the Glengarry & Stormont Company's proposed stations and grounds in Glengarry county, Ont., at Bridge End, mileage 5.28, and at Glen Gordon, mileage 12.78. This company is building a line from St. Polycarpe Junction, Que., southwest to Cornwall, Ont., 30 miles.

Chattanooga, Tenn.—We are told that construction work is expected to be finished this month on a reinforced concrete viaduct which is being built over the tracks of the Cincinnati, New Orleans & Texas Pacific, and the Western & Atlantic at East End avenue, Chattanooga. The length of the concrete structure between abutments is 371.7 ft. The length of the north approach fill is 160 ft., and the south approach fill is 470 ft. The viaduct is 60 ft. wide.

City of Panama.—The Panama Railroad has begun work on a new freight house. The building will be 75 ft. by 600 ft., and one story high, and will replace the old freight house which was recently condemned by the health authorities on account of its lack of protection against an invasion by rats.

East St. Louis, Ill.—The Southern Railway will start work at once on new engine terminal facilities at Denverside, near East St. Louis, at a cost of about $275,000, and is asking for bids for the construction of an 18-stall roundhouse, shops and other buildings. The improvements also include a 90-ft. turntable, modern coal and cinder handling plant, oil house, office building, etc., and the construction of repair yard tracks and other track work. The grading work for the tracks is now under way.

Lexington, Ky.—The Louisville & Nashville has given a contract to Rommel Brothers, Louisville, Ky., it is said, for building the roundhouse and repair shops in the yard at Lexington. (October 2, p. 624.)

Norfolk, Va.—A contract was let recently, it is said, to the Richardson Construction Company, Norfolk, for building a two-story addition to the general office building of the Seaboard Air Line at Norfolk. (August 7, p. 268.)

St. Catharines, Ont.—According to press reports the Grand Trunk is planning to put up a new station at St. Catharines.

St. Petersburg, Fla.—According to press reports the Tampa & Gulf Coast which recently completed an extension to St. Petersburg is making plans to build a passenger station at St. Petersburg. The cost of the improvements will be about $20,000.

Spartanburg, S. C.—Plans have been made, it is said, for the enlargement of the present passenger station at Spartanburg, and when the improvements are completed it will be used jointly by the Southern Railway, the Carolina, Clinchfield & Ohio and the Charleston & Western as a union station.

Railway Financial News

Missouri, Kansas & Texas.—The Supreme Court of the United States on November 9 dismissed the suit of the Missouri, Kansas & Texas Railway Company against the United States for $61,000,000 damages for failure to convey to it alternate sections of land through what was the Indian Territory.

Congress in 1866 offered alternate sections of public land in Indian Territory to the first railroad constructed from the Kansas state line to the Red river in Texas. The predecessor of the Missouri, Kansas & Texas won a construction contest, but the government declined to convey the land on the ground that the land was "Indian land" and not "public land" within the meaning of the act. The Court of Claims decided in favor of the government and the railway appealed to the Supreme Court, which now has affirmed the decision of the lower court.

The railway company brought the suit on the ground that the company as a land grant road was entitled to take alternate sections on each side of its right of way whenever the Indian title became extinct. The issue was whether the Indian title was extinguished when the Indians gave up their tribal relation and took lands in severalty as allottees of the government.

The railroad company contended that when the government divested the Indians of their tribal title the claim of the railway under its grant of alternate sections attached. The Court of Claims took a different view.

St. Louis & San Francisco.—Suits to recover $14,000,000 from directors and former directors of the St. Louis & San Francisco were dismissed in the federal court at St. Louis on November 10. The dismissal of the suit, which was filed by the receivers is part of the plan of the receivers to disclaim liability of the Frisco on a $26,000,000 bond issue of the New Orleans, Texas & Mexico. The attorneys for the receivers issued the following statement:

Inasmuch as the dismissal of this action will deprive the defendants of the opportunity to meet the charges of fraud made in the petition, we deem it but just to them to say that we have made an exhaustive examination.

We found that in that so-called Brownsville and Iberia deals for the latter of which settlement has been made, there was, in our opinion, an excessive exercise of authority by the directors, for the results of which, in the case of the Brownsville, the directors probably could be held accountable, and that certain of them also might be held accountable for profits made out of the deal, if the courts should decide that the St. Louis & San Francisco Railroad Company is liable at all on account of the New Orleans, Texas & Mexico division bonds.

We have failed, however, to find, and judging from the information that we have, we do not believe that any of the directors of the St. Louis & San Francisco have been guilty of any actual, wilful or intentional fraud in the administration of the affairs of the company.

On January 22, 1914, the receivers of the Frisco filed suit in the federal court for more than $14,000,000 against ten men who are directors of the Frisco from December 1, 1909, to June 1, 1910. During that time the Brownsville road was purchased. The ten men sued were B. F. Yoakum, former president of the Frisco board of directors; James Campbell of St. Louis, vice-president of the Frisco and head of the North American Company, which instituted the receivership proceedings, and seven other former directors of the Frisco—W. K. Bixby of St. Louis, A. S. Greig of St. Louis, B. L. Winchell of Chicago, E. V. R. Thayer of Boston, and C. W. Hilliard, Frank Trumbull and Hans Winterfeldt of New York.

San Antonio, Fredericksburg & Northern Railway.—This property was on October 29 put in the hands of a receiver on application of R. A. Love of Kansas City, Mo., president of the company. The line extends from Fredericksburg southward 24 miles to a connection with the San Antonio & Aransas Pass. It has been in operation only about a year. M. L. Trice was appointed receiver by Judge Maxey in the Federal Court. The road's indebtedness is $173,000; assets said to be $500,000.

ANNUAL REPORTS

CHICAGO, BURLINGTON & QUINCY RAILROAD COMPANY—SIXTIETH ANNUAL REPORT

Chicago, July 1, 1914.

To the Stockholders of the Chicago, Burlington & Quincy Railroad Company:

The following is the report of your Board of Directors for the year ended June 30, 1914:

CHICAGO, BURLINGTON & QUINCY RAILROAD COMPANY.
YEARS ENDED JUNE 30,

Per Cent.	1914.	OPERATING REVENUES.	1913.	Per Cent.
67.71	$62,799,188.01	..... Freight Revenue	$64,063,856.49	67.88
23.44	21,743,507.05	..... Passenger Revenue	21,895,690.73	23.20
2.62	2,428,503.50	..... Mail Revenue	2,329,351.41	2.47
2.80	2,595,965.75	..... Express Revenue	2,894,812.78	3.07
2.28	2,116,431.75	Miscellaneous Transportation Revenue	2,146,658.47	2.28
1.01	940,917.06	Revenue from Operations other ..... than Transportation	909,376.59	.96
.14	126,421.03	..... Joint Facilities	134,739.04	.14
100.00	$92,750,934.15	...Total Operating Revenue...	$94,374,485.51	100.00
		OPERATING EXPENSES.		
12.94	$12,002,627.57	Maintenance of Way and ..... Structures	$12,535,862.55	13.28
17.13	15,888,686.45	...Maintenance of Equipment...	16,133,215.36	17.10
1.76	1,634,672.43	..... Traffic Expenses	1,586,802.81	1.68
32.59	30,224,523.90	... Transportation Expenses ...	29,997,717.32	31.79
2.59	2,397,887.66	..... General Expenses	2,589,292.99	2.74
67.01	$62,148,398.01	...Total Operating Expenses...	$62,842,891.03	66.59
32.99	$30,602,536.14	....Net Operating Revenue....	$31,531,594.48	33.41
.....	140,247.90	Net Deficit from Outside ..... Operations	127,691.01	.....
.....	$30,462,288.24	..... Total Net Revenue	$31,403,903.47	.....
	$ 4,028,900.48	..... Taxes Accrued	$ 3,563,358.62	
	$26,433,387.76	..... Operating Income	$27,840,544.85	
		OTHER INCOME.		
	$ 601,538.27	..... Rents	$ 632,910.23	
	899,538.84	.... Miscellaneous Interest	1,327,019.67	
	$ 1,501,077.11	.....Total Other Income.....	$ 1,959,929.90	
	$27,934,464.87	....Gross Corporate Income....	$29,800,474.75	

	DEDUCTIONS FROM GROSS CORPORATE INCOME.	
$ 1,487,921.93	..... Rents	$ 1,158,071.87
128,707.50	.... Miscellaneous Interest	305.52
8,499,051.11	Interest Accrued on Funded Debt	8,546,453.42
659,861.03	..... Sinking Funds	655,450.28
44,516.16	...Discount on Funded Debt...	9,447.77
$10,820,057.73	..... Total Deductions	$10,369,728.86
$17,114,407.14	.....Net Corporate Income.....	$19,430,745.89
$ 8,867,128.00	..... Dividends	$ 8,867,128.00
5,715,875.07	Appropriations for Additions and ..... Betterments	7,647,743.21
$14,583,003.07		$16,514,871.21
$ 2,531,404.07	.....Surplus for the Year.....	$ 2,915,874.68

CAPITALIZATION.

CAPITAL STOCK.

Number of Shares.	Total Par Value Authorized and Outstanding.	Dividends Declared During the Year. Rate.	Amount.
1,108,391	$110,839,100.00	8%	$8,867,128.00

FUNDED DEBT.

Description of Bond.	Total Par Value Authorized.	Outstanding.	In Treasury, in Sinking Funds or Pledged as Collateral.	In Hands of Public.	Interest Accrued During Year.
Mortgage..	$222,020,000	$203,849,800	$23,492,400	$180,357,400	$8,059,963.11
Collateral Trust ...	7,968,000	7,310,200	5,660,000	1,650,200	292,408.00
Plain or Debenture..	4,300,000	3,667,000	3,106,000	561,000	146,680.00
Total ...	$234,288,000	$214,827,000	$32,258,400	$182,568,600	$8,499,051.11

TRAFFIC AND OPERATING STATISTICS.

ITEM.	1914. Dollars and Whole Numbers.	1914. Cents and Decimals.	1913. Dollars and Whole Numbers.	1913. Cents and Decimals.	Increase or Decrease. Dollars and Whole Numbers.	Increase or Decrease. Cents and Decimals.
PASSENGER TRAFFIC.						
Number of Passengers Carried Earning Revenue	23,445,911	.....	23,100,539	.....	Inc. 345,372	.....
Number of Passengers Carried One Mile	1,152,123,930	.....	1,139,958,615	.....	Inc. 12,165,315	.....
Number of Passengers Carried One Mile, per Mile of Road	126,058	.....	125,139	.....	Inc. 919	.....
Average Distance Carried, Miles	49	14	49	35	Dec.	21
Total Passenger Revenue	$21,743,507	05	$21,895,690	73	Dec. $152,183	68
Average Amount Received from each Passenger	.....	92739	.....	94784	Dec.	02045
Average Receipts per Passenger per Mile	.....	01888	.....	01921	Dec.	00033
Total Passenger Service Train Revenue	$27,443,073	19	$27,820,639	23	Dec. $377,566	04
Passenger Service Train Revenue per Mile of Road	$3,002	65	$3,054	02	Dec. $51	37
Passenger Service Train Revenue per Train Mile	$1	47134	$1	52022	Dec.	04888
FREIGHT TRAFFIC.						
Number of Tons Carried of Freight Earning Revenue	32,388,800	.....	33,389,439	.....	Dec. 1,000,639	.....
Number of Tons Carried One Mile	8,612,629,607	.....	8,791,435,597	.....	Dec. 178,805,990	.....
Number of Tons Carried One Mile per Mile of Road	942,339	.....	965,083	.....	Dec. 22,744	.....
Average Distance Haul of One Ton, Miles	265	91	263	30	Inc. 2	61
Total Freight Revenue	$62,799,188	01	$64,063,856	49	Dec. $1,264,668	48
Average Amount Received for each Ton of Freight	$1	93892	$1	91869	Inc.	02023
Average Receipts per Ton per Mile	.....	00729	.....	00729	.....	.....
Freight Revenue per Mile of Road	$6,871	09	$7,032	63	Dec. $161	54
Freight Revenue per Train Mile	$3	48951	$3	52568	Dec.	03617
OPERATING.						
Operating Revenues	$92,750,934	15	$94,374,485	51	Dec. $1,623,551	36
Operating Revenues per Mile of Road	$10,148	21	$10,360	00	Dec. 211	79
Operating Revenues per Train Mile	$2	59540	$2	64737	Dec.	05197
Operating Expenses	$62,148,398	01	$62,842,891	03	Dec. $694,493	02
Operating Expenses per Mile of Road	$6,799	88	$6,898	60	Dec. $98	72
Operating Expenses per Train Mile	$1	73907	$1	76285	Dec.	02378
Net Operating Revenue	$30,602,536	14	$31,531,594	48	Dec. $929,058	34
Net Operating Revenue per Mile of Road	$3,348	33	$3,461	40	Dec. $113	07
Net Operating Revenue per Train Mile	.....	85633	.....	88452	Dec.	02819
Average Number of Passengers per Car Mile	15	.....	16	.....	Dec. 1	.....
Average Number of Passengers per Train Mile	62	.....	62	.....	.....	.....
Average Number of Passenger Cars per Train Mile	6	27	6	23	Inc.	04
Average Number of Tons of Freight per Loaded Car Mile	19	08	19	10	Dec.	02
Average Number of Tons of Freight per Train Mile	478	37	483	83	Dec. 5	26
*Average Number of Freight Cars per Train Mile	37	84	36	96	Inc.	88
Average Number of Loaded Cars per Train Mile	25	09	25	34	Dec.	25
Average Number of Empty Cars per Train Mile	11	80	10	66	Inc. 1	14
Average Mileage Operated During Year	9,139	63	9,109	51	Inc. 30	12

*Including Cabooses.

MILEAGE STATISTICS.

ITEM.	1914. Miles.	1913. Miles.	Increase or Decrease. Miles.
LOCOMOTIVE MILEAGE—			
Revenue Service.			
Freight Locomotive Miles	18,700,800	19,130,297	Dec. 429,497
Passenger Locomotive Miles	18,164,766	17,862,403	Inc. 302,363
Mixed Locomotive Miles	936,243	844,265	Inc. 91,978
Special Locomotive Miles	20,026	17,310	Inc. 2,716
Switching Locomotive Miles	9,779,536	9,951,205	Dec. 171,669
Total	47,601,371	47,805,480	Dec. 204,109
Locomotive Mileage—Non-revenue Service	1,826,016	2,260,030	Dec. 434,014
CAR MILEAGE—Revenue Service.			
Freight Car Mileage:			
Loaded	451,470,933	460,405,258	Dec. 8,934,325
Empty	212,332,776	193,706,979	Inc. 18,625,797
Cahoose	17,132,686	17,427,153	Dec. 294,467
Total	680,936,395	671,539,390	Inc. 9,397,005
Passenger Car Mileage:			
Passenger	47,548,623	46,273,265	Inc. 1,275,358
Sleeping, Parlor and Observation	27,219,853	26,388,011	Inc. 831,842
Other Passenger Train Cars	42,270,155	41,336,527	Inc. 933,628
Total	117,038,631	113,997,803	Inc. 3,040,828
Car Mileage in Special Service:			
Freight, Loaded	175,643	207,178	Dec. 31,535
Freight, Empty	5,857	320	Inc. 5,537
Caboose	17,939	16,219	Inc. 1,720
Passenger	58,123	60,598	Dec. 2,475
Sleeping, Parlor and Observation	.....	.....	.....
Other Passenger Train Cars	1,571	86	Inc. 1,485
Total	259,133	284,401	Dec. 25,268
Total Car Mileage—Revenue Service	798,234,159	785,821,594	Inc. 12,412,565
Car Mileage—Non-revenue Service	6,637,427	10,136,338	Dec. 3,498,911
TRAIN MILEAGE—Revenue Service.			
Freight Train	17,065,955	17,331,661	Dec. 265,706
Passenger Train	17,721,174	17,461,373	Inc. 259,801
Mixed Train	930,638	838,983	Inc. 91,655
Special Train	18,879	16,378	Inc. 2,501
Total Train Mileage—Revenue Service	35,736,646	35,648,395	Inc. 88,251
Train Mileage—Non-revenue Service	1,043,727	1,331,388	Dec. 287,661

EQUIPMENT.

ITEMS.	Number on June 30, 1913.	Number Added During Year.	Number Retired During Year.	Number on June 30, 1914.	Average Tractive Power All Locomotives and Average Capacity All Freight Cars.
LOCOMOTIVES—Owned.					
Passenger	456	...	12	444	.....
Freight	922	22	25	919	.....
Switching	394	25	9	410	.....
Total Locomotives	1,772	47	46	1,773	29,549 lbs.
CARS—Owned.					
Passenger Service:					
First-class Cars	659	...	15	644	.....
Combination Cars	231	27	5	253	.....
Dining Cars	37	5	1	41	.....
Baggage, Express and Postal Cars	267	16	14	269	.....
Parlor Cars	14	...	...	14	.....
Other Cars in Passenger Service	45	...	4	41	.....
Total	1,253	48	39	1,262	.....
Freight Service:					
Box Cars	27,773	5,851	2,666	30,958	.....
Flat Cars	1,603	...	31	1,572	.....
Stock Cars	7,295	400	161	7,534	.....
Coal Cars	16,548	5,500	248	21,800	.....
Tank Cars	113	100	...	213	.....
Refrigerator Cars	2,318	750	71	2,997	.....
Other Cars in Freight Service	85	...	2	83	.....
Total	55,735	12,601	3,179	65,157	40.30 tons.
Company's Service:					
Officers' and Pay Cars	32	1	1	32	.....
Gravel Cars	975	...	...	975	.....
Derrick Cars	41	...	...	41	.....
Cahoose Cars	682	25	21	686	.....
Other Road Cars	4,571	154	101	4,624	.....
Total	6,301	180	123	6,358	.....
Total Cars Owned	63,289	12,829	3,341	72,777	.....

MILEAGE.

MILEAGE OF ROAD OPERATED.

STATE.	Line Owned.	Operated Under Lease.	Total Line Operated.
Illinois	1,672.38	112.86	1,785.24
Iowa	1,365.12	73.44	1,438.56
Missouri	1,122.31	10.89	1,133.20
Wisconsin	222.49	.53	223.02
Minnesota	23.61	14.84	38.45
Nebraska	2,850.34	22.37	2,872.71
Kansas	259.32	.82	260.14
Colorado	394.36	34.97	429.33
South Dakota	281.48	.....	281.48
Wyoming	617.90	.....	617.90
Montana	134.38	49.45	183.83
Total	8,943.69	320.17	9,263.86

LINE OWNED.

STATE.	Single Track.	Second Track.	Third Track.	Yard Track and Sidings.	Total.
Illinois	1,672.38	359.64	42.40	926.07	3,000.49
Iowa	1,365.12	244.53	.....	336.58	1,946.23
Missouri	1,122.31	107.06	.....	432.16	1,661.53
Wisconsin	222.49	104.46	.....	75.90	402.85
Minnesota	23.61	2.25	.....	30.57	56.43
Nebraska	2,850.34	17.96	.....	679.87	3,548.17
Kansas	259.32	.....	.....	24.17	283.49
Colorado	394.36	.....	.....	154.62	548.98
South Dakota	281.48	.....	.....	62.31	343.79
Wyoming	617.90	.....	.....	165.37	783.27
Montana	134.38	.....	.....	32.75	167.13
Total	8,943.69	835.90	42.40	2,920.37	12,742.36

TAXES.

	1914.	1913.	Increase or Decrease.
Illinois	$ 924,820.72	$ 755,691.95	Inc. $169,128.77
Iowa	512,400.43	442,147.40	Inc. 70,253.03
Missouri	396,164.54	400,659.55	Dec. 4,495.01
Wisconsin	239,746.19	207,261.45	Inc. 32,484.74
Minnesota	34,817.05	26,955.28	Inc. 7,861.77
Nebraska	1,049,459.83	963,763.18	Inc. 85,696.65
Kansas	69,804.97	60,796.95	Inc. 9,008.02
Colorado	207,830.02	176,730.84	Inc. 31,099.18
South Dakota	92,831.92	73,380.10	Inc. 19,451.82
Wyoming	228,122.67	172,675.50	Inc. 55,447.17
Montana	57,858.55	45,311.26	Inc. 12,547.29
Other States	183.82	427.82	Dec. 244.00
Total States	$3,814,040.71	$3,325,801.28	Inc. $488,239.43
United States Government	214,859.77	237,557.34	Dec. 22,697.57
Grand Total	$4,028,900.48	$3,563,358.62	Inc. $465,541.86

FREIGHT TRAFFIC MOVEMENT—ENTIRE LINE.

COMPANY'S MATERIAL EXCLUDED.

COMMODITIES.	Originating on this Road. Tons.	Received from Connections. Tons.	Total Freight Tonnage. Tons.	Per Cent.
Products of Agriculture—				
Grain	3,462,377	846,322	4,308,699	13.30
Flour	497,243	140,707	637,950	1.97
Other Mill Products	226,822	52,606	279,428	.86
Hay	325,248	60,033	385,281	1.19
Tobacco	1,715	555	2,270	.01
Cotton	2,335	13,461	15,796	.05
Fruits and Vegetables	397,092	774,643	1,171,735	3.62
Other Products	141,312	77,371	218,683	.68
Total	5,054,144	1,965,698	7,019,842	21.68
Products of Animals—				
Live Stock	1,520,096	199,254	1,719,350	5.31
Dressed Meats	145,408	6,121	151,529	.47
Other Packing House Products	161,894	7,594	169,488	.52
Poultry, Game and Fish	61,790	42,194	103,984	.32
Wool	7,948	6,862	14,810	.05
Hides and Leather	14,937	2,317	17,254	.05
Other Products	59,220	25,969	85,189	.26
Total	1,971,293	290,311	2,261,604	6.98
Products of Mines—				
Anthracite Coal	22,113	126,274	148,387	.46
Bituminous Coal	8,339,328	1,730,163	10,069,491	31.09
Coke	18,373	167,946	186,319	.57
Ores	102,312	382,379	484,691	1.50
Stone, Sand, etc	1,746,404	282,964	2,029,368	6.26
Other Products	86,753	249,664	336,417	1.04
Total	10,315,283	2,939,390	13,254,673	40.92
Products of Forests—				
Lumber	288,540	1,581,917	1,870,457	5.77
Other Products	128,269	126,063	254,332	.79
Total	416,809	1,707,980	2,124,789	6.56

Manufactures—				
Petroleum and other Oils	137,413	318,989	456,402	1.41
Sugar	122,495	127,120	249,615	.77
Naval Stores	10,324	2,359	12,683	.04
Iron, Pig and Bloom	9,873	117,884	127,757	.39
Iron and Steel Rails	28,401	97,731	126,132	.39
Other Castings and Machinery	146,403	216,909	363,312	1.12
Bar and Sheet Metal	42,629	195,833	238,462	.74
Cement, Brick and Lime	1,385,916	434,340	1,820,256	5.62
Agricultural Implements	161,881	74,762	236,643	.73
Wagons, Carriages, Tools, etc.	35,847	58,268	94,115	.29
Wines, Liquors and Beers	146,476	44,763	191,239	.59
Household Goods, etc	147,700	75,370	223,070	.69
Other Manufactures	422,372	455,393	877,765	2.71
Total	2,797,730	2,219,721	5,017,451	15.49
Merchandise	1,296,712	566,112	1,862,824	5.75
Miscellaneous	695,232	152,385	847,617	2.62
Total Tonnage	22,547,203	9,841,597	32,388,800	100.00

EXPENDITURES FOR NEW LINES AND EXTENSIONS, FOR EQUIPMENT, AND FOR ADDITIONS AND BETTERMENTS DURING THE YEAR.

ACCOUNT.	New Lines and Extensions.	Additions and Betterments. Charged to Road and Equipment.	Additions and Betterments. Charged to Income.	Total Expenditure.
I.—ROAD.				
Engineering	$ 51,965.21	$ 27,505.21	$ 15,801.50	$ 95,271.92
Right of Way and Station Grounds	237,502.04	1,755,620.41	.....	1,993,122.45
Real Estate	.....	Cr. 321.44	.....	Cr. 321.44
Grading	932,211.26	430,035.21	271,304.66	1,633,551.13
Tunnels	157,053.63	.....	28.67	157,082.30
Bridges, Trestles and Culverts	441,227.46	209,729.83	535,008.93	1,185,966.22
Ties	366,938.12	155,229.75	Cr. 5,411.32	516,756.55
Rails	393,816.64	330,652.26	222,054.47	946,523.37
Frogs, Switches	9,948.24	40,849.97	19,981.40	70,779.61
Track Fastenings and other mat'l	121,172.58	52,343.97	318,334.16	491,850.71
Ballast	53,404.36	72,583.65	96,460.65	222,448.66
Track Laying and Surfacing	110,625.83	313,283.01	89,564.16	513,473.00
Roadway Tools	355.79	.....	.....	355.79
Fencing R. of W.	15,028.69	12,598.64	.....	27,627.33
Cross'gs and Signs	1,763.22	52,896.99	156,252.17	210,912.38
Interlocking and other Sig. App.	530.34	192,324.27	61,538.24	254,392.85
Tel. and Tel. Lines	8,768.34 Cr.	219.58	17,345.01	25,893.77
Station Buildings and Fixtures	382,363.30	5,430.81	248,771.44	636,565.55
Gen'l Office Bldg. and Fixtures	.....	.....	56,442.53	56,442.53
Shops, Eng. Hs. and Trn Tables	28,591.89 Cr.	9,919.81	45,754.48	64,426.56
Shop Machinery and Tools	170.22	1,097.36	16,469.96	17,737.54
Water Stations	82,076.91 Cr.	1,637.99	59,819.86	140,258.78
Fuel Stations	19,094.48	26,994.49	26,047.02	72,135.99
Grain Elevators	.....	.....	31,108.42	31,108.42
Storage Wareh's.	18.56	27,047.33	.....	27,065.89
Dock and Wharf Property	5,650.70	.....	.....	5,650.70
Elec. Lgt. Plants	..... Cr.	3,153.02	..... Cr.	3,153.02
Misc. Structures	7,102.79	27,854.49	84,036.68	118,993.96
Transp. of Men and Material	92,159.09	.....	.....	92,159.09
Rent of Equip.	23,960.02	.....	.....	23,960.02
Repairs of Equip.	10,009.62	.....	.....	10,009.62
Earns. and Op'g Exp's During Construction	4,285.09	.....	.....	4,285.09
Injs. to Persons	5,969.18	.....	.....	5,969.18
Total	$3,563,763.60	$3,718,825.81	$2,366,713.09	$9,649,302.50
II. EQUIPMENT.				
Steam Locomotives	.....	$ 282,731.81	$ 333,467.01	$ 616,198.82
Pass. Train Cars	.....	135,023.28	256,384.05	391,407.33
Frt. Train Cars	.....	6,931,420.81	2,782,070.09	9,713,490.90
Work Equipment	.....	64,440.39	Cr. 13,644.28	50,796.11
Floating Equip't.	.....	.....	29.02	29.02
Total	.....	$7,413,616.29	$3,358,305.89	$10,771,922.18

GENERAL BALANCE SHEET.
June 30, 1914.

ASSETS.

Property Investment—Road and Equipment:		
Road	$356,740,929.14	
Equipment	76,911,265.96	
General Expenditures	174,194.12	$433,826,389.22
Reserve for Accrued Depreciation—Credit		26,069,041.05
Total		$407,757,348.17
Securities:		
Securities of Proprietary, Affiliated and Controlled Companies, Pledged—		
Stocks		$ 19,363,139.38
Securities Issued or Assumed, Pledged—		
Funded Debt		31,000.00
Securities of Proprietary, Affiliated and Controlled Companies, Unpledged—		
Stocks	$ 7,488,521.17	
Funded Debt	656,050.00	8,144,571.17
Total		$ 27,538,710.55
Other Investments:		
Advances to Proprietary, Affiliated and Controlled Companies for Construction, Equipment and Betterments		$ 645,786.51
Miscellaneous Investments—		
Physical Property	$ 1,447,778.92	
Securities Unpledged	1,489,676.89	2,937,455.81
Total		$ 3,583,242.32
Working Assets:		
Cash		$ 6,516,196.57
Securities Issued or Assumed, Held in Treasury—		
Funded Debt		11,573,100.00
Marketable Securities—		
Stocks	$ 763,072.12	
Funded Debt	62,500.00	825,572.12
Loans and Bills Receivable		3,640,712.38
Traffic and Car Service Balances due from other Companies		651,066.52
Net Balance Due from Agents and Conductors		2,395,244.29
Miscellaneous Accounts Receivable		3,449,369.68
Materials and Supplies		7,648,614.05
Other Working Assets		97,258.12
Total		$ 36,797,133.73
Deferred Debit Items:		
Advances—		
Temporary Advances to Proprietary, Affiliated and Controlled Companies	$ 81,521.44	
Working Funds	163,818.58	
Other Advances	3,704,373.79	$ 3,949,713.81
Insurance Paid in Advance		149,594.72
Cash and Securities in Sinking Funds		20,516,477.89
Securities in Provident Funds		496,538.89
Unextinguished Discount on Funded Debt		2,328,669.40
Other Deferred Debit Items		975,289.68
Total		$ 28,416,284.39
Grand Total		$504,092,719.16

LIABILITIES.

Capital Stock:		
Common Stock		$110,839,100.00
Mortgage, Bonded and Secured Debt:		
Funded Debt—		
Mortgage Bonds—		
Held by Company	$ 11,311,600.00	
Not Held by Company	192,538,200.00	$203,849,800.00
Collateral Trust Bonds—		
Held by Company	$ 216,500.00	
Not Held by Company	7,093,700.00	$ 7,310,200.00
Plain Bonds—		
Held by Company	$ 76,000.00	
Not Held by Company	3,591,000.00	$ 3,667,000.00
Total		$214,827,000.00
Working Liabilities:		
Loans and Bills Payable		$ 1,900,000.00
Traffic and Car Service Balances due to other Companies		1,493,403.70
Audited Vouchers and Wages Unpaid		9,204,133.29
Miscellaneous Accounts Payable		334,911.37
Matured Interest and Dividends Unpaid		2,176,695.75
Matured Mortgage, Bonded and Secured Debt Unpaid		25,000.00
Other Working Liabilities		45,809.41
Total		$ 15,179,953.52
Accrued Liabilities not Due:		
Unmatured Interest and Sinking Fund Payments		$ 1,431,288.32
Taxes Accrued		104,400.00
Total		$ 1,535,688.32
Deferred Credit Items:		
Operating Reserves		$ 2,029,340.12
Liability on Account of Provident Funds		496,538.89
Other Deferred Credit Items		478,691.33
Total		$ 3,004,570.34
Appropriated Surplus:		
Additions to Property since June 30, 1907, through Income		$ 27,146,235.22
Reserves from Income or Surplus—		
Invested in Sinking Funds		34,625,208.71
Not Specifically Invested		3,740,856.09
Total		$ 65,512,300.02
Profit and Loss		$ 93,194,106.96
Grand Total		$504,092,719.16

III.—GENERAL EXPENDITURES.				
Interest and Commissions	Cr. $618.56		Cr.	$618.56
Other Expenditures	Cr.1,347,438.21		Cr.	1,347,438.21
Total	Cr.1,348,056.77		Cr.	1,348,056.77
Grand Total	$2,215,706.83	$11,132,442.10	$*5,725,018.98	$19,073,167.91

*Of this amount $9,143.91 was charged to previously appropriated surplus.

NEW WORK.

During the year the line extending southerly from Laurel, Montana, was almost completed to Orin Junction, Wyoming, where, since the close of the year, it has been connected with the Colorado & Southern Railway.

Construction has been carried on for a connection of the Northport-Guernsey line with the Colorado & Southern Railway at Wendover, Wyoming.

Work has been begun on the construction of the Chalco-Yutan line, which is a cut-off connecting Omaha and Sioux City.

$1,243,481.60 has been expended for second track, and there have been placed in operation during the year 135.15 miles of main track, 73.81 miles of second track and 87.69 miles of other tracks.

Additional land for needed facilities has been purchased at Chicago, and Aurora, Illinois, and at other points.

A number of freight houses and passenger stations have been built.

Following is the report of the General Auditor, with statements prepared by him.

By order of the Board of Directors.

HALE HOLDEN,
President.

INCOME ACCOUNT.

OPERATING INCOME.

RAIL OPERATIONS—		
Operating Revenues:		
Revenue from Transportation:		
Freight	$62,799,188.01	
Passenger	21,743,507.05	
Excess Baggage	287,944.77	
Mail	2,428,503.50	
Express	2,595,965.75	
Milk	377,232.35	
Other Passenger Train	9,919.77	
Switching	1,301,641.68	
Special Service Train	40,147.75	
Miscellaneous Transportation	99,545.43	$91,683,596.06
Revenue from Operations other than Transportation:		
Station and Train Privileges	$ 8,264.40	
Parcel Room Receipts	11,485.97	
Storage—Freight	38,999.32	
Storage—Baggage	16,798.42	
Car Service	331,423.51	
Telegraph and Telephone Service	209,402.64	
Rent of Buildings and other Property	118,396.51	
Miscellaneous	206,146.32	940,917.06
Joint Facilities, Dr.	$ 229.09	
Joint Facilities, Cr.	126,650.12	$ 126,421.03
Total Operating Revenues		$92,750,934.15
Operating Expenses:		
Maintenance of Way and Structures	$12,002,627.57	
Maintenance of Equipment	15,888,686.45	
Traffic Expenses	1,634,672.43	
Transportation Expenses	30,224,523.90	
General Expenses	2,397,887.66	$62,148,398.01
Net Operating Revenue		$30,602,536.14
OUTSIDE OPERATIONS:		
Revenues	$ 936,206.91	
Expenses	1,076,454.81	
Net Deficit from Outside Operations		$ 140,247.90
Total Net Revenue		$30,462,288.24
TAXES ACCRUED		4,028,900.48
Operating Income		$26,433,387.76

OTHER INCOME.

Rents Accrued from Lease of Roads	$ 2,882.02	
Other Rents—Credits:		
Joint Facilities	455,570.51	
Miscellaneous Rents	143,085.74	
	$ 601,538.27	
Dividends Received on Stocks Owned or Controlled	165,408.00	
Interest Received on Funded Debt Owned or Controlled	519,999.32	
Interest on Other Securities, Loans and Accounts	214,131.52	$ 1,501,077.11
Gross Corporate Income		$27,934,464.87

DEDUCTIONS FROM GROSS CORPORATE INCOME.

Other Rents—Debits:		
Hire of Equipment—Balance	$ 434,228.96	
Joint Facilities	1,037,047.40	
Miscellaneous Rents	16,645.57	
	$ 1,487,921.93	
Interest Accrued on Funded Debt	8,499,051.11	
Other Interest	128,707.50	
Sinking Funds Chargeable to Income	659,861.03	
Extinguishment of Discount on Securities	44,516.16	$10,820,057.73
Net Corporate Income		$17,114,407.14

DISPOSITION OF NET CORPORATE INCOME.

Dividends declared on Stock:		
2 per cent, payable Sept. 25, 1913	$ 2,216,782.00	
2 per cent, payable Dec. 26, 1913	2,216,782.00	
2 per cent, payable March 25, 1914	2,216,782.00	
2 per cent, payable June 25, 1914	2,216,782.00	
	$ 8,867,128.00	
Appropriations for Additions and Betterments	5,715,875.07	$14,583,003.07
Surplus for the year		$ 2,531,404.07

FUNDED DEBT OF THE CHICAGO, BURLINGTON & QUINCY RAILROAD COMPANY.

Designation of Bond or Obligation.	Term. Date of Issue.	Term. Date of Maturity.	Total Par Value Authorized.	Total Par Value Outstanding.	Total Par Value Held by or for Company. In Treasury.	Pledged as Collateral.	In Sinking Funds.	Total Par in the Hands of the Public.	Interest. Rate.	When Payable.	Amt. Accrued During the Year.
MORTGAGE BONDS.											
C. B. & Q. R. R.:											
General Mortgage	1908	1958	$74,865,000	$74,865,000	$10,618,000	.....	.....	$64,247,000	4	M. & S.	$2,828,440.03
Illinois Division	1899	1949	50,835,000	50,835,000	384,000	.....	.....	50,451,000	3½	J. & J.	1,779,225.00
Illinois Division	1899	1949	34,165,000	34,165,000	189,000	.....	.....	33,976,000	4	J. & J.	1,366,600.00
Iowa Division Mortgage Sinking Fund Bonds	1879	1919	3,000,000	2,082,000	.....	.....	.....	2,082,000	5	A. & O.	105,537.55
Iowa Division Mortgage Sinking Fund Bonds	1879	1919	12,502,000	5,374,000	19,000	.....	.....	5,355,000	4	A. & O.	216,100.03
Nebraska Extension Mortgage Sinking Fund Bonds	1887	1927	29,441,000	21,939,000	23,000	$31,000	.....	21,885,000	4	M. & M.	887,526.67
B. & M. R. R. in Nebraska:											
Consolidated Mortgage Sinking Fund Bonds	1878	1918	13,751,000	13,613,000	43,000	.....	$11,363,800	2,206,200	6	J. & J.	816,780.00
Republican Valley R. R.: Mortgage Sinking Fund Bonds	1879	1919	2,643,000	932,800	600	.....	817,000	115,200	6	J. & J.	55,968.00
Tarkio Valley R. R.: Mortgage Bonds	1880	1920	430,000	22,000	1,000	.....	.....	21,000	7	J. & D.	1,925.00
Nodaway Valley R. R.: Mortgage Bonds	1880	1920	388,000	22,000	3,000	.....	.....	19,000	7	J. & D.	1,860.83
COLLATERAL TRUST BONDS.											
C. B. & Q. R. R.:											
Sinking Fund Bonds (Denver Extension)	1881	1922	7,968,000	7,310,200	216,500	.....	5,443,500	1,650,200	4	F. & A.	292,408.00
PLAIN BONDS.											
C. B. & Q. R. R.:											
Sinking Fund Bonds	1881	1921	4,300,000	3,667,000	76,000	.....	3,030,000	561,000	4	M. & S.	146,680.00
Total	....	....	$234,288,000	$214,827,000	$11,573,100	$31,000	$20,654,300	$182,568,600	...	.....	$8,499,051.11

SOUTHERN PACIFIC COMPANY—THIRTIETH ANNUAL REPORT

REPORT OF THE BOARD OF DIRECTORS.

NEW YORK, October 29, 1914.

To the Stockholders of the Southern Pacific Company:

The Board of Directors submit herewith their report of the operations of the Southern Pacific Company and of the Proprietary Companies for the fiscal year ended June 30, 1914.

PROPERTIES AND MILEAGE.

The transportation lines constituting the Southern Pacific System, June 30, 1914, were as follows:

Divisions.	First Main Track.	Additional Main Track.	Sidings.	Ferries.	Water Lines.
A.—*Mileage of lines belonging to or leased by Companies, the capital stocks of which are principally owned by the Southern Pacific Company.*					
(1)—Operated by the Southern Pacific Company under leases:					
Central Pacific Ry.	2,205.46	251.70	852.24	9.90	125
Oregon & California R. R.	697.45	2.85	165.91		
Southern Pacific R. R.	3,497.37	190.02	1,486.59	3.00	
South Pacific Coast Ry.	106.69	20.46	49.59	3.00	
(2)—Operated by the owning Companies:					
Morgan's Louisiana & Texas Railroad and Steamship Co.	404.53	40.22	228.50	3.00	
Louisiana Western R. R.	207.74	—	70.15		
Texas & New Orleans R. R.	438.03	3.46	177.06		
Galveston, Harrisburg & San Antonio Ry.	1,342.68	6.59	325.85		
Houston East & West Texas Ry.	190.94	—	56.03		
Houston & Shreveport R. R.	39.78	—	7.35		
Houston & Texas Central R. R.	829.66	1.27	245.27		
Southern Pacific Terminal Company	—	—	22.31		
Arizona Eastern R. R.	366.74	—	79.77		
Corvallis & Eastern R. R.	140.58	—	15.80		
Southern Pacific Company	—	—	—	—	4,683
B.—*Mileage of lines belonging to Companies, the capital stocks of which are principally owned by the Morgan's Louisiana & Texas R. R. & S. S. Co., but which are operated by the owning Companies.*					
Iberia & Vermilion R. R.	21.44	—	7.00		
Direct Navigation Co.	—	—	—	—	65
Total	10,508.49	516.57	3,789.42	18.90	4,873
Less operated jointly by Proprietary Co's.	31.49	9.97	.49		
Total mileage operated June 30, 1914	10,477.00	506.60	3,788.93	18.90	4,873
Total mileage operated June 30, 1913	10,330.06	425.10	3,674.92	18.90	4,997
Increase	146.94	81.50	114.01	—	—
Decrease	—	—	—	—	124

The total operated mileage of the lines constituting the Southern Pacific transportation system, and of the lines of other companies controlled by the Southern Pacific Company, including 400.99 miles of the Northwestern Pacific Railroad Company and 49.47 miles of the Sunset Railway Company, one-half of the capital stocks of which is owned by the Southern Pacific Company, amounted, on June 30, 1914, to 13,278.93 miles.

INCOME FOR THE YEAR.

The income for the year ended June 30, 1914, of the Southern Pacific Company and of the Proprietary Companies, combined, excluding offsetting accounts, compared with last year, is as follows:

	This Year.	Last Year.	+ Increase. — Decrease.	Per Cent.
Average miles of railway operated:				
Lines East of El Paso	3,459.16	3,435.01	+ 24.15	.70
Lines West of El Paso	6,962.49	6,875.98	+ 86.51	1.26
Total	10,421.65	10,310.99	+ 110.66	1.07
OPERATING INCOME.				
Revenue from transportation—rail lines	$126,614,536.84	$130,353,692.66	—$3,739,155.82	2.87
Revenue from outside operations	11,905,721.72	12,421,012.41	— 515,290.69	4.15
Total	$138,520,258.56	$142,774,705.07	—$4,254,446.51	2.98
Operating expenses—rail lines	$82,800,066.77	$82,135,109.49	+ $664,957.28	.81
Expenses outside operations	10,862,200.16	10,734,300.58	+ 127,899.58	1.19
Taxes (rail lines and properties dealt with as outside operations)	7,162,624.57	5,697,285.83	+ 1,465,338.74	25.72
Total	$100,824,891.50	$98,566,695.90	+$2,258,195.60	2.29
Net operating income over expenses and taxes	$37,695,367.06	$44,208,009.17	—$6,512,642.11	14.73
OTHER INCOME.				
Interest on bonds owned of Proprietary Companies	$3,612,450.71	$3,512,526.07	+ $99,924.64	2.84
Interest on bonds owned of Affiliated Companies	3,437,343.97	2,844,230.56	+ 593,113.41	20.85
Interest on bonds owned of Other Companies	345,243.61	490,809.71	— 145,566.10	29.66
Dividends on stocks owned of companies other than Proprietary Companies	3,656,276.04	3,230,061.82	+ 426,214.22	13.20
Income from lands and securities, not pledged for redemption of bonds	498,040.49	510,891.01	— 12,850.52	2.52
Income from sinking funds investments	296,309.57	263,742.90	+ 32,566.67	12.35
Balance of interest on loans and on open accounts other than with Southern Pacific Company and Proprietary Companies	1,795,239.28	1,369,218.04	+ 426,021.24	31.11
Hire of equipment	266,480.60	.....	+ 266,480.60	...
Miscellaneous income	196,306.40	129,053.14	+ 67,253.26	52.11
Total	$14,103,690.67	$12,350,533.25	+$1,753,157.42	14.19
Total net operating and other income	$51,799,057.73	$56,558,542.42	—$4,759,484.69	8.42
FIXED AND OTHER CHARGES.				
Interest on outstanding funded debt of Southern Pacific Co. and Proprietary Companies	$27,415,733.89	$25,809,405.90	+$1,606,327.99	6.22
Sinking fund contributions and income from sinking fund investments	805,702.07	773,834.49	+ 31,867.58	4.12
Hire of equipment—balance	—	600,581.05	— 600,581.05	...
Rentals for lease of road, joint tracks, yards and terminal facilities	644,675.79	702,030.44	— 57,354.65	8.17
Land department expenses	115,635.12	116,639.65	— 1,004.53	.86
Taxes on granted and other lands	292,583.15	256,934.39	+ 35,648.76	13.87
Miscellaneous expenses of Proprietary Companies	57,418.65	82,841.13	— 25,422.48	30.69
Taxes and other expenses of Southern Pacific Company	464,300.44	291,243.30	+ 173,057.14	59.42
Additions and betterments payable from income of Southern Pacific Company	21,094.49	71,219.37	— 50,124.88	70.38
Amortization of discount on funded debt	505,476.92	7,766.41	+ 497,710.51	...
Reserve for depreciation of rolling stock owned by Southern Pacific Company and leased to other companies	1,024,221.46	978,239.14	+ 45,982.32	4.70
Total	$31,346,841.98	$29,690,735.27	+$1,656,106.71	5.58
Surplus over fixed and other charges	$20,452,215.75	$26,867,807.15	—$6,415,591.40	23.88

Surplus over fixed and other charges brought over (equivalent to 7.50 per cent. on the outstanding capital stock of the Southern Pacific Company) $20,452,215.75

Applied as follows:

Dividends on common stock, viz.:		
1½ per cent. paid January 2, 1914	$4,090,086.08	
1½ per cent. paid April 1, 1914	4,090,086.08	
1½ per cent. payable July 1, 1914	4,090,086.08	
1½ per cent. payable October 1, 1914	4,090,086.08	
Dividends on stocks of Proprietary Companies held by the public	744.00	
		16,361,088.32
Surplus after payment of dividends		$4,091,127.43

The details of Operating Income and Operating Expenses are fully dealt with under "Transportation Operations."

The increase in the income for the year from interest on loans and open accounts, results, principally, from the increase in investment advances to Affiliated Companies.

The increase in the interest on the outstanding funded debt is the result, principally, of a full year's interest charge this year on the One-Year Five Per Cent. Notes, and on the Equipment Trust Certificates of the Southern Pacific Company, issued in the latter part of last year.

The year's income is charged with $805,702.07 for sinking fund contributions and income from sinking fund investments pledged for the redemption of bonds. The proceeds during the year from the sale of lands, also pledged for the redemption of bonds, amounted to $3,040,909.54. These sums, aggregating $3,846,611.61, are dealt with as Profit and Loss items, for the reason that they are applied in reducing the bonded indebtedness of the companies.

The increase in taxes and other expenses of the Southern Pacific Company, is the result, principally, of the increase in the amount of income tax paid to the United States Government, and of the increase in taxes paid to the State of Kentucky.

Under the provisions of the lease to the Southern Pacific Company, the expenditures for additions and betterments to the property of the South Pacific Coast Railway Company are payable by the lessee, and are, therefore, a charge to its income. Such expenditures for the year amounted to $21,094.49.

The increase in the charge for amortization of discount on funded debt is the result, principally, of charging against this year's income both the remainder of the discount on the One-Year Five Per Cent. Notes issued in June of last year and retired in June of this year, and a full year's proportion of the discount on Equipment Trust Certificates issued in the latter part of last year.

On June 30, 1914, the principal of advances to the Southern Pacific Railroad Company of Mexico amounted to $38,423,719.71. Interest accruing on these advances has not been taken into the income of the Southern Pacific Company.

CAPITAL STOCK.

There was no change during the year in the capital stocks of the Southern Pacific Company and of the Proprietary Companies. The amount outstanding June 30, 1914, was as follows:

Southern Pacific Company:		
Common stock		$272,672,405.64
Proprietary Companies:		
Common stock	$315,800,572.00	
Preferred stock	29,400,000.00	
		$345,200,572.00

Stocks of Proprietary Companies outstanding June 30, 1914, were held as follows:

Owned by Southern Pacific Company	$344,767,400.00	
Owned by Morgan's Louisiana & Texas R. R. & S. S. Co.	349,500.00	
In the hands of the public	83,672.00	
Total		$345,200,572.00

FUNDED DEBT.

To provide for the payment of $26,000,000, par value, One-Year Five Per Cent. Secured Gold Notes, due June 15, 1914, for advances to be made to its various controlled companies for construction, additions and betterments, and for other corporate purposes, the Southern Pacific Company authorized an issue of Five Per Cent. Twenty-Year Convertible Gold Bonds to an amount not exceeding $55,000,000, par value, to be dated June 1, 1914, and to mature June 1, 1934. The privilege was given to the holders of the capital stock of the company to subscribe to these bonds at par, on or before April 22, 1914, to the extent of twenty per cent. of their respective holdings, payment therefor to be made in three instalments, viz.: $333.32, at the time of making subscription, on or before April 22, 1914; $333.32, on or before June 1, 1914, and $333.36, on or before July 10, 1914. The subscriptions amounted to $54,534,000.00, of which the sum of $51,526,426.58 was received to June 30, 1914.

The bonds are convertible into paid up shares of capital stock of the company at $100 per share of $100 par value on or at any time before June 1, 1924, or, if before that date called for redemption, then up to thirty days prior to the redemption date mentioned in the call for redemption. All such bonds at any time outstanding (but not part thereof) are redeemable at the option of the Company at 105 per cent. of the par value thereof and accrued interest on June 1, 1919, or on any semi-annual interest date thereafter upon not less than ninety days previous notice.

In September, 1913, to provide for the purchase of new equipment, an equipment trust known as "Southern Pacific Company Equipment Trust, Series B," was created and an issue of $2,010,000, par value, Four and One-Half Per Cent. Equipment Trust Certificates authorized, all of which the trust provides shall be guaranteed by the Southern Pacific Company. The entire $2,010,000, par value, of certificates authorized were issued during the year.

The remaining $5,120,000, par value, of Southern Pacific Company Equipment Trust Certificates, Series A authorized in March, 1913, as mentioned in last year's report, were also issued during the year.

The funded and other fixed interest-bearing debt of the Southern Pacific Company and Proprietary Companies outstanding at the beginning of the year, was as follows:

Southern Pacific Company	$165,581,910.00	
Proprietary Companies	456,034,091.68	
		$621,616,001.68
Issued during the year:		
Southern Pacific Company.		
Equipment Trust Certificates Series "A"	$5,120,000.00	
Equipment Trust Certificates Series "B"	2,010,000.00	
Five Per Cent. Twenty Year Convertible Gold Bonds, Subscription Receipts	51,526,426.58	
One-Year Five Per Cent. Secured Gold Notes	6,000,000.00	
	$64,656,426.58	
Arizona Eastern Railroad Company.		
First and Refunding Mortgage Five Per Cent. Bonds	2,155,000.00	
		66,811,426.58
Retired during the year:		
Southern Pacific Company.		
One-year Five Per Cent. Secured Gold Notes due June 15, 1914, paid off	$26,000,000.00	
Equipment Trust Certificates Series "A" due March 1, 1914, paid off	1,012,000.00	
		$27,012,000.00
Arizona Eastern Railroad Company.		
Gila Valley, Globe & Northern Railway Company Five Per Cent. First Mortgage Bonds: Purchased from payments to sinking fund		2,000.00
Central Pacific Railway Company.		
Three and One-Half Per Cent. Mortgage Gold Bonds:		
Purchased from sale of lands	$428,000.00	
Purchased from sale of securities	391,000.00	
Purchased from payments to sinking fund	8,000.00	
	$827,000.00	
Less: Bonds included in above which were purchased prior to June 30, 1913, but which were cancelled during the present fiscal year	98,000.00	
		729,000.00
First Refunding Mortgage Four Per Cent. Bonds: Purchased from payments to sinking fund		27,000.00
Houston & Texas Central Railroad Company.		
First Mortgage Five Per Cent. Bonds: Purchased from proceeds of lands sold		71,000.00
Morgan's Louisiana & Texas Railroad and Steamship Company.		
General Mortgage Five Per Cent. Bonds due July 1, 1913, paid off		1,000,000.00
South Pacific Coast Railway Company.		
First Mortgage Four Per Cent. Bonds: Purchased from payments to sinking fund		235,000.00
Southern Pacific Railroad Company.		
First Refunding Mortgage Four Per Cent. Gold Bonds: Purchased from payments to sinking fund		13,000.00
Texas & New Orleans Railroad Company.		
Payments to State of Texas for account of School Fund Debt		5,459.44
		29,094,459.44
Amount of funded and other fixed interest-bearing debt of the Southern Pacific Company and Proprietary Companies outstanding June 30, 1914		$659,332,968.82
Net increase during the year		$37,716,967.14
The outstanding bonds are held as follows:		
In the hands of the public		$584,410,619.29
Owned by the Southern Pacific Company	$62,165,349.53	
Owned by Proprietary Companies	3,554,000.00	
Held in Sinking Funds of Proprietary Companies	9,203,000.00	
		74,922,349.53
		$659,332,968.82

ASSETS AND LIABILITIES.

The combined assets and liabilities of the Southern Pacific Company and of the Proprietary Companies, on June 30, 1914, and the increases and decreases during the year, excluding the offsetting accounts between the Companies, summarized, were as follows:

INVESTMENTS.	Total June 30, 1914.	Increase.	Decrease.
Investment in road and equipment	$902,631,959.28	$19,755,936.39	
Sinking funds	*12,226,059.84	578,100.81	
Deposits in lieu of mortgaged property sold	15,694.24	1,799.63	
Improvements on leased railway property	356,844.08	53,644.91	
Miscellaneous physical property	†16,792,531.80	—	$124,543.83
Stocks and bonds owned of Proprietary and Affiliated Companies	*415,830,946.61	3,089,882.16	
Advances to Affiliated Companies	105,524,690.33	14,577,743.54	
Other investments	15,033,270.06	—	470,622.67
	$1,468,411,996.24	$37,461,940.94	

Current and Deferred Assets.	Total June 30, 1914.	Increase.	Decrease.
Cash and demand loans and deposits	$19,170,584.79	—	$148,447.46
Special deposits	87,286.40	—	2,521,930.73
Other cash accounts	15,092,096.03	$2,761,560.60	
Material and supplies	18,682,686.49	1,544,613.15	
Deferred assets	6,021,735.14	19,070.09	
	$59,054,388.85	$1,654,865.65	
Unadjusted Debits.			
Discount on funded debt	$8,346,750.78	$1,464,558.48	
Other unadjusted debits	3,896,498.98	—	$1,409,000.56
	$12,243,249.76	$55,557.92	
Total assets	$1,539,709,634.85	$39,172,364.51	
Stock.			
Capital stock of Southern Pacific Company	$272,672,405.64		
Capital stock of Proprietary Companies	*345,200,572.00		
	$617,872,977.64		
Long Term Debt.			
Funded debt of Southern Pacific Company	$203,226,336.58	$37,644,426.58	
Funded debt of Proprietary Companies	*456,106,632.24	72,540.56	
	$659,332,968.82	$37,716,967.14	
Nonnegotiable debt to Affiliated Companies	$1,467,388.61	—	$3,086,271.76
	$660,800,357.43	$34,630,695.38	
Current and Deferred Liabilities.			
Audited accounts and wages payable	$8,259,352.31	—	$4,587,854.81
Interest and dividends matured unpaid	8,074,420.80	—	2,064,265.01
Unmatured dividends declared	4,090,086.08		
Unmatured interest accrued	5,541,822.41	$261,478.17	
Other cash accounts	4,338,022.28	—	102,139.93
Deferred liabilities	874,027.42	23,615.45	
	$31,177,731.30	—	$6,469,166.13
Unadjusted Credits.			
Accrued depreciation	$34,168,162.57	$23,846,976.16	
Other unadjusted credits	26,800,825.99	—	$8,684,353.14
	$60,968,988.56	$15,162,623.02	
Total liabilities	$1,370,820,054.93	$43,324,152.27	
Balance to credit of Profit and Loss	$168,889,579.92	—	$4,151,787.76
Total	$1,539,709,634.85	$39,172,364.51	

*The outstanding capital stock and funded debt include Proprietary Companies' capital stocks and funded debt of the part value of $345,116,900 and $74,922,349.53, respectively, a total of $420,039,249.53, which securities are owned by the Southern Pacific Company or by Proprietary Companies, or are held in sinking funds of Proprietary Companies. The cost of these securities is included in the investments shown above. Of the said amount, stocks of the par value of $249,653,161, which stand charged on the books at $232,932,667.41, are pledged against the issue of Southern Pacific Company stock and bonds.

†The value of the granted lands belonging to the Central Pacific Railway Company and to the Oregon and California Railroad Company, which remained unsold at the close of the year, is not included in the statement of the assets of the said companies.

TRANSPORTATION OPERATIONS.

The results of the year's transportation operations compared with those of last year are as follows:

	This Year.	Last Year.	Increase or Decrease.	Per Cent.
Average miles of railway operated	10,421.65	10,310.99	110.66	1.07
Operating Income.				
Freight	$78,369,414.08	$80,141,498.84	—$1,772,084.76	2.21
Passenger	40,485,949.07	42,389,837.48	—1,903,888.41	4.49
Mail	2,562,342.64	2,460,309.29	102,033.35	4.15
Express	2,622,158.72	2,757,259.88	—135,101.16	4.90
Other transportation revenues	1,213,384.83	1,332,463.69	—119,078.86	8.94
Revenues from operations other than transportation	1,361,287.50	1,272,323.48	88,964.02	6.99
Total—rail lines	$126,614,536.84	$130,353,692.66	—$3,739,155.82	2.87
Revenues from outside operations	11,905,721.72	12,421,012.41	—515,290.69	4.15
Total	$138,520,258.56	$142,774,705.07	—$4,254,446.51	2.98
Operating Expenses.				
Maintenance of way and structures	$16,064,457.14	$15,589,026.66	$475,430.48	3.05
Maintenance of equipment	18,934,335.01	19,295,724.63	—361,389.62	1.87
Traffic expenses	2,889,418.58	3,115,078.74	—225,660.16	7.24
Transportation expenses	40,936,821.47	40,408,953.93	527,867.54	1.31
General expenses	3,975,034.57	3,726,325.53	248,709.04	6.67
Total—rail lines	$82,800,066.77	$82,135,109.49	$664,957.28	.81
Expenses outside operations	10,862,200.16	10,734,300.58	127,899.58	1.19
Taxes	7,162,624.57	5,697,285.83	1,465,338.74	25.72
Total	$100,824,891.50	$98,566,695.90	$2,258,195.60	2.29
Net operating income over expenses and taxes	$37,695,367.06	$44,208,009.17	—$6,512,642.11	14.73
Freight Traffic.				
Tons of commercial freight carried	31,959,625	31,642,587	317,038	1.00
Tons of commercial freight carried one mile	6,987,916,295	7,034,174,870	—46,258,575	.66
Average tons per revenue train mile—all freight:				
East of El Paso	399.43	378.58	20.85	5.51
West of El Paso	510.30	508.35	1.95	.38
All lines	471.21	460.84	10.37	2.25
Average number of loaded cars in freight trains:				
East of El Paso	18.95	17.98	.97	5.39
West of El Paso	24.10	23.71	.39	1.64
All lines	22.28	21.61	.67	3.10
Average tons per loaded car mile—all freight:				
East of El Paso	21.08	21.05	.03	.14
West of El Paso	21.18	21.44	—.26	1.21
All lines	21.15	21.32	—.17	.80
Percentage of loaded car miles to total:				
East of El Paso	70.91	72.01	—1.10	1.53
West of El Paso	70.25	70.62	—.37	.52
All lines	70.45	71.04	—.59	.83
Average revenue per revenue train mile—commercial freight	$4.39	$4.33	$0.06	1.39
Average revenue per ton per mile—commercial freight	1.110 cents.	1.123 cents.	—.013 cents.	1.16
Average distance hauled — commercial freight	218.65 miles.	222.30 miles.	—3.65 miles.	1.64
Passenger Traffic.				
Total revenue passengers carried—including ferry suburban	42,744,673	42,006,240	738,433	1.76
Total revenue passengers carried one mile —including ferry suburban	1,748,983,080	1,834,380,082	—85,397,002	4.66
Average total revenue per passenger train mile	$1.34	$1.64	—$0.30	18.29
Average revenue per passenger per mile	2.247 cents.	2.248 cents.	—.001 cents.	.04
Average distance carried—including ferry suburban	40.92 miles.	43.67 miles.	—2.75 miles.	6.30

During the past ten years, with an increase of 24.46 per cent. in mileage Company's lines were abnormal during the year, and obstructions to traffic caused serious losses in earnings and heavy increases in expenses.

In every month of the fiscol year, except November, damages from washouts and landslides were frequent and embarrassing. The total number of interruptions was 227, with an average delay of three days each. The most serious interruptions were:

Eight days on Louisiana line, in September, from floods in the Calcasieu River.

Five days in October, on Victoria Division, and from two to sixteen days in December, at various points on the Houston and Victoria Divisions of Galveston, Harrisburg & San Antonio Railway and on Houston & Texas Central Railroad from phenomenal rains in Texas.

Seven oays between Colton and Los Angeles, eleven days between Los Angeles and Ventura, sixteen days between Ventura and Santa Barbara, and seventeen days on the coast line north of Santa Barbara, from the heaviest rains, in Southern California during January and February, of which there is any record.

The Nordhoff branch was cut to pieces and closed to traffic for forty-four days.

The continued sinking of the tracks in the Suisun marshes between Benicia and Sacramento, was the cause of very heavy expense, although the constant presence of large forces kept the tracks open for the safe but slow passage of trains.

On September 17th the lining of a tunnel, 1,371 feet long, in the Santa Lucia Mountains, near San Luis Obispo, was destroyed by fire, the tunnel caved in, and interrupted traffic for sixty days.

These unusual conditions caused serious losses in earnings, while the expenses for repairs amounted to $1,278,527, an increase over expenses of a similar character in the preceding year of $880,398. On our California lines alone, a further expenditure of $1,284,000 will be required to restore previous conditions and to provide reasonable protection against future damage. Of this amount $475,000 will be chargeable to Operating Expenses, and $809,000 to Additions and Betterments.

The large decrease In passenger and express earnings is attributable to deferred travel in anticipation of the California Expositions and numerous conventions to be held on the Pacific Coast in 1915; the diminished transportation of labor incident to the postponement of new enterprises; the curtailment of excursion, tourist and commercial travel by enforced economy; increased competition of interurban electric lines and motor vehicles; and reduction in express rates by the Interstate Commerce Commission and the Railroad Commission of California, which became effective in February and March of this year.

Notwithstanding the yield of normal crops in sections served by these lines, there has been a decrease in gross freight revenue of $1,772,084.76, due to a substantial curtailment of shipments of forest products in Louisiana and Texas resulting from the inability of railroads to make the usual purchases of cross-ties and from the postponement of other new construction requiring the use of lumber; the previous completion of electric power, water supply, irrigation and oil pipe line construction in California; and the extremely conservative purchases of merchandise.

Reduced rates compelled by influence of Federal and State Commissions which were in effect during last fiscal year and were not in effect throughout the previous year resulted in a shrinkage of at least $500,000 in the gross revenue of these lines, and it is conservatively estimated that cumulative reductions of this character during a period of four years ending June 30, 1914, decreased the gross revenue of these lines at least $4,000,000.

The decrease in net operating income over expenses and taxes, of $6,512,642.11, or 14.73 per cent., was caused by a decrease of $4,254,446.51, or 2.98 per cent., in total operating income, and an increase of $2,258,195.60, or 2.29 per cent., in total operating expenses, due principally to an increase of $1,465,338.74, or 25.72 per cent., in taxes. Operating expenses of rail lines include charges amounting to $2,617,760 for extraordinary expenses as follows: Repairing flood damages, as hereinbefore mentioned, $880,398; increased cost of locomotive fuel, $843,886; higher wage schedules, $221,404; increase in charges for renewal and depreciation of rolling stock as hereinafter explained, $672,072. But for these extraordinary charges, operating expenses of rail lines would have shown a decrease of $1,952,803, or 2.38 per cent., instead of an increase of $664,957. As an offset to these large increases in extraordinary items, substantial economies were effected by raising the average freight train load from 460.84 tons to 471.21 tons, and by promoting greater efficiency in the use of locomotive fuel, the latter being effected by the moving of 7.95 per cent. more gross ton miles per pound of fuel in freight service, and of 8.70 per cent. more gross tons miles per pound of fuel in passenger service. The saving in the fuel bill by this economy amounted to $707,627.

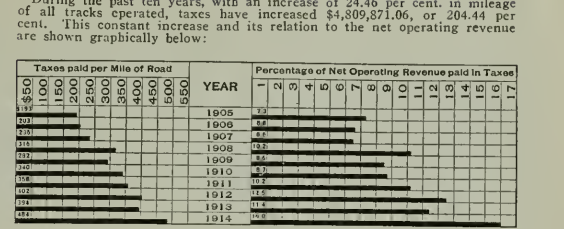
The accounting rules of the Interstate Commerce Commission, effective July 1, 1907, prescribe that estimated monthly charges shall be made to operating expense for depreciation of equipment, and that as equipment is retired from service, the amount of depreciation accrued prior to July 1, 1907, shall be charged to profit and loss. For many years prior to July 1, 1907, the transportation lines constituting the Southern Pacific System provided for the renewal or replacement of equipment condemned, sold, or otherwise disposed of, by charging operating expenses with the original cost thereof, less salvage, at the time the units of equipment were retired from service. In 1907, the Executive Committee of your Board, after giving the matter consideration, continued your Company's practice in lieu of that prescribed by the Interstate Commerce Commission, believing that as it recorded facts it was preferable to a method dealing with arbitrary estimates.

During the year 1912, a number of roads complied witb the instructions of the Interstate Commerce Commission and adopted its rules, in consequence of whicb, on reconsideration, your Executive Committee directed that, commencing July 1, 1913, your Company should set up depreciation currently in accordance with the Interstate Commerce Commission rule, and should write off the depreciation that accrued prior to July 1, 1913, to profit and loss, at the time the units of equipment were retired from service. As the Commission objected, however, to this method of handling the accrued depreciation, the matter was again considered by your Executive Committee, which approved the Controller's action in yielding strict obedience to the instructions of the Interstate Commerce Commission in charging the depreciation that accrued prior to July 1, 1913, based on the estimated life of the equipment in service on tbat date, and amounting to $22,458,476.54, to the profit and loss accounts of the system companies for the year just closed and crediting the same amount of reserve for "Accrued Depreciation —Equipment."

During the fiscal year ended June 30, 1913, charges to operating expenses on account of retirement of rolling stock, equipment under the old plan, as explained above, amounted to $1,518,986.18. Charges made during the fiscal year ending June 30, 1914, in accordance with rules prescribed by the Interstate Commerce Commission, amounted to $2,191,058.48, or an increase of $672,072.30.

TAXES.

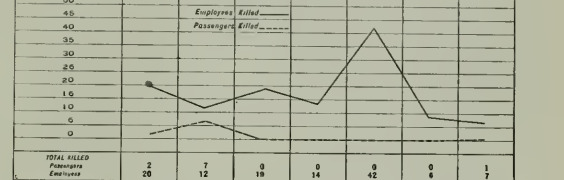
During the past ten years, with an increase of 24.46 per cent. in mileage of all tracks operated, taxes have increased $4,809,871.06, or 204.44 per cent. This constant increase and its relation to the net operating revenue are shown graphically below:



SAFETY OF OPERATION.

In the derailment of a mixed train in the month of June, 1914, a passenger lost his life. This was the first fatality to a passenger in a train accident for FIVE YEARS AND TEN MONTHS, during which period 316,531,599 locomotive miles were run and 237,317,775 passengers were carried, involving 10,234,656,080 passengers carried one mile. In the year just closed, 7 employes out of 9,418 lost their lives through train accidents in running 57,054,594 locomotive miles. Out of 42,571 employes engaged in pursuits not involving train movements, 16 lost their lives, or one fatality to every 832,800 days, or 2,300 years worked.

FATALITIES IN TRAIN ACCIDENTS



	1908	1909	1910	1911	1912	1913	1914
TOTAL KILLED							
Passengers	2	7	0	0	0	0	1
Employes	20	12	19	14	42	6	7
TOTAL KILLED PER MILLION LOCOMOTIVE MILES							
Passengers	0.036	0.148	0	0	0	0	0.018
Employes	0.382	0.254	0.360	0.259	0.772	0.156	0.123
Passengers Carried	41,303,734	39,337,735	40,190,200	39,095,058	40,329,011	42,006,240	42,744,873
Passengers Carried One Mile	1,640,036,373	1,541,212,518	1,608,824,993	1,808,133,603	1,787,640,025	1,834,396,082	1,748,983,000
Locomotive Mileage	52,292,012	47,282,374	54,457,017	54,227,433	54,427,530	57,653,635	57,054,594
Number Trainmen to Service	8,461	9,144	9,232	8,605	9,137	8,497	9,418

GOVERNMENT ATTACK ON RIGHT TO CONTROL CENTRAL PACIFIC RAILWAY.

On February 11, 1914, the United States, acting through the Attorney-General, brought suit in the United States District Court for tbe District of Utah, against the Southern Pacific Company and the Central Pacific Railway Company, to separate the two companies, on the ground that their union in one system was in violation of the Federal Anti-Trust Act of 1890, known as the Sherman law, and also in violation of the Pacific Railroad Acts, meaning the acts of Congress providing for the construction of the Union Pacific and Central Pacific Railroads. The nature of this suit was fully explained in a circular issued to the stockholders of this company on February 5, 1914, after the Attorney-General had publicly announced his intention to endeavor to divorce the Southern Pacific Company from the Central Pacific Railway Company. The case is now at issue, and the Government, which has the opening, began taking its testimony on September 21, 1914. So much depends upon the time consumed by the Government and the nature of its testimony, that it cannot now be said with any certainty when the case will be ready for argument in the lower court. It may be assumed that an appeal to the Supreme Court of the United States will be taken by the losing party. While suits under the federal Anti-Trust Act have heretofore afforded striking examples of the uncertainty of the law, this much is certain, that a decision declaring the union and one management of the Southern Pacific Company and the Central Pacific Railway Company to be in violation of the Sherman law, would go far beyond any previous decision of the Courts. It would involve a construction of the law, which, if impartially applied, would result in the wholesale disintegration of the railroad systems of this country. We have, moreovcr, in this case the unusual advantage of having as our allies the very communities in whose supposed interest the suit was instituted. The charge that the common control of the Central Pacific lines and the Southern Pacific lines is inconsistent with the provisions of the Pacific Railroad Acts, is based on a construction of those acts which was discovered for the first time when needed as a weapon of attack in the present suit. The relations between the Central Pacific and the Union Pacific have always been harmonious. That they were in accord with the requirements of the acts of Congress has never been questioned during the forty years of their existence, until the Government last February asserted the contrary. We believe that the rights and interests of both companies, as well as the interests of the communities they serve, justify and require the vigorous defense which the management is prepared to make against the demand of the Government for a disruption of our system of roads.

GOVERNMENT ATTACK ON TITLE TO OIL LANDS.

On June 22, 1914, the Supreme Court of the United States decided in favor of the defendants the suit of Edmund Burke and others against the Southern Pacific Railroad Company and the Kern Trading and Oil Company. The object of this suit was to recover some 3,200 acres of the oil lands of defendants in California, on the ground that, by reason of the provision in the act of Congress containing the land grant excepting mineral lands, and especially by reason of a so-called mineral reservation clause in the Railroad Company's patents, the subsequent discovery of oil under the lands made the patents inoperative and defeated the Railroad Company's title to the lands. In deciding against claimant, the Supreme Court declared that the subsequent discovery of oil did not cause the lands to revert to the Government, and that the mineral reservation in the patents was unauthorized and inoperative. The Court, in effect, held that

the patents could be avoided only by proving that they had been fraudulently obtained, and that suits to set aside such patents must be brought within six years from the date of issuance of the patents. These principles are as applicable to a suit by the United States as to a suit by an individual.

It follows, as a result of the decision in the Burke case, that proven fraud alone can avail to defeat our title to our oil lands. We know there was no fraud in obtaining the patents, and we may consider that the danger of losing the lands is now removed. Moreover, except as to a comparatively small quantity of land, in respect to which suits have already been instituted, the six years period of limitation is believed to be a bar even to a suit alleging fraud.

There are four suits pending based on alleged fraud, three against the Southern Pacific Railroad Company and one against the Central Pacific Railway Company. The aggregate number of acres involved is 7,493. There are only two other suits pending relating to oil lands. The acreage involved is 89,450 acres. These suits were originally based solely on the supposed efficacy of the mineral reservation clause. Since the Burke case was decided, the Government has attempted to amend its pleadings by alleging fraud. Our counsel advises that these suits need cause us no apprehension, because the charge of fraud comes too late and because it cannot be proven.

It is a subject for much satisfaction that our title to the valuable lands in question may now be regarded as unassailable.

GENERAL.

Your Board repeats the suggestion made last year that you take an active part in repelling the attacks of demagogues on your property. Unfair treatment of railroads is due in great part to the belief of politicians that only financial magnates suffer therefrom. The surest remedy for the evil is for railroad investors to give unmistakable evidence of their numbers and of their resentment of unfair legislation or regulation. You now number over 30,000, and with the stockholders of other railroads and with investors in their securities you form a body of a million or more voters, whose protests, backed up by ballots, can lawfully exert sufficient force to compel fair treatment by your servants in Congress, in legislatures, and on commissions. The common interests of railroad shareholders and of investors in every community, no matter how small, should cause them to actively participate in every election and to perform faithfully all other duties of citizenship, in order to secure proper representatives and protection for their interests. While your Company has cheerfully made such expenditures as were required by Federal or State Commissions or by legislation, many unreasonable laws have been enacted, which serve no public good, and which add unnecessarily to the cost of operation. There is, moreover, a continuous agitation for the passage of more laws to further burden the railways regardless of necessity or reason. During the fiscal year ended June 30, 1914, the cost of complying with such legislation and with the unreasonable requirements of Federal and State Commissions, has added $1,099,405.00 to the operating expenses of your Company, viz.:

Cost of inspectors required by the Safety Appliance Act, and the Boiler Inspection Act	$326,589.00
Increased cost incident to Full Train Crew laws, Hours of Service laws, and the law requiring self-cleaning ash-pans for locomotives	286,580.00
Cost of complying with laws requiring substitution of electric for acetylene headlights	4,121.00
Cost of unnecessary train service required by railroad commissions	18,872.00
Cost of physical valuation of property required by state commissions	37,609.00
Cost of compiling statistics, printing tariffs, and other similar requirements of Federal and State Commissions	425,634.00
Total	$1,099,405.00

In addition to the above, your Company lost approximately $275,000 during the year through failure to obtain approval of the Arizona Railroad Commission to an issue of $30,000,000, par value, two-year 5 per cent. secured gold notes, as hereinafter explained.

To provide funds for corporate purposes, arrangements were made with Bankers, in May, 1913, for sale of two-year notes at a very satisfactory price. Authority of the California Railroad Commission to issue the notes was obtained without delay; approval by the Arizona Corporation Commission, however, was withheld, pending certain assurances and guaranties on the part of the Company with reference to the conduct of its business in Arizona which it was not warranted in giving, and during the time the matter was pending before the Commission the condition of the money market had so changed that a sale of the notes could not be made. Further consideration of a two-year note issue was abandoned, and one-year notes, dated June 15, 1913, and maturing June 15, 1914, were issued instead, and sold at a price yielding approximately $275,000 less than would have been received, had the two-year notes been issued without delay. Under the laws of California and Arizona the issue of one-year notes did not require Commission approval.

The construction of the line of the Northwestern Pacific Railroad Company from Willets toward Eureka, Cal., a distance of 105.64 miles, referred to in the last annual report, has been completed, physical connection of the lines running north from Willets and south from Shively having been made on October 23, 1914. For the present, through freight business between San Francisco and Eureka is being handled at the convenience of the Company, and through daylight passenger service between those points will be commenced about November 15, 1914.

It is expected that with the opening of this line for business, and with the development of the country served, the earnings of the Company will be materially increased. One-half of the capital stock of this Company is owned by the Southern Pacific Company and one-half by the Atchison, Topeka & Santa Fe Railway Company.

On the lines of the Southern Pacific Railroad Company of Mexico, the revolutionary disturbances referred to in the last annual report have continued. Structures, track, and equipment have been destroyed and business conditions demoralized the result of which has been to decrease the revenues and to retard prospective traffic. The loss on account of the interruption to traffic from revolutionary causes, from the beginning of the Madero Revolution in 1910, to June 30, 1914, is estimated to be approximately 8,000,000 pesos. During the fiscal year ended June 30, 1914, the revenues of the line, including those derived from the transportation of troops and munitions of war, were considerably in excess of the expenditures made in connection with the maintenance and operation of the property. Only such maintenance work has been done, however, as was absolutely necessary to render it possible to operate the road. The Company has claims for loss and damage caused by revolutionary disturbances amounting to 287,000 pesos which have been approved by the Mexican Government, and claims amounting to approximately 1,846,000 pesos for troop train service and rental for road operated by the Mexican Government, none of which has been paid. Claims amounting to approximately 2,174,000 pesos, covering additional losses on account of revolutionary disturbances will be presented to the Mexican Government in due course.

There still remains to be completed 99.47 miles of line from Tepic to La Quenada. The revolutionary disturbances preclude any thought of completing this mileage at the present time.

In addition to the completed lines of railway reported under "Properties and Mileage," and the railways of the Northwestern Pacific Railroad Company and the Southern Pacific Railroad Company of Mexico referred to above, construction either was completed or is progressing on the lines of the following companies, viz.:

	Length of Projected Line. Miles.	Track Completed. Miles.	Grading Completed. Miles.	Grading Progressing. Miles.
Central Pacific Railway:				
Colfax to Blue Canon, Cal.—second track:				
Length of projected line	25.42			
Less placed in operation	13.22			
	12.20	9.39	2.08	.73
Fernley, Nev., to Westwood Junction, Cal.:				
Length of projected line	125.41			
Less placed in operation	106.21			
	19.20	*19.20		
Westwood Junction to Westwood, Cal.	11.96	*11.96		
Colusa & Hamilton Railroad:				
Hamilton to Harrington, Cal.	61.15	40.95	13.63	6.57
Galvestan, Harrisburg & San Antanio Railway:				
Bay Shore Junction to Seabrook, Tex.	11.24	2.63	4.13	4.48
Houston & Texas Central Railroad:				
Eureka to Stella, Tex.	9.50	†9.50		
Willamette Pacific Railroad:				
Eugene to Marshfield, Ore.	121.50	39.31	42.94	39.25

*Opened for traffic September 1, 1914. †Opened for traffic July 27, 1914.

The reduction in our surplus over fixed and other charges, due to causes largely beyond control, has imposed on your Company the necessity of reducing the expenditures for new construction, additions to and betterments of the property, to the lowest possible limit. The uncompleted work, listed above, is being slowly carried on to protect the investment already made, but no extensions or improvements of any description, not imperatively needed for protection of the property, are being authorized or even considered.

Under the pension system put into effect on January 1, 1903, six hundred and eighty-eight employes are carried on the pension rolls of the rail and water lines. The payments to them for the year amounted to $300,630.98.

By order of the Board of Directors,

JULIUS KRUTTSCHNITT,
Chairman of the Executive Committee.

Railway Age Gazette

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WE GUARANTEE, that of this issue (the monthly Engineering & Maintenance Edition) 10,750 copies were printed; that of those 10,750 copies 7,421 were mailed to regular paid subscribers to the weekly edition, 1,901 to subscribers who get the Engineering & Maintenance Edition only, 250 were provided for counter and news companies' sales, 1,073 were mailed to advertisers, exchanges and correspondents, and 105 were provided for samples and office use; that the total copies printed this year were 440,600, an average of 9,375 copies a week.

VOLUME 57 NOVEMBER 20, 1914 NUMBER 21

Contents

*Illustrated.

George E. McCaughan, claims attorney of the Rock Island, who has lectured in the Chicago common schools on "Safety-First," and who in other ways has participated in the movements in that city for the promotion of safety, recommends that this subject be made a part of the regular curriculum of all schools. Occasional lectures or meetings are not enough. There should be regular instructions. He suggests also that those railroad companies which, like the New York Central and the Rock Island, have motion-picture outfits, could do a good thing by lending these to schools in those cities where the city officers encourage such instruction. No argument is needed, of course, to convince anyone of the desirability of educating children in guarding against the dangers of the road, the railroad and the playground. Habits are formed in childhood. Many a child's playground can best be described as "everywhere," including railroad yards and tracks. The railroad officer who already has to spend half his time in doing things—believed to be in large measure unnecessary—which are required by the Interstate Commerce Commission, may not relish the suggestion that he go still further out of his immediate field; and emulate Mr. McCaughan in spending his mornings or evenings in school houses. Railway men are, indeed, branching out in directions which a few years ago were unheard of, but the superintendent who, like an ornamental mayor or governor should spend his whole time in making speeches would misuse his position. Nevertheless, there is, here, no doubt a field. Cultivation of the school children has been tried in other places. It is not wholly a new thing.

Safety-First for School Children

Our attention has been called to a series of developments in the Second Congressional district of Oregon which indicate that even in that state of radical ideas and radical legislation the people are not disposed to look with favor on politicians who advocate government ownership of railways. The present representative of the Second Oregon district is A. W. Lafferty. Last spring the Hon. Lafferty arose in his place in Congress and made, or at least secured leave to print, a speech advocating government ownership of railways. In support of his thesis he presented the hackneyed arguments and a large number of statistics and alleged facts which, apparently, were derived chiefly from a book written some years ago by one Anthony Van Wagenen of Sioux City, Iowa. In this book Mr. Van Wagenen advocated government ownership of railroads in a way which showed that he probably knew as little about the subject as any man living. It would appear that after making his speech Mr. Lafferty was defeated for renomination by the Republicans, who had originally elected him. At any rate, on October 2 he again arose in his place and referred in very uncomplimentary terms to a speech against government ownership which, he said, had been delivered by C. N. McArthur, the Republican candidate for Congress from the Second Oregon district, before the Portland Transportation Club. Thereupon Mr. Lafferty had both his original speech and Mr. McArthur's speech in reply embalmed in the Congressional Record. Now, in view of the fact that Oregon is the real birthplace of the initiative, the referendum and the recall in this country, one would naturally think that it would be as safe a place for a candidate for Congress to advocate government ownership and as unsafe a place to oppose it as anywhere in the United States. Nevertheless, we note by the election returns that C. N. McArthur, Republican, has defeated A. W. Lafferty, Independent, for re-election to Congress from the Second Oregon district. Evidently the people of that state are not as yet more prepared to accept the gospel of government ownership of railways than the people of the United States showed themselves to be when William Jennings Bryan made his famous speech on this subject at Madison Square Garden some years

Government Ownership in Oregon

ago. If the people of radical Oregon reject this gospel, how must we think that the people of the rest of the country would deal with it?

SUPERHEATERS ON SMALL LOCOMOTIVES

IN order to realize the greatest benefit from the economies which obtain in the use of superheaters, applications to existing locomotives have for the most part been confined to the larger classes of power which are, of course, the greatest money earners. The value of the superheater is now so well recognized that large numbers of the heavier types of locomotives which were originally built as saturated steam engines have had superheaters applied while passing through the shops, and others are undergoing the same change as rapidly as arrangements can be made to accomplish it. However, as yet little has been done toward the application of superheaters to what were the large locomotives of a few years ago, and which are now, for the most part, relegated to branch line and local main line service.

This is a problem which should, of course, be considered strictly from a business standpoint and it is not intended to suggest that the railways should apply superheaters to all existing locomotives, no matter how small or in what condition they may be, although in at least one case locomotives that would otherwise have to be discarded are being reclaimed by the expenditure of a comparatively small sum in the application of superheaters and allied changes, in such a manner as to make them serviceable for many years on branch lines. But the locomotives which would seem to hold out the greatest immediate possibility of economy by conversion from saturated to superheated steam are those of the Atlantic, Ten-wheel and Eight-wheel types in passenger service, and the Consolidation, Ten-wheel and Mogul types in freight service, built within the last 15 or 20 years. Many of these engines are already equipped with piston valves, a factor of considerable saving in making the change, as the slide valve cannot as yet be said to work satisfactorily with superheated steam. There are passenger trains now being hauled by Pacific type locomotives on schedules which could be successfully maintained by Ten-wheel or Atlantic type locomotives if given the increased boiler capacity which the superheater provides, and trains now operating on schedules which tax the capacity of engines of the two latter types to the utmost could then without difficulty undergo an increase in the number of cars or in the weight of the equipment. In this connection the increased weight of cars is a consideration which should not be overlooked. The general introduction on the main lines of most of the railways of steel equipment for passenger service has resulted in a great many cases in heavy wooden coaches being displaced for use on local and branch line passenger trains; indeed in some instances, steel underframe and all-steel passenger cars are in every-day use on such trains as well as on the heavier through trains. The use of this heavy equipment frequently presses the smaller saturated steam locomotives to the limit, and it becomes difficult or impossible for them to make up lost time or to get over the road on the schedule when it becomes necessary to add a car or two. The addition of superheaters to locomotives of the types mentioned increases their capacity so that they can successfully haul trains which otherwise they would be unable to handle and which, on the other hand, would not justify, from the standpoint of needed capacity, the employment of locomotives of the larger types.

Another opportunity for utilizing the economy of superheated steam is to be found on roads or divisions where the purchase of heavier motive power in order to increase trainloads will necessitate heavy expenditures for increasing the track and bridge capacity. In such cases the application of superheaters to existing engines will increase their hauling capacity and thus postpone the time when an increase in the weight of rails and the strength of bridges becomes necessary. Altogether it would seem that there must be large numbers of locomotives of these smaller types, on which the expenditure required to change them for the use of superheated steam would be amply justified by the economy afterward obtainable.

SPECIAL CHARGES FOR SPECIAL SERVICES AT CHICAGO

THE traffic and terminal situation at Chicago is, for various reasons, the most complex in the world. In the hearing of the 5 per cent rate case the Interstate Commerce Commission animadverted on the practice which has grown up at many places of the railways rendering certain services for nothing, or paying others for rendering certain services, the effect of which is to give many shippers store door delivery. The Commission intimated that the roads should impose special charges for the so-called "spotting" of cars and should discontinue arrangements under which some shippers are given what amounts to store door delivery while most shippers are not given such delivery.

The views expressed by the Commission applied with special force to the situation at Chicago. The railways centering there have now filed tariffs intended to carry out the policy which they understand to have been recommended by the Commission. The Chicago Association of Commerce and the National Industrial Traffic League are opposing this action. The situation at Chicago is so important, and at the same time raises so many questions which also come up at other large terminal points, that it merits special discussion.

The *Railway Age Gazette* from the first opposed the plan for making special a charge for merely placing freight cars on private sidings. We did so because this service is merely a substitute for another railway service, that of placing cars on team tracks, and is preferable from the standpoints both of the carrier and the shipper, in many cases, to placing cars on team tracks. At the same time this paper took the view that when the railway renders some service in addition to that of merely placing cars at a convenient point on the shipper's siding, such as that of moving them about within the shipper's plant, and spotting them for him, an additional charge should be made. The reason why this should be done is that the additional service is not a substitute for some ordinary railway service, such as that of placing cars on a team track, but is a substitute for a service which should be performed by the shipper himself, namely, that of teaming the freight.

Now, the railways at Chicago have been rendering the so-called trap car service for nothing. This is the service of placing a car at an industry to be loaded with less-than-carload freight and moving it to a freight station for the subsequent handling of the contents in the same way in which less than carload freight is handled after it has been delivered at the station by a team and truck. There is under the business district of Chicago a tunnel in which an electric freight railway is operated by a company known as the Chicago Warehouse & Terminal Company, and there is also a lighterage company operating on the river called the Merchants' Lighterage Company. These concerns haul freight between industries and their own stations and the railway stations. Some years ago some of the railways began applying the regular Chicago rates not only to and from their own stations and terminals, but also to and from points of origin and destination reached by the Chicago Warehouse & Terminal Company and the Merchants' Lighterage Company and to pay these companies allowances for the services which the latter render. It is now proposed by the railways to impose an extra charge for the trap car service, and to cease paying allowances to the Merchants' Lighterage Company and the Chicago Warehouse & Terminal Company, thereby making the Chicago rates apply only to the railways' own terminals and stations.

Now, what are the trap car service, the tunnel service and the lighterage service, fundamentally? Are they, like the service of placing a car at a convenient point on a shipper's siding, merely substitutes for some ordinary railway service? Clearly not. Obviously, they are services substituted for the service of handling freight between the stations of the railways and other points in the city by teams and trucks. How true this is, is indicated by the fact that the lighterage service was established on the Chicago river originally to move freight to and from the railway stations when, owing to a teamsters' strike, sufficient teams and trucks for this purpose were not available. In effect, then, by rendering the trap car service free, and by paying for the tunnel and light-

erage services, the railways of Chicago are doing the *equivalent* of teaming freight for nothing to and from their freight stations for those shippers of Chicago to whom the trap car, tunnel and lighterage services are rendered.

Now, the railways do not render the tunnel and lighterage services to shippers in other cities than Chicago, because in other cities such tunnel and lighterage facilities do not exist. In consequence, the payment by the railways for these special services in Chicago operates as a discrimination in favor of the benefited shippers in Chicago and against the shippers of other and competing cities. Furthermore, in other cities most of the shippers are not so situated that they can take advantage of the trap car service. Therefore, when it is rendered free it operates as a discrimination in favor of those shippers who receive it and against those who are obliged to deliver their freight to the railways by trucks and bear the expense of doing so. Finally, in Chicago there are many shippers who are unable to take advantage of the trap car, the tunnel or the lighterage service, but who must truck their freight to the railways; and therefore the rendering by the railways of these services free to the shippers who receive them operates as a discrimination in favor of them and against the rest of the shippers. In other words, not only do the railways by rendering the trap car service free, and by bearing the expense of the tunnel and lighterage services, render services additional to the ordinary railway service for which they receive no compensation, but they also discriminate in favor of some shippers and against other shippers.

Is there any justification for the railways continuing these practices? There does not appear to be any more justification for them rendering at their own expense services which are clearly substitutes for the teaming of freight than there would be for them bearing the expense of providing teams and trucks to haul freight to and from their stations. It is said that the trap car service saves the railways money, and is therefore of benefit to them as well as the shippers. But if we may assume that the shippers know what is best for them, why may we not also assume that the railway managers know what is best for the railways? Why all this solicitude on the part of the shippers for the welfare of the railways?

Again, it is said that if a special charge is made for the trap car service and the allowances for the tunnel and lighterage services are discontinued, the freight now moved in trap cars and by the tunnel and lighters will be transferred to trucks, and in consequence the present congestion of the streets of Chicago will be greatly aggravated. It is to be presumed that any charge which may be permitted by the Interstate Commerce Commission to be made for the trap car service will be reasonable; in other words, will only cover the cost of the service and perhaps a reasonable profit. A reasonable charge may be less than the cost of teaming the freight. If it is, how can it be assumed that the shippers would choose to incur the greater expense of teaming their freight in preference to the smaller expense of using the trap car service? On the other hand, if a reasonable charge for the trap car service would be greater than the expense of teaming the freight, why should the railways be expected to incur the greater expense of handling the freight by trap car rather than the smaller expense of handling it by team? On the assumption that a reasonable charge for the trap car service would exceed the cost of handling the freight through the streets in trucks, it would be better for the railways themselves to pay the cost of teaming rather than to render the trap car service for nothing.

Likewise, if the railways discontinue paying allowances to the tunnel and lighterage companies shippers subsequently will either find it less or more expensive to have their freight handled by the lighters and the tunnel than by team. If they find it cheaper to handle it by team it is hardly to be expected that they will quit sending it by tunnel and lighter. On the other hand, if it would be cheaper for the shippers to handle the freight by team than by tunnel and lighter, then obviously it would also be cheaper for the railways to bear the cost of having the freight teamed than to bear the cost of having it handled by tunnel and lighter, and on that assumption the railways are now losing money by paying for having the freight handled by tunnel and lighter rather than by teams.

The argument of the shippers that if the railways make a reasonable charge for trap cars and discontinue paying allowances to the tunnel and lighterage companies the freight now handled by them will be transferred to the streets is simply an argument that it is cheaper for whoever foots the bill to have the freight handled by team, and if that argument is valid, then the way in which the freight is now being handled in Chicago involves heavy economic waste and the trap car, lighterage and tunnel services ought to be totally abolished in order to stop this waste. Certainly, that line of reasoning is not persuasive when used to show that the present arrangements should be continued.

It may be contended, however, that while they do result in economic waste they should be continued because it is better that there should be such economic waste than that the streets of Chicago should be further congested. But if it is so desirable that the streets of Chicago should not be congested, why should the railways be required or expected to bear the cost of preventing them from being congested? If economic waste is to be incurred in order to keep the streets of Chicago from being congested, why should not the people of Chicago, or the shippers of Chicago, foot the bill rather than the railways? When did it become a function of railways to render services at a loss in order to relieve congestion of the streets of a city? Evidently, if they do incur loss in this way somebody must foot the bill. Who is that somebody to be? Evidently either the stockholders of the railways or the passengers and shippers of other communities. But to say that the stockholders of the twenty-seven railways entering Chicago or the passengers and shippers of other communities should bear the expense of preventing congestion in the streets of Chicago, rather than the people and shippers of Chicago themselves, is absurd.

We reach, then, the conclusions (1) that the trap car, lighterage and tunnel services in Chicago are services additional to the ordinary transportation services; (2) that when the railways render or pay for these services without charging those to whom they are rendered anything for them, they discriminate against all communities in which and against all shippers to which similar services are not rendered on the same basis; and (3) that the argument that the present arrangement should be continued in order to prevent congestion of the streets of Chicago is the height of absurdity. It is quite possible that in the tariffs which the railways have been preparing and filing for the changing or abolishing of these arrangements there are injustices. But these can be remedied. As to the proposition that the railways should not continue to render the trap car services free or to pay allowances to the tunnel and lighterage companies, that proposition cannot be controverted on any other or better ground than can the proposition that rebating ought not to have been abolished and ought now to be revived; for the fact is that the present trap car, tunnel and lighterage arrangements in Chicago are merely devices to give rebates.

ILLINOIS CENTRAL AND LOUISVILLE & NASHVILLE

THE Illinois Central was a Harriman road as long as that term was applicable. There is, of course, now no such thing as a Harriman road; but the traditions, organization, viewpoint and ideals of the Illinois Central may still be called, without violating the Sherman anti-trust law, characteristic of the Harriman system. The Louisville & Nashville is a Walters road.

The Illinois Central and the Louisville & Nashville are very nearly the same length—the Illinois Central, 4,769 miles; the Louisville & Nashville, 4,938 miles. To some extent the two roads are competitive; to some extent they are comparable in physical condition, nature of traffic, etc.; in other respects they are quite unlike. It is interesting, even if no definite conclusions can be reached, to compare and contrast operating and traffic conditions and to attempt to analyze, even if in a very general

way, differences in the operation of the properties that may fairly and properly be attributed to differences in policy of the owners.

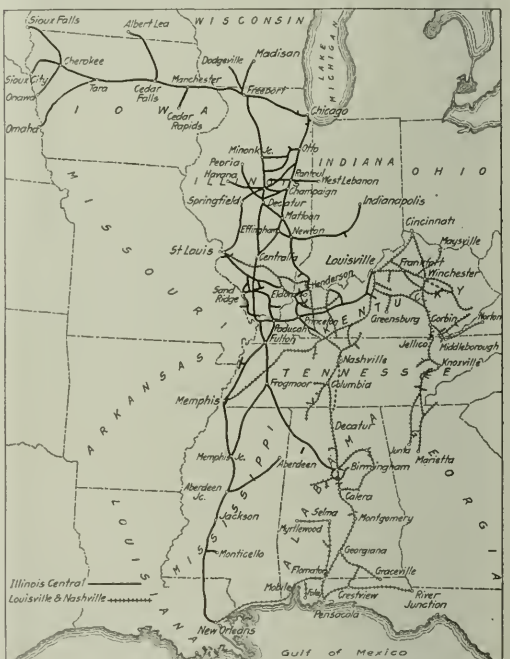
The roads are so nearly alike in length of mileage that it is not necessary to reduce earnings and expenses to a per-mile basis. The Illinois Central in the fiscal year ended June 30, 1914, operated an average of 4,769 miles, almost the same as in the previous year. The Louisville & Nashville operated 4,937 miles of road, an increase of a little over 100 miles as compared with the previous year. The principal cities which are served by both the Illinois Central and the Louisville & Nashville are St. Louis, Memphis, New Orleans, Birmingham and Louisville. The map shows the quite striking difference in topography of the two roads. The Illinois Central consists of a main line from Chicago to New Orleans, with an important branch to Birmingham and branches tapping Indianapolis and Louisville. The line running west from Chicago to Omaha and Sioux Falls is of secondary importance; in other words, the Illinois Central is largely main line. The Louisville & Nashville, lying east of the Mississippi valley, connects the important industrial centers of the middle west and southeast. It has, furthermore, a large percentage of branch line mileage.

The character of traffic and characteristics of traffic statistics reflect this difference in location and topography. The average length of haul of freight on the Illinois Central was 241 miles in 1914 and 171 miles on the Louisville & Nashville. The average length of passenger journey on the Illinois Central was 26 miles; on the Louisville & Nashville, 43 miles. The Illinois Central's very large commutation business into Chicago is an important factor in explaining the difference in the average passenger journey. The difference in the location of the roads explains the difference in length of haul. The earnings per ton per mile on the Illinois Central were 5.63 mills in 1914; on the Louisville & Nashville, 7.78 mills. The earnings per passenger per mile on the Illinois Central were 1.908 cents, in the Louisville & Nashville, 2.266 cents.

The Louisville & Nashville does not include in its report to stockholders a table showing classification of tonnage; but from its report to the Interstate Commerce Commission it is possible to make a comparison with the Illinois Central which, like most other roads, includes such a statement in its report to stockholders. Of the total 32,215,000 tons of freight carried in 1914 by the Louisville & Nashville, 36.97 per cent was furnished by bituminous coal, the total coal tonnage in 1914 being 11,910,000, comparing with 11,369,000 tons in 1913. Of the total tonnage of 32,343,000 tons carried by the Illinois Central in 1914, 37.55 per cent was bituminous coal, the total coal tonnage being 12,146,000 tons, comparing with 10,489,000 tons in 1913. Besides its coal tonnage the Louisville & Nashville has a very large tonnage of ores, 4,185,000 in 1914, or 13.18 per cent of its total tonnage. The tonnage of ores on the Illinois Central is negligible. On the other hand, products of agriculture furnished but 7.55 per cent of the total tonnage on the Louisville & Nashville, and forest products 9.12 per cent, while on the Illinois Central products of agriculture furnished 17.14 per cent and lumber 14.85 per cent. Manufactures furnished 11.83 per cent of the Louisville & Nashville's total tonnage, and but 8.16 per cent of the Illinois Central's.

Before making a comparison of the showing in 1914, and especially of the changes, as compared with 1913, shown by the annual reports of these two roads, emphasis must be laid on their recent history. The Illinois Central was very seriously affected by a strike in the fall of 1911, the effects of which extended through most of the fiscal year ended June 30, 1913. Furthermore, the Illinois Central suffered seriously from the floods in 1913. The Louisville & Nashville suffered much less from the floods in 1913 and had no strike on its hands. The comparison therefore, between 1914 and 1913 on the Louisville & Nashville is a comparison between two comparatively normal years, while this comparison for the Illinois Central is between an abnormal year and a comparatively normal one. By normal is meant a year which for the particular road in question is not unlike the same year for other roads.

In 1914 the Illinois Central had net income available for dividends of $8,139,000, or $1,564,000 more than the net in 1913. The Louisville & Nashville had $7,084,000 in 1914, or $1,547,000 less than in 1913. The Illinois Central has outstanding $109,296,000 common stock on which it now pays 5 per cent dividends, and the Louisville & Nashville has outstanding $72,000,000 stock on which it pays 7 per cent. The total funded debt of the Illinois Central is $197,261,000, and of the Louisville & Nashville $184,463,000. It will be seen, therefore, that the Illinois Central has outstanding considerably larger amounts of capital securities; but, on the other hand, the Illinois Central has an investment of $48,853,000 in securities of proprietary and affiliated companies, $42,196,000 advances to these companies, and $53,215,000 miscellaneous investments, while the Louisville & Nashville has a total of but $10,483,000 of securities of proprietary and controlled companies, $18,913,000 advances to these companies, and $22,188,000 other investments; so that whereas the Illinois Central's



The Illinois Central and the Louisville & Nashville

outstanding securities exceed the Louisville & Nashville's by $60,072,000, the Illinois Central's investment other than in its road and equipment exceeds the Louisville & Nashville's by $82,680,000. The Illinois Central's total income other than from the operation of its railroad was $7,321,000 in 1914, an increase over the previous year of $1,321,000. The Louisville & Nashville's other income was $2,813,000, a decrease of $224,000; and whereas the Illinois Central's total other investment is nearly three times that of the Louisville & Nashville's, its other income is quite a little less than three times that of the Louisville & Nashville. The Louisville & Nashville's surplus, after the payment of 7 per cent on its stock, of $1,639,000 as compared with the Illinois Central's $2,632,000, after paying only 5 per cent on its stock, is in small part explained by the more profitable other investment of the Louisville & Nashville, due largely to its investment in Nashville, Chattanooga & St. Louis, in part by the smaller proportion of its stock to total outstanding securities, and in part to the somewhat larger net earning power of the railroad. The smaller proportion of face value of stock

to total securities, while it concentrates the profit, is a factor of weakness rather than strength, although, of course, it is rather beside the question to talk about weakness in connection with the Louisville & Nashville.

The Illinois Central's railway operating income was $11,739,000, in 1914, an increase over 1913 of $489,000, and the Louisville & Nashville's was $12,325,000, or $588,000 less than in 1913. Although the Illinois Central's operating income is smaller—about in proportion to its lesser mileage—than the Louisville & Nashville, we would expect to find it considerably larger, so great a proportion of the mileage being main line mileage, with a long freight haul. The table at the end of these remarks shows how nearly alike the two roads are in proportion of revenue from passengers and from freight to total revenue; but it will be remembered that both the ton-mile rate and the passenger-mile rate are very much lower on the Illinois Central than on the Louisville & Nashville. The business handled, therefore, is, of course, much larger on the Central than on the Louisville. The total number of tons of freight carried in 1914 by the Central was 32,343,000, comparing with 30,447,000 in 1913. On the Louisville the total tonnage in 1914 was 32,215,000, and in 1913 32,242,000. With its longer average haul, however, the Central had 7,789,000,000 ton-miles in 1914 as against the Louisville's 5,512,000,000 ton-miles.

The total number of passengers carried by the Central was 27,523,000 in 1914 as against 27,538,000 in 1913. On the Louisville & Nashville it was 13,360,000 in 1914 and 12,928,000 in 1913. The passenger mileage in 1914 on the Central was 719,000,000, and on the Louisville & Nashville 577,000,000.

As would be expected, therefore, transportation expenses on the Illinois Central are higher than on the Louisville & Nashville, $24,150,000 on the former and $20,638,000 on the latter in 1914. With 41 per cent more ton mileage and 25 per cent more passenger mileage handled, the Illinois Central's transportation expenses were but 17 per cent more than the Louisville & Nashville's. One reason, presumably for this is the very much larger freight trainload, which on the Illinois Central was 417 tons in 1914, an increase of 10 tons over the previous year, and on the Louisville & Nashville 297 tons in 1914, an increase over the previous year of 2 tons. Of course it is quite impossible to say as to how much of this difference in trainload is due to a difference in traffic conditions and how much to a difference in the stress which is laid by the operating management on the importance of heavy trainloading.

The two roads pursue much the same policy in regard to maintenance, although the Illinois Central in the last two years has held down rather hard on its maintenance of way expenditures. In 1914 the Central spent $9,206,000 on maintenance of way, and the Louisville $9,323,000; in 1913 the amounts spent were $8,519,000 and $11,033,000 respectively. With such a comparatively small amount of branch line mileage, the Central's policy is not quite as generous compared with the Louisville's as would appear at first glance.

Maintenance of equipment expenditures on the Illinois Central were affected seriously by the strike which was previously mentioned. In 1914, however, all bad effects of the strike had disappeared. In that year the company spent $14,510,000 for maintenance of equipment as against the Louisville's $12,240,000. These figures compare with $13,952,000 for the Central and $11,217,000 for the Louisville in 1913. The mileage of equipment on the two roads compares as follows:

	I. C.	L. & N.
Revenue freight-train miles	18,395,000	18,004,000
Revenue passenger-train miles	13,180,000	10,649,000
Percentage of empty freight-car mileage	33	31

As to financial condition, the Louisville & Nashville is in funds; the Illinois Central at the end of the year was not. The Louisville & Nashville had on hand on June 30 $13,816,000 cash, with no loans and bills payable, and total working assets of but $8,048,000. The Illinois Central had on hand $10,859,000 cash, but of this $10,780,000 was due on the following day, July 1, on 4½ per cent notes. There were $725,000 loans and bills payable, which, however, was less by $5,755,000 than loans and bills payable at the beginning of the year, and total working liabilities, exclusive of the 4½ per cent notes just mentioned, but including the bills payable of $10,200,000. The Illinois Central has in its treasury $21,666,000 securities of its own, and in addition $15,718,000 marketable securities. Its very low working capital, therefore, is due not to any lack of liquid assets, but to the bad state of the bond market. The Louisville & Nashville's strong cash position is due to the sale in 1913 of $12,000,000 stock. During 1914 the Louisville & Nashville sold $19,592,000 bonds and retired $1,541,000, leaving a net increase in the debt outstanding in the hands of the public of $18,051,000. The Illinois Central sold in all $4,000,000 refunding mortgage bonds and $3,500,000 equipment trust certificates, $2,975,000 equipment trust certificates, however, being retired. In 1914 the Illinois Central spent a total of $11,814,000 on additions and betterments The Louisville & Nashville spent $12,036,000 for additions and betterments, including equipment.

The following table shows the principal figures for operation, comparing the two roads in 1914 and in 1913:

	1914		1913	
	I. C.	L. & N.	I. C.	L. & N.
Average mileage operated	4,769	4,938	4,763	4,820
Freight revenue	$43,871,272	$42,868,078	$42,589,299	$42,924,952
Passenger revenue	13,715,979	13,082,509	13,455,884	12,835,658
Total operating revenue	65,873,700	59,682,778	64,280,903	59,465,699
Maint. of way and structures	9,205,946	9,323,206	8,519,025	11,033,134
Maint. of equipment	14,510,079	12,239,795	13,952,654	11,216,889
Traffic expenses	1,290,778	1,334,264	1,320,583	1,239,702
Transportation expenses	24,150,040	20,638,427	24,743,324	19,884,015
General expenses	1,618,484	1,247,015	1,513,325	1,417,141
Total operating expenses	50,775,327	44,782,708	50,048,912	44,810,880
Taxes	3,341,247	2,600,288	2,903,551	1,761,626
Operating income	11,739,475	12,324,900	11,250,848	12,913,621
Gross income	19,060,075	15,137,877	17,250,200	15,950,725
Net income	8,138,824	7,084,162	6,575,113	8,630,944
Appropriations	*41,643	†405,275	.....	250,646
Dividends	5,464,800	5,040,000	6,557,760	4,618,733
Surplus	2,632,381	1,638,887	17,353	3,761,565

*For additions and betterments.
†Sinking fund and doubtful accounts.

NEW BOOKS

Federal Trade Commission Law. Pamphlet, 42 pages, 6 in. by 9 in. Published by W. H. Lowdermilk & Co., 1424 F street, Washington, D. C. Price 50 cents.

This pamphlet contains a digest of the U. S. Federal Trade Commission Act, which was approved September 26, and the text of the anti-trust law and of other acts or parts of acts supplementary to it. There is also given the full text of the latest supplementary act, known as the Clayton bill, which has become a law since this pamphlet was written. The only discussion in the book is that contained in an introduction of ten pages by John B. Daish, a well-known lawyer of Washington.

American Society for Testing Materials 1914 *Year Book.* Size 6 in. by 9 in., 500 pages, illustrated, bound in cloth. Published by the society, office of secretary-treasurer, University of Pennsylvania, Philadelphia, Pa. Price $5.

The "Year Book," which is one of the regular publications of the American Society for Testing Materials, contains all of the standard specifications of the society in their latest revised form. Among those of special interest to railway men are the revised specification for rails; splice bars; structural steel for bridges; structural steel for locomotives; concrete reinforcing bars; axles, shafts and forgings for locomotives and cars; tires and locomotive cylinders, and the new specifications adopted at the last convention for cars, carbon bars for springs, methods of analyses of plain carbon steel and drain tile. In addition to the standard specifications adopted by the society, the book also contains selected specifications from other sources for reference purposes. These include the A. R. E. A. 1914 rail specifications and specifications for Bessemer and open hearth rails by the United States Steel Products Company, dated September 1, 1914. The book also includes the personnel of the technical committees and the regulations governing the work of these committees.

Letters to the Editor

CONNECTICUT CITIZENS MADE POSTHUMOUS CRIMINALS

New York City.

To the Editor of the Railway Age Gazette:

The action of the government in its proceedings relative to the New York, New Haven & Hartford, whether one considers the utterances of the Interstate Commerce Commissioners or the varied moves of the Attorney General, has been characterized by numerous mistakes, which are obvious to all broad-minded railway men who have followed the facts; but the latest proceeding, the prosecution in New York, under which the grand jury was induced to return indictments against 21 men for alleged violations of the anti-trust law, going back to the year 1891, was peculiarly crude and blundering. This long-range firing from Washington, reported in the *Railway Age Gazette* of November 6, page 878, can be seen in its worst aspect only by one who is acquainted with Connecticut affairs and who is able to take a calm perspective over the last 30 years. Let me call your attention to a letter by the Rev. Dr. E. P. Parker, of Hartford, printed in the Hartford Courant. He says, in part:

"I have read with gratification the editorial comments of the Springfield Republican on the indictment of directors and former directors of the New York, New Haven & Hartford for criminal conspiracy, with little or no discrimination. Perhaps the just severity of its comments is the more effective for being couched in a guarded form of expression. Some of us, who know several of these indicted gentlemen, find it difficult to refrain from language more charged with indignation.

"With what justice, with what propriety, yea, with what decency, was the list of indicted persons officially published to the world with another sort of black list of the names of [fifty] persons not under indictment, many of whom have been for years sleeping in honored graves? Some of these men thus unnecessarily and, as I think, most indecently blacklisted, I had known for long years. Had Connecticut a man of his day more respected for his flawless integrity than Luzon Morris, of New Haven? Permit me to name three others, personally and intimately known to me, Leverett Brainard, Henry C. Robinson and Col. Frank W. Cheney.

"Whatever mistakes of judgment these men may have made in the course of their lives of public service, no one who knew them, no man of their day in Connecticut, ever doubted their absolute fidelity and integrity. Without the slightest prejudice to others, one may safely say that no man in Connecticut was more in the respect, confidence and honor of his fellow-citizens, no man more completely combined the virtues and the graces of an irreproachable gentleman, than Col. Frank Cheney. Rather than do a known wrong thing, in private or in public business, he would have cut off that arm shattered at the battle of Antietam. And it pleases somebodies, in the misuse of office and power, for motives which may be conjectured, to blacklist such names before the public; to attempt to discredit and dishonor the dead whom they cannot indict, and who can make no protest nor defense! . . . I, for one, wish to speak plainly for my dear dead friends, and to protest against what seems to me a heedless, if not wanton sacrilege. One would rather go to hell with some men than to heaven with others."

One of the fifty names in the list of those not indicted according to law, but, by this publication, indicted before the public by the press agent of the Washington officials, was that of the late J. Pierpont Morgan. Who that has read the facts believes that Mr. Morgan desired or intended either to defy the Attorney General or to rob the New Haven road? With our hindsight, we can say that in buying the New York, Westchester & Boston and putting that great burden on the New Haven's treasury he made a colossal blunder; but will the courts call that blunder a crime? These prosecutions began with an extremely silly mistake—the indictment of Mellen and Smithers for an alleged agreement not to waste millions of money in building useless railroads to Boston and Providence—and the gentlemen of the Department of Justice have been trying, ever since, to make amends by doing something that would prove to be really in the public interest. Thus far they have had no success. There is no sign of success in the future; and so, presumably, those of the New Haven men who are still living must face a two years' campaign in the courts, like that of the suit against the United States Steel Corporation—two years, or four years, or whatever number of years may be necessary for the government to find some way to let itself down softly.

Chief Justice White, in laying down a "rule of reason," has restored the courts to a position where, it is to be hoped, they can get along with the anti-trust law without killing the business of the country; but who can infuse reason into the Attorney General's department? R. Blanchard.

CHEMICAL SPECIFICATIONS FOR BRAKEBEAMS

Franklin, Pa.

To the Editor of the Railway Age Gazette:

In looking over the report of the American Railway Master Mechanics' Association for 1914, I note that progress has been made in the adoption of chemical specifications for various parts of the locomotives, but fail to find any for brakebeams. If there is any one part of a locomotive or car that demands the highest grade material it is the brakebeam. It is subject to many shocks and strains other than direct pulls, such as the emergency application and the vibrations due to chattering. A broken brakebeam means the loss of braking power on the car or locomotive tender to which it is attached, and this is an important factor in the case of high speed passenger trains; and a broken beam often causes derailments, wrecks and delays.

The chemical analysis of axles, wheels and other parts of railroad equipment has been given great thought and study, but today brakebeams are used which are made from scrap, without regard to its physical or chemical value. I know of one mill that is rolling sections for the solid type of beam from scrap steel axles. Inasmuch as the price of steel axles is not uniform, it is safe to assume that quality is not. This mill also rolls a section for the compression member of a trussed beam from scrap high carbon steel rails. From my knowledge of the material, I believe it is liable to fracture from shocks, such as an emergency application of the brakes and those incident to a chattering beam.

The chemical analysis of steel rails is not uniform, hence the strength and quality must vary. Steel of this character has gone through various heat treatments to bring it up to a standard required for the purpose for which it is first used, but the heat treatment it receives in the scrap reducing mill is crude and the cooling is governed by the temperature of the atmosphere; hence it is a material of unknown value, and a treacherous material in extremely cold and frosty weather. Would an engineer consider the use of shapes rolled from scrap axles and rails in the construction of railway equipment, bridges and skyscrapers? I think not. Then why use it for such an important and vital part as a brakebeam? I believe the American Railway Master Mechanics' Association and the Master Car Builders' Association committees on standards should determine by tests and investigation the analysis best adapted to withstand the shocks incident to the service of this device and recommend specifications, or at least, have specifications call for the best structural steel.

It is claimed by manufacturers that they test all beams, but I understand this test is only by a direct pull. I know of no beams being subject to a drop test, which would be similar to an emergency application of the brakes. B. Haskell, M. E.

After Effects of the War on Business and Railroads*

Railroads Basis of Country's Credit. Their Stability and Prosperity Must Be Protected In New Conditions

By James J. Hill

The business men of the country are occupying themselves, most properly, with efforts to adapt our interests to the great change of conditions resulting from the European war. Although outside the zone of conflict, we have to pay our tribute and bear our share of the burden. The government is promoting measures looking to the strengthening of our finances, the provision of a merchant marine and the raising of supplementary revenue. Everywhere there is thoughtful study of conditions. Only in mutual co-operation can the sacrifices which a great war imposes on all the nations be lightened. On the whole, the immediate crisis created by the war has been met with wisdom, and its necessary evils combatted with no small measure of success.

The country would, however, be foolish if it did not go further; if it did not examine some of the other needs which have thus far been put off until a more convenient season; if it did not, above all, consider the greater changes in industrial and financial conditions that must be the aftermath of a struggle on such a scale between the commercial countries, which, with us, have been the mainspring of the material progress of the world.

What is to happen when the war closes, leaving half a continent in ruins, killed or maimed industries, and dead and wounded men, the whole structure of the world's activity and intercourse to be rebuilt? What are to be the new conditions under which we as well as others will have to labor, and how may we by wise forethought at this time save ourselves from consequences which affect our own country as well as others, from mistakes that may well if not avoided write the name of the United States among those of the great sufferers by this war?

One common factor will enter into any adjustment after hostilities have ceased, no matter who may be victors. This is the relation of the supply of capital to the demand for it, and the effect of a changed situation in this respect upon the larger interests of the country, in common with the rest of the world. It would be criminal neglect not to consider this future, and make against it what provision we may be able to. For out of accumulated capital have arisen all the successes of industry and applied science, all the comforts and ameliorations of the common lot. Upon it the world must depend for the process of reconstruction in which all have to share. And the need of available capital in the period following the close of this war will constitute one of the greatest problems that the world has had to face.

NATIONS STRAINED THEIR CREDIT

Before the outbreak these warring countries had already strained their credit to the breaking point to provide for internal development and at the same time maintain their enormous military and naval establishments.

The combined debts of the five principal nations now fighting amounted in 1912 to more than $23,000,000,000. They borrowed several billions more in the following two years. Their expenditures during the continuance of hostilities run from $25,000,000 a day to twice that sum, according to the activity of movement. In the first 30 days their borrowings or anticipations of credit through note issues ran again into the billions. As soon as peace approaches, not only will all these expenditures and forced loans have to be consolidated and secured on some basis to avoid national bankruptcy, but the financial strain will really only have begun.

The billions upon billions' worth of property destroyed will have to be replaced. Granting that a sadder and a wiser world shall determine never again to permit the creation of mighty military establishments which can have no other use than the provoking of war, the amount of money and credit required merely to make good the ravages of the conflict is beyond estimate. Whole cities must be rebuilt. Whole agencies of commercial progress, like the German merchant marine, must be renewed. The annual production of wealth will be lessened by the total labor product of the million or more workers who have given their lives during the conflict. One conclusion stands out more prominently than any other when we come to consider the certain conditions following the conclusion of peace, no matter who triumphs and no matter what its terms. This is that there will be such a relative scarcity of available capital as the world has not seen for a century or more, while the demand for it will be greater than the world has ever known.

Cash and credit will, therefore, in the United States as elsewhere, command higher rates and be more difficult to obtain, probably, than within at least any recent experience. There can be no relief from outside, for the condition must be world-wide. Capital is the most cosmopolitan as well as the most fluid of all the world's resources. In ordinary times it flows instantly from point of supply to that of demand. The nation with a money surplus relieves that with a deficit. But this deficit will be as international as industry itself. The inequality of capital to the work to be performed will be a world condition. It may affect us almost as seriously as those whose homes and industries lie in ruins about them. And it is just this possibility that we should now acknowledge, study and endeavor to prevent.

The largest single industry in the United States is the tilling of the soil, and this will suffer least of all. Our farmers are gathering crops of unprecedented abundance, and marketing some of them at the highest prices received for many years. Whatever else the survivors of the war abroad may lack, they must have food. The farmer needs no considerable supply of extra capital. He has been, on the whole, helped or not hurt by this war, and it will continue to be so. And he is sure, through the working of the new banking law, of money enough to move his crops and finance his legitimate agricultural operations. So he may be dismissed with no more than such temporary and incidental relief as the passing circumstances of the present season may call for.

EFFECT ON RAILROADS

The next greatest industry is the operation of the railroads of the United States, and here we find a situation greatly different. The whole country has taken measures to assist interests immensely inferior. Our commerce is, most wisely, helped in every way possible to tide over the monetary interruptions of war. Our manufacturers are to be helped to reach their markets wherever possible, while movements are under way that will go far towards turning over to them a share of the business formerly done by some of the combatants who will not be in a position for years to come, if ever, to regain the trade that they have lost. But, while the President, in response to an appeal by a committee of business men, has expressed in general terms his opinion that the railroads should receive some consideration, nothing has been done nor is there immediate prospect of definite and effective action. Yet, without the railroad, without its unimpaired service and its constant extension and improvement, neither the farmer, nor the merchant, nor the manufacturer, nor the consumer, can prosper.

It should be obvious to every one that the railroads must be

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so treated that they can at least earn in part and borrow in part the vast sums which they are going to require. Unless they can earn, and earn more liberally than in the past, they could scarcely borrow even in such a market as that of the first six months of this year. In the financial market created as a consequence of this war, they will not be able to borrow at all, or only on unfavorable terms and to a limited extent. With pressure upon them from all sides for more wages, more taxes, more facilities, more kinds of costly service and more money to pay the salaries of state and national agencies charged with the never-ending task of investigation and inquisition, they cannot even maintain the unsatisfactory rate of earnings of their recent past. This is not the argument of an advocate for a cause; it is the conclusion drawn from official facts.

According to the latest figures given out by the Interstate Commerce Commission, which are those for the year 1913, the total par value of outstanding railway capital in the United States is only a little short of $20,000,000,000. Of the total capital stock, almost exactly one-third paid no dividend whatever. On over 10 per cent of the total funded debt no interest was paid. It will take some unusual inducement to tempt capital, even if over-abundant and seeking for investment, to loan in large volume an employment showing such a rate of return.

The work done by the railroads increased in 1913 in every direction. More passengers, more ton miles, more tons of freight per train mile, work and efficiency were growing. Yet the increase in total operating revenue was but $90,000,000 more than the increase in operating expense, leaving out of account the great increase in other items of expenditure. The present situation is disclosed by some quite reliable figures from other sources, which carry the facts down to a date later than that covered by the last complete official report.

The railroads east of the Mississippi and north of the Potomac and Ohio rivers, in their statement filed with the Interstate Commerce Commission this spring, show that in the last ten years population in their territory had increased 17 per cent, freight traffic 53 per cent, passenger traffic 42 per cent, and mileage only 6½ per cent.

The 35 principal railroads in this territory proved that since 1910 they had added $659,000,000 to their property investments, and that their net earnings were $16,311,000 less last year than they were then, although their gross earnings were $186,775,000 more. All had been eaten up by additional compulsory expenses and taxes. And this affects not merely the holders of stock, more widely diffused among persons of moderate means than ever before, but the more than 1,800,000 employees whose wages cannot be maintained if railroad earnings are reduced arbitrarily below a given point.

The Bureau of Railway News and Statistics has carried the figures right down to the present day. While they are not complete or official, yet, so far as they go, they are computed from reports received by the Interstate Commerce Commission. These show that for the fiscal year ended June 30, 1914, the gross operating revenues of the railroads of the United States were nearly $80,000,000 less than those of the year before. The ratio of operating expenses, which for 1913 reached the high figure of 69.40 per cent, went to 72.33 for 1914, and in the last six months of the year averaged 75.70. The total taxes paid by the railroads of the country were a little over $80,000,000 in 1907, and in 1914 they were nearly $142,000,000. Yet between 1907 and 1913 the average freight receipts of the railways of the country had been reduced from 7.59 to 7.29 miles per ton per mile, a reduction that meant to the railroads $90,000,000 lost revenue. During all this time, wages, supplies and pretty nearly every item on the expense list have shown a steady increase.

BILLIONS REQUIRED FOR PROGRESS

Now, these are the facts with which the railroads of the country are soon to confront the abnormal conditions that will follow the close of the great European war. Seven years ago a conservative calculation showed that they needed a new investment of five billion dollars, not to provide for future growth, but merely to do the business that was then offered to them. The need of such investment and the amount of it required to raise the facilities of the railroads to the level of the demands made upon them by the public have grown each year since then.

With the new stimulus which our people reasonably expect after peace is established, the new markets to be satisfied, the new demands filled, all involving additional demands upon the carrier, his machine will break down hopelessly unless it can be made more adequate. That can be done only by securing the investment of enough capital. It could not be done today if the supply of capital and the demand for it stood relatively as they did six months ago. To imagine that it can be done when there is such a poverty of available capital as there will be for ten, twenty, possibly more years to come, is absurd.

WHAT WILL FOREIGN INVESTORS DO?

What are likely to be the effects at home of conditions which surely approach, if no preventive is provided? There are probably $15,000,000,000 to $16,000,000,000 of American railroad securities held at home, and from $3,000,000,000 to $5,000,000,000 held abroad. What must happen to these securities if nothing is done?

To look only at the probable action of the foreign holder, so soon as the exchanges are opened once more, what is he likely to do with property averaging him a return of 4 or 5 per cent, in another country, when the reconstruction of industry at home is calling for all available capital at a much higher interest rate? What is likely to be the effect upon the railroads, upon the credit of the country, upon the gold supply and the whole financial system, if the holders of these securities are virtually compelled, as sound business men looking for the highest average rate of profit, to dump any such quantity of their holdings upon the markets of the United States? What must be the effect upon business, credit and banking of so profound a disturbance in the basis of such an enormous financial and industrial interest?

I have stated in outline the main facts of the after-the-war situation as it relates to the railroads. Through them it relates to every business and to every family and every man in the country.

The railroads require a loosening of the bonds which even in ordinary times clasp them so tightly that they cannot give to the public the best service of which they are capable. It needs no reversal of general policies, no unsettling of the relation between the railroads and the government, but an agreement upon just two things: First, a general permission to all the railroads to advance rates, if they find it necessary, to not to exceed a certain per cent of the rates at present in force; second, the assurance by common consent of the leaders of public opinion and political action that there will be no more legislation restricting railroad activities, lessening receipts or increasing their expenditures.

The magnitude and the urgency of this matter have not yet impressed themselves duly upon the people of this country. They have been too stunned by the awful and unexpected spectacle abroad, too absorbed in the progress of the most terrible event in history, too involved in study of the immediate consequences which had to be faced almost in the day that they were born, to realize the railroad situation in the new light thrown upon it by the lurid flames of conflict. But it cannot be relegated to a later time or an inferior place.

The railroad is the sap of the industrial tree. It is the speed regulator of industry. It is the thermometer of credit. Its stability, its prosperity, its ability to confront with confidence a totally new era in the capitalistic and credit conditions of the world, must be protected and assured. No duty devolving upon those who sit in the watch-tower of the world while nations sway and fall below them, studying how to guard ourselves against the calamities that their ambition and hate and faith in force threaten to send on us as well as on them, can take precedence of this.

Annual Meeting of Railway Fire Protection Association

Report of the Second Annual Meeting of This Association with Abstracts of Papers on Fire Prevention

The second annual convention of the Railway Fire Protection Association was held at the Hotel Raleigh, Washington, D. C., on October 6 and 7. The meeting was called to order by President F. H. Elmore, superintendent of insurance of the Southern Railway. In his address, the president called attention to the preliminary work to which the association's first year had been devoted and noted that the real work of the society, to prescribe the methods of fire protection, had hardly been begun. He emphasized the necessity of co-operation, first, on the part of members in their relations with the various committees, and, second, on the part of the society towards the operating department, expressing the opinion that once the interest and support of the operating officer were secured, accomplishment would be assured. The real work of the society, therefore, he said, lies in devising practical, economic and effective ways and means for the protection of and the prevention of loss to property. Its province is to develop standard practices and to play the part in the railway field that the National Fire Protection Association plays in industry in general; it must prove to the operating officer and to the latter association that it is the authority in its branch of the subject.

The report of the executive committee showed that the society had increased its membership approximately 57 per cent, and recommended the establishment of a number of new committees.

The Committee on Fire Hazards, Charles N. Rambo (Norfolk & Western) chairman, presented a report, from which the following is abstracted:

The Committee on Fire Hazards has not attempted to ascertain the causes of fire, but rather to consider some of the common hazards that exist and to prepare standards for correction or elimination. It has put its recommendations in the form of bulletins of the Committee on Fire Hazards and proposes that they be improved upon, if necessary, and adopted as standards, possibly in the form of a "Manual" or "General Code" on fire prevention. During the year the committee has prepared six bulletins.

Bulletin No. 1 giving general recommendations for the prevention of fire losses, deals primarily with buildings and is subdivided into four sections: Construction, Care of Property, Lighting, Heating and Power.

Bulletin No. 2 relates to the hazard of locomotive sparks. The members of the committee, without exception, believe one of the greatest hazards to contend with in connection with railroad risk is that of the spark hazard, and it has, therefore, through a sub-committee, gone into the subject very minutely. The bulletin aims primarily toward the elimination of the hazard and invites uniformity of action in connection with the proposed maintenance safeguards. The bulletin is given herewith almost in full:

The hazard of locomotive sparks and the consequent fire damage to railroad and other property has received special study by the railroads and insurance companies.

It seems to us that this subject having been given such careful thought and attention by the departments of railroads vitally interested, is one in relation to which your committee should consider positive means of eradication of the hazard, rather than some of the auxiliary methods that have been pursued to lessen the result of the hazard. By the former is meant that the principal place to offset this hazard is in the roundhouse and shops in keeping the screens, fittings, front end appliances, ash pans and dampers up to the standard as set forth in the blue prints of most railroads. By the latter we mean corrections in construction of buildings, such as has been undertaken in the past through the substitution of a better class of roof coverings, the avoidance of unnecessary pockets in roofs for the accumulation of sparks, etc., the cutting of weeds in the vicinity of railroad property, digging of ditches, cutting of avenues in timber tracts and the application of fire resistive coatings to woodwork exposed or subject to lodgment of sparks or hot coals; and by keeping the ties and stringers on bridges and trestles in good order.

While sparks from smoke stacks or cinders from ash pans may be classed as the primary cause of fires started in this way, the secondary cause is running with damper doors not entirely closed. What may also be termed secondary is the bad condition of shingle roofs, platforms, trestles, roofs of wooden cars, exposed inflammable merchandise in cars, or rubbish about buildings. If the secondary causes were taken care of the result through the primary cause would be reduced to a minimum.

The various motive power departments of the railroads, as well as the Master Mechanics' Association, have given this matter a great deal of consideration and standards have been adopted which, it has been believed, would give generally satisfactory results, by meeting both the conditions of service and minimizing the hazard. On some of the large railroads severe service tests have been made; spark arresters have been given careful constructive consideration, and in many instances the losses from sparks have been greatly decreased. It is a question for the committee to emphasize whether it may not be possible in the future to eliminate fires from this cause entirely. It seems to be a question for the master mechanics, shop and roundhouse foremen to solve by periodical inspection and careful maintenance, as we who are studying the prevention of loss by fire, must necessarily defer to a large extent any investigation of or judgment as to the correction or elimination of the spark hazard to those dealing more directly with the mechanical contrivance concerned.

The main point that this committee can emphasize, therefore, is the importance of the inspection of spark arresters and ash pans; not a haphazard inspection, but an examination of the screen to see if it is stripped or worn out; if the wires are spread, if the fittings around the sides of manhole cover, the nozzle and steam pipes are tight; to see if the ash pan dampers, damper controlling devices and the extension of pan outside of mud ring are in good order. There should be a weekly inspection of all engines and a duly authorized form of report provided, on which the signature of the inspector making the examination should be recorded. There should also be an inspection when any repairs are completed and the locomotive again turned over for road service with the corresponding signature of the inspector making the final inspection. In addition to this, we would recommend that efficiency committees be authorized to check up the inspectors. We also recommend that whenever fires occur on or near the right of way, alleged to be caused by sparks, a report be immediately made of the condition of the spark arresters and ash pans of the locomotives passing the location several hours prior to the fire and that such report be checked against the last weekly inspection of these engines. We also recommend the following as a systematic method of dealing with the subject:

"Master mechanics and engine house foremen should see that all locomotives are properly inspected after each trip, and that any defects in ash pans or ash pan gear are properly reported on special form for that purpose and repairs made.

"Weekly, or at staybolt or boiler wash period, the front end of locomotive must be opened and examined and a special examination of ash pans made. The condition of front ends and ash pans must not only be reported on special form for that purpose, if repairs are necessary, but the condition as found must be carefully noted in book or blank form and signed for by the inspector or inspectors actually making the inspection.

"If repairs are necessary, the front end and ash pans must be

re-inspected upon completion of repairs and proper notations as to condition made in the book or blank provided for that purpose and signed by the inspector actually making inspection.

"Books or blanks when filled should be forwarded to the master mechanic upon whose division the locomotive has been in service, and he will send them to the superintendent of motive power."

Accompanying these suggestions is the blank form of report recommended for use.

We believe with a uniformity in respect to careful maintenance of the corrective influences that have been devised that much can be done in preventing the large fire waste caused by flying sparks. This, however, must receive careful individual co-operation on the part of all railroads and then the motive power departments, and our hope is that we may be able in the future to acknowledge the result of the work of some inventive mind that will bring about the entire elimination of fires caused by sparks thrown from the smoke stacks of locomotives.

Bulletin No. 3 gives general recommendations in connection with chimney flues, stoves and furnaces. Bulletin No. 4 relates to boiler houses, boiler settings and boiler stacks.

Bulletin No. 5 deals with the storage of railway fusees and torpedoes. The handling of these supplies possibly has not resulted in any serious fire loss, but there have been sufficient damage resulting from lack of care and difference of opinion as to proper methods to lead the committee to take up the subject with a view to possible improvements. An abstract of the bulletin follows:

Railway fusees and track torpedoes are classed in the group of "Less Dangerous Explosives" as fireworks; more specifically fusees as "Common Fireworks" and torpedoes as "Special Fireworks" with placards "Inflammable," "Handle Carefully" and "Keep Fire Away."

The hazard of railway fusees and torpedoes is recognized by the "Bureau of Explosives," to whom due acknowledgment is given for suggestions as to handling or storage.

Fusees when handled in original unbroken shipping packages in quantities at distribution centers should be stored in a small magazine, preferably 40 feet from other buildings or lumber. The magazine should be lightly constructed and covered inside and out with incombustible material. It should keep out rain, snow and sparks, and should be provided with a ventilator. No artificial means of heating or lighting should be employed. The magazine should be sufficiently dry if supported on posts or pilings a foot or more from the ground, and so arranged that there is free circulation of air beneath.

Not more than four gross of fusees should be kept in the general storehouse at one time. Any broken packages should be kept in a tight metal lined or asbestos board lined wood box with a spring hinge or self-closing cover. This box should be used for no other purpose and kept in a dry place, not in proximity to any artificial source of light or heat.

Torpedoes when handled in original unbroken shipping packages in quantities at distribution centers should be stored in a separate magazine similar to that used for fusees.

Not more than ten gross of torpedoes should be kept in the general storehouse at any time. Broken packages or loose torpedoes should be kept in a tight asbestos board lined wood box, with sliding cover, used for no other purpose. A sliding cover is recommended in preference to a drop hinged cover to prevent premature explosions in case a torpedo should rest over the edge of the box. The box should be kept in a dry place not in proximity to any artificial source of light or heat, and care should be taken to prevent the accidental dropping of torpedoes on floors where they might be stepped on or run over by trucks.

Placard all magazines and storage boxes: "Explosives—Handle Carefully—Keep Fire Away." Do not store fusees and torpedoes in same magazine or box. Do not store fusees and torpedoes with other explosives or inflammables. Exercise care in keeping fusees dry—improperly made fusees if damp are liable to spontaneous ignition. Broken, wet or oily fusees should be destroyed by burning. Broken or defective torpedoes should be destroyed by immersion in water.

We suggest as a suitable receptacle for such loose supplies as have been obtained by trainmen from storehouses a small metal or rectangular shaped wood box with spring hinged cover. The box should be only large enough to hold the requisite number of fusees and one end partitioned off for torpedoes. In cabooses racks may be used to advantage for fusees.

The above suggestions are not meant to interfere with any special and safe practice now followed, such as that relating to trainmen's metal receptacles as are now used for carrying flags, fusees and torpedoes.

Bulletin No. 6 deals with storage and handling of small oil supplies at miscellaneous properties. An abstract follows:

One of the greatest hazards is the storage of oil without proper safeguards, and this undoubtedly is one of the most difficult hazards to guard against.

On railroads having little fire prevention supervision, small supplies of oil will be found scattered around throughout the various station buildings, the quantity and location depending on the convenience of the user. At many places the oil supplies will be surrounded by an oil soaked floor and small quantities of oily waste or rags will be in evidence, no thought whatsoever being given to the hazard involved. The danger of such storage without proper precautions is evident, particularly where floors become thoroughly saturated from constant lamp filling drippings.

The fire loss records show that too little attention is being paid to safeguarding the country stations against loss; and a study of this subject will show that a large percentage of fires in them are of unknown origin. Many agents use oil for illuminating purposes; many also take care of signal lights, and in some cases they keep a supply of gasoline for cooking and motor car purposes. Sometimes this oil is kept outside of buildings, but more often it is found stored in the coal bin, or in one corner of the freight room, and quite frequently with records or in concealed places like closets underneath stairways.

The hazard of spontaneous ignition is often present with improper oil storage and handling, for although pure mineral oils in combination with cotton or oily waste or rags will not oxidize and the hazard of spontaneous ignition is not present when they are used, they are often adulterated with vegetable or animal oils and therefore the presence of oily waste in railroad properties is always a menace.

We therefore make the following suggestions and recommendations: Oil storage of every nature at properties other than standard oil houses, wherever possible, should be entirely removed from station buildings and other properties and housed in a separate and inexpensive structure built expressly for that purpose, in a portion of which provision can also be made for the coal supply. This combination coal and oil house should be located a sufficient distance from all other properties to permit possible destruction by fire without endangering any other structure, but not far enough away to be inconvenient. All lamps and lanterns should be filled and trimmed in this structure.

The use of ordinary metal trays or sand boxes is better than allowing cans of oil to set on wooden floors of freight house, but your committee recommends that a separate, isolated coal and oil house be given preference and that if for any reason this cannot be arranged or wherever it becomes impracticable to construct a separate building, a metal lined oil cabinet be installed in the freight room.

Regardless of where or how oil is stored a supply of fine dry sand for extinguishing fires should always be on hand.

At large terminal warehouses, where electricity is used oil is frequently kept in buildings (generally in the basement) often in large quantities, for use in car heaters during the winter months or for oiling warehouse trucks, etc. No matter what precautions are taken to guard against fire the danger is too great for the values at risk. It is recommended in such instances that a separate building be constructed similar to that suggested for station

buildings and miscellaneous properties. Where it is felt that a large expense is warranted, or the city ordinances or fire authorities prohibit the construction of a wooden building, a brick oil house should be built.

In the report of the Committee on Statistics and Forms, presented by B. F. James (Colorado & Southern), chairman, there were submitted several forms as follows: Causes of fires; classification of property losses; telegraphic advice of fire; detailed report of fire (by mail); card notice of fire to be thrown off by trainmen notifying section men of fire; local fire prevention report; fire department drill report; fire inspector's report.

Two of these had been used by the committee in connection with its work in the past year, and it was ascertained that the fires in the past five years on the roads investigated (ranging from 19 roads operating 27,396 miles in 1909 to 28 operating 39,576 miles in 1913) were traceable to the following causes:

Unknown	44.29 per cent
Sparks from engines	20.47 per cent
Heating appliances and flues	6.17 per cent
Caught from adjacent property	4.55 per cent
Tramps and trespassers	3.87 per cent
Incendiary	2.79 per cent
Coals dropped by engines	2.45 per cent
All other causes	15.41 per cent

The total fires in these five years numbered 10,160, the total loss was, including railroad property and lading liability, $5,840,644, an average of $574.86 per fire.

The report on Fire Fighting Organization presented by E. B. Berry (Southern Railway) chairman, emphasized the necessity of forming fire fighting brigades and of regular drills at frequent intervals.

The report on Fire Fighting Apparatus presented by B. S. Mace (B. & O.) chairman, treated primarily of the apparatus used or needed at local freight and passenger stations, at coaling stations and on engines and cars. A brief description was given of the practices that are generally followed on most roads and various recommendations were made for the further extension of good practices or for the remedying of bad ones.

The officers of the association were re-elected to serve for the following year. They are: President, F. H. Elmore, Southern Railway; vice-president, P. Hevener, Chicago, Rock Island & Pacific; secretary and treasurer, C. B. Edwards, Mobile & Ohio.

New executive committee members were chosen as follows: One year, C. S. Sherwin, Missouri, Kansas & Texas; three years, B. F. James, Colorado & Southern; C. N. Rambo, Norfolk & Western.

FORTY-TON ELECTRIC FREIGHT-YARD CRANE

The illustrations show a modern transfer crane installed at the "West Yard" of the New York, New Haven & Hartford in Providence, R. I., a four-motor electric traveling gantry crane with a main lift of 40 tons, and a higher speed auxiliary hoist of 5 tons capacity. The span from center to center of runway rails is 55 ft. 6 in. This covers a wide driveway and two tracks, while the range of crane travel is approximately 300 ft. About 12 or 15 cars can be set for unloading at one time. In Fig. 1 the crane is shown with a fairly heavy load on the main hook and of a character necessitating careful handling to avoid damage.

The other illustration (Fig. 2) shows how a wide-awake shipper has taken advantage of the new facilities. A certain scrap dealer in Providence ships quantities of metal turnings and filings, collected from numerous machine shops. Before this crane was available, these turnings were all shoveled by hand from wagon to car, holding the team and two men for from one to one and one-half hours for each load, as it was, indeed, hard digging. Now, however, by the use of the removable wagon

Fig. 1—Electric Traveling Crane in the Yard of the New York, New Haven & Hartford at Providence, Rhode Island

body, as shown, the load is transferred to the car in five minutes; and with no other labor than the driver can himself perform.

The wagon body has a hinged tail-board, the latch of which is released by pulling on the rope which is held by the teamster.

The saving in time and labor in a single operation is a comparatively small item, considered by itself, but multiplied many times a day there is a substantial gain for both the railroad and the shipper. Not the least of the benefits to the railroad, when freight traffic is brisk, is the earlier release of inbound cars.

The number of teams using the crane averages perhaps twenty

Fig. 2—Loaded Wagon-body, to be Emptied into Gondola

a day, using it to unload or load structural steel and other building materials, heavy machinery, etc.

The cost of this crane, installed, including foundations, was about $14,000; and the expense of operation is about $100 monthly.

This crane was built and erected by the Shaw Electric Crane Company, a subsidiary of Manning, Maxwell & Moore, Inc., New York. Alternating current motors are used, protected by weather-tight housings; and electric power is supplied from the central station service.

Irregular Express Service on the Trans-Siberian.—As evidence of and owing to irregularity of the express service on the Trans-Siberian route, caused by the present situation in Europe, the Korea-Manchuria express between Fusan and Changchun, on the Korean Railways, which has hitherto been operated three times a week, will be run once a week for the time being.

ANNUAL REPORT OF SPECIAL COMMITTEE

The special committee of the American Railway Association on relations of railway operation to legislation, W. J. Jackson, chairman, under date of November 3, has issued Report No. 13, which includes the following:

Two hundred and forty-two roads (227,141 miles) are supporting the work of the committee. The sub-committees have been continued, viz.: (1) officers of the mechanical departments; (2) enginering officers; (3) signal officers.

Practically all the individual bills relating to railway operation have been combined in a single bill giving the Interstate Commerce Commission authority to require the installation, under certain conditions, of block signal systems, automatic train stops, and steel passenger equipment, and authorizing the commission to designate the type of headlights to be used; to investigate roadbed, track, equipment and facilities, and to direct changes, improvements and repairs. This bill has not yet been reported out of committee, but it is probable that this is the form which any legislation on this subject will take. Your committee has obtained the views of a very large number of operating officers on this bill, and is prepared to present the conclusions of the railways on the subject when opportunity offers.

To ascertain the extent of the financial burden placed upon the railways by legislation affecting operation, your committee recommends separation of accounts to enable each road to know definitely the precise amount which it is obliged to pay out by reason of such legislation.

Since the last report no bill has passed both houses of Congress.

A bill changing the penalty clause in the hours of service act has passed the House of Representatives, and is pending in the Senate. If this becomes law, the penalty for violation of that act will be not less than $100 nor more than $500, instead of not more than $500, as at present.

An agreement has been reached with the chief inspector of locomotive boilers as to setting a factor of safety for boilers in service prior to January 1, 1912, and the necessary changes in the rules were promulgated by the commission on June 9, 1914. A bill is pending in Congress extending the jurisdiction of the bureau of locomotive boiler inspection over all parts of the locomotive. The railways have appeared in opposition to this bill.

In April, 1914, a committee of the American Society of Mechanical Engineers proposed a code for the construction, maintenance and inspection of stationary boilers, and offered a draft of a typical law enforcing such code. In view of the inclusion of a number of requirements which were not in harmony with the experience of the railways, the matter was discussed with the responsible officers of the American Society of Mechanical Engineers, and it is thought that the code in question will be materially modified. Your committee, however, has not felt that it should give even tentative approval to any proposed legislation on this subject. . . .

The number of steel and steel underframe passenger equipment cars constructed in the United States in the calendar year 1914, was 3,129, bringing the total number of these cars in existence to approximately 14,100. This latter figure compares with 1,302 such cars in service January 1, 1909.

Your committee on July 11, 1914, bulletin No. 63, containing a revised arrangement for the telegraphic notification of accidents to the safety division of the Interstate Commerce Commission and the bureau of locomotive boiler inspection, together with a cipher code adapted for this purpose. There has been an extremely heavy demand for this bulletin, which was issued with the consent or approval of the heads of both of the departments named above.

Presentation of the railways' case before the Interstate Commerce Commission in the private car investigation, was concluded in June, 1914. The total expense was $6,129. . . .

During 1915, the legislatures of 43 states will be in session. Your committee has decided to maintain the arrangement of

keeping itself informed of all bills affecting railway operation introduced and passed in all states, and will arrange to notify its supporters of them. Your committee feels that in the states where state committees have been organized, the work done by such committees has been extremely beneficial to the general movement. Their continuance during the session of the legislatures which meet next year is strongly recommended.

An appendix to the report, filling ten pages, gives an abstract of all legislation pending before Congress.

STEAM LOCOMOTIVES OF TODAY

The sub-committee of the railroad committee of the American Society of Mechanical Engineers has prepared a report in the form of a paper for presentation at the annual meeting. The report is signed by G. M. Basford, F. H. Clark and W. F. Kiesel, Jr., and will be presented in the afternoon of Wednesday, December 2, 1914, at the rooms of the society, 29 West 39th street, New York, when a full discussion is invited. The report in full is given below:

Recent progress and improvement in the efficiency and capacity of steam locomotives has been of such remarkable character and extent that a record in the proceedings of this society is justified.

Steam and electric locomotives as rivals in the same field has been a favorite subject for discussion before engineering societies, and it is easy to start arguments in favor of each of these rivals among the partisans interested. Whether or not the steam locomotive is to be displaced by the electric is, of course, an important question which will in time be settled by the court that settles all such questions, that of the treasurer's figures. For the present and for the immediate future the burden of transportation falls and will continue to fall upon the steam locomotive. If the steam locomotive is to be perpetuated it is fitting that it should be improved to the utmost limit. If it is to be finally displaced it is fitting that it shall be so improved in order that progress to something better shall be intelligently developed upon a solid foundation. This discussion will be confined to the steam locomotive, its progress in the recent past, and its possibilities for the near future.

PROGRESS IN CAPACITY

While efforts individual in character and extent were made in this country before that time, the first consistent and systematic plan to secure the utmost power of locomotives within given restrictions of weight and cross-section clearance was inaugurated 20 years ago. This plan began with an eight-wheel or American type passenger locomotive, built for an eastern railroad in January, 1895. This locomotive weighed 116,000 lb., with 74,500 lb. on driving wheels. It provided a tractive effort of 21,290 lb. While this locomotive was not the most powerful in passenger service at that time, it was the first of a chain of passenger locomotives leading in a connected series by the same builders, up to and including recent designs of the Mountain type, representing the largest passenger type of present practice. This type has four-wheel leading trucks, eight driving wheels and two trailing wheels. The largest of the Mountain type weighs 331,500 lb. with 240,000 lb. on driving wheels and produces a tractive effort of 58,000 lb., or about three times the tractive effort of the first design of the series built during a period of 20 years.

In the year 1898 the engineering and railroad world was interested by the appearance of the largest and most powerful locomotive built up to that time. This was of the Consolidation type with a two-wheel leading truck and eight driving wheels. This locomotive was built in Pittsburgh, and for a number of years was the largest and most powerful of its type, and the largest and most powerful locomotive in the world. Its total weight is 330,000 lb., weight on drivers 208,000 lb. and tractive effort 53,300 lb.

Today the most powerful freight locomotive has two leading and two trailing wheels and 24 driving wheels. It gives a tractive effort of 160,000 lb. and weighs 410 tons. This locomotive has hauled a train of 251 freight cars weighing 17,912 tons, exclusive of the locomotive. The total length of the train was 1.6 miles, the maximum speed attained was 14 miles per hour. This required a maximum drawbar pull of 130,000 lb. This locomotive has six cylinders and three groups of driving wheels.

A freight locomotive has recently been built having two cylinders and a single group of driving wheels which develops a tractive effort of 84,500 lb. Such has been the progress in capacity.

This progress has been rapid, perhaps somewhat too rapid with respect to improvements in operating facilities and progress in other features of railroad equipment. It has been rendered possible by corresponding developments of factors making for greater efficiency in boilers and in engines. During the past 20 years in this country locomotive development in capacity and in efficiency, particularly during the past five years with respect to efficiency, has been remarkable, and is worthy of record with progress in marine and stationary engineering.

In Europe the relatively high cost of fuel led to efforts to improve efficiency before this problem aroused serious attention in this country, but physical limitations more rigidly restricted the size and weight of locomotives in Europe. Our problem is to secure maximum efficiency combined with great size, great weight and great power which is more difficult. Since the development in the size and weight has been tremendous, even though these limits may not yet have been reached, it is now appropriate to concentrate on efficiency.

For a number of years the physical capacity of the fireman to shovel horsepower through the fire door determined the capacity of the locomotive at speeds. Mechanical stokers have removed that limitation. It is now possible to fire six tons, and more, of coal per hour into a locomotive firebox. This has changed the problem into one of getting the maximum amount of heat out of the coal and using it economically in the cylinders. With the large figures now prevailing for drawbar pull and weight it is fitting that closest attention should be given to the best possible use of every pound of metal and every pound of coal. Due to recent application of several economy producing and capacity increasing factors great improvements have already been made with promise of more to come.

Among these economy producing and capacity increasing factors are the following improvements:

- Boiler design in the relationships of the factors making up heating surface;
- Firebox design;
- Front end design, draft appliances, exhaust nozzles;
- Ashpan design as to air openings;
- Superheating;
- Compounding;
- Feedwater heating;
- Firebrick arches and circulating supporting tubes;
- Valve gear;
- Detail design to secure reduced weight of reciprocating parts and other parts;
- Use of high-grade alloy steels to reduce weights;
- Mechanical stokers;
- Labor-saving devices for the engineman and fireman;
- Improved counterbalancing to permit of greater weight on driving wheels by reducing dynamic stresses.

And yet to come is powdered fuel with possibilities unknown in scope and in importance. Powdered fuel is in reserve, promising the ideal method of complete combustion under control more perfect than is possible with present methods other than oil burning and perhaps with economies impossible to obtain with oil.

PROGRESS IN EFFICIENCY

Valuable comparisons may be drawn from the best results of ten years ago and of today. At the Louisiana Purchase Exposition in 1904 the tests made by the Pennsylvania Railroad revealed important figures concerning locomotive performance at

that time. It was shown to be possible to obtain equivalent evaporation from and at 212 deg. of 16.4 lb. of water per sq. ft. of heating surface, indicating the power of locomotive boilers when forced. It was shown that when the power was low, the evaporation per pound of coal was between 10 and 12 lb., whereas the evaporation declined to approximately two-thirds of these values when the boiler was forced. These results compared favorably with those obtained in good stationary practice, whereas the rate of evaporation in stationary practice lies usually from 4 to 7 lb. of water per sq. ft. of heating surface per hour. In steam consumption the St. Louis tests showed a minimum of 16.6 lb. of steam per i. hp. per hour. In coal economy the lowest figure was 2.01 lb. of coal per i. hp., the minimum figure for coal per dynamometer horsepower was 2.14 lb. These records were made after the superheater had become a factor in locomotive practice and they represent economies attained by aid of the superheater in one of its early applications. This is important in the light of the recent development of the superheater. These remarkable figures have never received the attention which they deserve from engineers. They serve, however, to show that 10 years ago a steam locomotive had attained results which were worthy of the best attention of the engineers of the time. Since then greater progress has been made and today locomotives of larger capacity than those concerned in the St. Louis tests have given better results.

Voluminous records of recent investigations of locomotive performance taken from the Pennsylvania Railroad test plant at Altoona show that the best record of dry fuel per i. hp. hour down to the present date is 1.8 lb., with a large number of less than 2 lb., while the best performance in dry steam per i. hp. hour is 14.6 lb. with a large number less than 16 lb. A reduction of 10 per cent in fuel and 12 per cent in water is remarkable as the result of a development of 10 years. This coal performance was recorded by a class E6S Pennsylvania Railroad locomotive while running at 320 r. p. m. and developing 1,245.1 i. hp. The same locomotive gave a fuel rate of 1.9 lb. while running at the same speed and developing 1,750.9 i. hp. The best water rate was given by a class K2SA Pennsylvania Railroad locomotive while running at 320 r. p. m. and developing 2,033.1 i. hp. These high powers indicate that the locomotives were not coddled as to output of power in order to show high efficiencies, but that high efficiencies accompany actual conditions of operation in severe service. As to power capacity expressed in terms of evaporation, it is interesting to note that the maximum equivalent evaporation from and at 212 deg. per sq. ft. of heating surface per hour on the Altoona test plant is 23.3 lb. These figures of high efficiency were obtained from locomotives which represented not only very careful, general and detail design, but their design included several of the improvements making for greater capacity and higher efficiency.

Having in mind the facts that steam locomotives are power plants on wheels, built to meet rigid limitations of weight, both static and dynamic, and that the use of condensers is impossible, engineers in general must admit the high character of the work of locomotive designers which has attained these results.

Greater efficiency, which is revealed on the test plant and through reports of engineers, would be important because it proves that progress is being made in the possibilities of locomotive performance. Improvement which is revealed by operating statistics and which, therefore, appears in the records of the treasurer's office is the real test in this case. It is important to know that increased power of locomotives, attained largely through the development of economy-producing and capacity-increasing factors, has produced results which the financial reports of railroads prove beyond question. A recently published list of train tonnage on 45 prominent railroads indicates that 16 of these roads have increased their average freight trainloads by over 30 per cent during the last five years. Credit must be given to the improvement in the locomotive for most of this development. These figures reveal the value of increased power and efficiency of steam locomotives and the end is not yet in sight.

WHAT REMAINS TO BE DONE

American locomotive development to its present state would have been impossible without the use of the improvements already mentioned. It is believed that all these are capable of still further development, making for still greater economy in the use of fuel and, therefore, promising greater power capacity. It is the object of the committee to present these possibilities for discussion by those who are engaged in perfecting and improving steam locomotive practice in this country. It is the hope of the committee that engineers who are devoting their attention to the design of locomotives as a whole and those who are engaged in the development of the various details which have contributed to the high efficiency of the steam locomotive of today will discuss the progress of the recent past and reveal possibilities for future development and improvement in capacity and efficiency.

RAILWAY AFFAIRS IN OTHER COUNTRIES

A despatch from London under date of October 31 states that the directors of the Central Argentine Railway (owned by English interests) have decided to raise immediately $5,000,000 of new capital by the issue of 6 per cent three-year notes at par. These notes will be offered to existing stockholders, and are already quoted at 1 per cent premium. Most of the railroads in Argentina, however, are at the present time meeting with financial difficulty, partly because of the war and partly because of a poor agricultural year. The Buenos Ayres Pacific which paid 3 per cent dividends last year, has passed its dividends. The Central Argentine, the Buenos Ayres Great Southern and the Buenos Ayres Western have likewise reduced their dividends. The Argentine Railway, one of the Farquhar companies has fared even worse. This company, which was formed in 1912 by Percival Farquhar, has control of the Cordoba Central and large interests in the Entre Rios, the Argentine North Eastern and the Province of Santa Fe Railway. It is now understood that the first two lines will break away from the control of the Argentine Railway, and it is also stated that the latter will have difficulty in meeting $7,500,000 of 6 per cent notes falling due in February, 1915.

The mileage of the South Australian state railways on June 30, 1914, was 1,845, of which 1,052 miles was of 3 ft. 6 in. gage, 85 miles more than on June 30, 1913, and 793 miles was of 5 ft. 3 in. gage, 70 miles having been added during the year. The railway administration also operates under agreement with the Australian government an additional 478 miles of 3 ft. 6 in. gage railway from Port Augusta north to Oodnadatta almost on the Northern Territory line. There are also 463 miles of line authorized or in course of construction. In the fiscal year ended June 30, 1914, the South Australian Railways, exclusive of the Port Augusta-Oodnadatta line earned a total of $11,349,040, of which $3,657,067 was passenger train revenue, $7,456,149 freight train revenue, including $3,125,649 received for the carrying of minerals, and $245,775 miscellaneous revenue, such as wharfage, rents, etc. There were increases in all items of traffic except wheat and livestock and the total earnings, $558,001 greater than in the fiscal year ended June 30, 1913, constituted a new record. The total expenditure, on the other hand, was $7,318,028, $544,271 greater than in 1913. The net revenue of $4,042,772 was equal to 5.33 per cent on a capital expenditure of $75,812,740 on average mileage open. From this net revenue there were deducted interest charges of $2,753,175, chargeable to the railways by the government at the rate of 3⅞ per cent. The surplus for the year was $1,287,874, or $1,319,738, including the balance to credit of profit and loss on the Port Augusta-Oodnadatta line; and the administration's total surplus on June 30, 1914 was $2,593,544. The South Australian Railways in 1914 carried 19,809,533 passengers an average distance of 11.95 miles. The total revenue freight tonnage was 15,082,769, of which 1,617,804 tons were minerals, 300,579 wheat, 26,089 wool, 110,762 livestock and 1,048,237 other commodities. The total earnings per mile open were $6,250.

Eighth Conference of the Western Economic Society

Report of Meeting Devoted to Subject of "American Railway Problems" With Brief Abstracts of Papers

The eighth conference of the Western Economic Society was held at the Hotel Sherman, Chicago, on November 13 and 14, and was devoted to the subject "American Railway Problems." Various topics pertaining to some of the principal problems involving railway regulation, were assigned to prominent authorities on the various subjects for prepared papers, and each was followed by a general discussion. Following is a brief summary of some of the papers of interest to railway men:

VALUATION FOR RATE REGULATION

Pierce Butler, valuation counsel of the western group of railways, presented a paper on "The Valuation of Railway Property for Purposes of Rate Regulation." Mr. Butler said that the ascertainment of the value of a thing, whether it be a vacant lot or railroad property, is the determination of a fact, and that the same property cannot be of two or more different values at one time. Reliable knowledge concerning the value of railroad property may be useful for various purposes, for example, as a basis for taxation, as a guide to investors in railroad securities, as an aid to the public control of the issuance of stock and bonds, as an aid to test the reasonableness of the general level of rates, and as a guide for further legislation. It is, however, a mistake to suppose that railroad rates are, or as a practical matter can be, *made* or *based upon* the value of the property used to render the service. In rate cases involving the question of confiscation, the value of the property is an essential fact, but a rate only high enough to be nonconfiscatory may be much below what is reasonable.

The federal valuation act requires the commission to ascertain and report value, and also to report in detail many facts and much information, so that data may be at hand for the application of whatever principles of valuation may finally be adopted. The value required to be ascertained is not for any particular purpose, so it may become involved in rate-making, in rate-judging, in taxation, in accounting, in capitalization, in public purchase, in sales of securities and it may be used as a guide to future legislation, but it is value in its broadest sense that must be found and reported.

The substitution of cost for value and the making of rates on that basis would unjustly deny reward and profit to the owners of the best railroads of the country, and amount to seizure of the use of private property without just compensation. There is no foundation for the suggestion that there exists between the public and each railroad carrier the relation of principal and agent or beneficiary and trustee. The title to railroad property is not held either in whole or in part, for the use or benefit of the public. The company has the full title and ownership.

VALUATION FOR TAXATION

T. S. Adams, member of the Wisconsin Tax Commission and secretary of the National Tax Association, presented a paper on "Valuation of Railway Property for Purposes of Taxation." Mr. Adams said that the aim or goal of valuation for purposes of taxation is in most states to find the price at which property would sell under normal conditions. What the property cost has, in this connection, no necessary significance. This fact, he said, distinguishes tax valuation from valuation for purposes of rate regulation. Valuation for taxation depends primarily upon earnings, and earnings in turn depend upon rates. It is obvious that no such valuation can be employed for the purpose of regulating or changing rates. For the same reason that local valuation of railway property is bad, state valuation of railway property could advantageously be replaced by federal valuation, or better still, by co-operative valuation on the part of the state governments acting jointly, or through some central bureau maintained by them. Such control, he urged, should certainly go to the promulgation of binding and uniform rules regarding the allocation or apportionment of revenues and expenditures to the various states. At present there is no uniformity of practice. This is preeminently a task for the Interstate Commerce Commission. In his opinion, however, such control by the superior jurisdiction should not go to the length of replacing state by federal taxes.

IMPROVEMENTS MADE FROM EARNINGS

Albert W. Bullard, of E. H. Rollins & Sons, presented a paper on the subject "Shall Improvements Made From Earnings be Capitalized or Included in Valuation?" His conclusions were summarized as follows: That net earnings are the property of the stockholders, and, therefore, property acquired with net earnings is likewise the property of the stockholders. That it is better to invest a portion of the earnings in improvements, and subsequently capitalize them after a liberal surplus has been created than to pay out all net earnings in cash dividends and sell securities to provide funds for all improvements. That valuation has to do with the property owned and not the source from which funds to acquire it were obtained, and therefore, property obtained from net earnings should be included in a valuation for any purpose.

RAILWAY ACCIDENTS AND SAFETY FIRST

Ralph C. Richards, general claim agent and chairman of the Central Safety Committee of the Chicago & North Western, presented a paper on "Railway Accidents and Safety First." which was illustrated with lantern slides and charts illustrating the safety first work on the North Western and accident statistics of the railways of the United States. He said that for all practical purposes the only accidents that can now be materially reduced on the railways without the assistance of the public are those resulting in death and injury to employees. During the 52 months in which the safety first movement has been in effect on the North Western, the company has had 360 fewer reports of people killed and 10,951 fewer reports of people injured than it would have had during that period on the basis of the experience during the year ending June 30, 1910. "This being an economic society," he said, "perhaps some one may want to know what the economic value of the safety first movement is in dollars and cents. The average cost of railroad accidents in this part of the country is $113.93 per case. So every time you save an accident you save $113.93. In the 52 months on the North Western, with an increase of 450 miles and about 10 or 12 per cent increase in earnings we have had 11,311 fewer accidents. Any one can figure what the saving in dollars and cents is, although the movement was started to save lives and increase safety and regularity of operation, improve working conditions and create a better feeling between the officers and the men, and only incidentally, to save dollars."

COST OF SERVICE

Halford Erickson of the Railroad Commission of Wisconsin, presented a paper on "Cost of Service as a Basis of Rate Making." Mr. Erickson said that to apply the value of the service principle as the fundamental one to railroads and public service companies generally would be in opposition to the law and to the economics of public policy. The value of the service principle is held mostly by those who argue for the greatest freedom in rate making or who are against any restrictions therein. It is noted for its lack of more exact measure upon which to adjust rates, and for the freedom it gives to the play of judgment and motives. The cost of service basis, on the other hand, is advocated by those whose aim it is to develop more scientific systems of rate making than those now in effect, and who are considering the interests of the public as well as those of the carrier. This basis recognizes the importance of distance in rate making. The

all-inclusive nature of the phrase "value of the service" and its companion phrase "What the traffic can bear," makes it next to impossible to define their real meaning. That the carriers can always be depended upon to treat all shippers, including the public, equitably and fairly, would seem to be refuted by experience. There are such variations in views honestly held as well as in the conditions that are encountered, that even with the best of intentions serious inequalities are likely to find their way into the management of such enterprises as public utilities. It is possible, however, that such phrases may in a sense be applied to the principles involved in the classification of freight.

Many manufacturing plants, where the common expenses are relatively about as great as in railway service, through their systems of cost accounting are in a position to determine the cost per unit so closely that these costs are made the basis for both present and future prices. The methods which are thus successfully employed in the manufacturing world would, it seemed to him, lead to equally satisfactory results if applied to the railway service.

INTERLOCKING DIRECTORATES

"The Economic Significance of Interlocking Directorates in Railway Finance" was discussed by Frank Haigh Dixon, professor of economics, Dartmouth College.

If our judgment as to the desirability of the relationship of railways and credit institutions is to be determined solely by results, he said, we must conclude that the balance swings heavily in favor of the continuance of the present policy. Opposition to the close association of financial houses and railways grows rather out of the concentration and monopolization of credit. The real evil resulting from the interlocking of railways and credit houses, he said, if any evil exists, arises primarily out of the relation of credit institutions to each other, rather than out of their relation to the railways through representation on railway boards. The menace is in the concentration of credit.

As to the interlocking relationship arising from the demands of construction or operation, he said, many of them are absolutely essential, and most of them are harmless. With the power in the hands of the Interstate Commerce Commission and many of the state commissions to control the accounting and examine the books of railway corporations, we may safely assume that public interests will in nowise be prejudiced by the close relationship of parent railways and their subsidiary operating companies. Regarding such affiliations as have the restraint of competition in mind, their economic significance depends upon the purpose in view and the methods by which such purpose is effected.

"When that day comes," he said, "and it is not far in the future, that the commission assumes as complete control of service as it has already done of rates, it will then in my judgment be of little or no public concern whether parallel and competing railways are or are not interlocked. That every evil of a monopoly character will then be done away with for good and all I do not assert. That would be placing too low an estimate on the ingenuity of the financial juggler. But the public advantages of co-operation on the part of large railway systems under the conditions here described so decidedly outweigh any remote disadvantages that there seems to me to be no justification for a prevention of interlocking relationships. Such close co-operation will work not to the restraining of trade unreasonably, but rather to its liberation, for it will permit the execution of co-operative plans for relief in many situations that are now wastefully handled. It will permit the application of the principles of scientific economic railway operation to the railway system as a whole. It is a curious myopia that persists among the American people and demands competition between these great industries to the certain burdening of them ultimately with its inevitable costs. Yet with this prejudice against combination lodged in the breasts of the people, the movement of events as expressed in legislation has been steadily away from reliance upon the efficacy of competition and in the direction of more and more rigid regulation. That it will stop short of government ownership does not seem at all clear."

THE BANQUET

At the banquet on Friday evening, "The Public View of the Railways' Need for an Increase of Freight Rates" was discussed by John H. Gray, professor of economics, University of Minnesota; "The Railways' View of the Freight Rate Question," by E. P. Ripley, president of the Atchison, Topeka & Santa Fe, and "The Efficiency of Railway Operation in Relation to an Advance in Rates," by Samuel O. Dunn, editor of the *Railway Age Gazette*.

PRESIDENT RIPLEY'S ADDRESS

President Ripley spoke in part as follows:

Railroads in this country were built upon the theory that competition would prevent extortion, and the business was considered in the light of other ordinary ventures, but it gradually became apparent that each railroad was a practical monopoly at least so far as certain territory was concerned, and that there should exist some impartial tribunal which should limit the amount of charge which a railroad company might make. The fundamental and underlying trouble with our legislation, as has long been recognized by students of economics, is that our present laws strive to retain the former theory of competition and consequently forbid combination, while at the same time prescribing uniformity in charges, and thus practically rendering combination necessary. This contradiction in our laws is pretty clearly recognized, but no lawmaking body seems to have had the courage to attempt to change the conditions.

Owing mainly, though not entirely, to unintelligent legislation the railroads as a whole find themselves unable to meet the demands made on them; and it is not possible for the best of them to raise money at rates which they can afford to pay. This is not a development of the European war conditions, but something that took place before any war was declared. The attack of the muck-raker and the agitator had done its work and the government, heeding these attacks and ignoring the actual conditions, had in effect declared railroad investments unsafe. It will be said that mismanagement of certain properties has helped to bring about this result, and this is very likely; I am not apologizing for these cases, but they nearly all occurred under your laws and were by advice of counsel.

The simple truth is that rates are unremunerative; that the end of the rope has been reached for some of the roads and is not far off for others. All the talk that has been given us about extravagance in operation, about facilities granted free of charge to favored individuals, about free passes, about mistakes of railroad management, may be allowed for all it is worth and more than it is worth, and the stubborn fact still remains that the public does not pay enough to warrant first-class service, and that it will have nothing else; also that much of our trouble comes from laws that are fundamentally wrong—and that altogether our various governments—state and national—are responsible for these conditions.

I could go on at great length on the inconsistencies and crudities of our present laws; of the impracticable character of regulation by 49 local commissions plus one general commission; of that impossible condition created by the duties of the interstate commission—detective bureau and prosecuting agency in the initial stages—later attempting to act as a judicial body on cases worked up by its own endeavors; and not so much interested in bettering conditions as in getting convictions: rules and regulations prescribed without regard to the cost or inconvenience to the carrier and adding greatly to his burdens.

Even admitting for argument's sake the fairness and ability of each individual member of the commission, there does not exist a body of seven men who could by any human possibility transact the business of 250,000 miles of road; nor who could act as unbiased judges on cases which they had themselves developed and which they or their subordinates had already passed on.

Therefore I say that our present laws regulatory of railroads are a "hodge podge" incapable of intelligent administration. Do not understand me as desiring to be free of restraint—quite the contrary. I simply say that present conditions cannot continue

and the public will rightfully refuse to make investments which the acts of government have made uncertain.

I refrain at this time from forecasting the future; a change is coming because present conditions cannot last. The danger is that they will last long enough to wreck the best railway system the world has ever known and its epitaph will be "Killed by Government Interference."

Arthur Hale, general agent of the American Railway Association, presented a paper on "Freight Car Surpluses and Shortages," which was published in last week's issue.

W. Z. Ripley, professor of political economy, Harvard University, presented a paper on "The Investor's Interest in Railroad Valuation."

EFFICIENCY OF RAILWAY OPERATION

Mr. Dunn pointed out that no evidence had been produced in support of the sweeping charges of inefficiency. The greatest economy in transportation is secured by moving traffic in large units. The density of passenger traffic of our railways is small compared with that of European railways and they haul fewer passengers per train, but between 1900 and 1910 they increased the number of passengers per train 36½ per cent. Between the same years the average tons per train in France increased from 144 to 181; in Prussia Hesse, from 163 to 236; in the United States from 271 to 380. Up to 1913, the freight trainload in this country had increased to 469 tons. The passenger journeys and freight hauls are longer here, but the wages paid are higher. The average annual railway wage in Germany increased from $338 to $392 between 1906 and 1911, or 16 per cent, and in the United States from $588 to $724, or 23 per cent, and to 1913 to $758, or 29 per cent. In spite of the relatively high wages paid here, the units of traffic moved per dollar of capitalization and of operating expenses in 1911 were as follows:

	Germany	France	United States
Ton miles per dollar of capital cost	8.6	3.8	18.4
Passenger miles per dollar of capital cost	5.6	2.9	2.1
Ton miles per dollar of operating expenses	67.5	62.9	138.9
Passenger miles per dollar of operating expenses	44.3	47.5	15.9
Total traffic units per dollar of capital cost	14.2	6.7	20.5
Total traffic units per dollar of operating expenses	118.8	110.4	154.8

If the evidence shows that under efficient management net earnings are insufficient to attract sufficient investment a case has been made out from the standpoint of public expediency for higher rates.

ELECTRIC ARC WELDING*

By J. H. Bryant†

Electric arc welding as a commercial process may be divided into two general classes:

First—Benardos or carbon electrode process in which the arc is drawn between the metal to be welded and a carbon electrode.

Second—Slavianoff or metal electrode process in which the arc is drawn between the metal to be welded and a metal electrode.

These two processes are generally spoken of as carbon electrode and metal electrode welding respectively.

In addition to these there is the Zerener process, in which the arc is drawn between two carbon electrodes, as in the arc lamp, and the metal to be welded is placed in contact with the arc. This is, however, not considered a commercial proposition in this country, as its field of application is limited, and the apparatus itself is unwieldy.

Quoting from C. B. Auel in the *American Machinist* (1911): "In carbon electrode welding the metal to be welded is made one terminal of a direct current circuit, the other terminal being a carbon electrode. Upon closing the circuit by bringing the carbon electrode into contact with the metal and then withdrawing it to a distance, an arc is drawn between the two terminals. Through the medium of the arc, which is the hottest flame known (having a temperature between 3,500 deg. and 4,000 deg. Centigrade—6,300 deg. to 7,200 deg. Fahrenheit), the metal may be either entirely melted away, molded into a different shape or fused to another piece of metal as desired."

The metal electrode process of welding is a somewhat later development than the carbon electrode method, and differs from the latter in that a metallic electrode is substituted for the carbon.

If direct current is available from a shop or commercial circuit, welding can be done directly from this source of supply, but this method has been found to be very wasteful of power and should not be resorted to except where welding is only to be done at very infrequent intervals. An additional disadvantage of the use of the shop circuit as a source lies in the fact that, unless arrangements are made for insulating the work from ground, the shop circuit is grounded, with attendant danger to other employees in the shop, as well as to the welding operators. A much more economical method is that of using a motor generator set, the motor being constructed with characteristics suitable for operation on the shop or other circuit, and used to drive a low voltage generator. The generator may be either shunt or compound wound, the shunt wound machine being satisfactory where only one arc is to be operated, while the compound wound machine is preferable if several arcs are to be supplied from the same unit. Experience has shown that generators giving a potential of 75 volts or thereabouts will enable satisfactory results to be produced. As different welds require different strengths of current, it is at once evident that there must be some means of regulating the current supply. This is usually effected by inserting resistance in the welding circuit connecting it in series with the arc.

A suitable electrode holder must be provided for both carbon electrode and metal electrode welding. Protective equipment is necessary for the operator on account of the fact that the exposure to the rays of the arc causes an irritation and subsequent peeling of the skin if the exposure has been sufficiently long, say several minutes. The irritation is very similar to sunburn and is uncomfortable, but no serious consequences ensue, and at the end of a few days all traces of the burn disappear.

When the carbon electrode is used, the filling material is usually of the same metal as that being worked upon and may be used in any convenient form. When metal electrodes are used for welding iron and steel they should be of best quality of soft iron or steel wire and may range in diameter from ⅛ in. to ¼ in. The length most generally used is about 12 in. Copper, bronzes and brasses with a low percentage of zinc may also be welded by this process, in which case the electrodes should be of the same material as that being welded. Where the zinc content of brasses is high, it volatilizes to such an extent as to make the work porous and brittle.

The current required for carbon electrode welding varies from a minimum of about 200 amperes to a maximum of around 700 amperes, or even more in very heavy work. In general, however, 300 or 400 amperes have been found to be sufficient for ordinary carbon electrode work.

The metal electrode process, though a considerably later development than the carbon electrode method, has a field of application very distinct in many cases from the older process. Its principal advantage is on work where it is desirable to localize the heat to the greatest extent possible, thus minimizing strains due to expansion and subsequent contraction. An example of this is in the welding of sheet metal or of a broken bridge in a flue sheet. Another advantage of this process is that it enables welding to be done in a vertical plane or even from the underside of the piece to be repaired. With the metal electrodes much lower currents are used than in the carbon electrode process. The maximum value hardly ever exceeds 150 to 175 amperes. For a greater portion of the work a current of about 100 to 130 amperes is found satisfactory, although the amount of current required will vary with the size of the electrode and the class of work being done.

The carbon electrode process is also well adapted for cutting

*Abstract of a paper presented before the Western Railway Club, November 17, 1914.

†Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa.

of metals. In cutting the arc is drawn just as in welding and is played along the line to be cut, provision being made for the melted metal to run off. Very rapid work of this sort can be done, especially if heavy currents are used. The heat generated varies approximately as the square of the current so that a comparatively small increase in current will give a considerable increase in the rapidity with which work may be done.

Among the principal uses of arc welding equipment in steam railroad shops are the following: Flue welding; firebox repairs; frame repairs, and building up of worn parts. Besides these there are innumerable minor uses for the equipment.

General practice varies as regards the best method of welding flues. The time of welding will probably average 15 per hour, although as high as 25 per hour have been reported. This time is for 2-in. flues. Five inch superheater flues are being welded at about one-fourth this rate. It is interesting to note that the flue sheet is found to be in better condition upon removal of flues than is the case where flues have not been previously welded in. This is due to the fact that the welding builds up the sheet around the flue holes to about the original thickness.

Closely related to flue welding is the subject of firebox repairs. The defects to be repaired include cracks in the side, flue, door and crown sheets, leaky staybolts, leaky seams, etc. Also sheets will often be found to be in such condition that repairs are impossible, and it is necessary to put in patches. All of this class of work can be done very satisfactorily by the use of the arc welding equipment. Broken locomotive frames also are very satisfactorily repaired by the use of the electric arc. One railroad (R. F. & P.) reports that it has in service at the present time 65 welded locomotive frames and has had only one failure; this failure was attributed to the fact that the arc weld was in close proximity to one made by another process.

The following figures are taken from records of actual repairs made in a large railroad shop in the middle west at various times, the figures given being a comparison between the actual cost of welding and that of putting the apparatus back into service by methods previously used, either by replacement or by repair of the old parts. The arc welding costs were based on a power cost of 51 cents per hour for the carbon electrode and 17 cents an hour for the metal electrode, together with cost of labor and an overhead charge of 40 per cent. The power costs used are slightly higher than those usually obtaining in shops of this nature:

	Cost of welding	Cost by other methods
Plugging 51 holes in expansion plate, holes 1 in. diam. by ½ in. deep	$2.75	$10.15
Repairing mud ring	6.50	34.57
Cutting four 6-in. holes in tender deck sheet ½ in. thick	1.08	8.35
Welding eccentric strap, broken through neck	1.08	41.28
Repairing mud rings	6.50	24.57
Welding two spokes in driving wheel center	7.98	99.98
Welding cracks in bulkhead in tender tank	2.33	8.00
Welding cracks in side sheets	26.15	31.79
Repairing firebox	134.89	869.58
Building up flat spots on locomotive driver	.40	225.00

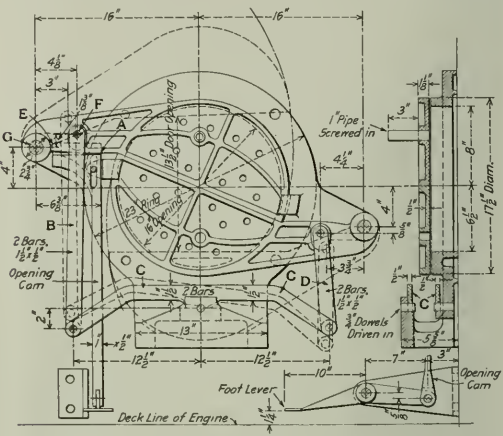
No hard and fast rules can be laid down as to the size of outfit required, as no two installations will be alike in their requirements, and the matter of selection of apparatus of proper capacity is largely one of judgment and experience. In steam railroad shops installations are usually made of sufficient capacity to take care of not less than four to six operators, and the larger shops can occasionally use even greater capacities to advantage. Where a greater number of operators are to be supplied, however, it is generally found to be more economical to install additional outfits in other sections of the shop where welding is to be done, rather than to put in one large central plant. This is on account of the fact that as this work is usually more or less scattered the cost of line copper becomes an item for consideration.

Arc welding is not to be considered as a panacea for all the ills that the metal worker is heir to. There are many classes of work for which it is entirely unsuitable, but its range of usefulness is so wide that it has long since fully justified its existence.

GRAVITY FIRE DOOR

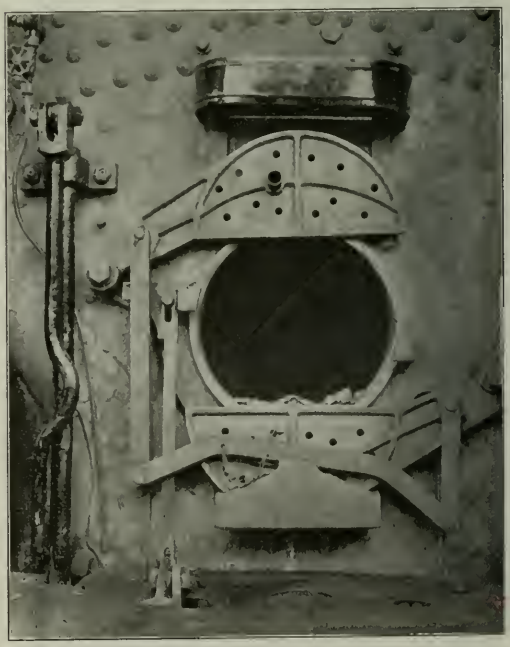
A foot-operated locomotive fire door, the two halves of which are so arranged as to counterbalance each other, thus making unnecessary the employment of a power cylinder, has been developed and patented by P. C. Withrow, mechanical engineer of the Denver & Rio Grande.

As shown in the engraving the door is in two sections, the



Simple Gravity Fire Door

upper part being pivoted at the left and the lower part at the right. It is opened by means of a foot lever located at the left and 20 in. out from the back head. This lever operates the door opening cam, which has a specially formed shoe at its upper end bearing against the under side of the upper door at *A*.



Gravity Fire Door Locked in Open Position

As pressure on the foot lever opens the door the point of contact between the cam and the door shifts from *A* to *E*. This gives a comparatively large leverage by means of which to start the door without unnecessary effort, and the decreasing leverage as the movement progresses keeps the travel of the foot pedal within reasonable limits.

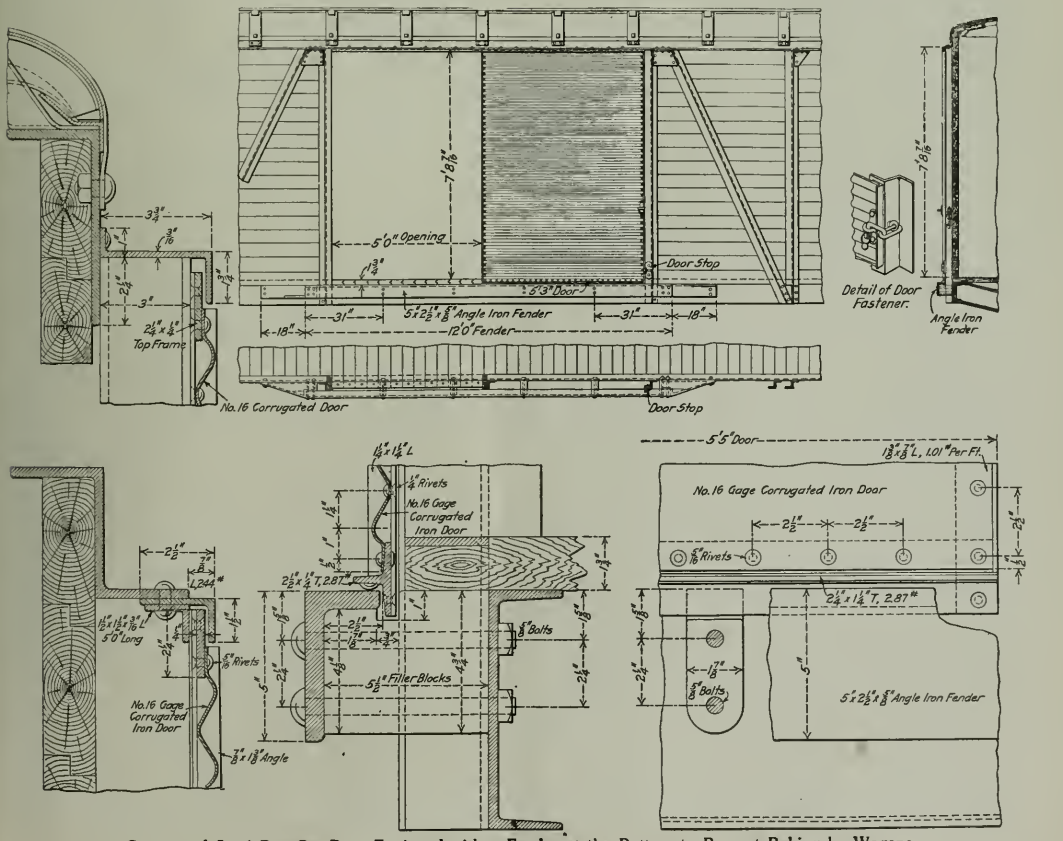
The upper and lower sections of the door are connected by means of rods *B* and *D* and equalizer *C*. The pin *F* which connects rod *B* to the upper door is located above the hinge pin *G*, thus causing it to swing in closer to the vertical line through the hinge pin as the door is opened. The leverage of the upper door, the weight of which causes the closing movement, is thus increased. It will be noted that the pin which secures rod *D* to the lower section of the door is located at a point much nearer the horizontal center line through the hinge pin than is pin *F* in the upper door. The increase in leverage of the lower door in the open position is therefore less than that of the upper door. A further increase in leverage of the upper section is effected by the rolling contact between equalizer *C* and the door frame at the right of the equalizer fulcrum pin. This causes the fulcrum to gradually travel to the right as the door is opened. The upper door thus has sufficient overbalance to insure prompt closing on releasing the pressure from the foot lever. As the closing movement proceeds the various points return to a normal position, thus destroying the overbalance, and the closing is completed without slamming. The foot lever bracket may be fastened either to the back head or the deck as is most convenient.

This device has been in use experimentally on the Denver & Rio Grande for about two years, where it has been meeting with considerable favor. It is claimed that prompt opening of the door is effected without extraordinary effort; sufficient force is brought to bear upon the pedal by the natural swinging of the weight to the left foot as the fireman swings the shovel toward the fire door.

CORRUGATED STEEL DOOR WITH FENDER ATTACHMENT

A corrugated steel box car door which is being manufactured by the American Car Roof Company, Chicago, is fitted with a fender attachment to prevent the doors being raked by wagons, etc., when the car is being loaded or unloaded.

The fender consists of a 5 in. by 2½ in. angle held out from the side of the car by means of cast filler blocks; at the ends snub-nosed castings are used. When shut the front end of the door fits into an angle, the idea being to prevent it from bulging out in case freight should accidentally fall against it on the inside. It is securely fastened by a one link chain and hook in the rear which it is believed is sufficient to keep the rear edge of the door from bulging out. This door does not run on pulleys, but is supported at the bottom near each end by hard bearing points. It is claimed that in many instances after several months' service the pulleys which are commonly used for supporting car doors rust and stick. Further advantage in suspending the door on bearing points at the bottom is claimed, as when it is suspended from the top by means of pulleys, very few bolts or rivets can be employed to carry the weight of the door itself.



Corrugated Steel Box Car Door Equipped with a Fender at the Bottom to Prevent Raking by Wagons

AMERICAN RAILWAY ASSOCIATION MEETING

The fall session of the American Railway Association was held at the Blackstone hotel, Chicago, on November 18. There were present 210 members, represented by 180 delegates. The executive committee reported that the membership now comprises 402 members, operating 274,790 miles, a decrease of one member and an increase of 900 miles. The associate membership now comprises 201 members, operating 12,138 miles, an increase of 38 members and 1,610 miles.

The executive committee also reported that its attention had been called to the use of illuminated electric signs on the rear of passenger trains. The committee adopted the following resolution in connection therewith: "Resolved, that the American Railway Association disapproves of the use of electric illuminated signs on the rear of passenger trains, by reason of the effect they have of concealing essential indications of standard marker signals, and also because they absorb the light of other signals and have a tendency to divert the attention of the employes, whose duty it is to observe signals which are essential in railway operation."

The committee also stated that the president, as authorized at a meeting of the Association on May 20, appointed a committee of nine to investigate such changes as have been, or may be, suggested in the system of uniform standard time, as adopted in United States and Canada in 1883, to report to the Association at the present session. The committee consists of E. B. Thomas (chairman), president of the Lehigh Valley; B. McKeen (vice-chairman), general manager, Pennsylvania Lines West of Pittsburgh; C. W. Galloway, general manager, Baltimore & Ohio; H. A. Worcester, general manager, Cleveland, Cincinnati, Chicago & St. Louis; D. C. Moon, general manager, Lake Shore & Michigan Southern; A. W. Johnston, general manager, New York, Chicago & St. Louis; A. J. Stone, vice-president and general manager, Erie; M. S. Connors, general manager, Hocking Valley, and H. W. McMaster, general manager, Wheeling & Lake Erie.

The committee presented a report, and resolutions recommended by it were adopted asking that when any proposition shall be made for change in standard time of the whole or any part of the membership of the Association the subject shall be referred to the executive committee. The executive committee shall thereupon appoint a committee of nine members on standard time, which shall promptly examine and report on the effect of such proposed change of time—as to its advantages or disadvantages to the road or roads directly affected—to any other member of the Association, or upon the uniform standard time system generally; and it is further recommended that no change be made in the standard used by any member until such committee shall have presented its report and it has been acted upon. The Association urges the roads which made changes in their standard in April and May by adoption of Eastern time in place of Central, and so departed from heretofore uniform standard time, to return to the use of uniform standard upon their lines at the earliest practicable date.

It was decided to discontinue the compilation of statistics of car surpluses and shortages, and of car balance and performance for reasons of economy.

The committee on transportation reported that it has now practically completed the revision of the standard code of train rules for single and double track, rules governing movement of trains with current of traffic on two or more tracks by means of block signals, rules governing movement of trains against current of traffic on two or more tracks by means of block signals, and additional rules for three or more tracks. Before presenting this to the association for adoption it desires to give each member an opportunity to examine the rules and formally submit its criticism. Circular No. 1,472 has, therefore, been issued, embodying the revision of train rules, and replies thereto are requested on or before December 14, 1914. As a result of suggestions which it hopes to receive in reply to this circular, the committee expects to be able to present a complete report to the association at its May, 1915, session.

COMMITTEE ON MAINTENANCE

The committee on maintenance reported that E. C. Carter had resigned as chairman on account of his retirement from railroad service and A. T. Dice had been elected chairman. The vacancy on the committee has been filled by the election of F. T. Hatch, chief engineer, Vandalia Railroad. The committee announced the result of the letter ballot, ordered at the previous meeting of the association, relative to standard inside dimensions of box cars. Although a majority of the members voted in favor of the three resolutions, the number of freight cars represented by such memberships was less than two-thirds of the freight cars owned and controlled by the members of the Association. The resolutions were therefore not adopted.

The committee also included in its report a summary of the replies to the circular respecting the number of freight cars, passenger cars and locomotives equipped with safety appliances as required by the United States safety appliance standards, as of July 1, as follows:

Number of members reporting, 384.

(a) Freight cars in service 2,510,214.

(b) Passenger cars in service, 56,980.

(c) Locomotives in service 66,853.

Fully equipped with safety appliances required by the United States safety appliance standards, promulgated by the Interstate Commerce Commission in its order, dated March 13, 1911:

(a) Freight cars 652,999.

(aa) Freight cars put in service since July 1, 1911, 551,455.

(b) Passenger cars 52,470.

(c) Locomotives 63,687.

Fully equipped with secure grab-irons or handholds on the ends and sides of each car, as required under section 4 of the act of 1893, as amended April 14, 1896, and March 2, 1903:

(a) Freight cars 2,510,214.

(b) Passenger cars 56,980.

The joint committee on automatic train stops reported that F. C. Rice, general inspector of transportation of the Chicago, Burlington & Quincy, had been elected chairman, vice E. C. Carter, resigned. The committee also reported that it had continued its research of the subject and had received the reports of tests of automatic train control devices which have been recently made. Since the adoption of requisites of installation for automatic train control, as approved by the association on May 20, 1914, no stop device, which has been thoroughly and practically tested and has been demonstrated to comply therewith, has come to the notice of the joint committee. The committee has planned to pursue further its investigations, and has issued a circular (number 1470) to the members of the association for that purpose.

The committee on electrical working reported that the subjects which have been under consideration since its report of April 20, 1914, are those connected with electrical working conductor clearances as affected by permanent way and rolling equipment structures, also specifications for electric power and telegraph or telephone wire line crossings over railways. The existing standards were recommended. The practice of the associations in regard to these facilities has been under investigation by the committee with the view of securing uniformity in standards adopted by various engineering associations. The committee stated that the diagram of the third rail working conductor clearances adopted by the association in May, 1912, has been under consideration by the sub-committee in joint session with subcommittees of the American Railway Engineering Association and the American Electric Railway Engineering Association, with the view of establishing limited rolling equipment clearances in space close to track rail, for permanent way structures or for other devices, such as automatic train stops. These sub-committees have concluded that the "third rail clearance" diagram can be extended towards track rail without materially affecting interchange equipment, and have accordingly adopted the following resolution:

"That the limiting clearance line for rolling equipment as adopted by the American Railway Association should be changed so that the points FE 2½/15 and GE out 15 become FE 2½/6 and GE out 6."

This recommendation was adopted by the association: This provision will allow devices attached to the permanent way to project 2½ in. above top of track rail in space from point ¾ in. to point 6 in. distant from gage line.

The sub-committee of Railway Engineers' Association recommended the adoption of the five overhead clearances diagrams approved by the association at its meeting in Chicago, March, 1914, as recommended practice. The association accepted this recommendation.

The specification of the American Electrical Railway Engineering Association for overhead crossings of electric light and power lines was adopted as recommended practice.

The committee advised that consideration of overhead crossings for telegraph and telephone lines had been referred to a sub-committee which has been in conference with similar committees of the American Railway Engineering Association and the American Electrical Railway Association. The sub-committee recommended the adoption of the telephone, telegraph and signal wire crossing specification prepared by the Association of Railway Telegraph Superintendents, with the exception of one paragraph relating to minimum clearances of poles from railway tracks. The side clearance specified by the telegraph superintendents was not considered sufficient, and it was recommended that the minimum clearance of poles be made to conform to that established for the transmission line crossing structures.

The specification which the committee offered has not been definitely acted upon by the engineering associations, but the committee thought it desirable to place on record at this time the essentials of a matter which is of immediate and increasing importance to railroads, and the committee, therefore, offered the specifications for adoption as recommended practice of the association. The association took action accordingly.

The sub-committees appointed by the committee for further investigation of continued subjects are as follows:

On third rail working conductors and on overhead working conductor clearances, A. S. Baldwin, Illinois Central; J. H. Davis, Baltimore & Ohio; E. B. Katte, New York Central.

As representatives of committee on national joint committee on specifications for wire and cable crossings, E. B. Katte, New York Central; J. H. Davis, Baltimore & Ohio.

The committee on relations between railroads reported that it has approved the application of 66 roads to sign the per diem rules agreement, and has rejected the applications of four. It has reported to the executive committee on the eligibility of 47 roads to become associate members of the association.

On the recommendation of the committee a national form of weight agreement was approved.

The committee submitted a code of L. C. L. rules governing receiving, stowing, handling and delivery of less than carload freight, and also recommendations covering methods for handling carload shipments of flour, which were approved.

The committee reported that it was advised that in official classification territory a uniform charge had been adopted of $2 for cars reconsigned en route and $5 for cars reconsigned at destination, and that it understands that similar action is contemplated in other parts of the country. The committee also reported that it had authorized an increase in the number of members of the committee on weighing and the committee on packing, marking and handling of freight by the addition of the president of the Freight Claim Association, and the president of the American Association of Freight Agents, ex-officio.

The following were elected members of the committee on the safe transportation of explosives and other dangerous articles: Central of New Jersey, Missouri Pacific and St. Louis & San Francisco.

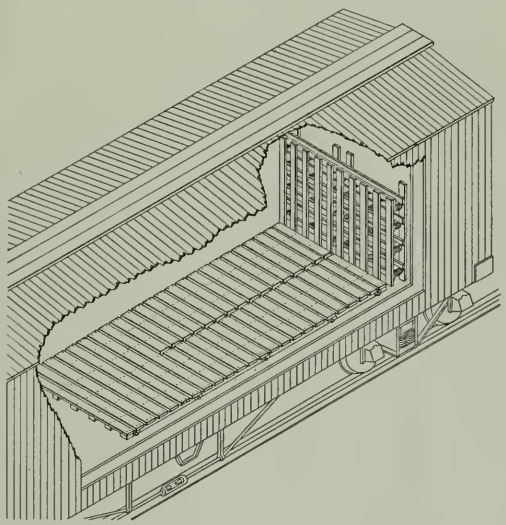
The following were elected members of the committee on electrical working; Illinois Central and Long Island.

The following were elected members of the committee on nominations: C. W. Galloway, Baltimore & Ohio, and W. B. Storey, Atchison, Topeka & Santa Fe. The association decided to hold its next session in Atlantic City on May 19, 1915.

SHOCK ABSORBER FOR FREIGHT CAR LADING

A means of protecting freight of a fragile nature against breakage due to shocks while in transit has been developed by B. Monesmith, of Cresco, Ia., and George E. Cutler, a commission merchant of New York City, and application has been made for patents. It has been applied to two shipments of eggs from Cresco, Ia., to New York City, both of which arrived at destination in perfect condition. Each shipment consisted of something over 400 cases and formed a refrigerator carload.

The patents which have been applied for are designed to cover the application of two principles, one the placing of the load upon a disengaged floor or platform free to move longitudinally upon the floor of the car, and the other a means of absorbing the momentum due to this movement without shock to the lading. The application of these principles to the two refrigerator cars,



Shock Absorber as Applied to Refrigerator Cars for Egg Shipments

while crude in some respects, was very simple and effective in its action. Longitudinals of 2 in. by 4 in. section were secured to the under side of the floor racks and the whole was then placed upon a number of rollers of small iron pipe. These rollers, which are placed crosswise of the car, were held in line by shallow notches in the bottom of the longitudinals, the length of the notches being sufficient to allow a motion on the rollers of about 5 in. With the sections all in place the result is a single structure free to move lengthwise of the car through a distance of about 4½ in. or 5 in. In each end of the car was placed a shock absorber in two sections, temporarily secured to the car with lag screws. Each section of the shock absorber consists of 12 coils of light wire placed between two light timber frames, one of which was secured to the end of the car and the other free to move as the springs were compressed.

In loading a space of about 6 inches remained unfilled at the middle of the car. This was loosely filled with straw and excelsior which on being unpacked at destination showed practically no evidence of having been compressed by the shifting of the load in the two ends of the car, and an egg placed in this space came through unbroken. The cost of the equipment as applied to these cars is stated to be about $30 per car.

Maintenance of Way Section

Concrete Railway Signs

The report on concrete posts, presented at the recent annual convention of the American Railway Bridge & Building Association, brought out an extended discussion of concrete signs, indicating the very general interest in this subject at the present time. While one man reported that concrete signs had been standard on his road for six years, a number of others reported that they were using them only experimentally and other members had not used them at all. The sign along the railroad right of way has not only to withstand the ordinary ravages of the elements, but also the more serious attacks of maliciously inclined persons. It is the latter abuse which concrete signs withstand with difficulty. The Santa Fe found that the long thin panels forming the arms of the standard crossing sign were defective in this regard, and have tentatively adopted metal crossarms bolted on concrete posts. For mile posts and similar signs where a heavier post can be used, concrete has been found well adapted. Several methods have been used to bring out the letters or figures in the posts. Probably the most common is the casting of the posts with blocks in place of the letters, which blocks are later replaced with a mixture of lamp-black and cement. The determination of the proper quantity of lamp-black to give a sharp distinctive color, and at the same time to prevent smearing to adjacent surfaces, requires care. Several men also reported a tendency for the inserts to break and fall out. One member stated that he had overcome this difficulty by partially imbedding a number of small staples in the green concrete in the bottom of the opening left for the colored concrete to serve as a bond with the latter. While requiring greater care in handling, the concrete sign is more durable than the wooden and with proper care should prove more economical.

Sanitation of Camp Cars

In view of the very general activity of state and local boards of health throughout the country, the importance of the maintenance of clean and sanitary quarters for laborers employed in maintenance work, especially in floating gangs, is being brought more directly to the attention of railroad men. For section gangs the box car removed from its trucks is rapidly being replaced with permanent frame or concrete buildings. However, this is not universally the case, as many old box cars are still doing service as living quarters for the men and, differing from the cars on wheels, after once being set out, they continue to be used long after their proper life has been reached. The real problem, however, is to provide quarters for the floating or extra gangs. Box cars condemned for revenue service make the practical camp for such a gang moving from place to place and can be fitted into very suitable quarters. The men employed in such gangs a few years ago readily maintained their cars in a satisfactory condition, but the general introduction of laborers from southern Europe and Mexico with their lower standards of living, has made it very difficult to maintain sanitary conditions. As a result, railway officers have been inclined to pay less attention to the character of the cars furnished to these men. While in nearly all cases in which complaints have arisen, equally objectionable conditions can be found elsewhere in the community, this is no defense of these conditions on the railroads, and with the present attitude of the public, the railroads are apt to be the first to be criticized. In several states drastic action has already been taken, even to the extent of limiting to four men the number who may sleep in one car. If the roads are to avoid similar requirements in other states, they will have to overhaul their camps in the near future, and then keep them in proper condition.

Treated Ties on the L. & N.

The timber treating plant at Gautier, Miss., operated by the Louisville & Nashville, was one of the first plants of this kind built in the country. It has long supplied the road with treated bridge timber, but until the completion of the new plant at Guthrie, Ky., described in this issue, no ties had been treated by this road. It is a striking evidence of the satisfactory service of treated timber that a road should extend its use so widely after long experience in one field. This decision to treat ties is also significant because the road is located in a timbered country where ties can be secured on practically the entire system. A comprehensive study of present and probable future costs of untreated and treated ties on the various lines was made in considering the project to build the new plant at Guthrie as the first step in a program of tie preservation. This study showed that economy could be effected by treatment in addition to the well recognized advantage of conserving the available timber supply. In order to secure the maximum economy it was found that the curve ties which must be plated should be creosoted and the others not requiring plates, treated with zinc chloride. In accordance with this conclusion, the plant was designed for both processes, and a great deal of care was used in planning the arrangement and details of equipment to reduce the cost and increase the efficiency of operation. As evidence of the result of this preliminary study, the cost per tie for heating as shown in the early months of the plant's operation, is more than 400 per cent lower than the similar figure in many large plants, on account of the compact arrangement and the improved details of the heating system in the tanks and cylinders.

Why Not 40-Ft. Rails?

A few years ago the standard length of rails was 30 ft. Within the past decade this has been increased 33 ft. and many men are now asking why this cannot now be increased to 40 ft. The immediate purpose, of course, is to reduce the number of joints and as the joint is the weakest part of the track and expensive in first cost and maintenance, this is an important advantage. One factor limiting the length of rails is the length of the cars available for their transportation. A few years ago 34-ft. and 36-ft. cars were most common, but within recent years cars 40 ft. long or longer have come into very general use. Another objection raised is the necessity of providing increased expansion for the longer rails. However, with the adoption of the heavier sections within the past few years, it has been found possible to reduce the relative allowance of expansion when laying rails so that this is not serious. A third objection is that the longer rails would be more difficult to handle because of their increased weight. This is a serious objection where the rails are handled by hand, but with the adoption of the heavier sections mechanical appliances have come into more general use for unloading and loading rails, as well as for placing them in the track, and the adoption of longer rails would undoubtedly increase their use. From the standpoint of the manufacturers there are more serious objections. Some of the mills will have to be reconstructed in large part to make rails of this length, although other mills are now prepared to roll them in limited quantities. It is also stated that with the increased length it will be more difficult to keep the rails straight. Both of these are serious objections which, however, the manufacturers will undoubtedly be able to obviate when the demand arises.

EXCESSIVE LIVE STOCK LOSSES

THE killing and injuring of live stock on the right of way is a source of loss to the railways which amounts to more than is usually realized. One western system, on which conditions are probably no worse than on many other roads in central, southern and western territory, has analyzed these losses very carefully, and found that for the last fiscal year the claims paid for live stock killed and injured by trains averaged $27.85 per mile of line. For individual divisions this figure varied widely, being as low as $6 on some and as high as $112.49 on one. On another central western road the number of head of stock killed annually on the tracks averages 1.32 for every mile of line.

It is scarcely necessary to point out that claims paid for stock killed represent an absolute loss both to the owner and the railway. The former is seldom satisfied with the settlement, and the roads must pay in addition to the amount of the claim the cost of burying or removing the carcasses. Also, the settlement of claims is a fruitful cause of dispute between the company's representatives and actual or prospective patrons, often resulting in permanent antagonism to the road. When such a loss becomes as great as that mentioned above, special efforts to reduce it are warranted.

The possible success of such efforts depends to a large extent on local conditions. In some of the eastern states, where there is a comparatively small amount of stock, the problem of keeping it off the track is not so serious. On the other hand, in some southern or western states, where stock is raised in large numbers, and particularly where the free range laws are in effect, removing all responsibility from the owner to fence up his stock, a railroad has a very difficult task to prevent trains from striking animals on the track. The first road mentioned above finds that 55 per cent of its stock claims are the result of accidents occurring on 14 per cent of its mileage located in states where these laws govern and the second road killed more than 6,000 head of stock in one state, or 74 per cent of the total for the system, while only 28 per cent of the system mileage is operated in that state. In some parts of the country the owners of stock consider it their inalienable right to let their stock graze on the railway right of way, and attempts to fence this property are not popular and in some cases have even been met with active resistance.

The part of the right of way around stations cannot be fenced off and on every road some live stock is struck within the limits of station grounds. This class of accidents forms 25 per cent of the total on the road referred to. Little can be done to prevent them beyond trying to educate the enginemen to be careful and to enlist the co-operation of local employees in correcting conditions that would tend to attract loose stock to the station grounds and in driving such stock out of the way of harm whenever possible.

In the endeavor to prevent the rest of the accidents, which are a large majority, two means are available—to keep the animals off of the right of way and to keep the trains from hitting those that do succeed in getting on. The former involves the construction of fences and cattle guards and their proper maintenance. The typical right of way fence is almost invariably better than adjacent line fences, costing perhaps $500 to $700 per mile of line. Such a fence is required by law in many states and in view of the nature of the service that is required of it, is probably the most economical that could be provided. Many cattle guards in service do not turn stock successfully. On the other hand, some states have required pit guards, a type much more expensive than is justified and one the use of which involves actual danger to the stock. It has been estimated by one of the roads furnishing the above figures that 90 per cent of the accidents to live stock on the divisions with the worst records could be eliminated by a complete installation of fence and steel or other equally efficient cattle guards.

After the installation of proper structures to turn stock, the section foremen have an important duty to perform in maintaining them. It is very difficult to get foremen to take time from track work to fix a fence before an accident happens, but if they could be made to realize the average loss to the company for stock killed on every mile of line, they would see that they cannot afford to delay the fence repairs too long. In some cases minor points in maintenance are overlooked which destroy the effectiveness of the most expensive fence and cattle guards. Insufficient barriers at small streams crossing the tracks, too much space under wing fences and the leaving out of cattle guards for several days after heavy ballasting work, are illustrations of such points.

The high cost of fences and cattle guards makes it necessary to consider carefully the possible saving to be effected by their installation and in some cases it may be difficult to justify this expense. In general, however, the amount spent to maintain fences is much below the economical figure. The first road mentioned above, for example, spent about half as much for repairing fence during the last fiscal year as for claims paid to owners of stock killed or injured. In so far as greater expenditure for fence repairs would have decreased these stock claims, that use of the money would have been much more beneficial both to the road and its patrons.

COMPARISONS OF RAIL FAILURES BY MILLS

IN compiling the annual statistics of rail failures for the year ending October 31, 1913, an abstract of which is published on another page in this issue, the Rail Committee of the American Railway Engineering Association has made two important departures from the methods followed in compiling previous reports. Up to this time only the failures occurring during the preceding year have been tabulated in the annual reports, but this year all failures occurring since the rail covered by the records of the Association was laid in the track have been included. As the total number of failures in any one year depends largely on the average age of the rail, the total number of failures to date in the rails covered by the records is a better indication of the character of all the rails thus covered than the records of failures for any individual year. While it is unfortunate that a number of the roads are not co-operating with the committee by reporting to it their failures, so that only about 30 per cent of the rails rolled during the period under consideration are included in these statistics, this total tonnage of over 5,500,000 tons is sufficiently large to make any conclusions drawn reasonably representative of the situation throughout the country.

The second innovation in this year's report is the comparison of failures by mills, which is the most important step yet taken by the committee in the analysis of rail failure statistics. It has been common knowledge that there are wide differences in the quality of the rails rolled at different mills and that while some manufacturers have been making every endeavor to improve the quality of their product, the efforts of others have been less marked. The publication of statistics of rail failures, grouping these failures by mills, will serve as an incentive to still further effort on the part of those manufacturers desirous of maintaining a high standard which will force the other manufacturers to meet the standards set by their competitors. The *Railway Age Gazette* has, therefore, repeatedly advocated during the past few years, the compilation and publication of such statistics and in its issue of January 12, 1912, such a tabulation was made and published, compiled from the best data then available. The committee is to be commended for compiling this data in this form for public information, and it is to be hoped that they will be revised from year to year to show the progress made by the different mills. It would appear advisable to separate the mills in some way to equate for the more important differences in the climatic conditions under which the rails are in service. However, despite such differences in conditions which must be allowed for, we believe that the publication of statistics such as these will do much to improve the standards of rail manufacture.

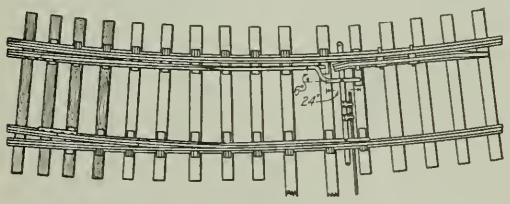
Letters to the Editor

STAGGERED SWITCH POINTS

Tullahoma, Tenn.

To the Editor of the Railway Age Gazette:

An arrangement of switch points very similar to the one described in your issue of September 18, by W. F. Rench, supervisor, Pennsylvania Railroad, has been in use on the Centreville branch of the Nashville, Chattanooga & St. Louis since February, 1908. The only difference apparent from the diagram accompanying the description mentioned is that two tie rods are used in that design and a connecting rod at right angles, while the switch worked out by me has only one rod. The point to be protected is shortened 24 in. and a flanged reinforcing angle extended the same distance with an offset of 6 in. in order to provide room for the guard rail. The head rod is connected to the reinforcing bar the same as to the switch point in standard switches. This switch was patented in December, 1908, having been worked out in order to avoid derailment where a side track leading to the depot at Centreville, Tenn., turns out of the inside of a 20-deg. curve. Before this



An Arrangement of Staggered Switch Points in Use on the N. C. & St. L.

switch was put in the side line point could only be used four months with safety. After that time the wheel would mount the point and leave the track. With the arrangement shown in the sketch the switch point will last as long as the rails. This has the added advantage that when switch points have to be changed before the rails wear out, the new points do not match the old rails and make rough joints. Three other switches on the branch referred to have a similar arrangement of the points designed to protect the main line points on outside turnouts to avoid danger of derailment and to keep the outside points from wearing. One of these switches is on a 20-deg. curve, one on a 10-deg. curve, and the other on an 8-deg. curve. Arrangements to market this switch are now being made by J. Z. Easley, Nashville, Tenn.

R. A. Easley,
Road Supervisor, N. C. & St. L.

AN AGENT'S IDEAS OF EXTRA GANGS

Three Lakes, Wis.

To the Editor of the Railway Age Gazette:

This summer a gang of about 30 Greeks spent a month or so putting in ties in this vicinity. They were in charge of an Irish foreman, who admitted that he had no control of them. There were probably half a dozen good workers in the gang, and the rest were drones, but if one of the laziest had been discharged the whole gang would have quit. They received about 15 cents a day more than the section men, and averaged about four ties per day per man. After they were gone the regular gangs had to retamp, line up, and make a track out of the mess they left. If in putting in ties the section men in that district did not average a dozen ties per man per day under similar conditions they would not think they had done a good day's work, but they had to watch those Greeks loaf and draw more money than they, which probably did not have a tendency to increase their ambition to do good work.

My suggestion for doing such work is as follows: Most section foremen know one or two available men who can be picked up at any time that an increase in the section force is authorized. Why not take half a dozen sections, three each way from the work to be done, pick out two of the best men on each gang for a temporary extra gang, replacing them with the extra men the foremen can pick up, pay them at least two dollars a day, give them a good clean car with clean blankets and bunks to sleep in, and treat them right? The best trackman among the section foremen in the district should be put in charge of this gang at a salary of at least $100 a month, and he and the gang should be made to understand that they must produce results to hold their jobs. I believe that such a system would cut the cost per tie in half. The men would also feel that the company wanted to do the fair thing with them, and to give them the benefit of any extra money to be spent.

D. E. Lamon,
Agent, C. & N. W.

A LARGE HOOK BLOCK

Toledo, Ohio.

To the Editor of the Railway Age Gazette:

My attention has been called to the description of a 50-ton hook block published in the *Railway Age Gazette* of July 17, in which it is stated that this block is "so far as known, the largest ever built." It may interest your readers to know that a four-sheave block of my design is now in use for oil well drilling that has a working load of 80 tons and weighs 2,015 lb. without the hook. The side bars of the block are 1⅛ in. thick, and 8 in. wide; the plates are ⅜ in. thick, the separators are of cast iron, the sheave pin is of forged steel 4½ in. in diameter, the shackle bolt is 2 15/16 in. in diameter, and the becket bolt is 2 7/16 in. in diameter. The sheaves are of cast iron 26 in. in diameter, bronze bushed, and designed for a 1-in. wire rope.

The hook that is used with this block weighs 800 lb., and has a working load of 75 tons. The Union Tool Company, Los Angeles, Cal., which manufactures this block, also manufactures a five-sheave block which weighs approximately 2,600 lb., and has a working load of 100 tons.

William H. Wolfgang.

NEW BOOKS

Plane Surveying. By William G. Raymond, dean of the College of Applied Science, State University of Iowa. Size 4½ in. by 7 in., 590 pages, 239 illustrations, 19 tables and 7 plates. Flexible leather binding. Published by the American Book Company, New York. Price $3.

The second edition of Raymond's "Plane Surveying" has just been issued in pocket book form. Portions of the book as written 18 years ago have been rearranged and all of it rewritten, although little change has been made in the subject matter. This book is intended for classroom use and deals largely with land surveying. The author does not attempt to go into the details of the operations of various surveying methods, but explains principles fully, and includes problems intended to show the possibilities and limitations of the various instruments and methods.

Surveying Manual. By Howard Chapin Ives, professor of railroad engineering, Worcester Polytechnic Institute. Size 4½ in. by 7 in., 296 pages, illustrated, bound in flexible leather. Published by John Wiley & Sons, New York City. Price $2.25.

Ives' "Surveying Manual" has been prepared for the use of students in engineering courses other than civil, and is therefore more elementary than most of these manuals. The use of all the common instruments is covered, and there are chapters on railroad curves, the laying out of public lands, computation, plotting, latitude, longitude and azimuth and large surveys. The common tables which are required in using the ordinary instruments are included for easy reference.

New Tie Treating Plant With Unique Features

L. & N. Builds Two-Cylinder Plant at Guthrie, Ky., After Careful Study of Timber Conditions on Its Lines

The Louisville & Nashville has operated a new wood preserving plant at Guthrie, Ky., for the past season, which is designed to treat ties either with creosote or zinc chloride. The Bethell process with 8 lb. of creosote per cu. ft., and the Burnett process with ½ lb. of dry zinc chloride per cu. ft. injected in a 4 per cent solution are used. The ties treated at the new plant are red oak and black oak. The capacity of the plant is about 800,000 per year.

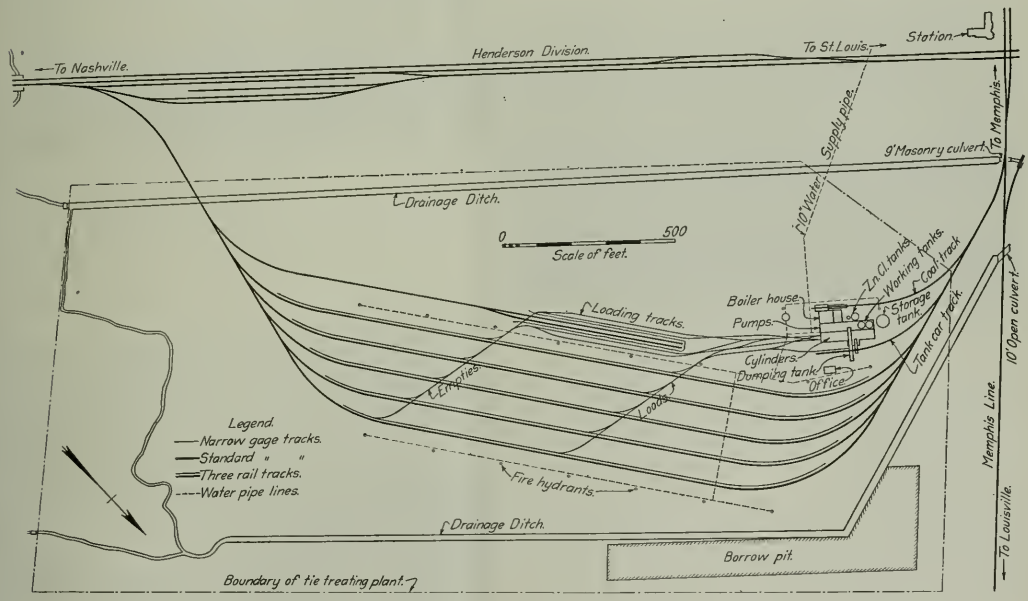
GENERAL

White oak ties were formerly standard in the territory to be served by the new plant, these ties being plated on curves, primarily to resist rail spreading rather than wear of the ties. In determining whether to replace these ties with treated ones, and if so, the type of treatment to be used, comparative capitalized costs of untreated, creosoted and zinc chloride treated ties, both with and without tie plates, were prepared. Including all items, such as the cost of ties and treatment, transportation, interest and Decatur. As timber can be secured over practically the entire L. & N. system, it is expected that additional plants will be located at the most economical points for distribution and in choosing future locations it is planned to limit the haul of treated ties to about 150 miles, which is equivalent to a transportation cost of $0.06 per tie.

The tie supply for the Guthrie plant is secured within a radius of about 100 miles. The ties are delivered along the track by the contractors and are inspected by a representative of the timber department of the railway before being loaded by the section gangs. The standard tie is 7 in. by 9 in. by 8 ft. 6 in., and the standard method of stacking in the tie plant storage yard is 1 by 9. Practically all ties for treatment are loaded in box and cattle cars.

STORAGE YARD

The new plant is located on a tract of about 70 acres in the southeast intersection angle of the Henderson division and



Layout of New L. & N. Tie Treating Plant and Storage Yard at Guthrie, Ky.

on treating plant, etc., and with an assumed life of 8 years for an untreated tie, 11 years for one treated with zinc chloride and 14 years for one treated with creosote, the zinc chloride treatment was shown to be the most economical without tie plates and the creosote with them. The present standard has therefore been changed to provide for creosoted ties on curves which are tieplated anyway, and zinc chloride ties without plates on tangents. As the cost of timber increases, the advantage of zinc chloride over creosote is reduced and it is expected that eventually creosote will be substituted for zinc chloride.

The new plant was located at the intersection of the Cincinnati-Memphis and the St. Louis-Nashville lines in order to facilitate the distribution of the treated ties over a large area. The ties will be shipped as far as St. Louis, Memphis, Louisville Memphis line tracks and directly opposite the Guthrie station. The track connections to both lines, the layout in the storage yard and the position of the buildings are shown in the accompanying plan. The grading of the yard required the moving of about 50,000 cu. yd. of material, most of which was taken from drainage ditches with a bottom width of 20 ft., which were dug along each side of the property, and the remainder from a borrow pit conveniently located. Open drains were provided across the yard at intervals of about 120 ft., and the surface was sloped 0.5 per cent towards the east side. Drains are to be put in transversely under each track in line with the open drains.

In order to secure nine months' storage before treatment, space sufficient for stacking about 450,000 ties has been provided along the yard tracks. Five three-rail tracks, averaging

about 1,650 ft. long, are spaced 73 ft. center to center, the standard gage tracks connecting by 14-deg. curves to a ladder track at each end leading to the main lines. Two narrow gage ladder tracks cross the yard at an angle of 46 deg. There are also a standard gage lead from the south ladder to the two depressed load tracks, a coal track leading to the coal trestle alongside the boiler house, and a tank car track reaching the receiving tank.

A double crossover is located between the narrow gage tracks immediately in front of the cylinders and the number and arrangement of tracks leading to the cylinders is calculated to facilitate the movements of trains of tie cars. Ordinarily the north narrow gage ladder track is used for loaded trains going to the cylinders and the south ladder track for empties going from the loading platform back into the yard for ties. The yard is laid with cinder ballast and white oak ties, 70-lb. rail being used on standard gage tracks and 58¼-lb. rail on the narrow gage tracks.

The ties are stored in piles 11 high. As many as 65 tie handlers are used to unload and stack the ties, the rate for this work being one cent per tie. The loading of treated ties is handled by the same men using skids from the trams into the standard gage cars on the depressed tracks. A tie checker and the superintendent are in charge of the operation of these tie handling gangs.

A 32½-ton narrow gage steam locomotive is used for all

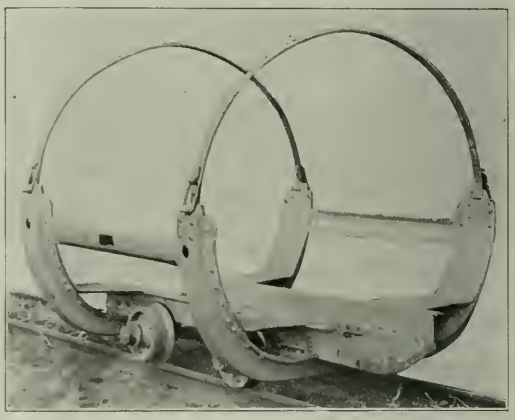
General View of the Tie Storage Yard With the Treating Plant in the Background

switching of standard and narrow gage cars in the yard. It is a four-driver Baldwin locomotive, weighing 65,000 lb. and equipped with Walschaert valve gear. It is capable of handling 12 to 14 loaded box cars. An engine pit and penstock are provided for this yard engine near the cylinder building.

The tie trams, of which there are 120, are of a new design by the Allis-Chalmers Company, providing unusual strength. The frame consists of heavy Z-bars with cast steel bumpers at the ends and mounted upon square steel axles securely bolted to the Z-bars. The arms are of cast steel consisting of a flat upper plate and a lower plate pressed into a tapering box section securely riveted together and to the frame. Additional stiffness is provided by connecting the arms to the top of the Z-bars by corrugated gusset plates. The design has been carefully worked out to provide the strongest section at the point where the greatest stress is applied. The arms are further stiffened by connecting them near the top on either side with a pressed steel brace. A flat bail and a link connecting by a locking device of malleable iron riveted inside the arm are provided, these features being patented. The wheels are provided with roller bearings and are held in place by cast iron collars secured to the ends of the axles. As the axles are secured to the frame by a single bearing there is no obstruction outside of the wheels, making it possible in case of breakage to remove any wheel without disturbing the remainder of the car.

BUILDINGS AND TANKS

The main building is 156 ft. by 58 ft., with a boiler house, 66 ft. 7 in. by 36 ft. 1 in., on one side and a test cylinder room, 12 ft. 1 in. by 32 ft., on the other. A dumping and drain tank cellar extends transversely under the middle of the building and the main floor is divided into three parts, the cylinder room, the pump room and the working cylinder room. The foundation is of concrete with reinforced footings under concentrated loads. The basement walls are also reinforced. The floor over the cellar is a 4-in. reinforced concrete slab supported by 16-in. concrete beams The floors in the other portions of the building are also of concrete 4½ in. thick laid directly on the fill. The walls of the building are of brick with Fenestra steel sash in the windows, some of which are movable for ventilation. The



Heavy Tie Tram of New Model Designed for This Plant

roof is a 3½-in. reinforced concrete slab supported by 15-in., 42-lb., I-beams and covered by a composition tar and gravel surface. A monitor of reinforced concrete construction provides additional light from the roof.

An office building of brick construction, which also includes a laboratory, is located near the main building.

The storage tanks for creosote oil and 50 per cent zinc chloride solution and the mixing tank for the 4 per cent solution are located outside the building, but immediately adjacent to it. All other tanks and equipment are contained in the building, the arrangement being unusually compact. The creosote oil storage

Side View of the Treating Plant Showing Tanks, Boiler Room and Coal Dumping Trestles

tank is 40 ft. in diameter and 30 ft. high, of standard steel construction, the roof being supported by two angle iron trusses placed at right angles to each other. Its storage capacity is 273,405 gal. The zinc chloride storage tank is 15 ft. by 15 ft., with a capacity of 18,827 gal., and the 4 per cent mixing tank adjacent to it is 20 ft. by 20 ft., holding 44,983 gal. The working tanks, which extend up through the roof of the building, are 20 ft. in diameter and 24 ft. high, each having a capacity of 53,944 gal. They are set up 7 ft. 2 in. above the floor level on a re-

inforced concrete slab supported by four 12-in. concrete walls on a reinforced concrete foundation mat.

A 4-in. air space is left between the tanks and the protective cover above the roof of the building. The heating system in these tanks, which is one of the unique features of design, consists of straight lengths of pipe extending from a manifold. Each length of pipe consists of a 1-in. live steam pipe inside a 2½-in. exhaust pipe. The end of the larger pipe is closed by a plug, the inner surface of which is rounded so that the live steam coming out in the inner pipe is directed back through the annular

End View of Treating Plant Showing Boiler Room, Cylinder Room and One of the Heavy Narrow Gage Locomotives

space around the smaller pipe. Important advantages of this system are that each line of pipe is free to expand or contract and that the pipes can be easily removed for cleaning. By carefully locating the points at which these heating pipes enter the tanks, it was made possible to draw them straight out through windows in the side of the building.

With the exception of a measuring tank 4 ft. 8 in. in diameter by 8 ft. 9 in. high for the test cylinder, which is located in the test cylinder room, all of the other tanks are arranged in the basement under the building. One of these, 7 ft. in diameter and 38 ft. 4 in. long, is used to receive either creosote or zinc chloride from tank cars standing on the track outside. Another 7 ft. by 100 ft. receives the contents of the cylinders at the com-

One Corner in the Operating End of the Pump Room Showing Arrangement of Valves and Cylinder Room Through the Opening at the Left

pletion of a change. A 3-ft. by 10-ft. drum is used for measuring the 50 per cent zinc chloride solution when transferring it to the mixing tank and a 3-ft. by 15-ft. sap drum is provided to receive the sap coming from the cylinders during the application of the preliminary vacuum.

PUMP EQUIPMENT AND PIPING

Four solution pumps are provided; one 7½-in. by 8½-in. by 10-in. duplex piston tank pump for handling either creosote or zinc chloride from the tank car receiving tank to the proper storage tank, being provided also with a 2-in. suction line to connect to the dome of a tank car if it cannot be discharged by gravity; one 12-in. by 12-in. by 12-in. Worthington tank duplex piston pump for transferring the solution from the 7-ft. by 100-ft. dumping tank to the working tank, suction and discharge lines also being arranged to connect to any of the outside tanks; and two 7½-in. by 4½-in. by 12-in. Deane oil-pressure pumps equipped with automatic pump governors for applying the pressure on the solution in the treating cylinders. There is also one Deane 10-in. by 16-in. by 12-in. duplex crank and fly wheel vacuum pump with jet condenser for exhausting the air in the cylinders before the application of the solution and one 4½-in. by 2¾-in. by 4-in. Deane duplex oil pressure pump for use with the test cylinder. No air compressor is included in the present equipment, although provision has been made in the piping system to connect up a compressor in case it should be decided in the future to use air in the treatment or for transferring the solution.

The boiler equipment consists of two 200-hp. Vogt boilers of the water tube type equipped with "Vigilant" feed water regulators. A 500-hp. Cookson open type feed water heater and two 6-in. by 4-in. by 6-in. Blake duplex center packed plunger type feed water pumps are also installed. The boilers are equipped with automatic stops and check valves. The

One End of the Pump Room Showing Type of Equipment and Piping Arrangement

boiler draft is furnished by a 100-ft. steel stack, 4 ft. in diameter. An 8-in. steam header supplies all pumps and heating coils in the cylinders and storage tanks. The coal for the boilers is dumped in a reinforced concrete hoppered chute alongside the boiler room, which is approached by five spans of reinforced concrete trestle.

The water supply for the plant is secured from the railway's pipe line at a pressure of 35 to 40 lb. The zinc chloride mixing tank and the boilers are supplied directly from the feed line and a 50,000-gal. steel tank is kept full for use in emergencies. A 16-in. by 9-in. by 12-in. Blake & Knowles duplex Underwriters' fire pump, with a capacity of 750 gal. per min., is provided, and an ample number of fire hydrants are located throughout the storage yard and around the buildings. The plant is lighted by electricity furnished by a 7½ kw. d. c. generator located in the pump room.

The piping received a great deal of study in the design of the plant, both as to the details of pipe material, valves, fittings, etc., and the arrangement of the runs to simplify as much as possible the operation of the plant. The same relative position is maintained between all pipe lines, valves, gages, etc., which are in duplicate for the two cylinders, thereby eliminating as far as possible the chance for mistakes in using the equipment. The steam and exhaust lines are of standard steel pipe with 250-lb. flanged and screwed fittings for the former and 125-lb. fittings for the latter. The steam lines include five steam traps. The

air lines are of 175-lb. flanged cast iron pipe with 250-lb. fittings and 125-lb. steel pipe with 125-lb. fittings. All solution lines 4 in. in diameter or over, and the 3-in. pressure lines, are of flanged 175-lb. cast iron pipe, all other solution lines being of standard steel. The high pressure solution lines have 250-lb. valves and fittings and low pressure 125 lb. The fire lines in the yard are of hub and spigot cast iron pipe.

Gate valves are used in all water and solution lines, and in some steam lines where it is essential that the valves be either full open or shut. Throttle valves of the globe type are used in other lines. Provision for expansion in the 10-in. pipe line leading to the 40 ft. by 30 ft. creosote storage tank is secured by inserting an 8-in. steel U-bend, and 6-in. copper expansion joints are used in the connections to the two exterior zinc chloride tanks. The problem of providing for expansion is greatly simplified by the location of the tanks close to the building.

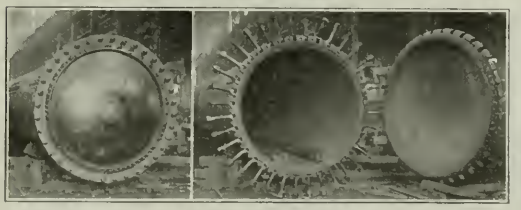
All valves in solution lines that need to be operated in treating a charge have long stems which are carried up through the floor slab over the cellar to stands which are carefully grouped to simplify the operation of the valves. All valves and indicators used in treating a charge are located within a space 60 ft. by 24 ft.

CYLINDERS

The two cylinders are each 133 ft. long and 7 ft. in inside diameter. They are designed for a working pressure of 250 lb. per sq. in., the shells being of ¾-in. flange steel. Each shell is made in 17 courses, each course being a single plate 99 in. wide. The circular seams are lapped and double riveted and the longitudinal seams are double butt strapped and triple riveted. The cylinders are supported on cast iron saddles, the one located near the center being bolted securely to the foundation while the others rest on rollers allowing free expansion.

The doors are of the built-up type, consisting of a cast steel shell frame, a cast steel door frame and a flange steel dished head riveted to the door frame. The door is secured by 36 T-head bolts resting in semi-circular grooves in the shell frame. Each bolt is secured in place by a bolt retainer fastened to the shell frame. The door hinges are designed to carry the entire weight of the door when opening and closing, and are provided with ball thrust collar bearings making the door easily operated.

The track construction used in the cylinder was adopted on account of its strength and the fact that it absolutely prevents



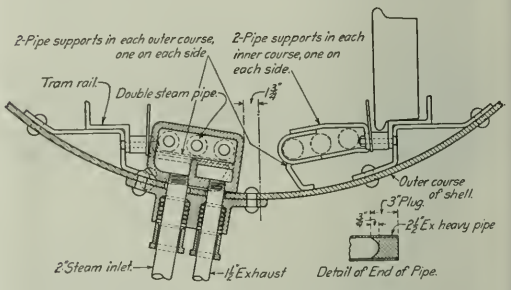
The Built-up Doors for the Treating Cylinders, Closed and Open

the derailment of cars in the cylinders. The track consists of heavy Z-bar rails mounted on pressed steel brackets riveted to the shell. The wheel is guided by a heavy steel plate bolted to the inner flange of the Z-bar and separated from it by cast iron spreaders, the height of this guide plate being such that the wheels cannot pass over it when a car is in its highest possible position.

Each cylinder is provided with a 36-in. by 36-in. dome located near the center, within which an automatic float valve is operated by a pressed steel float secured to the lower end of the valve stem. An electric indicating device is arranged on the upper end of this valve stem and properly connected to a bell or light in the pump room to notify the operator when the cylinder is full and the valve closed. This arrangement has been found to be a decided improvement over gages, indicators, or similar devices.

The system of heating the solution in the cylinder is the same as that described above for the working tanks, except that ¾-in. and 2-in. pipes are used. The manifolds are located at the center of the cylinder from which the heating pipes extend in both directions. The steam inlet and exhaust pipes are screwed directly to the bottom of the manifold, preventing leakage of steam or water in the cylinder and also preventing leakage of oil from the cylinder around the pipe connections. Two sets of pipes are provided in each cylinder, a clear space being left between them in order to make it possible to flush the cylinder to wash out any accumulation of chips, dirt, etc.

The compact arrangement of the plant makes it possible to maintain the desired temperature in the working tanks and cylin-



Detail of Pipe Arrangement for Heating Treating Cylinders, Showing Also Track Construction in the Cylinders

ders without undue loss of heat in transmission, as no long exposed pipe lines are required. In view of the consideration which was given this feature in the design, it was gratifying to find that the actual cost of heat per tie for the first three months of operation was less than 0.2 cents.

A test cylinder 3 ft. 6 in. in diameter by 11 ft. 6 in. long with all necessary piping connections is installed for experimental work which is being carried on continuously.

OPERATION

The standard method of treating is, first, to apply a vacuum of 20 to 24 in. for one hour, then without relieving the vacuum, to allow the creosote or zinc chloride to flow into the cylinder at a temperature of 170 deg. F. The pressure is then raised to 160 lb. per sq. in and maintained for six hours.

The plant is operated by an engineer, an assistant engineer, a fireman and a helper, with an assistant engineer and a fireman at nights. The charges are changed at 6 a. m. and 6 p. m. Each charge consists of 15 trams, making it possible to treat 60 trams in 24 hours, with an average of about 2,800 ties.

The design of this plant was carried out under the direction of W. H. Courtenay, chief engineer, and the buildings were designed in his office under the direction of J. A. Galvin, architect. The general arrangement of the plant and many of the details, including the piping, were worked out by John B. Lindsay, superintendent of timber treating plants, who also has charge of the operation of the plant through his assistant, H. G. Laird. The grading and concrete work were contracted to the Meacham Contracting Company, Hopkinsville, Ky., and the track work and building construction were handled by company forces. The Allis-Chalmers Company, Milwaukee, Wis., furnished and installed the cylinders; the Henry Vogt Machine Company, Louisville, Ky., furnished the tanks, and all piping and valves were supplied by the Crane Company, Chicago. Engineer, J. M. Foley, of Birmingham, Ala., installed the pumps, piping, valves, etc. Work was begun on this plant in June, 1913, and it was open for operation on March 7, 1914.

A Simplified Method for the Location of Sidings

Several Typical Problems Together With Some Important Practical Considerations Regarding the Layout

By W. F. Rench
Supervisor, Pennsylvania Railroad, Perryville, Md.

A supervisor frequently has need of a simplified method by which the curves of a siding may be laid out on the ground, either at the time the preliminary survey is made, with the object in view of showing the applicant for the siding the salient features of the location or of making notes necessary to an estimate of the grading, when a tape line layout may be the only one possible, or at a later time when the siding is about to be constructed and a transit may be unobtainable or its use inconvenient. Doubtless many cases require some instrumental work and it is then useful to know how the processes can be simplified, as the corps will generally consist of the supervisor or his assistant and a trackman or two.

It is thought that probably the greater number of cases of siding layout can be met by the use of the tape line alone. Most supervisors carry with them at all times a 5-ft. extension rule and a 50-ft. steel tape and not a few a 100-ft. length of string to correct the general line of curves. By the aid of the simple rules of geometry and with the use of the accessories mentioned, it is possible to dispose immediately of very many cases and often avoid the necessity of a subsequent visit to the location.

The matter is greatly simplified by the fact that the right of way line is nearly always parallel with the tracks and the building which fixes the location of the siding is also parallel. The siding therefore is either parallel or at right angles with the track. But even for those cases where the siding is not parallel or at right angles with a tangent main track a special solution is possible which is not unduly complicated and which can be comprehended by most maintainers of track.

It is not claimed that any new theories have been developed, but it is claimed that certain of the solutions offered are not to be found in any of the field books. Of the many which are to be found there only those have been selected which tend to simplify the supervisor's work and even to open the way for the safe handling of such problems by the brighter track foremen, not a few of whom are now entering the ranks of supervisor.

It will perhaps be thought by some that in neglecting the tangents introduced into the siding curve by the straight

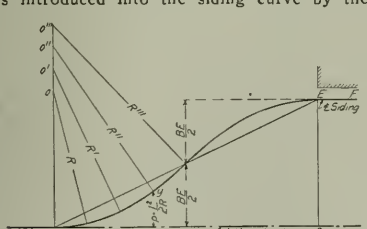


Fig. 1—A Siding Parallel to the Tangent Main Track

switch and frog accuracy is being sacrificed, but it will be found that for turnouts above No. 5 (and those below have been practically eliminated by the operation of the Safety Appliance law) no sensible error will result from this source. Stakes need not be set at either the point of switch or the point of frog, but their location should be indicated by marks on the rail and care should be taken that the half inch point of frog is always understood.

The simplest case is that of a siding parallel with a tangent main track and flanking a building, the location of which fixes the maximum offset distance. There is no practical need nor is there usually the space for introducing any tangent between the curves, but in order to render the physical conditions at the point of reverse as favorable as at the beginning and ending of the curve, it is quite advantageous to make the curves flatter at the reversing point. This may be done by using the formulae for the parabola. While this increases the length of the curve somewhat, the extension is not more than a few feet even for an extreme case.

The formulae symbolized are $p = \frac{l^2}{2R}$ and $l = \sqrt{2pR}$, or expressed in words signify that for a chosen distance from the point of the curve along the tangent, *the offset is equal to the square to the distance divided by twice the radius,* or conversely, for a chosen offset from the tangent, *the linear distance is equal to the square root of the product of the offset multiplied by twice the radius.* The field books employ these formulae for staking out a circular curve by offsets from the tangent and chords produced, the value of the offset from the chord produced being twice that from the tangent, when the distance used is a chord of the curve instead of a length on the tangent. The method is undesirable because the operation of successively producing the chords renders the process subject to cumulative error.

By the use of the formulae in the manner suggested, the distance from the end of the curve to the reversing point and from the reversing point to the point of switch may be obtained at once. These distances will be equal if the two

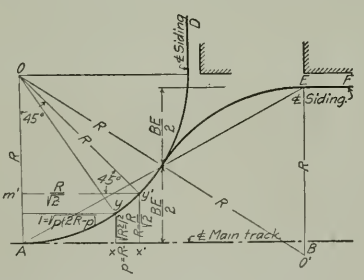


Fig. 2—A Siding Parallel to or at Right Angles to the Tangent Main Track

curves are of equal radii and the reversing point will be midway between the line of the main track and of the siding. Whether the curves be of equal radii or otherwise, this point will lie in the line joining the two tangent points. Any number of intermediate points on both curves may be set after computation of the offsets. Those for the second curve may be made supplements of the whole distance between the siding and the main track and thus all the measurements be made from an actual base line and every source of error in the field work be eliminated. It should be noted that the offsets vary as the square of the linear distance and if the distances selected are in a simple ratio, the square of this ratio multiplied by the first offset will supply the other offsets with a considerable saving in computation.

When the length of radius is not absolutely determined by

limiting conditions, as indeed seldom is the case, one should be chosen which will make the offset at the point of frog equal to the gage. This radius will be about 5 per cent larger than the actual radius obtaining through the lead, but this advantage is quite desirable both from the maintenance and operating standpoints. This solution may be used for the case of a crossover between two tracks which are parallel, but which are so far separated that a tangent between the frogs is impracticable.

If it is preferred to make the reversed curves circular rather than parabolic the formulae outlined for a continuous circular curve should be employed.

The problem of locating a siding at right angles with the main track may likewise be met by the use of offsets and with as great accuracy as the average transit instrument will supply. It is necessary in any event to adjust the detail line of the curve when finally laid, and this can best be done with a string. The formulae for offsets employed in the preceding case will not answer for the circular curve required and the proper formulae for such cases are the following: $p = R - \sqrt{R^2 - l^2}$ and $l = \sqrt{p(2R - p)}$. These symbols signify that for a chosen distance from the point of curve along the tangent, *the offset is equal to the radius minus the square root of the difference between the radius squared and the linear distance squared;* or, conversely, for a chosen offset from the tangent, *the linear distance is equal to the square root of the product of the offset multiplied by the difference between twice the radius and the offset.*

This may be used for the offsets from either end to the middle of the curve, for which point it should be noted that the linear distance is equal to the radius divided by the square root of 2, which is 1.414, and the offset is equal to the difference between the radius and this linear distance.

A test of the correctness of the layout will lie in the fact of the total measured length of the curve agreeing with the length as computed by the simple properties of the circle.

The problem when the line of the siding either converges

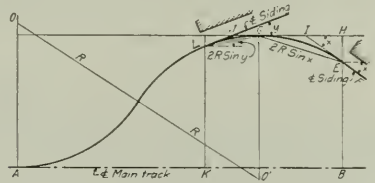


Fig. 3—A Siding at an Angle with the Tangent Main Track

toward or diverges from the line of the main track may appear to be quite complicated, but when understood becomes really quite simple. The field work necessary to a solution of such a case consists only in measuring the angle of divergence and the offset distance at the point of tangency. The problem then is to determine the position of a tangent parallel with the main track which, for the chosen radius, will make the curve pass through the point desired and be tangent to the line of the siding at that point.

The field books develop with great interest to the mathematically inclined the problem of finding the equal radii for a known position of the line joining the two ends of the reversed curve. But as the effect of such a proposition is to establish a curvature that will generally necessitate the use of special frogs it is clearly not of much use in the solution of the practical track problem.

The angle may be obtained with the tape line by laying down equal distances along the two sides of the angle and measuring the spread at the ends of such distance and by dividing the constant 57.3 by the ratio of these measurements, which it will be noted is the same problem as used in measuring the angle of a frog.

The length of chord subtending a central angle of this computed value may be found with sufficient accuracy by dividing the angle by the degree of curve. The tangent offset for this chord will be obtained from the formula in Example 1, and the linear distance by a solution of the right angled triangle in which the chord is the known hypothenuse and the tangent offset the other known side. The position of the parallel tangent and the linear distance to the point of curve are now

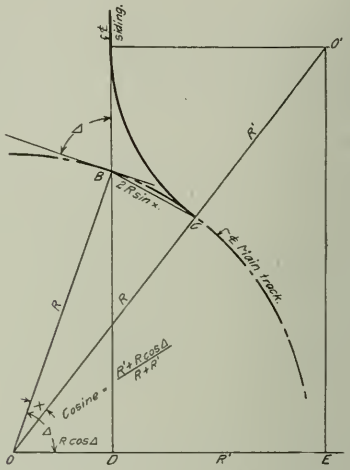


Fig. 4—A Siding from the Outside of a Curved Main Track

known and the solution of the problem becomes simply that of Example 1, except that for the diverging line a portion of the computed curve is imaginary and for the converging line a portion of the computed curve will be duplicated beyond the point of tangency with the imaginary parallel line.

The problem of establishing a connection from a curved main track requires instrumental work in measuring the angle between the siding tangent and the tangent to the main track curve at the point of intersection and of de-

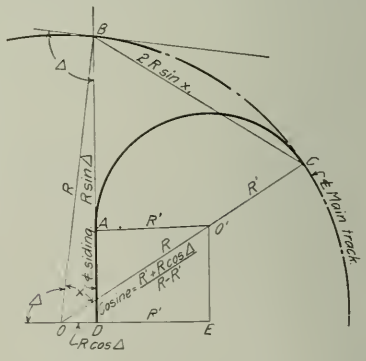


Fig. 5—A Siding from the Inside of a Curved Main Track

flecting for the several stations after computing the length of curve between the point of intersection and the p. c. of the siding curve and of the distance on the siding tangent between the main track curve and the p. t. of the siding curve. This distance from the main track curve to a possible point of tangent for the siding curve should be measured as a check on the selection of radius for the sliding curve. The choice of curves is limited to those which will permit the use of a

regular number of frog and will thus be the curvature of some regular connection plus or minus the degree of the main track curve, depending upon whether the siding is from the inside or outside of the curve.

There are six cases of this one general problem, of which the two that most commonly occur are given. The other cases include two more from the inside, in both of which the angle ⌐| is greater than 90 deg. and R^1 either greater or less than R cos ⌐|, and two more from the outside in both of which ⌐| is less than 90 deg. and R^1 either greater or less than R cos ⌐|. Each case supplies variations which the mathematical skill of the engineer will readily differentiate.

The solution of all is rendered more facile by extending the siding tangent to a normal line which passes through the center of the main track curve and intersects a line parallel with the siding tangent through the center of the siding curve. This brings the measured angle ⌐|, which it will be noticed is included between the radius of the main track curve and the normal to the siding tangent, into direct geometric relation with the two known radii. The solution indicated for the two cases may be applied with apparent modification to all the cases when the angle between the siding tangent and the radii passing through the p. c. of the siding curve may be obtained, as well as the central angle of the siding curve and the distance to the actual p. t. of the siding curve when a test of the correctness of the assumed radius will be had upon comparison with the tentative measured distance.

When it is not necessary to establish the siding curve immediately, the work may be greatly simplified by taking scale measurements from an accurately plotted plan. These will answer every purpose if the original survey was correct and

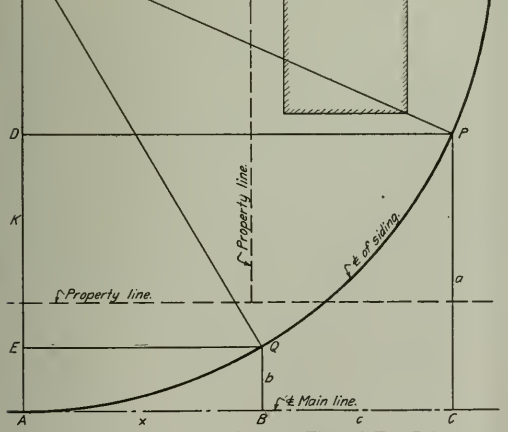


Fig. 6—A Siding Required to Pass Through Two Points

the drawing made to a scale as large as 1 in. to 40 ft., or preferably 1 in. to 32 ft.

The problem of locating a siding on a continuous simple curve which shall pass through two definite points is of very frequent occurence, as when a property corner must be avoided and farther on a corner of a building cleared. The finite problem is capable only of theoretical solution when the result will be a curve which may or may not approximate that of some regular connection. But it will generally be possible to change one or both points so that the curve of the nearest regular number of frog may be employed.

The theoretical solution is readily made by means of the geometrical relations indicated in the diagram and furnishes the two following formulae by which the radius may first be computed and if this answers the practical requirement, the distance from the point of curve to the foot of the perpendicular through the nearer point.

It will be noted that the formula for obtaining the radius has been reduced with a view of establishing the function R in its simplest form, which will be found to facilitate greatly the detailed solution. Indeed without this simplification the solution is immeasurably tedious.

$$R - \frac{a+b}{2} - \frac{c^2}{2(a-b)} = \frac{c}{a-b}\sqrt{2bR - b^2}$$

$$x = \sqrt{b(2R - b)}$$

The factor preceding the square root sign need only be carried to two decimal places and to the same degree of accuracy when squared. The remaining members may be used throughout of the nearest even whole number.

When the radius found is not of practical application, as when a radius of 375 ft. results, which lies midway between the curve of a No. 6 and a No. 8, No. 7 not being used, the problem becomes one of adjustment within the limits that are possible for changes in the two assumed points. The quarters will seldom be so close that a change of a few feet will not be practicable and in such event the choice will lie between a compounded curve and a special frog.

A solution of the extreme case mentioned will afford some hints that will tend to simplify the solutions of other problems. It should be noted that a radius within 50 ft. will furnish practical results in the use of any particular frog. Thus a radius of 300 ft. will answer for a No. 6 or 450 ft. for a No. 8. But upon the determination of the radius a computation should be made of the distance to the point where the offset distance is equal to the gage plus ½ in., and this point be used for the point of frog and a proper lead laid off to determine the point of switch, which need not be exactly at the point of curve.

Let a = 137, b = 51, c = 100; then, $R - 152 = 1.16\sqrt{102R - 2601}$

Squaring, $R^2 - 304R + 23104 = 138R - 3511$

(138) (25737)

$R^2 - 442R + 48841 = 22226$

(diff. 25737)

$R - 221 = 149$, or $R = 370$.

Changing to a = 132, b = 56, c = 100, $R - 160 = 1.32\sqrt{112R - 3136}$

$R^2 - 320R + 25600 = 196R - 5456$

(196) (40964)

$R^2 - 516R + 66564 = 35508$

(diff. 40964)

$R - 258 = 189$, or, $R = 447$ ft., which permits the use of No. 8.

Changing to a = 144, b = 44, c = 100, $R - 144 = \sqrt{88R - 1936}$

$R^2 - 288R + 20736 = 88R - 1936$

(88) (14608)

$R^2 - 376R + 35344 = 12672$

(diff. 14608)

$R - 188 = 113$, or $R = 301$ ft., which permits the use of No. 6.

PRACTICAL CONSIDERATIONS IN SIDING LAYOUTS.

The feature of clearance in siding layout is a basic one because it concerns not only the switching movements but affects also the question of safety to persons. Some roads prescribe the minimum distance from the track for structures and a few require that this limit shall be followed in the case of movable obstructions. But the addition to this minimum made necessary by the "nosing," overhang or tilt of the cars, which is a variable one, is not generally stated. Assuming that the widest car which moves in regular traffic is 10 ft. 9 in., a limit of 4 ft. 7 in. from the gage line of tangents for all obstructions would allow a margin of 1 ft. 7 in. without any correction for accidental unevenness of elevation or for swaying of the car while in motion and with a fair degree of maintenance this would render operation entirely safe.

Car design is such that in a general way the nosing nearly

equals the overhang on curves that are without super-elevation. The corrections may be readily computed for cars with 30 ft. truck centers by taking one-fourth the degree of the curve as inches of overhang and assuming that the nosing is no more than that figure and adding or subtracting whatever may be proper for the super-elevation employed. If this is 1½ in. as suggested, the tilt at the eaves of the car would add or subtract 4½ in. from the correction depending on whether the low or high side were in question. The fact should not be overlooked that at the end of the curve a correction should also be made which is one-half that for the body of the curve. The distance beyond the point of tangency to the point where correction no longer applies is about 18 ft.

The overhead clearance limit is conveniently fixed at 16 ft. above the top of rail which meets the requirements of all present equipment and probably is ample for all future design. As this clearance will not pass a man riding a car, tell tales should be placed. The least overhand clearance that will safely pass trainmen standing upon the highest cars is 20 ft. 9 in. above the top of rail.

The considerations of alinement, grade and super-elevation are other important elements in a siding layout. As a general proposition, if space is available, no shorter radius should be employed than can be operated practically by any class of engine. For most roads this is the curve of a No. 6 turnout from tangent which is 23 deg. or 250 ft. radius. This requirement is not practical in congested districts and it will often be necessary to modify the curvature to the minimum that a due consideration for safety in coupling cars will permit. This radius has been variously determined, but probably is close to that of a No. 5 turnout from tangent or a 162-ft. radius. Where sharp curvature and maximum gradient are both involved insistence should be had upon the best possible feature for each.

The allowable maximum gradient for siding connections for the best service is 2 ft. in 100 ft. and the maximum for a track upon which cars stand for unloading 1 ft. in 100 ft. It is possible to operate sidings with a gradient as great as 4.7 ft. in 100 ft., but the best drill engines cannot handle more than three loaded cars on such a gradient and the operation is therefore unprofitable. The danger of wrecks from cars running away with the possibility of fouling the main line even when derails are provided renders such a gradient highly objectionable. It is very important that all radical changes of grade in siding connections shall be eased by vertical curves, as the absence of such advantage is a frequent source of accident.

The general feature of gradient concerns the approaches to coal trestles more particularly, and is one where the road must often take a firm stand against the insistence of the applicant for more headroom. The adoption of a limiting gradient by the road many times would supply the means of combatting such demands. If greater headroom is desired it can nearly always be had by excavating the site. Any less clear height than 6 ft. 6 in. below the stringers will not permit a horse being driven through and any greater headroom than 14 ft. will break the coal or grind a measurable amount of it into dust with a considerable loss to the dealer.

The question of super-elevation is one concerning which authorities differ. It will be argued that no super-elevation is possible through the connection and therefore none is necessary beyond the connection. But the difference is that the track through the extent of the switch timbers is more rigidly secured in line, surface and gage, if tie plates be used on the timbers as should be the case, and there is less chance for distortion. It will be found that a super-elevation of 1½ in. for all siding curves is a decided maintenance advantage.

The importance of good line and surface is not fully appreciated. Very many obscure cases of siding derailment wherein the cause is given as "truck failing to curve" is really irregular line or uneven elevation. To spend money in siding maintenance is much better than spending it for small wrecks with its annoying interruption to drill work or the possibility of injury to men.

The best maintenance of sidings can only be attained by constant inspection and supervision. The track walker should go over every siding once every day. The foreman should inspect each siding in his territory twice a week. The supervisor should make a careful examination of his sidings and switches once every month and make permanent notes of what he finds. He should also require a report every two weeks from his foremen stating that he has made his inspection and calling attention to any specified repairs that may be necessary requiring material that he lacks. For the best results the foreman should not be overburdened with siding responsibility. Probably 30 switches is the most that one foreman can look after if he has main track duties also.

MOTOR CARS ON THE KATY*

By J. L. Walsh

Superintendent, Parsons District, Missouri, Kansas & Texas, Parsons, Kan.

In March, 1913, we were furnished 10 Fairbanks-Morse No. 32 motor cars at a total cost of $2,444. In the 13 months these cars have been in service they have made 80,465 miles, consuming 2,701 gallons of gasolene at a cost of $256.63, with oil and other supplies costing $75.61—making 29.9 miles per gallon of gasolene.

When these cars were put in service on the Kansas City division the number of sections was reduced from 16 sections of six miles each, to 12 sections of eight miles each. During the 13 months ending June 1, 1914, our total cost of track labor on sections, including wages of foremen and laborers, was $36,497.15, while for the 13 months previous to the use of these cars the expense was $39,823.95, showing a saving with the cars of $3,326.80. Deducting from this amount the cost of the cars leaves a net saving of $882.30. It is, therefore, conservative to figure that our saving on the 10 cars now in operation will amount to $3,000 per year.

This saving of $3,326.80 has enabled us to maintain a tiling gang in maintenance work. Outside of the tiling gang the use of the motor car has enabled us to maintain the Kansas City division without the use of an extra gang, and we believe the track conditions on that division are considerably better than they were last year, even though our heaviest power has been in service on the division since May, 1913.

In addition to the real money saved in the operation of these cars, probably the largest saving is effected in going to and from work as under ordinary conditions the cars will make a speed of 20 miles per hour, enabling the men to start to work fresh from 30 to 45 minutes earlier than they would on the hand car, and permitting them to work the same length of time longer in the evening. The total saving thus effected is represented by 13,134 labor hours, amounting to $1,970.10, which amount alone would pay for the cars in 15 months.

There are many instances where we have been able to double up section men for work that would ordinarily require an extra gang, and which would be very expensive if we attempted to double up gangs with the hand cars. As an instance of the value of motor cars, I will cite the case of a serious derailment which damaged the track and a high trestle. We were able to get four section and one bridge gangs to the scene four hours before the wrecker arrived, during which time the track and bridge were made safe for the passage of trains, so that we were able to open up the main line in one hour after the wrecker arrived, we thus saving a detour to one of our fast passenger trains which we would have had to make, had it not been for the motor cars.

Another great advantage of the motor car is the fact that we are able to keep a full quota of section laborers on each section, as the motor car relieves them of the hardest work trackmen are called upon to do. In the event of storms, the motor car acts as an incentive for section men to patrol their track, which

*An abstract of a paper presented at an operating department staff meeting held at Galveston on June 22 and 23, 1914.

otherwise might not be done. Another advantage is that the foreman can leave three of his men on a piece of work and go over his section with one man. The same is true in going after water, or material needed, all of which amounts to considerable saving when it is not necessary to use the entire gang.

These cars will accommodate 10 men, together with the track tools, and they have handled a push car with from 25 to 40 ties with comparative ease. With the aid of a push car we are able to handle 20 men in extra gang work, enabling the gang to get to work sooner, and work longer per day, thus saving many labor hours.

While the motor car promotes economy and efficiency in track work, probably a greater efficiency and economy obtains from their use by bridge gangs. We had in use by a bridge gang a Buda motor car No. 19 equipped with a free-running engine which gave perfect satisfaction. We found that it was possible to eliminate four moves of the bridge outfit per month, the average move being about 25 miles. As the outfit consisted of six cars, or about 150 tons, and as the transportation expense of handling freight on this district is 0.027 cents per ton mile, we were able to save on this item alone $486 per year. A further saving of 20 hours each month to trains handling bridge material will amount to $65 per month, or $780 per year. With the aid of a motor car in a bridge gang, we can operate with one man less, making a saving in wages of $648 per year, or a grand total of $1,914 per year, while the cost of the car is a trifle above $300. With the aid of a push car we can handle four 30-ft. stringers, together with the men and tools. A great deal of money was also saved by distributing gang over 20 or 25 miles doing small jobs that would be very expensive if handled in the old way.

RAIL FAILURES STATISTICS FOR 1913*

By M. H. Wickhorst
Engineer of Tests, Rail Committee, American Railway Engineering Association

This report deals with the statistics of rail failures for the year ending October 31, 1913, furnished by various railroads of the United States and Canada in response to a circular sent out by the American Railway Association. The information furnished by each railroad showed the number of tons laid of each year's rolling from each mill and the total number of failures that had occurred in each year's rolling from the date laid until October 31, 1913. Heretofore only the failures occurring in the year covered by the report were shown, but in this report the total failures occurring since the rail was laid are made the basis of comparison.

The tonnages of rail represented by these statistics are shown below:

Year rolled	Bessemer	Open-Hearth	Total
1908	282,945	156,120	439,065
1909	432,155	461,261	893,416
1910	564,713	828,111	1,392,824
1911	276,933	646,809	923,742
1912	80,146	939,025	1,019,171
1913	63,472	793,557	857,209

FAILURES CLASSIFIED BY MILLS

For the purpose of determining the failure performance of the rails furnished by the different mills, the statements were first grouped between Bessemer and open-hearth steel. They were then grouped by steel mills, and each mill's tonnages grouped by the year the rail was rolled. Totals and averages were obtained for each of these groups.

Failures of Bessemer and Open-Hearth Compared

Year rolled	Failures per 10,000 tons		Comparative failures	
	Open-Hearth	Bessemer	Open-Hearth	Bessemer
1908	268.9	302.1	100	112
1909	109.0	212.4	100	195
1910	57.6	132.1	100	229
1911	37.4	94.2	100	252

*Abstracted from Bulletin 170 of the American Railway Engineering Association, just issued.

The rails for 1912 and 1913 are not included in this comparison, as they are probably too young for the comparison to be as reliable as for the older rails. Comparing the different years, the failures per 10,000 tons of open-hearth rails are proportionately much larger for the year 1908 (approaching the number of Bessemer failures), and this suggests the thought that there were faulty practices in the early rollings of open-hearth rails that were improved upon in later years.

In order to show the relative number of failures from each of the mills and to show the ranking of the mills as regards the failure performance of the rails rolled by them, the following table has been prepared. Taking the average number of failures per 10,000 tons of all the mills in any year's rolling as 100, the relative number of failures of each of the mills is shown for the years 1908, 1909, 1910 and 1911. The later rollings are not included because of being too young.

Bessemer			Open-Hearth		
Mill	Rank	Relative failures	Mill	Rank	Relative failures
Maryland	1	56	Colorado	1	20
Cambria	2	71	Tennessee	2	26
Lackawanna	3	89	Lackawanna	3	52
Illinois	4	89	Pennsylvania	4	58
Carnegie	5	161	Maryland	5	76
Algoma	6	191	Carnegie	6	96
			Illinois	7	107
Average		100	Cambria	8	136
			Bethlehem	9	210
			Algoma	10	312
			Dominion	11	539
			Average		100

The "100" given as "Average," it should be understood, is not obtained as the average of the column below which it appears, but is taken to represent the failure performance of the tonnage covered by these statistics of all the mills during the four years represented and for Bessemer and open-hearth rail separately. The "Relative Failures" give the number of failures that occurred in the same tonnage that had 100 failures as an average of the rails of all the mills.

A striking feature noticeable in this comparison is the very large differences between the different mills, especially in the open-hearth steel, some of which can be attributed, probably, to differences in the service to which the rails are subjected, but this can be only a partial explanation.

COMPARISON OF SECTIONS, WEIGHTS AND POSITIONS IN THE INGOT

A retabulation was made of all the failure reports with special reference to the matter of performance of different sections and was divided into three groups as follows: Thick base, high rails, or the A. R. A. type A group; thick base, low rails, or the A. R. A. type B group, and thin base, or A. S. C. E. group. The results indicate that the various types of section have about the same failure tendency, although on account of the differences in service no definite conclusions can be drawn as to the different types of section. The thin-base rails showed a somewhat larger percentage of failures as base breaks and broken rails, although the failures per 10,000 tons were about the same.

Comparisons were made of failures by weights of rail, but definite conclusions as to the failure performance of different weights of rail probably cannot be made from these statistics because of the difference of service to which the light and heavy rails are subjected. The comparisons indicate that the weight of rail per yard does not greatly influence the failures per 10,000 tons.

A comparison of the rails from the different ingot positions indicated that, as a general average, the failures classified as head failures of the "A," or top rail, were 2.7 times the failures of the other rails of the ingot in Bessemer steel and 1.8 times in open-hearth steel. In the failures classified as base breaks and broken rails the different rails of the ingot showed about the same failure tendency, or a little less in the "A," or top rail.

A comparison of rails made of steel treated with titanium with those of plain steel showed that in some cases the treated rails gave fewer failures per 10,000 tons than the plain rails,

and in other cases the plain rails gave the smaller number of failures. As a general average the titanium-treated rails gave somewhat less failures per 10,000 tons.

The tables showed that, after a period of service of five years, as a general average, about 1¼ per cent of the rails were reported as failed.

ROADMASTERS' ASSOCIATION COMMITTEE ASSIGNMENTS

The following subjects for investigation on which reports will be made at the 1915 convention of the Roadmasters' & Maintenance of Way Association were selected at a recent meeting of the executive committee. The personnel of the committees assigned to this work are also given.

New and Experimental Track Accessories and Tools: William Shea (C. M. & St. P.), chairman, J. W. Dahl (N. Y. C. & H. R.), J. O'Connor (M. St. P. & S. S. M.), D. O'Hern (E. J. & E.), Emmet Keough (C. B. & Q.) and George Beckingham (G. T.).

Proper Organization of Section Forces and Methods for Maintaining and Policing Track. Sub-committee No. 1, For High Speed, Heavy Traffic Railroads: M. E. Eagan (N. Y. C. & H. R.), chairman, H. Ferguson (G. T.), A. L. Kleine (A. T. & S. F.), W. P. Murn (N. P.), J. E. McNeil (A. T. & S. F.), David Mau (C. M. & St. P.) and L. C. Ryan (C. & N. W.). Sub-committee No. 2, For Light Constructed Railroads Carrying Heavy Traffic: J. Buel (A. C.), chairman, J. W. Fletcher, Jr. (Car. & N. W.), William Wharry (G. T.), H. A. Buel (C. M. & St. P.), George Corcoran (C. & N. W.), E. W. Gulley (C. R. I. & P.), and B. F. Harrison (C. R. I. & P.). Sub-committee No. 3, For Large Terminals: G. H. Brooks (St. L. T.), chairman, David McCooe (G. T.), F. E. Crabbs (C. & N. W.), William Lawrenz (C. & E. I.), A. M. Anderson (C. M. & St. P.), J. P. Corcoran (C. & A.), M. Griffin (C. R. R. of N. J.), and T. F. Donahoe (B. & O.).

ABSTRACT OF ENGINEERING ARTICLES

The following articles of special interest to engineers and maintenance of way men, and to which readers of this section may wish to refer, have appeared in the *Railway Age Gazette* since October 23, 1914:

Licenses for Engineers.—The arguments formulated by D. F. Crawford of the Pennsylvania Lines West against the bill for licensing engineers which is now being prepared by a commission of the Pennsylvania state legislature were commented on in an editorial in the issue of October 30, page 782.

The New Kansas City, Mo., Union Passenger Station.—The new passenger station used by all roads entering Kansas City, Mo., which has just been completed at a cost of about $11,000,000, was opened for traffic on November 1. An illustrated description of this building and the accompanying facilities was published in the issue of October 30, page 799.

The Jersey City Passenger Station Improvements.—A unique problem in passenger terminal construction has been solved by the Central Railroad of New Jersey in the improvements recently completed at its Jersey City station, where all passengers are transferred between trains and ferry boats. A large increase in capacity has been secured by building a new two-story ferry house, enlarging the concourses and rearranging the station building. This work was described and illustrated in the issue of November 6, page 860.

Construction of the New York Connecting Railroad.—The 10-mile line which is being built at an estimated cost of $30,000,000 to connect the New York, New Haven & Hartford in the Borough of the Bronx with a point in Brooklyn opposite the Greenville yards of the Pennsylvania for freight traffic and with the East river tunnel line of the Pennsylvania for passenger traffic, was described and illustrated in the issue of November 13, page 888. This line includes an arch bridge over the Hell Gate which is the longest arch span ever built, a considerable length of high viaduct, and other important structures.

New Alpine Tunnel Pierced.—The last wall of rock was brought down in the tunnel from Montiers, in France, to Granges, in Switzerland, on the morning of October 28, the engineers from the two sides meeting at half-past four amid cheering.

AN UNUSUAL FAILURE OF A CREOSOTED PILE

In the construction of a turntable in the Brownwood, Tex., division yard of the Gulf, Colorado & Santa Fe recently, it was thought advisable to drive piles under the foundation as there was no rock within reach. This yard is laid on a fill of 5 to 8 ft., the natural surface being bottom land which proved to be very compact and to offer great resistance to the driving of the piles. The piling furnished for this work was removed in 1913 from the Galveston bay bridge, where it had been driven in 1895. The timber was long leaf yellow pine which had been preserved by the marine treatment, consisting of steaming and the injection of 24 lb. of creosote per cu. ft. When this bridge was dismantled the best of the piles were pulled and saved.

These piles failed during driving at Brownwood and were later dug out and replaced by concrete. The condition of one of these piles after its failure is shown in the accompanying photograph. The point bears practically no evidence of battering, although at a distance of about 3 ft. from the point the wood fibers have been distorted, splintered and compressed longitudinally until the diameter was increased to nearly 4 ft. This tearing of the fibers shows that the preservative treatment was of the best, and the condition of the wood as to decay has remained excellent. The only plausible explanation of the failure is that the pile penetrated the natural ground for the length which is undamaged, and that the failure occurred at the level dividing the ground and the filling material.

Creosoted Pile that Failed by Brooming About 3 ft. from the Point

The Trans-Australian Railway.—The latest report concerning the East to West Transcontinental Railway which the Australian government is constructing between Port Augusta in South Australia and Kalgoorlie in Western Australia shows that 231 miles of earthworks have been completed and that the rails have been laid for 225 miles.

Constructing Embankments with Suction Dredges

The Burlington Has Constructed Three of these Large Dredge Outfits to Rebuild Line Along the Mississippi

The Chicago, Burlington and Quincy is now engaged in the reconstruction of its line and the building of a second track between Savanna, Ill., and St. Paul, Minn., a distance of 280 miles. This line follows closely the east bank of the Mississippi river for the entire distance and for the greater part of the way is closely hemmed in by high bluffs on the east and by the river on the west. It was built in 1885 with a maximum grade of 0.3 per cent and maximum curve of 3 deg. In reconstructing this line the grade is being reduced to a maximum of 0.2 per cent and the curvature to 1 deg. While the reduction in grade has not introduced any serious problems, the establishment of this low standard of curvature has made necessary some very heavy grading work.

Since the old 3-deg. line followed the river closely it is evident that a 1-deg. line must either cut heavily into the projecting bluffs or cross the numerous bays of the river. The decision between these alternative locations depended largely on the type of construction equipment to be employed. After making detailed surveys, the river line was adopted. The work has been carried on continuously since 1910 until now the second track is about half completed. It is costing from $25,000 to $75,000 per mile and will require the expenditure of about $13,500,000 for the entire line.

Over 12,000,000 cu. yd. of embankment lies in the river or immediately adjacent to it in addition to the excavation and

The Old Line and a Completed Cut Off Built by a Dredge

other embankment work on the main land. This large amount of river work has prompted the construction of three complete suction dredge outfits by the railroad, which are now being operated by its own forces. The first one with a 15-in. suction pump was completed and placed in service in 1910 and was described in the *Railway Age Gazette* of August 25, 1911. The following year an 18-in. dredge of the same general design was built, while the third, with a 20-in. pump, was placed in service last year. Considerable dredge work is also being done by contract. As these three company dredges have all been in operation for more than one entire season, it is possible to gain a fairly accurate idea of their performance.

The first essential for economical dredge operation is good material to handle. Mud or very fine sand deposits slowly on the bank and a large portion is carried off with the water, while coarse sand or gravel is readily retained on the bank. Accordingly the river channel or slough adjacent to the work is first sounded to determine the character of the material in the bottom. The dredges are then located where they may secure the greatest proportion of heavy materials, readily working down stream as the embankment is completed and the material in the river bottom gives out or is exhausted. Under good working conditions about 20 per cent of the material pumped consists of solids, while about 35 per cent of the working time of the dredges is consumed in necessary delays.

Another factor limiting the output is the length of the discharge line. While this naturally depends on the distance from the beds of good material to the bank, it is kept under 2,000 ft. whenever possible, although the 20-in. dredge has pumped through a line over 3,000 ft. long. When starting work at a new

Completing a 300,000 cu. yd. Embankment at Lynxville, Wis.

location the discharge is directed on the center line of the proposed embankment until the fill appears above the water, when the discharge end of the pipe line is turned lengthwise along the bank and the water is conducted over the end to give the material an opportunity to deposit, the end of the bank being built ordinarily on a 6:1 or 8:1 slope. The sides of the bank are built to the desired slope of 2:1 by the use of sheet iron shields 10 ft. long and 24 in. high. As the bank is brought to the desired grade it is leveled off by the bank gang during the intervals when the dredge is not working. No side or top shrinkage is added since the material is deposited wet. These embankments are being built 34 ft. wide on top for double track. As they are completed, track is laid along the outer edge and the outer face, which is exposed to wave action of the river, is pro-

The 20-in. Suction Dredge

tected with a 3-ft. coating of riprap or bluff debris loaded in the vicinity by steam shovels.

Another source of delay is occasioned by the necessity of moving the dredge as the material is exhausted. The 20-in. dredge can reach 37 ft. below the surface of the water and can pump within a radius of 250 ft. without stopping operations. Beyond this distance pumping must be stopped while the boat is being moved.

These dredges were formerly operated with two 12-hour shifts, although the shifts have since been reduced to 11 hours to enable minor repairs to the dredge to be made without the resulting

delay to the men. The regular force employed on each shift on the 20-in. dredge consists of a foreman, 6 men on the dredge, and 15 men on the bank. The bank, pontoons and dredge are lighted at night by electricity generated by a steam turbine driven dynamo on the boat.

While it is difficult to compare the yardage of material handled by these dredges because of the influence of local conditions of material, length of discharge line, size of embankment, etc., the performance of last year is fairly typical of the results which have been secured. Two sets of yardage figures are kept. The gross yardage is estimated and includes all material pumped, while the net yardage only includes that between the specified slopes. It is found that the gross yardage normally exceeds the net by about 30 per cent, owing mainly to the amount of material deposited outside the slopes and principally below the water line where the sand assumes a slope of 3:1 or even flatter. The 20-in. dredge, working in poor material, pumped 445,000 cu. yd. gross measurement or 316,000 cu. yd. net measurement in 149 working days last year or an average per day of 2,100 cu. yd. net. The corresponding total net yardages for the 15-in. and 18-in. dredges working 174 and 187 days, respectively, were 362,000 and 507,000, making a total net yardage for the three dredges last year of over 1,185,000. The total net yardage of the three dredges this season up to September 1 is 800,000. One of the accompanying photographs shows the 20-in. dredge 2 miles north of Lynxville, Wis., before the discharge line and pontoons were in place, preparatory to starting work on a 400,000-yd. embankment, while another shows the 18-in. dredge completing a 300,000-yd. embankment at Lynxville, Wis.

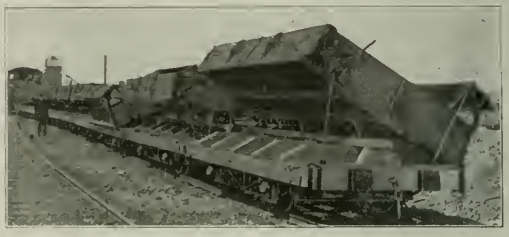
The most important advantage of the dredges for this work is the reduction in cost of the yardage handled. The cost of building a construction trestle and bringing material in by steam shovel and work trains would have made this location prohibitive in cost and would have required that the line be located closer to the bluff with the resulting difficulties with rock slides, bluff debris and storm water. As handled at present the dredges are depositing the material from 25 to 50 per cent cheaper than it could be placed by steam shovels on a line located for steam shovel work. Other advantages are that no work trains hauling material are required on the main line while the ballast is not damaged by the dropping of sand or dirt from passing construction trains. Also, more yardage can be deposited in a given time in this way than by steam shovels, while there is no shrinkage or settlement of the banks.

AN IMPROVED SIDE DUMPING CAR

A wooden side dumping car that has been under development in the shops of the Hecla Mining Company for the last two years, and used on the Calumet & Torch Lake Railway for one year, has been placed on the market by the Calumet Car Company, Houghton, Mich. The car, as it is now built, has a capacity of 9 cu. yd. It is 17 ft. long from coupling to coupling, and weighs 10,500 lb. It is of simple construction, which reduces both the original cost and the maintenance. Several of these cars have been in constant use from 6 to 12 months, and it is said that no repairs have been necessary.

The truck of this car is of the ordinary four-wheel type with a spacing of 7 ft. 6 in. between axles. The frame is of wooden construction and supports a central longitudinal bar 4 in. by 11½ in. in section and 14 ft. 10 in. long, to which the body of the car is fastened and about which it rotates in dumping. The body is 8 ft. 8 in. wide, 14 ft. long and 20 in. deep. The angle of repose of the car when in the unloading position is 30 deg., which was found from experiment to be sufficient for the easy discharge of coarse material. It is planned, however, to adjust the height of the car to the required angle for easy and quick discharge of any class of material.

The side boards are fastened to the ends of the body by sector shaped castings in such a way that they are pushed outward and upward when the car is dumped, affording ample room for discharging the load and eliminating all friction between the load and the side board. The side board is held up in dumping by vertical rods attached to the frame, as shown in the illustration. The end boards of this car are beveled and the side boards fit up snugly when in normal position. One man can operate the car. The lever that holds the car in normal position is equipped with a locking device which prevents it from being jarred out of place and permitting the car to be dumped thereby. There is also an automatic locker on the side to prevent any portion of the load escaping while the



A Train of Calumet Dump Cars

car is in its normal position. Another improvement on this car is the automatic locker for holding the load bed in a tilted position while dumping. This device consists of catch hooks fastened to the under side of the body, opposite hooks being connected by an operating rod and spring which holds them in a position to engage with keepers that are fixed to the frame, when the car is tilted to a dumping position. This is useful when the material is moist and does not run out readily. It is also planned to construct the frame of the car of steel and to use air for unloading.

ANNUAL TRACK INSPECTION ON PENNSYLVANIA LINES

The annual track inspection of the Pennsylvania Lines West of Pittsburgh was made on Tuesday, Wednesday and Thursday, October 6, 7 and 8, inclusive. The inspection party, as customary, consisted of the general manager and his staff, including the chief engineers maintenance of way and their assistants, the general and division superintendents, the division engineers, assistant division engineers and supervisors of the system, traveling on six special inspection cars. Meals were served in special commissary cars at stopping points en route and sleeping car accommodations requiring three trains were carried for the entire party. The inspection covered the main line of the Fort Wayne from Pittsburgh to Chicago and of the Pan Handle from Chicago to Pittsburgh.

The first prize for the best supervisor's subdivision, based on line and surface, was awarded to Charles McCarthy, supervisor of the Logansport division at Union City, Ind., while the prize for the best supervisor's subdivision based on all points was awarded to Simon Clary, supervisor of the Pittsburgh division at Carnegie, Pa. The prize for the best track foreman's section, based on line and surface, was awarded to P. S. Crawford, section foreman on Mr. McCarthy's subdivision of the Logansport division. In addition to these three prizes, others were awarded to the track foreman on each supervisor's subdivision having the best section, based on all points.

The Shantung Railway of China.—It is officially announced in Tokio that the Shantung Railway, which has been in the hands of the Japanese since the beginning of October, is still in their control, despite constant Chinese efforts to effect a dislocation.

A Discussion of the Common Forms of Rail Failures

Describing the Various Types of Failures Generally Encountered With Their Causes and Means of Detection

By F. E. Weymouth
Engineer of Tests, Maryland Steel Co.

The logical classification of rail failures seems to be one that places them under headings descriptive of the manner in which the failures develop or occur in service. A classification of these various types leads naturally into a study of the causes. A description of the *causes* of rail failures, however, involves a detailed study of each failure, and it is usually the case that two or more causes contribute to the ultimate failure of the rail in service.

CRUSHED HEAD FAILURES

Under this heading are placed all rails that indicate a "flattening" of the head or a breaking down of the head structure.

This type is sometimes given the term "split head" as are many of the "crushed head" rails from which a piece has been split off. Rails with this type of failure are also very frequently termed "piped" rails by the trackman. While the term "piped" may serve the trackman very well, it suggests that this type of failure comes from the presence in the rail of unwelded surfaces of an original cavity (called a "pipe") of the ingot. If this were true the term "piped" would be preferable to "crushed head," but very few failures are traceable to this cause.

"Crushed head" rails in track are readily detected in three ways. First, the widening out of the head is very apparent in track. Second, a dark streak appears in the center of the top of the head of the crushed portion, indicating that a portion of the metal is depressed and is not receiving the usual brightening from the wheels. Third, the distortion or breaking down of the head structure can be detected by a fishing template or by the appearance of a rust streak under the head. This type of failure develops very slowly in service and can be readily detected in its earlier development.

The question naturally arises, Does this type of failure occur in unsegregated steel? and our answer must be, "unfortunately yes." To investigate this type of failure a machine was designed at our plant with the purpose of reproducing the condition of the wheel loading that we get in service. Unsegregated rails have been tested in this machine and it has been found possible to develop "crushed heads" in any rail. The rapidity with which the crushing develops under this test is dependent upon the weight applied and the number of passes given.

To further answer this question of the occurrence of "crushed heads" in unsegregated steel, we can refer to the reports covering the rail failures on all the principal railroads of this country. Of 3,864 rails that failed from "crushed heads," 2,398, or 62.06 per cent, were from the top portion of the ingot, where we may expect segregation, and 1,466, or 37.94 per cent, were from the center and lower part of the ingot, where there is no segregation.

Mention was made of the misuse of the term "pipe." A "piped" rail is one in which the sides of the original shrinkage cavity (called a pipe) in the ingots are found pressed closely together in the rail. Cutting open the section we find that the walls of the cavity are not granular, but smooth, thus showing clearly that these two surfaces have always been separate and distinct.

Another means of differentiating between true pipe rails and true split heads is in the location of the opening in the rail. The opening of a split head is almost always confined to the head, while a true pipe is confined to the web, extending very little into the head. In some few cases we find a true split head running into a pipe, but these cases are very rare indeed.

*Abstract of a paper presented before the New England Railroad Club on November 10, 1914.

FLOW OF METAL

This term is used to describe rails that show a "rolling out" or flowage of the top metal of the head toward the sides, without a breaking down of the head structure. Flowage of the top metal occurs in many different forms. The most prevalent failures of this type are those rails that show flowage at the ends of the rail. While it may be true that under severe traffic conditions the design of the joint is of great importance, our observations have been that by far the great majority of failures of rails at the ends are due to loose bolts at the joint.

One of the most annoying types of "flow of metal" to the trackman who desires a smooth riding rail is that which has been given the term "flowed in spots." A sloughing off of the top metal in several spots with the subsequent breaking off of the flowed metal causes what is sometimes called "roaring" rails. These spots appear on the gage corner of the head. A satisfactory explanation of this type has not been evolved, but intense localized wheel pressure which stretches the metal beyond the elastic limit is one of the main causes.

The effect of slipping drivers and of sliding wheels is very marked in the development of rails that fail from "flow of metal." In both cases the top metal of the head is overheated and cooled quickly in the same manner that a piece of steel is hardened by heating and quenching. Failures of rails from "Flow of Metal" cannot be classed as being in any way dangerous failures, but may be a starting point for the development of splits and breakages.

BROKEN RAILS

Under the heading "Broken" rails we include all rails that show cracks or splits of any kind, as well as those rails which have broken across, separating them into two or more parts. "Broken" rails are the most important class in our study of rail failures, since it is the rail that gives way suddenly in track that is the most dangerous.

In looking over the statistics of wheel loads for the last few years, and comparing them with the number of flange breaks, we find that the increase in "flange breaks" goes hand in hand with the increase in wheel loads. By "flange breaks" we mean the breaking out of a piece of the flange, usually over a support. These pieces usually take the shape of a crescent and are often termed "crescent shaped flange breaks."

It has been stated by some investigators that at least 60 per cent of all rails that failed from breakage across the section are the result of flange breaks. Some go even further and give 90 per cent, but while our investigations do not show as high a percentage as 60 per cent, it is important to note that flange failures will undoubtedly greatly weaken the rail section, and we may expect breaks across the section at any point where the rail section is so weakened. Failures of this type are due to one part of the flange carrying more of the load than the other part; in other words, by an uneven bearing of the flange of the rail.

The claim is often made that flange breaks are the result of lack of transverse ductility in the rail accompanied by the presence of seams. We must remember that a rail is one of the rolled shapes which does not receive any rolling in the direction at right angles to its length. The crystals or grains are elongated and knitted together in the direction of rolling, while the cohesion between the crystals or grains transverse to the rolling is necessarily less. This lowering of the ductility when we break a rail in the direction of its length is a natural consequence

of its manufacture, and its tendency to cause flange breaks must be overcome by some other means than changing the method of rolling.

Seams are very prominently mentioned by some investigators as the main cause for "flange breaks." A critical examination of a large number of "flange breaks" shows that many of these pieces do show distinct seams, while in many others the seam would only be visible under a microscope, and in very many cases no seam whatever is present. Seams are elongations of small cracks formed in the early passes in rolling the ingot, and even with the utmost care and best practice known, they are bound to occur in the steel. It is safe to state that no rail has ever been rolled by any manufacturer, at any time, that was absolutely free from seams.

Maintenance conditions play a very important part in the occurrence of breaks across the section. The surface or vertical alinement is of utmost importance. Weights and speeds of locomotives and the method in which these weights are imposed upon the rail are also important factors in the stresses in rails.

Within the last few years a type of failure called the "transverse fissure" has come to our notice. This name is given to a fractured rail section that shows smooth dark or silvery spots in the head, while the rest of the metal is granular. In track this type of failure seldom gives any warning. The "transverse fissure" is found on the fractured surface usually without any connection with the outside skin of the rail, indicating that it is an internal fissure that radiates from a nucleus. No satisfactory explanation of the cause has as yet been evolved. As yet "transverse fissures" have not been found in rails that have not been in service. They occur, for the most part, on the gage side of the head, indicating that they are developed at the places of greatest strain. The large majority of these failures occur in steel that is high in carbon. Failures of this type are not confined to any proces of manufacture, or to any one mill, but some mills are practically free from these "transverse fissure" rails.

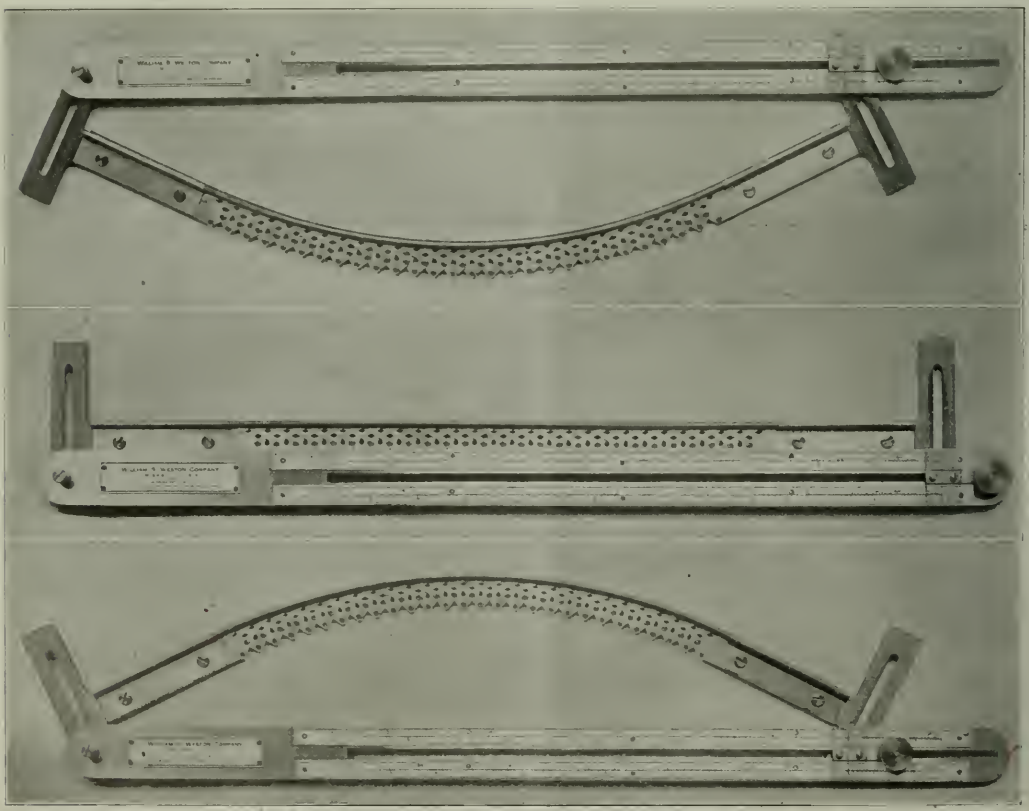
BREAKS IN WEB

Breaks in the webs of rails usually occur at the bolt holes. By far the majority of the breaks occurring at bolt holes are due to loose joints. When a joint is allowed to become loose a leverage is set up, which, combined with the severe blow due to the joint being loose, may easily cause the breaking out of a piece, or a longitudinal split in the web. It is the writer's opinion that low joints due to loose bolts contribute more broken rails at the bolt holes than any other one cause.

Very rarely we find cracks occurring longitudinally in the web at the bolt holes. The cause of this occurrence has not been satisfactorily explained, but blows from a spike maul, and excessive alternate bending, either in cold straightening or in track, may be contributory causes.

AN ADJUSTABLE ARC RULER

A new drafting instrument known as the adjustable arc ruler has been patented and is now on the market which is intended to replace an entire set of curve templets commonly used in railway drafting offices. It is designed for drawing



The Concave, Straight and Convex Positions of the Adjustable Arc Ruler

short arcs of circles of any radius over 3½ in., and can also be used to draw long arcs, replacing a beam compass, by locating auxiliary points on the curve not farther apart than the length of the instrument, through which successive sections of the curve can be drawn. It is claimed that the instrument is accurate for all practical requirements little short of the limit of hair line tests with a rigid compass.

The instrument can be used with either a concave or convex ruling edge, as shown in the illustrations, a change from one form to the other being made by sliding the scale bar and its bearings in the slots in the T-shaped end plates from one limit to the other. This shifting of the scale bar can be easily and quickly accomplished with the thumb and index figure of each hand as a preparatory movement in the act of setting the gage plate of the scale to the radius required. The scale bar carries separate lines of graduation on highly polished celluloid for the convex and concave ruling edges so arranged that the scale to be used is always the one nearer the ruling edge.

The lattice shaped curving member, which in the instrument now on the market is 10 in. long, maintains the regularity of the curve automatically by a mechanical movement. The fundamental principle of this construction is illustrated in the accompanying diagram. The flexible curving member consists primarily of two light steel ribbons about as heavy as watch springs placed edge to edge, a series of inclined arms attached rigidly to one ribbon, a series of oppositely inclined arms attached to the other ribbon and pivotal connections between the free ends of the oppositely inclined arms.

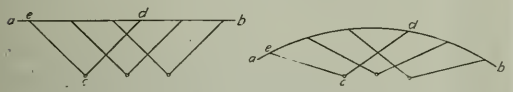


Diagram Illustrating Construction of Arc Ruler

The line a-b in the first figure represents the steel ribbons one above the other, the line c-d inclined to the right, represents arms rigidly attached to the upper ribbon, while the line c-c inclined to the left represents the arms attached to the lower ribbon. The ribbons are free to have a relative longitudinal movement. When the instrument is adjusted for a convex curve as in the second figure, the upper ribbon is moved toward the right so that the bases e-d of the triangles e-c-d are all an equal amount longer than in the first figure, and as the arms are rigidly attached to the ribbons, the latter are necessarily curved. As the arms are all of equal length, the relative movement of the ribbons produces a uniform change in all the triangles and accomplishes the automatic regulation of the curvature. With the exception of the steel ribbons the instrument is almost entirely of German silver. It is being manufactured and is for sale by the William S. Weston Company, 1431 Marquette building, Chicago.

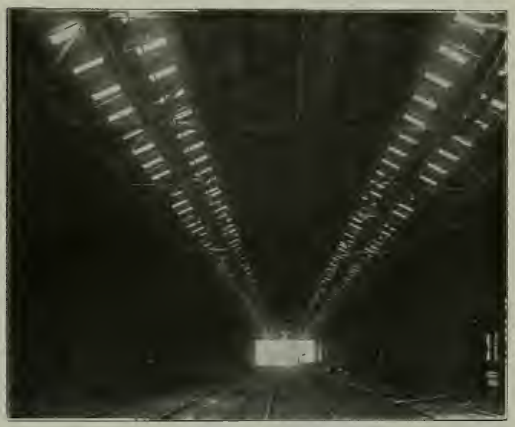
A CORRECTION

In the article entitled "The Present Status of Ferro-Titanium in Rail Manufacture," published on page 750 of our issue of October 23, the statement was made that only one heat out of 31 treated with titanium and tested for segregation exceeded the maximum limit of 12 per cent, fixed by an important eastern road. In the same sentence, however, it was stated that the maximum variation in the 31 analyses was 11.5 per cent, which proves the inaccuracy of the statement which followed. In the earliest reports of these tests, from which the article was first written, this maximum variation slightly exceeded 12 per cent. When the figure was corrected later we omitted to strike out the remainder of the sentence, although this doubtless caused little misunderstanding on the part of careful readers.

The concluding sentence in this article, stating that the results secured were not necessarily conclusive because of the small number of rails available for comparison, was also liable to misinterpretation, as it referred only to the Santa Fe tests, while the other tests referred to were more comprehensive, and therefore more conclusive.

CEMENT TILE ROOFING

A large installation of cement tile, which illustrates well the adaptability of this type of roofing to special forms of construction and to harmonious effects with elaborately planned architectural details, is a feature of the new Union station at Kansas City, Mo. Approximately 1,000,000 sq. ft. of surface has been covered by this tiling in the new building and train shed, a special plant being built at Kansas City to manufacture the tiles.



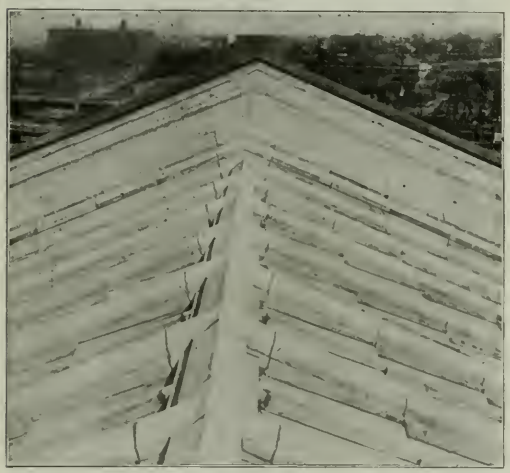
Interior View of a Building Lighted by Wire Glass Insert in Federal Cement Tile

Portion of the Train Shed at Kansas City Station Showing Vertical Tiles Along Right Side of Smoke Duct

The details of the tiles used on the building were designed by Jarvis Hunt, the architect who prepared the plans for the station, the object being to secure the effect of a cut stone roof. This effect was further obtained by making the tiles of a gray color, instead of the red ordinarily used, in order to match closely the sandstone walls of the building. As the station roof is pitched, no waterproofing coat over the tiles was necessary.

In the construction of the train shed, tiles 1½ in. thick, 24 in. wide and about 7 ft. high were placed vertically along the edges of the 15-ft. 6-in. opening over each pair of tracks. These tiles are supported by lugs on the outside resting on the roof. A portion of the roof over these sheds is also covered with cement tiles about 24 in. by 48 in. in size, covered by a composition roofing.

This installation was made by the Federal Cement Tile Company, Chicago, sub-contractors under the George A. Fuller Construction Company, Chicago. The former company has placed cement tile roofs on many important buildings, including a number for railway companies, which are reported to be giving very satisfactory service. The standard red tiles for pitched roofs are made by a special process which combines other ingredients with Portland cement to form a material which it is claimed is waterproof, fireproof, and not subject to corrosion from sul-



Portion of the Roof of the Kansas City Station Building Showing Special Cement Tiles Designed to Imitate a Cut Stone Roof

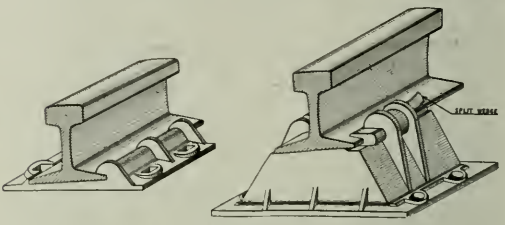
phurous gases. Each tile covers an exposed surface 24 in. by 48 in., and is ⅛ in. thick. The reinforcing metal is carefully imbedded in the cement to prevent corrosion. The tiles interlock by means of lugs on the underside and are joined by an adjustable roll sealed with elastic cement. Federal tiles for pitched surfaces are also made with an insert of wire glass 12 in. by 24 in., which interlocks with the standard red tile for top lighting. An installation of these tiles is illustrated herewith.

In addition to the advantages of permanence and absence of maintenance costs, the use of cement tiles effects a saving in steel construction to support the roof, which in the case of the Kansas City installation is estimated at 25 per cent as compared with a solid concrete slab roof.

One of the important large installations of these tiles on railway buildings is at Gary, Ind., on the general shops of the Elgin, Joliet & Eastern. Eight buildings, including the locomotive and car repair shops, paint shop, oil house, machine shop, power house, etc., were covered with Federal cement tiles six years ago, and the roof is reported to be giving the best of satisfaction now.

A CANTED RAIL BRACE AND TIE PLATE

To eliminate the necessity of elevating the outer end of the tie and the shoulder of the roadbed on curves, the Track Specialties Company, New York City, is now placing on the market a canted brace plate and tie plate. With this device all ties are laid level in the ballast and the outer rail is elevated the desired amount on curves by means of this type of chair, which is securely fastened to the tie by spikes and



Two Types of Canted Rail Braces and Tie Plates for Different Degrees of Super-Elevation

which in turn holds the rail by means of a split wedge. These chairs are made in varying heights to give the desired elevation for any degree of curve and speed of trains. They are also designed for all standard rail sections. The wedge holding the rail is driven against the traffic to retard creeping. These plates are made of malleable iron.

A UNIQUE PUMPING STATION

An automatic pumping plant has recently been completed by the Pittsburgh, Fort Wayne & Chicago at Verner, Pa., to supply water to the railroad shops at Washington avenue, about a mile away, and to the locomotives and the passenger station at Federal street in the old city of Allegheny. The plant is unusual in the construction of the pump house, and in the fact that

Interior of Pennsylvania Pump House Showing Motors and Controllers

the three rotary centrifugal pumps with which it is equipped have a larger capacity than any similar pumps heretofore installed by the Pennsylvania Company.

The station is located on the bank of the Ohio river. The pump house is a brick structure, circular in shape and 32 ft.

in diameter, with foundations of reinforced concrete surrounding a water well. This foundation is 40 ft. in diameter, and was sunk to rock 24 ft. below the water level in the Davis island pool. The foundation, which is in reality a concrete caisson, was sunk in a single piece, being fitted at the bottom with a steel cutting edge and loaded with 1,000 tons of rail. Under the circumstances a cofferdam could not have been constructed in this location. Cast iron gratings are placed in the walls of the concrete substructure to admit water.

An intake crib 96 ft. long and 16 ft. wide, made of 2 in. by 12 in. planks, was sunk in the river and filled with gravel to act as a filter for the water passing into the intake pipes which lead to the pump house. The bottom of the crib is 21 ft. below pool level. Two 24-in. intake pipes are provided, which were assembled on shore and floated into place. In order to accomplish this, the ends were plugged with wood in order to make the pipes watertight, and when they had been floated into position, water was permitted to enter through a hose until the pipes had sunk to the bottom of the river. The wooden plugs were then removed by a driver.

The three electrically operated centrifugal rotary pumps each

Circular Pump House on the Ohio River at Verner, Pa.

have a capacity of 1,000,000 gal. of water a day. Two of them will be used continuously, the third being held in reserve in case one of the others should be out of service. Space is provided in the pump house for two additional pumps if they are required. The electric power used to drive the pumps is transmitted from the Washington avenue shops. The motors are direct connected to the pumps by vertical shafts, being set above high flood water line, 26 ft. above pool level. The pumps are located a few feet above pool level, being submerged during floods and operating equally well whether submerged or not. They are driven at a speed of 1,200 revolutions per minute.

The water is pumped from the station through a 14-in. supply pipe to two 100,000-gal. steel tanks on the bluff about 300 ft. above the pumps. The starting and stopping of the pumps is controlled by an automatic electric device depending on the elevation of the water in the tank. The cast iron supply pipe on the hillside is now being encased in concrete, this work being made difficult by the rocky, precipitous face of the bluff. The distributing pipes from the tanks are 12-in. cast iron.

The entire work of building the pump house, crib, tanks and pipe lines was handled under the supervision of R. Trimble, chief engineer maintenance of way, Northwest System, and the pumping machinery was designed and installed under the supervision of T. W. Demarest, superintendent of motive power.

P. & L. E. CLASSIFICATION YARD LIGHTING

The lighting of a classification yard presents a special problem because of the long, narrow lanes between rows of freight cars, which are darkened by shadows unless the light is properly dispersed. An effective installation of lighting in such a yard was recently made by the Pittsburgh & Lake Erie at McKees Rocks, Pa., just outside the city limits of Pittsburgh. This yard contains about twenty tracks extending for approximately one half mile.

The sources of light are eight Cooper Hewitt quartz lamps, mounted on steel towers, as shown in the accompanying illustration. The lamps are rated at 2,400 candle power, with an energy consumption of 726 watts, resulting in an efficiency of .3 watts per candle. Direct current at 220 volts is supplied to the lamps from the company's power plant located nearby.

The towers are 12 ft. square at the base, 100 ft. high, and are

General View of the P. & L. E. Yard at McKees Rocks Showing 100-ft. Steel Towers Supporting 2400 Candlepower Lamps

spaced about 400 ft. apart in two rows, one on each side of the yard, which is approximately 225 ft. wide. Each lamp is suspended from a short mast arm which extends out over a platform for the attendant, access to which is had by means of a ladder mounted on the side of the tower. A chain and a cut-out, however, permit the lamp to be lowered from the ground, thus obviating the necessity of the lamp attendant climbing the tower.

As the quartz burners have a life of several thousand hours, and the globes are at such a height as to be out of the smoke zone, almost no cleaning or other attention is required. The light given by these lamps enables the men to see with proper clearness, not only every track and car, but also the switches at the head of the yard. The illumination is such that one may readily read a newspaper at night. The absence of shadows and glare greatly facilitates the movement of the cars throughout the yard by permitting the exact location of each to be easily determined, and also tends to prevent accidents.

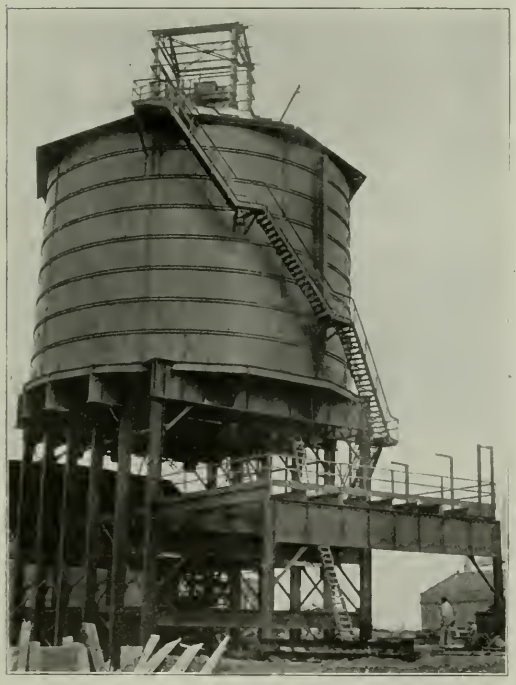
In addition to the increased speed in handling cars gained through the better lighting, conditions are made much easier

for the men returning on foot to the hump as they are enabled to avoid incoming cars, switches, posts and other obstacles. The fact that the lamps are mounted at such a height permits an excellent distribution of the light which possesses an inherent color value that is particularly suitable for outdoor illumination. Another feature that peculiarly adapts the quartz lamp to this field of lighting is the steadiness of the light.

This installation was made under the direction of D. P. Morrison, electrical engineer of the P. & L. E.

CONCRETE LINING FOR STEEL BUNKERS

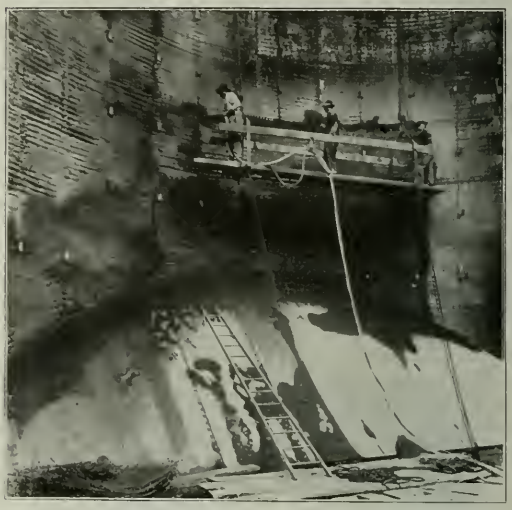
The ability to place a coating of concrete over a steel surface with the cement gun has been utilized by the Minnesota Steel Company, Duluth, Minn., in lining a large circular steel tank used for supplying coal to its coke plant and also for lining a row of parabolic coal bunkers. This lining was adopted in connection with the steel tank as the best and most economical solution of the problem of storing coal containing small percentages of sulphur without damage to the tank from the corrosive action. Such a structure is said to be less expensive and lighter than one of reinforced concrete and the character of the material placed with the cement gun insures a continuous non-porous surface which it



A 2,100-Ton Coal Bunker Lined With Concrete

is difficult, if not impossible, to secure by placing concrete by hand.

The circular tank is approximately 55 ft. in diameter and 40 ft. high, with a capacity of 2,100 tons of coal. The 33 parabolic bunkers are approximately 20 ft. wide, 12 ft. deep and 17 ft. long. A layer of 5 in. of concrete is used in the large tank and 2 in. in the bunkers. A layer of triangular mesh wire cloth was placed in horizontal bands over the inner surface of the tank, being secured to vertical rods attached to iron lugs provided at numerous places in the surface of the tank. The mesh was held away from the steel approximately ¾ in. The first layer of "Gunite," which is the name applied to the material placed with the cement gun, was deposited through this mesh serving to hold the wire cloth in place and to cover and protect the steel plate thoroughly. A second layer of Gunite was then placed to bring the total thickness to 5 in. In the case of the parabolic bins, where the drop of the



Placing a Concrete Lining in a Large Coal Bunker With the Cement Gun

coal against the sides and bottom could never be great, a 2-in. lining was considered sufficient.

The work of lining these tanks was carried out by The Gun-Crete Company, Chicago.

STRENGTHENING THE TRANSCONA ELEVATOR

The work of moving back into position the storage of bins of the Canadian Pacific elevator at Transcona, near Winnipeg, which settled to an angle of 27 deg. from the vertical on October 18, 1913. As described in the *Railway Age Gazette* of April 18, 1913, both the handling house and the storage bins were supported on a reinforced concrete mattress. The usual tests indicated sufficient strength in this type of construction to carry the load without the necessity of sinking piers to bed rock, and confidence in this plan was increased by the fact that other elevators in this vicinity have been erected in the same way without mishap.

When the settlement of the bins occurred, the low corner of the foundation mattress settled to a point very much below the mattress of the handling house, but fortunately the latter structure was not disturbed sufficiently to cause any movement in it. Before the work of underpinning and straightening the bins could be undertaken, however, it was necessary to secure the handling house. This was accomplished by first sinking shoring piers to rock outside the main structure, on which timber shores were placed which were calculated to carry a very large proportion of the total weight of the building. The underpinning of the columns of the handling house was then undertaken by cutting through the mattress in the panels between columns and drifting in to points under the centers of the columns and there sinking piers to rock by the "Chicago" method.

After this underpinning of the handling house structure had been advanced sufficiently to make its stability absolutely certain, work was begun on the straightening of the bins. The bin

structure weighs about 20,000 tons, consisting of five rows of circular bins with 13 in each row. The final underpinning consists of five rows of piers with 14 in each row located under the contacts of the bins. Before any movement was allowed to take place, piers were sunk underneath the low corner of the mattress to avoid any possibility of the structure sinking further into the ground. On the high side a general excavation was made to a point about 15 ft. below the high corner of the mattress for the full length of the building. By the use of a belt conveyor placed along this excavation which delivered into the elevator at the north end, the excavated material was removed at a minimum cost.

After the low corner was made secure, work was undertaken on the other foundation piers, at the same time loosening up the supporting ground under the high side of the structure and allowing it gradually to sink back towards a plumb position. This method was followed until the structure reached an angle of 18 deg. from the vertical, when a series of solid oak rockers was introduced in the mattress on top of the middle line of piers. Jacks or shoring screws were placed underneath the low side, working on top of the piers that were in place, and by jacking up the low side and removing earth from under the high side the structure was gradually brought back until it was 8 deg. from the vertical when another line of oak rockers was introduced on the next line of piers east of the middle. This was done in order to give the structure an additional lift, which when it was brought into the vertical position, would leave the bottom of the tunnels above the natural ground water level.

During the settlement of the elevator the north end dropped about 5 ft. lower than the south end on account of the ground being somewhat softer at the north end and the supporting ground at the south end being prevented from flowing, due to the location of the work house. This inclination has been allowed to remain in straightening the elevator, as there is no loss of efficiency, convenience of operation or safety. The structure has been lifted above 12 ft. during the process of straightening, this movement being accomplished without any damage to the structure. The method adopted for straightening the elevator has proved efficient and very economical as compared with the cost of taking down the old structure and rebuilding it. This work was handled by The Foundation Company, New York, in conjunction with the engineering officers of the Canadian Pacific, lines west.

EDUCATIONAL WORK AMONG EMPLOYEES IN THE MAINTENANCE OF WAY DEPARTMENT

By J. T. Bowser

Maintenance of Way Department, Queen & Crescent Route, Danville, Ky.

The value of educational work among railroad employees has long been recognized. In the mechanical and transportation departments there are apprentice schools, reading room courses of various kinds, and lectures on safety and efficiency. In the maintenance of way department very little has been done along this line, due perhaps to the fact that the employees of this department are so widely scattered. That much good can be done in an educational way among this class of railroad employees can hardly be questioned, but the methods employed in these other departments are not altogether practicable in the maintenance of way department, while their cost would probably be prohibitive.

I will set forth a few ideas which if carried out will be both practicable and inexpensive. Of course, anything of this nature must be entirely elective, and it will be said that the average section, extra gang, or bridge and building foreman has hardly enough time to do what is required of him, much less to give much attention to something that is entirely aside from his work. But the average foreman does read a little, and, by giving him something to read which will be of value to him, an interest may possibly be stimulated which will awaken an intelligence which has become dormant in the rut of the routine of daily work.

The division head of the maintenance of way department on any railroad, with the co-operation of an intelligent and interested chief clerk, can organize an inexpensive system of educational work which will be of value to his subordinates. In the average division office two or three railroad or technical magazines may be found which, when read by the subscriber, are usually discarded or left on file for possible reference. Frequently one section of these magazines is devoted to the maintenance of way department and questions are discussed in such a manner that they may be readily grasped and understood by anyone interested in this class of work. These magazines can be forwarded to the foreman at one end of the road, with instructions attached to forward to the foreman next to him on the line when he has finished reading it, and so on over the entire road. These instructions can be gotten out by mimeograph and so worded as to apply to any literature which may be sent out. Copies of speeches, lectures, and even advertising matter, having more or less to do with railroading, which are constantly being received in the division offices, have their educational value and may be sent out in this manner. Articles of especial interest should be marked so as to be readily located.

Some discretion must, of course, be used in selecting the class of employees to whom a certain magazine or other piece of literature is to be sent. Literature having more strictly to do with bridges, buildings or concrete work should be sent to bridge and building foremen, though, when the interest of a section or extra gang foreman is really aroused, he will be interested in this also. Many will say that not one foreman in twenty will read this material, or if they read it, they will receive no practical benefit from it. What if only one in twenty does read what is sent him? It has made one better employee and has lost nothing.

It may not require much mental ability to tamp a tie or to frame a bridge timber, but if we are to supply the crying need for intelligent and resourceful foremen and supervisors, we must add a little variety to the mental food of those from whom we draw this supply. Give the track foreman something beside track and the bridge and building foreman something beside structures. The employees should be encouraged to ask questions personally or by mail, and if the office or the head of the department cannot answer all of them, a little effort on their part will secure the desired information and both parties will be benefited. Inquiries should be answered promptly so as not to discourage the questioner. All questions should be treated seriously, for an inquiring mind is often very sensitive to the least suggestion of ridicule. If, in the opinion of the head of the department, an inquiry can be better explained or answered by personal interview, the questioner should be summoned to the office and the matter thrashed over thoroughly. This personal attention will encourage him and many questions which might never have come up in correspondence may be discussed in a few minutes. Foremen should be encouraged to make trips over the road and see what others are doing, and especially to look over any interesting or unusual work which may be going on, and, briefly, a policy of interest and encouragement should be adopted to supply the food to keep the interest alive. Like any other innovation, it will have its scoffers, but the spirit is contagious, and results that are well worth the trouble and the slight expense will be obtained. Such a policy will create among the employees an increased respect for themselves and for their position. It will stimulate ambition, increase mental ability and vastly improve the quality of the material from which supervisors or other minor maintenance of way officers must be selected.

Hostile Aircraft and English Railway Trains.—The following notice has been posted in the London & South-Western trains: "In view of possible attacks by hostile aircraft it is necessary that the blinds in the carriages of all railway trains should be kept down after daylight. Passengers are requested to assist in this direction."

Boring 100,000 Ties by Hand With Simple Apparatus

A Description of the Manner in Which This Was Accomplished in a Short Time Without Special Equipment

By C. W. Lane
Supervisor, Timber Treating Plant, Baltimore & Ohio, Green Spring, W. Va.

The Baltimore & Ohio desired quick action in securing 100,000 treated ties, adzed and bored, for use with screw spikes on a special form of tie plate. A costly betterment of road was nearly one-half completed when the decision was made to use ties of this character, consequently no delay in furnishing the material could be permitted.

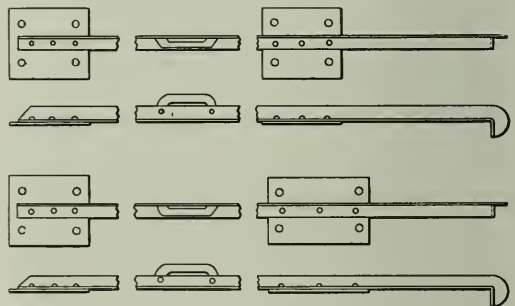
Of course, bored ties must be bored before treatment, and as the road operates a treating plant at Green Spring, W. Va., it was decided to adze and bore the ties at this plant. The road owned no boring and adzing machine, yet the cost of the work had to be kept down. It was plain that adzing the ties would be the most expensive part of the process and it was decided to eliminate this feature entirely by using only sawed ties, of which an adequate supply fortunately was available.

Plenty of air pressure at 100 lb. per sq. in. was to be had at the plant and it was determined to bore the ties by using small portable air motors capable of driving a ⅝-in. bit 6 in. into the wood. In one portion of the tie plant yard a standard gage track was paralleled by a narrow gage track 40 ft. away. It seemed logical, then, to load the sawed ties on

The Three Skidways on Which the Ties to Be Bored Were Handled

flat cars in the yard, deliver them at one end of a rude skidway built between the standard and narrow gage tracks, bore them on a rough platform at the narrow gage end of the skidway, and load them on trams to be run into the cylinders for treatment.

In all such enterprises the adjusting of the little details of arrangement and apparatus means the ultimate success or failure of the project, so as a first step some little thought was given to the form of skidway upon which the ties were to be handled. The first skidway built was in the form of a rude trestle work, sloping from a height of about 2½ ft. above the floor of a standard gage flat car to the level of the boring platform which was at the height of the arms on the narrow gage tram cars. This skidway is shown at the left in one of the accompanying illustrations. After this skidway was completed the cost of labor and material entering into its construction was deemed too high and a cheaper method of building these skidways was sought. There were some piles of ties ready for treatment between the narrow and standard gage tracks at this place and in building the next skidway one of these piles was taken down to a level slightly below that of a flat car floor. Rails were then laid across this level crib-work of ties and a boring platform erected at the narrow gage end at the level of arms on the narrow gage tram cars, as before. This is the middle skidway shown in the illustration. This proved a fairly cheap construction, but for the third and last skidway built three 67-lb. rails were used at the height of a flat car floor and the arms on the trams, the rails being supported by simple crib-work of ties, as shown in the foreground of the illustration. It is well to



The Templet Used in Boring Intermediate and Joint Ties

note here that the first or sloping skidway proved to be the more efficient inasmuch as ties could be fed faster to the men doing the boring, which meant, of course, that the work could be done a little cheaper.

The sawed ties having been picked up in the yard, loaded on flat cars and delivered on the skidway, the next step was the marking of the places where the holes were to be bored.

A Close View of One of the Skidways Showing the Inspection, Marking, Boring and Loading of Ties

This was done by using a template made of iron with holes exactly corresponding to the holes in the tie plate that was to be used. There were two of these templates, one for joint and one for intermediate ties, constructed according to the accompanying sketch. The joint ties had to have four holes bored for each tie plate, while the intermediate ties had to have only two holes for each plate. The little hook

on one end of the template was hooked over one end of the tie and thus determined the distance from the end that the holes were to be bored; this was known as the "line end" of the tie.

Two men performed the operation of marking the ties for boring. The template was first properly placed in position and then the men marked the places by driving a hand punch through the holes in the template with a wooden mallet. One little detail was quickly worked out which added greatly to the success of this part of the work. The punches were first made fast to a stiff spring which was in turn fastened to the template and which kept the punches out of the holes until struck. Instead of having to pick up and insert the marking punch in two or four holes and strike two or four blows with the mallet, according to the template used, one smart blow on the spring marked the whole set of holes. This little change naturally pleased the laborers and meant more output, which is only another way of saying "more money for the men at a cheaper rate for the company."

The ties having been marked were pushed along the skidway to the men who did the boring. The little air motors, driving the boring-bits, were suspended from a sort of walking-beam or old fashioned well-sweep, pivoted overhead so that it could move up or down, or in a horizontal direction, as desired. As the motors were too heavy to handle steadily all day they were counterbalanced by weights placed on these walking-beams. The bits with which the boring was done were fitted with stops to insure the holes being bored to the exact depth desired, which in this case was 6 in.

After the ties were bored they were immediately loaded on trams, stamped, checked, reported and sent to the treating cylinders.

In any statement of costs the particular conditions surrounding each bit of work bear directly on the unit-price, and the following prices are given as fairly well suited to the locality where this work was done, but with a full understanding that cheaper or possibly higher rates might fit the situation in other places. It cost 1½ cents per tie to sort out and load ties in the yard and ½ cent per tie to deliver them properly piled on the skidway.

A gang could bore 600 intermediate ties in 10 hours. The two men marking and pushing ties to the boring-platform and the two men doing the boring received 1½ cents per tie divided equally. These four men earned then about $2.25 per 10-hour day per man. The two men loading trams received ¾ cent per tie or $2.25 each for 600 ties. This made the total cost for an intermediate tie 4½ cents.

A gang could bore 400 joint ties in 10 hours. The rate for marking and boring these ties was 2¼ cents per tie, but the men loading the trams received the same rate of ¾ cent per tie because they could be loading other trams at regular yard rates during the time they had to wait for the slower moving joint ties to be bored. The total cost per joint tie was therefore 5 cents. A portion of these costs should not be included in the bill against adzing and boring by hand, because these same ties would, in the natural course of events, have to be picked up for treatment which would cost something, varying at the different plants, say, approximately 1½ cents per tie. This leaves then as the cost chargeable strictly to this work 2¾ cents for the intermediate ties and 3½ cents for the joint ties, which is entirely prohibitive as compared with work done by a modern adzing and boring machine, but is not necessarily prohibitive when a comparatively small number of ties are needed, as in this instance, to form a component part of a costly project.

The initial cost of an adzing and boring machine properly installed, of a sufficient size to take care of the requirements of a fair sized road, would probably be $15,000 to $18,000, including, of course, the buildings and grading necessary. In this instance, the installation of such a machine could not be considered inasmuch as speed and immediate delivery of the output were vital.

DIFFICULT TRACK MAINTENANCE

The track maintenance in the New York subway is of interest to maintenance men because of the very dense traffic on these tracks which, among other things, gives a very short interval of time between trains in which the men can work. Regardless of these frequent interruptions, the tracks must be in condition for the passage of trains whenever necessary. The question of safe-guarding the men at work in so limited a space, either from coming in contact with each other or from an oncoming train, and yet to work them to the best advantage, is a difficult one in itself. Some very interesting points in this connection were brought out in a paper read by O. O. Dixon, assistant engineer, Interborough Rapid Transit Company, before the New York Railroad Club on October 16, 1914. The following abstracts are taken from the paper:

When relaying rails under traffic, a gang consists of about 18 to 20 men. The work involves the withdrawing of the spikes, taking off the joints, cutting out the bonds, the removal and replacement of rails and rebonding. One rail is removed in from one to two minutes. From 1:00 a. m. until 5:00 a. m. 33 rails can be renewed on curves of local tracks. The intervals between trains on local tracks during these hours is 7½ minutes. On the express tracks, where there is no traffic during the hours mentioned, 65 rails can be renewed on curves, and more on tangents.

The men are protected by two caution lights placed 500 ft. away from the gang, and a man with a red light within communicating distance of the gang. In pulling the spikes between the third rail and the running rail a shackel bar is used. The ballast in front of express stations is taken out and renewed about every two years, and at local stations every five years. Few ties have been renewed, except at switches and on curves where they have split due to frequent rail renewals, also where they were decayed due to dry rot. In making tie renewals, one rail is removed and all new ties installed for a rail length.

In the initial installation 100 lb., 33-ft. rails were used with joints staggered and spliced with 24-in., four-bolt angle bars. On curves the same construction was used, with the addition of an inclined guard rail which was bolted to the lower rail about every three feet, using adjustable cast iron separators to take up the wear. The curves were laid to 4 ft. 8½ in. gage, and the flangeways varied from 1¾ in. to 2¼ in., depending upon the degree of curvature. It was soon found that the guard rail was so flexible that it concentrated the pressure on the bolts, causing frequent breakages, and when the bolts held the wheels were allowed to sideslip between them, causing considerable corrugation. In view of these facts this light guard rail was replaced by one of the same section as the running rail, having one flange sheared off. The adjustable separators were replaced by one-piece separators to give the correct flangeway, also the gage of track was slightly widened on sharp curves, depending on the radius. Later, the rails on the high side of a curve having a radius of 700 ft. or less, were further reinforced with malleable iron tie plate rail braces placed on every other tie, also shoulder tie plates and cast iron rail braces were installed to support the guard rail and relieve the strain on the guard rail bolts. Under existing conditions of traffic it is necessary to use as many as four anti-creepers per rail to prevent the traveling of the rails. Owing to the frequent rail renewals, screw spikes have not been used to any extent because of the time and difficulty involved in pulling them.

Damage to the Ottoman Railway of Asia Minor.—The secretary of the Ottoman Railway from Smyrna to Aidin has announced that a severe earthquake occurred in the Sparta and Bouldour district of Asia Minor on October 4, and damaged the roadbed in several places, although operation was resumed in less than 24 hours. Two stations and other buildings have been seriously damaged, but it is estimated that the total cost of repairs will not exceed $45,000.

General News Department

In a fire at Galveston, Tex., November 17, the Southern Pacific elevator was destroyed, together with 909,000 bushels of wheat; loss $1,500,000.

E. L. Tinker, secretary of the Central Safety Committee of the El Paso & Southwestern, has resigned that position and the duties have been taken up by R. P. Kyle. Headquarters at El Paso, Tex.

It was announced in Canada, November 13, that regular trains would begin running on the National Transcontinental Railway between Moncton and Levis this week. A train will run each way three times a week.

The Atchison, Topeka & Santa Fe, on November 10, had the largest commercial freight loading in its history. A total of 5,229 cars were loaded on the entire system that day, compared with the previous record of 5,204.

The St. Louis & San Francisco has announced that on November 10 train auditors were removed from all passenger trains on the system, and their duties are now performed by the conductors. The order is said to be a part of the company's general retrenchment policy.

The New York State Civil Service Commission announces examinations to be held December 12 for the position of inspector of equipment, for the Public Service Commission, First district (New York City). The salary will be from $900 to $1,200 yearly. The commission desires to get men who have had six years' experience in car house or car shop work.

Fairfax Harrison, president of the Southern Railway, speaking at Atlanta, last week, said that the severe retrenchment made necessary by the falling off in traffic would be continued, even to the extent of depriving passengers of some of the luxuries and conveniences which they have been accustomed to. The gross receipts of the railway company in September were 8.33 per cent less than in the same month of last year, and in October the decrease was 18.75 per cent. Curtailment of expenses has been necessary, in some cases, as a "war measure," even where it was uneconomical to make the reduction. Both the officers and the employees of the company have to stand serious losses. He believes that the present severe stress will be temporary and new construction work, provided for by capital which was raised last spring, has not been suspended.

Complete official figures show that the majority given by the voters of Missouri against the full crew bill was three times as great as was shown in the estimate based on the early returns; 324,085 votes against and 159,593 in favor, a majority of 164,492 in opposition to the bill. This makes the vote more than two to one against the law. Outside of the three principal cities, St. Louis, Kansas City and St. Joseph, the measure received only 86,660 votes in the state, and was beaten by a ratio of about three to one. The farmers in every section of the state voted almost solidly against it. St. Louis, in which the Brotherhood looked for a big majority in favor of the bill, went against it by 18,417. In Kansas City and in St. Joseph it was carried. The majority against the bill is one of the greatest in the history of Missouri and is larger than the state has ever given to any candidate.

Increased Passenger Fares in Eastern Territory

The Pennsylvania and the Philadelphia & Reading have filed with the Interstate Commerce Commission new passenger tariffs, to go into effect December 15, which advance the rates for many long distance interline tickets and abolish round trip tickets for local travel. Despatches from Washington indicate that changes, like these, and others of smaller amount, are to be made by all the principal roads in trunk line territory. Most of the interline rates in the new tariff are made on the basis of 2½ cents a mile. From Philadelphia to Chicago the present rate is $18.22; new rate $19.10; Philadelphia to Indianapolis, present rate $16.72, new rate $18.03. Local round trip tickets will cost double the one way fare. Examples of this change are: from Philadelphia to Paoli and return, present rate 80 cents, new rate $1; Atlantic City, by electric line $1.75, advanced to $2; by steam line $2 to $2.25. The round trip rate between New York and Philadelphia, $4, will be advanced to $4.50; between Baltimore and Washington $4, advanced to $4.80; Philadelphia and Washington $6, advanced to $6.80. On the Reading the round trip rate between the terminus and Wayne junction is advanced from 20 cents to 26 cents. Monthly tickets on both roads will be advanced 25 cents a month. Tickets good for 100 rides (family tickets) will be withdrawn from sale, as will also the fifty-trip tickets. Ten-ride tickets good for bearer will be sold at nine-tenths the local rate for ten single tickets.

Tramps by the Train Load

A press despatch from San Bernardino, Cal., November 16, says that 93 tramps, on their annual winter tour westward, are in jail at that place, charged with having seized a San Pedro, Los Angeles & Salt Lake freight train on the Mojave desert. The tramps, more than a hundred strong, when the train entered Otis overpowered the trainmen, broke seals of freight cars and after making themselves comfortable, ordered the engineman to proceed to Los Angeles. A posse was waiting at San Bernardino for the train, and all but ten of the tramps were captured.

Arbitrators in Western Enginemen's and Firemen's Controversy

The arbitration board, to consider enginemen's and firemen's wages on the western roads, has finally been completed, after months of delay, and hearings are to be begun at Chicago, November 30. The arbitrators are: H. E. Byram, vice-president of the Chicago, Burlington & Quincy; W. L. Park, vice-president of the Illinois Central; F. A. Burgess, assistant grand chief of the Brotherhood of Locomotive Engineers; Timothy Shea, assistant to the president of the Brotherhood of Locomotive Firemen and Enginemen; Charles Nagel, ex-secretary of Commerce and Labor, and Jeter C. Pritchard, presiding judge of the United States Court of Appeals of the Fourth Circuit.

Electrification on the St. Paul

Construction work in connection with the electrification of the Chicago, Milwaukee & St. Paul between Harlowton, Mont., and Avery, Idaho, has been resumed. Thus far the poles have been placed for a distance of 30 miles on the 116-mile division between Three Forks and Deer Lodge, Mont., which is the first to be equipped. The company has ordered nine freight and three passenger electric locomotives from the General Electric Company. These locomotives will be of the same construction except that those to be used for passenger service will be geared for a higher speed. The total weight of these locomotives will be 519,000 lb. each, and the weight on drivers 400,000 lb. They are to be delivered in October, 1915, at which time, it is planned, the construction work over the entire line will have been completed.

Railway Development Association

At the closing session of the Railway Development Association held in Chicago last week, a report of which was given in last week's issue, Mrs. Edith Loring Fullerton, wife of H. B. Fullerton, director of agricultural development of the Long Island Railroad, was elected an active member of the association. Mrs. Fullerton has actively co-operated with her husband in the direction of the Long Island experimental farm at Medford, L. I., since its establishment in 1905, and has recently been appointed assistant director of agricultural development. She was the author of a book, "The Lure of the Land," describing the Long Island development work, which was widely circulated, and is vice-president of the Woman's Agricultural and Horticultural

Association. It was decided to hold the annual meeting of the association on May 10, 11 and 12, 1915, at St. Paul, Minn.

Western Association of Short Line Railroads

Thirty representatives of the short line railroads in California, Arizona, Nevada and Idaho met in San Francisco, November 17, and formed a permanent organization to look after their common interests as to rates for carrying the mails, legislative matters and dealing with the Interstate Commerce Commission. The organization will be known as the Western Association of Short-Line Railroads. D. M. Swobe, vice-president of the McCloud River Railroad, San Francisco, was elected president.

A committee was instructed to oppose the Bourne and Moon bills pending in Congress, in both of which the provisions are such that, it is believed, the payments to the small roads for carrying the mails will be reduced.

Revenue and Expenses of Steam Roads in August

The Bureau of Railway Economics' summary of revenues and expenses and comments thereon for August, 1914, are as follows: Railways operating 227,184 miles of line are covered by this summary, or about 90 per cent of all steam railway mileage in the United States. Their operating revenues for the month of August, 1914, amounted to $266,928,165. This amount includes revenues from freight and passenger traffic, from carrying mail and express, and from miscellaneous sources connected with rail and auxiliary operations. Compared with August, 1913, these operating revenues show a decrease of $12,496,358. Total operating revenues per mile averaged $1,175 in August, 1914, and $1,244 in August, 1913, a decrease of $69, or 5.6 per cent.

Operating expenses, which include the cost of maintaining track and equipment, operating trains, securing traffic, and of administration, amounted to $179,163,880. This was $12,989,650 less than for August, 1913. These operating expenses per mile of line averaged $789 in August, 1914, and $856 in August, 1913, a decrease of $67 per mile, or 7.8 per cent.

Net operating revenue, that is, total operating revenues of rail and auxiliary operations less operating expenses, amounted to $87,764,285, which was $493,292 more than for August, 1913, but that this increase is due to increase in mileage is shown by the fact that net operating revenue per mile decreased. Net operating revenue per mile of line averaged $386 in August, 1914, and $388 in August, 1913, a decrease of $2 per mile, or 0.6 per cent.

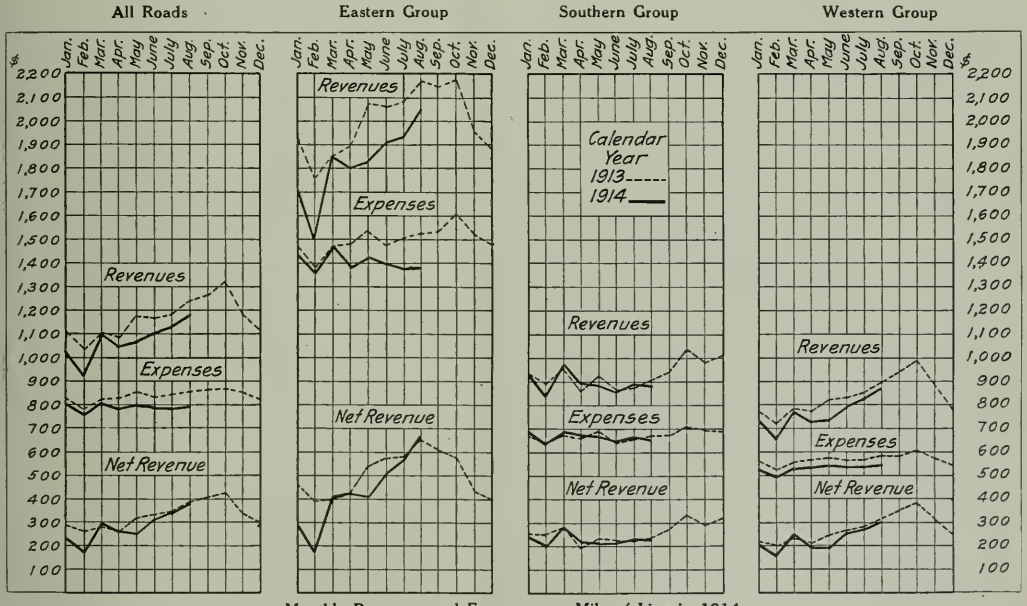
Taxes for the month of August amounted to $11,288,351, or $50 per mile, an increase of 0.7 per cent over August, 1913.

Operating income, which is net revenue from rail and auxiliary operations, less taxes, averaged $336 per mile of line, and in August, 1913, $339, thus decreasing $3 or 0.8 per cent. Operating income for each mile of line for each day in August averaged $10.85, and in August, 1913, $10.95. Operating income is that proportion of their operating receipts which remains available to the railways for rentals, interest on bonds, appropriations for betterments, improvements, new construction, and for dividends.

The railways of the Eastern district show a decrease in total operating revenues per mile of line as compared with August, 1913, of 6.4 per cent, the railways of the Southern district a decrease of 2.3 per cent, and the railways of the Western district a decrease of 5.1 per cent. Operating expenses per mile decreased 10.0 per cent in the East, decreased 2.3 per cent in the South, and decreased 6.7 per cent in the West. Net operating revenue per mile increased 2.0 per cent in the East, decreased 2.3 per cent in the South, and decreased 2.2 per cent in the West. Taxes per mile show an increase of 1.0 per cent in the East, an increase of 2.1 per cent in the South, and an increase of 0.5 per cent in the West. Operating income per mile increased 2.1 per cent in the East, decreased 3.1 per cent in the South, and decreased 2.7 per cent in the West.

The operating ratio for August, that is, the per cent of total operating revenues absorbed in operating expenses, was 67.1 per cent, which is comparable with 68.2 per cent in August, 1913, and 64.0 per cent in August, 1912. The operating ratio in the Eastern district for August was 67.3 per cent, as compared with 70.0 per cent for August, 1913; was 74.2 per cent in the Southern district as compared with 74.2 per cent in 1913; was 64.5 per cent in the Western district, as compared with 65.5 per cent in 1913.

Comparison of returns for two months of the current fiscal year with those of the corresponding months of the previous fiscal year reveals a decrease in total operating revenues per mile of 5.3 per cent, a decrease in operating expenses per mile of 7.0 per cent, and a decrease in net operating revenue per mile



Monthly Revenues and Expenses per Mile of Line in 1914

of 1.3 per cent. This net operating revenue per mile decreased 0.3 per cent in the East as compared with the corresponding period of the previous year, decreased 0.5 per cent in the South, and decreased 1.9 per cent in the West.

When the returns for the eight months of the calendar year 1914 are compared with those of the corresponding months of 1913, they show a decrease in total operating revenue per mile of 6.2 per cent, a decrease in operating expenses per mile of 4.8 per cent, and a decrease in net operating revenue per mile of 9.8 per cent. This net operating revenue per mile decreased 15.0 per cent in the East as compared with the corresponding period of the previous year, decreased 3.6 per cent in the South, and decreased 6.6 per cent, in theWest.

The diagram shows the variations in operating revenues, operating expenses, and net operating revenue per mile for the separate months of the calendar year 1913 and of the calendar year 1914 to date, and the following table shows the per cent of operating revenues consumed by each class of expenses:

PER CENT OF TOTAL OPERATING REVENUES

Account	August, 1914 United States	Eastern District	Southern District	Western District	Two months of the fiscal year 1915
Freight revenue	66.3	65.1	69.5	66.4	66.0
Passenger revenue	25.0	25.4	23.4	25.1	25.1
Mail revenue	1.7	1.4	1.7	2.1	1.8
Express revenue	2.1	2.1	2.3	2.1	2.2
All other revenues	4.9	6.0	3.1	4.3	4.9
Maintenance of way and structures	13.2	12.1	14.7	13.9	13.4
Maintenance of equipment	16.5	16.8	20.3	14.9	16.9
Traffic expenses	1.8	1.5	2.5	2.0	1.9
Transportation expenses	32.8	34.0	34.1	30.9	33.3
General expenses	2.2	2.1	2.5	2.3	2.3
All other expenses	0.6	0.8	0.1	0.5	0.6
Total operating expenses	67.1	67.3	74.2	64.5	68.4

International Engineering Congress

Announcement has been made of the program for the International Engineering Congress to be held in San Francisco, September 20 to 25, 1915, under the auspices of the American Society of Civil Engineers, the American Institute of Mining Engineers, the American Society of Mechanical Engineers, the American Institute of Electrical Engineers, and the Society of Naval Architects and Marine Engineers. Col. G. W. Goethals, governor of the Canal Zone, has consented to act as honorary president of the congress and is expected to preside over its general sessions. In spite of the conditions now prevailing in Europe the committee of management is in receipt of a sufficient number of communications from various foreign countries to indicate that a large majority of the papers originally requested for presentation at the sessions of the congress will be handed in on time and that the congress will be truly international in character. The total number of papers contemplated was about 290. Of this number about 220 are either definitely promised or well assured. The remainder, apportioned chiefly among the nations in the present war zone, are uncertain and it is expected that some of them will not be secured, but it is believed that by substituting for these others that have been offered the general plan for the congress may be carried out with a minimum of change.

The papers to be presented will cover the general field of engineering in a broad and comprehensive manner and with special reference to the important lines of progress during the past decade, and the most improved practices of present and future development. The authors of the papers are distributed over the engineering world and comprise men eminent in the various branches of the profession. A special effort will be made to procure discussions carefully prepared in advance for presentation with the papers, and opportunity will be afforded for oral discussion. The meetings will be held in the new Auditorium building in the civic center of San Francisco. The topics to be discussed are grouped as follows: Panama Canal, 24 topics; waterways, 6 topics; irrigation, 11 topics; railways, 7 topics; municipal engineering, 8 topics; materials of engineering construction, 20 topics; mechanical engineering, 28 topics; electrical engineering, 8 topics; mining engineering, 10 topics; metallurgy, 10 topics; naval architecture and marine engineering, 19 topics, and miscellaneous. The topics to be discussed in relation to railways include: Relation of railways to social development; present status of railways; economic factors governing building of new lines and location; physical characteristics of road, including track and roadbed; bridges, tunnels and terminals; construction methods; signals; equipment, including motive power other than electric; rolling stock in general; loading equipment and electric motive power in general.

B. F. Yoakum Suggests Government Copartnership in Railways

B. F. Yoakum has addressed a letter to Judson C. Clements of the Interstate Commerce Commission, to clear up a misunderstanding which he says has arisen from his testimony before the Interstate Commerce Commission in the Rock Island investigation, and to show that he is in favor of a form of government co-partnership, as distinguished from government ownership. Mr. Yoakum says that he believes a co-partnership arrangement under special federal charters to be granted to railroads desirous of operating under a federal license would be the wisest solution of the presenr unsettled condition. "The federal government," he said, "is now regulating the expenses and revenues of railroads, but should go a step further and safely aid them in future financing, and in consideration therefor enjoy a share of the profits, with representation on the boards of directors." His plan contemplates an exchange of government 3 per cent bonds for the higher interest railroad bonds.

"The change of securities," he says, "should be gradual through the creation of a low interest bearing government-railroad bond to take the place of the underlying higher interest bearing railroad bonds as they may mature; or they could be exchanged under a refunding process. Each transaction should be approved by the Interstate Commerce Commission, always provided that the net earnings of the railroad must be at least 2½ times the interest on the government-railroad bonds exchanged for the present underlying bonds. These new bonds should be a first lien on the property. All junior mortgage bonds and the stock would be subject to these new bonds, on which the government would not be responsible but would, under equitable terms to be agreed upon, share in the profits with the stockholders. At a rough estimate, in the course of a few years, one-half of the present underlying bonds, or about five billion dollars, would be exchanged or refunded into a lower interest bond. A large proportion of these old bonds bear 5 per cent and 6 per cent, and a few 7 per cent interest; therefore under the proposed system there would eventually be a saving to the railroads of approximately 100 million dollars a year in interest alone. This is on the assumption that such a government-railroad bond, being a first lien, would be as attractive to bankers and investors as the present 3 per cent government Panama canal bonds. If in this way the railroads of the country can save 100 million dollars a year in the item of interest, under my estimate it would insure the government receiving as its share under the proposed copartnership arrangement, probably from 15 to 20 million dollars a year."

The Railway Business Association

Fairfax Harrison, president of the Southern Railway, and Warren G. Harding, United States senator-elect from Ohio, are announced as the speakers for the sixth annual dinner of the Railway Business Association, the national organization of manufacturers, merchants and engineers dealing with steam railroads, which will be held at the Waldorf-Astoria hotel, New York, Thursday evening, December 10. The business meeting of the association will be held at 11 a.m. at the hotel, the election of officers at 1.30 p.m. and the dinner at 7, the doors opening exactly on the hour.

The circular announcing the names of the speakers says in part:

"Mr. Harrison unites long experience and responsibility as a railway official with the oratorical art of the attorney. Practiced for many years in the study of public opinion as it affects the prosperity of the railways, he is a leader in the cultivation of friendly sentiment and cordial co-operation between railway managers and the people whom they serve.

"Mr. Harding is a journalist with substantial business interests. During several years of legislation affecting business and transportation he has given constant admonition, caution and counsel lest industry and commerce be shackled and the public welfare impaired. On that platform he has now been chosen by the people of Ohio as their senator in Congress. The obligation of government to promote national prosperity will furnish the keynote of his

address, while his brilliant endowment as a writer and speaker complete the promise of a message appetizing in form as well as invigorating in substance.

"Subscribers to the dinner as this circular goes to press exceed those upon the corresponding date in 1913. Such response to an announcement not naming the speakers and at a time like the present is a display of enthusiasm by our members which proves anew their belief in the cause and their loyalty to the work."

MEETINGS AND CONVENTIONS

The following list gives names of secretaries, dates of next or regular meetings, and places of meeting.

AIR BRAKE ASSOCIATION.—F. M. Nellis, 53 State St., Boston, Mass. Next convention, May 4-7, 1915, Hotel Sherman, Chicago.

AMERICAN ASSOCIATION OF DEMURRAGE OFFICERS.—A. G. Thomason, Demurrage Commissioner, Boston, Mass. Annual convention, April, 1915, Richmond, Va.

AMERICAN ASSOCIATION OF DINING CAR SUPERINTENDENTS.—H. C. Boardman, D. L. & W., Hoboken, N. J. Next meeting, October, 1915.

AMERICAN ASSOCIATION OF FREIGHT AGENTS.—R. O. Wells, Illinois Central, East St. Louis, Ill. Annual meeting, May 21-24, 1915, Richmond, Va.

AMERICAN ASSOCIATION OF PASSENGER TRAFFIC OFFICERS.—W. C. Hope, C. R. R. of N. J., 143 Liberty St., New York.

AMERICAN ASSOCIATION OF RAILROAD SUPERINTENDENTS.—E. H. Harman, Room 101, Union Station, St. Louis, Mo. Next meeting, May 20-21, 1915, San Francisco, Cal.

AMERICAN ELECTRIC RAILWAY ASSOCIATION.—E. B. Burritt, 20 W. 39th St., New York. Annual convention, October, 1915, San Francisco, Cal.

AMERICAN ELECTRIC RAILWAY MANUFACTURERS' ASSOCIATION.—H. C. McConaughy, 165 Broadway, New York. Meetings with American Electric Railway Association.

AMERICAN RAILROAD MASTER TINNERS, COPPERSMITHS AND PIPEFITTERS' ASSOCIATION.—W. E. Jones, C. & N. W., 3814 Fulton St., Chicago. Annual meeting, Chicago.

AMERICAN RAILWAY ASSOCIATION.—W. F. Allen, 75 Church St., New York. Next session, May 19, 1915, Atlantic City, N. J.

AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—C. A. Lichty, C. & N. W., Chicago. Next convention, October 19-21, 1915, Detroit, Mich.

AMERICAN RAILWAY ENGINEERING ASSOCIATION.—E. H. Fritch, 900 S. Michigan Ave., Chicago. Next convention, March 16-18, 1915, Chicago.

AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION.—J. W. Taylor, 1112 Karpen Bldg., Chicago. Annual meeting, June 9-11, 1915, Atlantic City, N. J.

AMERICAN RAILWAY SAFETY ASSOCIATION.—L. F. Shedd, C. R. I. & P., Chicago.

AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—A. R. Davis, Central of Georgia, Macon, Ga. Annual meeting, July, 1915.

AMERICAN SOCIETY FOR TESTING MATERIALS.—Prof. E. Marburg, University of Pennsylvania, Philadelphia, Pa.

AMERICAN SOCIETY OF CIVIL ENGINEERS.—Chas. W. Hunt, 220 W. 57th St., New York. Regular meetings, 1st and 3d Wednesday in month, except June, July and August, 220 W. 57th St., New York.

AMERICAN SOCIETY OF ENGINEERING CONTRACTORS.—J. R. Wemlinger, 11 Broadway, New York. Regular meetings, 2d Thursday in month, at 2 P. M., 11 Broadway, New York.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 39th St., New York. Annual meeting, December 1-4, 1914, New York.

AMERICAN WOOD PRESERVERS' ASSOCIATION.—F. J. Angier, B. & O., Mt. Royal Sta., Baltimore, Md. Next convention, January 19-21, 1915, Chicago.

ASSOCIATION OF AMERICAN RAILWAY ACCOUNTING OFFICERS.—E. R. Woodson, 1300 Pennsylvania Ave., N. W., Washington, D. C. Annual convention, April 28, 1915, Atlanta, Ga.

ASSOCIATION OF MANUFACTURERS OF CHILLED CAR WHEELS.—George W. Lyndon, 1214 McCormick Bldg., Chicago.

ASSOCIATION OF RAILWAY CLAIM AGENTS.—C. W. Egan, B. & O., Baltimore, Md. Annual meeting, third week in May, 1915, Galveston, Tex.

ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.—Jos. A. Andreucetti, C. & N. W., Room 411, C. & N. W. Sta., Chicago. Annual meeting, October, 1915.

ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—P. W. Drew, Soo Line, 112 West Adams St., Chicago. Annual meeting, June 22-25, 1915, Rochester, N. Y.

ASSOCIATION OF TRANSPORTATION AND CAR ACCOUNTING OFFICERS.—G. P. Conard, 75 Church St., New York. Next meeting, December 8-9, Richmond, Va.

BRIDGE AND BUILDING SUPPLY MEN'S ASSOCIATION.—L. D. Mitchell, Detroit Graphite Co., Chicago, Ill. Meetings with American Railway Bridge and Building Association.

CANADIAN RAILWAY CLUB.—James Powell, Grand Trunk, P. O. Box 7, St. Lambert (near Montreal), Que. Regular meetings, 2d Tuesday in month, except June, July and August, Windsor Hotel, Montreal, Que.

CANADIAN SOCIETY OF CIVIL ENGINEERS.—Clement H. McLeod, 176 Mansfield St., Montreal, Que. Regular meetings, 1st Thursday in October, November, December, February, March and April. Annual meeting, January, Montreal.

CAR FOREMEN'S ASSOCIATION OF CHICAGO.—Aaron Kline, 841 Lawler Ave., Chicago. Regular meetings, 2d Monday in month, except July and August, Lytton Bldg., Chicago.

CENTRAL RAILWAY CLUB.—H. D. Vought, 95 Liberty St., New York. Regular meetings, 2d Friday in January, May, September and November. Annual meetings, 2d Thursday in March, Hotel Statler, Buffalo, N. Y.

ENGINEERS' SOCIETY OF WESTERN PENNSYLVANIA.—Elmer K. Hiles, 2511 Oliver Bldg., Pittsburgh, Pa. Regular meetings, 1st and 3d Tuesday, Pittsburgh.

FREIGHT CLAIM ASSOCIATION.—Warren P. Taylor, R. F. & P., Richmond, Va. Annual meeting, June 16, 1915, Chicago.

GENERAL SUPERINTENDENTS' ASSOCIATION OF CHICAGO.—A. M. Hunter, 321 Grand Central Station, Chicago. Regular meetings, Wednesday, preceding 3d Thursday in month, Room 1856, Transportation Bldg., Chicago.

INTERNATIONAL RAILWAY CONGRESS.—Executive Committee, 11, Rue de Louvain, Brussels, Belgium. Next convention, June 23 to July 6, 1915, Berlin.

INTERNATIONAL RAILWAY FUEL ASSOCIATION.—C. G. Hall, C. & E. I., 922 McCormick Bldg., Chicago. Annual meeting, May 17-20, 1915, Chicago.

INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—Wm. Hall, 829 W. Broadway, Winona, Minn. Next convention, July 14-17, 1915, Sherman House, Chicago.

INTERNATIONAL RAILROAD MASTER BLACKSMITHS' ASSOCIATION.—A. L. Woodworth, C. H. & D., Lima, Ohio. Annual meeting, August 17, 1915, Philadelphia, Pa.

MAINTENANCE OF WAY AND MASTER PAINTERS' ASSOCIATION OF THE UNITED STATES AND CANADA.—T. I. Goodwin, C. R. I. & P., Eldon, Mo.

MASTER BOILER MAKERS' ASSOCIATION.—Harry D. Vought, 95 Liberty St., New York. Annual convention, May 26 to 28, 1915, Chicago, Ill.

MASTER CAR AND LOCOMOTIVE PAINTERS' ASSOCIATION OF THE UNITED STATES AND CANADA.—A. P. Dane, B. & M., Reading, Mass. Next convention, September 14-17, 1915, Detroit, Mich.

MASTER CAR BUILDERS' ASSOCIATION.—J. W. Taylor, 1112 Karpen Bldg., Chicago. Annual meeting, June 14-16, 1915, Atlantic City, N. J.

NATIONAL RAILWAY APPLIANCES ASSOCIATION.—Bruce V. Crandall, 537 So. Dearborn St., Chicago. Next convention, March 15-19, 1915, Chicago.

NEW ENGLAND RAILROAD CLUB.—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass. Regular meetings, 2d Tuesday in month, except June, July, August and September, Boston.

NEW YORK RAILROAD CLUB.—Harry D. Vought, 95 Liberty St., New York. Regular meetings, 3d Friday in month, except June, July and August, 29 W. 39th St., New York.

NIAGARA FRONTIER CAR MEN'S ASSOCIATION.—E. Frankenherger, 623 Brisbane Bldg., Buffalo, N. Y. Meetings monthly.

PEORIA ASSOCIATION OF RAILROAD OFFICERS.—M. W. Rotchford, Union Station, Peoria, Ill. Regular meetings, 2d Thursday in month, Jefferson Hotel, Peoria.

RAILROAD CLUB OF KANSAS CITY.—C. Manlove, 1008 Walnut St., Kansas City, Mo. Regular meetings, 3d Friday in month, Kansas City.

RAILROAD MASTER TINNERS, COPPERSMITHS AND PIPEFITTERS' ASSOCIATION.—U. G. Thompson, C. & E. I., Danville, Ill. Annual meeting, May, 1915.

RAILWAY BUSINESS ASSOCIATION.—Frank W. Noxon, 30 Church St., New York. Annual meeting, December 10, 1914, Waldorf-Astoria Hotel, New York.

RAILWAY CLUB OF PITTSBURGH.—J. B. Anderson, Room 207, P. R. R. Sta., Pittsburgh, Pa. Regular meetings, 4th Friday in month, except June, July and August, Monongahela House, Pittsburgh.

RAILWAY ELECTRICAL SUPPLY MANUFACTURERS' ASSOCIATION.—J. Scribner, 1021 Monadnock Block, Chicago. Meetings with Association of Railway Electrical Engineers.

RAILWAY FIRE PROTECTION ASSOCIATION.—C. B. Edwards, Fire Ins. Agt., Mobile & Ohio, Mobile, Ala. Next meeting, October, 1915.

RAILWAY SIGNAL ASSOCIATION.—C. C. Rosenberg, Times Bldg., Bethlehem, Pa. Next meeting, March 15, 1915, Chicago. Annual meeting, September 21-24, 1915, Salt Lake City, Utah.

RAILWAY STOREKEEPERS' ASSOCIATION.—J. P. Murphy, L. S. & M. S., Box C, Collinwood, Ohio. Annual meeting, May 17-19, 1915, Hotel Sherman, Chicago.

RAILWAY SUPPLY MANUFACTURERS' ASSOCIATION.—J. D. Conway, 2136 Oliver Bldg., Pittsburgh, Pa. Meetings with Master Car Builders and Master Mechanics' Associations.

RAILWAY TELEGRAPH AND TELEPHONE APPLIANCE ASSOCIATION.—G. A. Nelson, 50 Church St., New York. Meetings with Association of Railway Telegraph Superintendents.

RICHMOND RAILROAD CLUB.—F. O. Robinson, C. & O., Richmond, Va. Regular meetings, 2d Monday in month, except June, July and August.

ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.—L. C. Ryan, C. & N. W., Sterling, Ill. Annual meeting, September 14-16, 1915, Chicago.

ST. LOUIS RAILWAY CLUB.—B. W. Frauenthal, Union Station, St. Louis, Mo. Regular meetings, 2d Friday in month, except June, July and August, St. Louis.

SALT LAKE TRANSPORTATION CLUB.—R. E. Rowland, Hotel Utah Bldg., Salt Lake City, Utah. Regular meetings, 1st Saturday of each month, Salt Lake City.

SIGNAL APPLIANCE ASSOCIATION.—F. W. Edmunds, 3868 Park Ave., New York. Meeting with annual convention Railway Signal Association.

SOCIETY OF RAILWAY FINANCIAL OFFICERS.—Carl Nyquist, C. R. I. & P., La Salle St. Sta., Chicago. Annual meeting, September, 1915.

SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—E. W. Sandwich, A. & W. P. R. R., Atlanta, Ga. Next regular meeting, January 21, 1915, Atlanta, Ga.

SOUTHERN & SOUTHWESTERN RAILWAY CLUB.—A. J. Merrill, Grant Bldg., Atlanta, Ga. Regular meetings, 3d Thursday, January, March, May, July, September, November, 10 A. M., Candler Bldg., Atlanta.

TOLEDO TRANSPORTATION CLUB.—Harry S. Fox, Toledo, Ohio. Regular meetings, 1st Saturday in month, Boody House, Toledo.

TRACK SUPPLY ASSOCIATION.—W. C. Kidd, Kanawa Iron Works, Hillburn, N. Y. Meetings with Roadmasters' and Maintenance of Way Association.

TRAFFIC CLUB OF CHICAGO.—W. H. Wharton, La Salle Hotel, Chicago.

TRAFFIC CLUB OF NEW YORK.—C. A. Swope, 291 Broadway, New York. Regular meetings last Tuesday in month, except June, July and August, Waldorf-Astoria, New York.

TRAFFIC CLUB OF PITTSBURGH.—D. L. Wells, Erie R. R., Pittsburgh, Pa. Meetings bimonthly, Pittsburgh. Annual meeting, 2d Monday in June.

TRAFFIC CLUB OF ST. LOUIS.—A. F. Versen, Mercantile Library Bldg., St. Louis, Mo. Annual meeting in November. Noonday meetings October to May.

TRAIN DESPATCHERS' ASSOCIATION OF AMERICA.—J. F. Mackie, 7122 Stewart Ave., Chicago. Annual meeting June 15, 1915, Minneapolis, Minn.

TRANSPORTATION CLUB OF DETROIT.—W. R. Hurley, Superintendent's office, L. S. & M. S., Detroit, Mich. Meetings monthly, Normandie Hotel, Detroit.

TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, N. Y. C. & H. R., East Buffalo, N. Y. Annual meeting, September, 1915, Chicago.

WESTERN CANADA RAILWAY CLUB.—W. H. Rosevear, P. O. Box 1707, Winnipeg, Man. Regular meetings, 2d Monday, except June, July and August, Winnipeg.

WESTERN RAILWAY CLUB.—J. W. Taylor, 1112 Karpen Bldg., Chicago. Regular meetings, 3d Tuesday in month, except June, July and August, Karpen Bldg., Chicago.

WESTERN SOCIETY OF ENGINEERS.—J. H. Warder, 1735 Monadnock Block, Chicago. Regular meetings, 1st Monday in month, except January, July and August, Chicago. Extra meetings, except in July and August, generally on other Monday evenings.

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF SEPTEMBER, 1914—CONTINUED

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses						Net operating revenue (or deficit).	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
		Freight.	Passenger.	Total. inc. misc.	Maintenance Way and structures.	Maintenance Of equipment.	Traffic.	Transportation.	Miscellaneous.	General.	Total.			
Chicago, Peoria & St. Louis	255	$119,338	$31,262	$159,791	$25,128	$24,524	$5,585	$61,226	.....	$5,379	$121,842	$37,948	$5,700	$32,248	$45,551
Delaware & Hudson Co.—R. R. Dept.	881	1,631,668	326,294	2,068,596	130,630	317,957	23,764	689,035	$13,544	57,822	1,231,472	837,124	56,250	780,818	.....
Kansas City, Mexico & Orient	740	150,960	29,324	192,243	29,445	20,399	8,279	69,222	.....	8,259	135,604	56,639	8,500	48,139	.....
Oahu Ry. and Land Co.	109	60,866	22,927	89,967	9,737	10,896	646	21,298	.....	3,964	46,540	43,426	7,250	36,176	—12,530
St. Louis Merchants' Bridge Terminal	9	.....	229	166,062	23,790	4,567	769	80,180	.....	9,167	118,473	47,589	8,330	39,259	29,984
St. Louis, San Francisco & Texas	244	55,420	29,242	91,934	25,954	15,080	2,200	45,175	.....	4,669	93,080	—1,146	1,327	—2,477	—35,233
St. Louis Southwestern	943	440,682	107,496	585,805	75,317	97,006	26,037	164,212	3,700	28,125	394,244	191,561	29,626	161,888	—96,244
St. Louis Southwestern of Texas	811	184,390	84,540	295,357	75,131	74,702	12,464	137,025	945	17,213	316,658	—21,301	13,500	—34,990	—43,074
San Antonio & Aransas Pass	724	284,891	105,678	417,263	56,166	73,072	6,710	172,307	.....	10,132	318,387	98,876	12,000	86,740	—135,696
San Pedro, Los Angeles & Salt Lake	1,132	501,323	199,984	785,956	99,560	118,187	31,076	246,417	13,383	18,311	526,935	259,021	40,012	218,965	—584
Seaboard	3,099	1,053,018	352,854	1,575,036	191,928	268,924	64,211	596,800	6,539	52,953	1,181,354	393,682	91,000	302,539	—161,240
Southern	7,036	3,494,503	1,529,522	5,509,732	806,401	1,039,272	189,850	2,006,809	41,116	173,401	4,254,226	1,255,505	215,195	1,037,679	—494,817
Southern in Mississippi	281	51,483	29,771	88,371	22,504	9,820	2,919	39,402	.....	3,613	78,257	10,113	7,750	2,353	7,207
Southern Pacific	6,522	5,693,763	2,398,900	9,040,322	791,586	1,169,185	151,006	2,669,659	137,787	229,038	5,136,185	3,904,137	423,613	3,478,489	—55,753
Spokane International	163	45,417	17,393	67,589	15,863	5,753	2,280	21,961	.....	3,016	48,873	18,716	3,993	14,724	—30,396
Spokane, Portland & Seattle	556	301,061	136,155	480,338	49,966	34,731	7,335	92,984	3,800	13,722	202,538	277,800	53,400	224,376	26,698
Tennessee Central	294	84,673	37,088	130,051	32,519	18,508	5,816	52,638	.....	6,762	116,243	13,808	4,480	9,307	—30,406
Terminal R. R. Ass'n of St. Louis	35	.....	169	241,200	16,884	9,130	904	77,791	.....	6,559	111,268	129,932	29,017	100,915	38,314
Texas & New Orleans	469	198,727	94,219	313,054	67,169	116,478	7,397	129,852	16,854	11,391	349,806	—35,952	15,793	—51,878	—115,248
Texas & Pacific	1,887	950,726	363,169	1,434,307	145,336	239,633	34,280	582,887	15,931	38,980	1,055,287	379,020	68,700	309,650	33,290
Toledo & Ohio Central	446	520,550	64,703	617,893	61,192	78,094	6,795	194,572	1,960	9,339	351,951	265,941	21,348	244,141	72,528
Toledo, Peoria & Western	248	58,574	44,214	108,517	17,170	27,193	2,162	43,936	.....	3,377	93,839	14,678	6,100	8,578	1,193
Toledo, St. Louis & Western	451	326,799	28,714	383,185	52,242	55,592	15,456	140,442	.....	8,097	271,829	111,356	22,000	89,356	—19,510
Trinity & Brazos Valley	315	39,521	14,797	61,247	22,848	8,417	2,316	35,521	.....	7,672	76,773	—15,526	4,900	—20,435	30,550
Ulster & Delaware	129	48,261	34,794	98,109	19,117	14,119	1,430	46,218	55	3,380	84,319	13,790	3,300	10,490	10,584
Union Pacific	3,615	4,139,962	934,800	5,567,557	711,643	629,236	91,372	1,201,847	75,177	118,167	2,826,046	2,741,511	185,119	2,555,857	320,565
Union R. R. of Baltimore	9	126,661	25,471	153,971	12,599	.....	.....	4,606	.....	2,303	19,508	134,463	6,230	128,232	4,714
Union R. R. of Pennsylvania	31	.....	.....	405,800	11,649	112,118	100	137,322	.....	3,190	264,378	141,422	3,459	137,963	27,718
Vandalia	910	702,771	227,842	1,030,635	150,572	186,809	21,022	365,422	12,644	20,871	757,340	273,295	32,291	241,004	—39,849
Vicksburg, Shreveport & Pacific	171	71,336	40,989	126,046	20,578	25,914	3,573	49,378	2,624	5,236	107,303	18,743	7,200	11,543	—11,317
Virginia & Southwestern	240	146,322	16,250	168,271	24,720	36,751	2,808	47,322	.....	4,130	115,729	52,542	6,250	46,292	—2,324
Virginian	503	507,694	39,244	577,786	68,030	94,130	5,588	116,909	10,500	10,330	298,018	279,768	22,500	257,268	5,405
Wabash	2,518	1,811,323	602,551	2,647,733	292,604	453,212	80,735	975,693	17,187	57,498	1,875,382	772,351	83,657	688,646	—45,538
Washington Southern	36	33,043	40,818	101,415	15,264	16,205	1,253	40,070	1,400	3,126	77,317	24,098	3,320	20,778	—462
West Jersey & Seashore	356	161,700	439,050	664,678	96,954	84,665	12,046	250,481	2,868	14,490	461,504	203,175	28,159	174,929	91,435
Western Maryland	661	593,851	97,936	724,690	106,809	119,472	21,434	271,501	2,076	19,787	539,514	185,176	24,500	160,676	41,776
Western Pacific	943	448,165	117,886	596,988	142,691	61,020	24,103	174,361	12,325	20,341	434,841	162,147	30,009	132,138	—31,069
Western Ry. of Alabama	133	61,450	38,209	109,007	16,937	25,566	5,659	30,627	1,447	4,253	84,490	24,517	5,816	18,695	—19,129
Wheeling & Lake Erie	459	469,835	53,791	569,727	64,872	105,077	9,074	187,070	1,421	15,921	383,435	186,292	32,976	153,316	76,899
Yazoo & Mississippi Valley	1,372	613,690	201,397	878,547	136,765	145,386	16,778	335,745	798	22,733	657,681	220,867	50,000	170,756	37,121
THREE MONTHS OF FISCAL YEAR ENDING JUNE 30, 1915															
Alabama & Vicksburg	143	$240,657	$125,660	$403,249	$65,649	$98,118	$10,897	$146,559	$9,840	$16,608	$347,671	$55,578	$21,720	$33,858	—$42,525
Alabama Great Southern	309	853,124	326,018	1,286,433	160,169	337,422	40,749	427,764	10,119	27,984	1,004,208	282,226	46,479	235,710	—42,089
Atchison, Topeka & Santa Fe	8,427	16,958,232	6,346,127	25,280,359	3,691,431	4,250,156	493,538	6,803,463	.....	447,054	15,679,124	9,601,415	1,192,380	8,400,215	1,104,794
Atlanta & West Point	93	144,252	125,089	306,085	52,085	74,483	16,058	94,633	4,447	13,017	254,723	51,362	21,375	29,961	—17,412
Atlanta, Birmingham & Atlantic	646	475,508	178,038	713,899	113,835	129,328	39,836	303,215	.....	30,664	616,878	97,022	43,011	53,790	—38,089
Atlantic & St. Lawrence	167	214,500	106,682	351,381	69,494	48,392	12,088	154,211	.....	8,410	292,594	58,787	32,400	26,387	31,484
Atlantic City	170	227,492	762,846	1,023,654	79,957	83,749	10,800	419,907	222	5,976	600,611	423,043	40,500	382,507	—48,352
Atlantic Coast Line	4,664	4,393,894	1,986,603	6,938,463	1,339,448	1,474,736	164,815	2,800,001	19,947	235,279	6,012,192	926,271	414,000	509,048	—481,621
Baltimore & Ohio—System	4,516	19,378,005	4,438,681	25,629,396	2,595,565	4,851,473	485,658	9,330,173	141,911	551,147	17,955,927	7,673,469	798,106	6,873,950	—679,942
Baltimore & Ohio Chicago Terminal	80	.....	2,232	437,443	49,500	65,530	2,808	171,338	10,438	14,289	313,903	123,540	57,064	66,476	8,048
Bangor & Aroostook	631	529,411	190,567	767,279	153,391	140,560	8,054	252,051	4,337	28,582	586,976	180,304	26,250	154,049	—28,157
Belt Ry. Co. of Chicago	24	.....	.....	837,559	61,814	69,404	3,087	261,493	.....	17,979	413,776	423,783	34,684	389,099	146,554
Bessemer & Lake Erie	204	3,254,461	148,277	3,448,975	230,726	504,004	28,015	617,461	7,334	34,264	1,414,695	2,034,280	54,000	1,980,272	473,657
Bingham & Garfield	27	338,811	13,535	354,988	39,829	52,283	2,874	59,718	288	5,893	160,885	194,103	5,738	188,365	—66,070
Birmingham Southern	43	138,061	3,583	252,221	63,749	45,293	1,395	90,012	.....	10,338	210,787	41,434	6,587	34,846	—86,028
Boston & Maine	2,252	6,922,692	4,897,044	12,884,675	2,138,358	2,100,376	132,822	5,231,752	59,160	277,767	9,940,235	2,944,441	503,710	2,440,731	—558,631
Buffalo & Susquehanna R. R. Corporation	253	349,740	23,149	381,663	77,276	115,559	3,453	113,185	.....	16,276	325,750	55,914	7,800	48,114	.....
Buffalo & Susquehanna Railway	91	47,594	27,262	82,865	20,165	31,001	1,564	37,367	175	7,507	97,778	—14,913	4,800	—19,713	4,679
Buffalo, Rochester & Pittsburgh	596	2,337,679	349,889	2,790,079	445,439	646,244	34,109	815,021	4,183	52,826	1,997,822	792,257	60,000	732,244	—248,304
Canadian Pacific Lines in Maine	233	137,714	61,303	219,159	70,180	44,933	19,237	101,116	.....	10,931	246,398	—27,239	36,000	—63,239	33,421
Carolina, Clinchfield & Ohio	248	501,959	59,354	576,356	53,453	71,058	20,848	109,037	.....	26,007	275,630	300,726	42,750	257,941	—124,189
Carolina, Clinchfield & Ohio of S. C.	18	26,864	5,170	32,777	2,692	299	5,436	6,262	.....	1,698	16,387	16,390	2,250	14,140	—8,576
Central New England	304	744,251	138,595	924,604	229,526	111,368	3,168	305,426	.....	11,872	661,224	263,380	33,000	230,347	—154,180
Central of Georgia	1,924	1,936,513	939,282	3,173,317	480,016	628,892	107,593	1,127,263	4,158	101,292	2,437,450	735,867	154,195	581,301	40,364
Central of New Jersey	678	5,444,900	2,051,877	7,922,094	721,204	1,254,119	96,479	2,574,037	41,419	148,033	4,835,023	3,087,071	351,533	2,735,513	114,743
Central Vermont	411	682,076	285,290	1,049,353	171,583	165,735	23,601	450,321	9,009	19,546	839,795	209,558	47,280	162,278	49,548
Charlestan & Western Carolina	341	302,115	100,517	425,234	95,873	89,924	12,903	166,729	.....	12,455	377,883	47,351	15,000	32,350	—36,048
Chesapeake & Ohio Lines	2,367	7,923,477	1,772,310	10,297,298	1,242,486	2,188,737	171,354	3,203,136	67,117	210,177	7,083,005	3,214,293	329,766	2,884,294	87,778
Chicago & Altan	1,033	2,420,948	1,188,759	3,915,854	426,730	829,220	107,063	1,252,477	30,904	87,060	2,733,453	1,182,401	134,550	1,047,350	—19,836
Chicago & Eastern Illinois	1,282	2,857,161	813,836	3,978,632	446,960	787,847	64,561	1,373,329	23,554	105,520	2,801,703	1,176,929	170,700	1,006,049	376,733
Chicago & Erie	270	1,186,581	178,266	1,491,166	257,987	—126,327	59,819	695,059	6,393	38,924	931,854	559,311	38,685	520,584	606,685
Chicago & North Western	8,108	14,348,126	6,481,408	23,109,423	3,833,462	3,420,120	339,335	7,489,405	168,973	423,420	15,674,715	7,434,708	1,125,000	6,308,361	175,859
Chicago, Burlington & Quincy	9,264	16,830,614	6,262,895	25,183,260	2,964,831	4,145,282	425,865	7,276,893	206,584	510,092	15,529,547	9,653,713	997,584	8,656,129	—29,947
Chicago, Detroit & Can. Gd. Trunk Jctn.	60	141,459	60,803	241,392	33,971	33,309	5,456	119,612	.....	3,881	196,229	45,163	8,610	36,553	—2,549

Traffic News

The Illinois Central fast freight train between Chicago and New Orleans recently completed a record of 310 days' service in which it arrived at destinations on time.

All the St. Louis railroads, except two, have agreed on a plan for having their city ticket offices in one building, at Broadway and Locust street, but to have separate offices for each road, not a joint office. It is expected to save $100,000 a year in rentals.

The Traffic Club of New York

The Traffic Club of New York will hold its annual meeting and election of officers at the Hotel Astor, New York, on November 24.

National Industrial Traffic League

The annual meeting of the National Industrial Traffic League was held at Chicago on November 12 and 13.

In his opening address President H. G. Wilson, traffic commissioner of the Traffic Bureau of the Toledo Commerce Club, severely criticized railway men and others for attempting to undermine the present system of railroad regulation, and for "the present veiled attack on the usefulness of the Interstate Commerce Commission," which, he said, "is the culmination of studied effort and purpose on the part of those who would have that body composed of creatures of their own choosing, instead of the conscientious men they are." Following this the league adopted the following resolutions:

"Whereas, regulation of common carriers through the medium of the commerce act, as administered by the Interstate Commerce Commission has been received by many interests in other than a friendly spirit, and

"Whereas, recently much criticism has been indulged in through the public press, and otherwise, of the act and particularly of its administration, therefore be it

"Resolved, that the National Industrial Traffic League, in annual convention assembled, declares its firm belief in the wisdom of governmental regulation and reaffirms its approval thereof; and, while reserving to itself, as well as granting to others, the privilege of recommending such changes in or additions to the commerce act from time to time as may be deemed wise for the best interests of all concerned; it hereby further resolves that it renews its expression of respect for and belief in the ability and integrity of the Interstate Commerce Commission, and is unalterably opposed to any action that would have the effect of repealing the commerce act or influencing unfairly the administration of this act by the Interstate Commerce Commission."

The business session of the league was devoted to the presentation and discussion of committee reports. On the recommendation of the executive committee it was decided to make a fight on tariffs filed recently with the Interstate Commerce Commission by the railroads in Western Trunk Line and Central Freight Association territories, imposing a charge of four cents per hundred pounds for trap car service, and the attorneys of the league were instructed to file a petition with the commission for suspension of the tariff. It was also decided to oppose the tariffs filed by the railways eliminating stop-over privileges, and to oppose the proposed increased demurrage for regrigerator cars loaded with perishable fruit and vegetables. A committee of seven was appointed to negotiate with the carriers to secure a general adoption of the uniform code of storage rules agreed on by the league and representatives of the carriers through the American Railway Association and approved by the Interstate Commerce Commission, but which has not been made effective by all the carriers. There was considerable discussion on a report that the railways in many cases do not promptly furnish copies of new tariffs to the shippers, and that the shippers have difficulty in ascertaining the exact provisions of such tariffs in advance. The president was instructed to confer with the Interstate Commerce Commission to see what steps could be taken to improve the situation.

The league adopted a report of the legislative committee favoring a resolution of the American Bar Association, recommending a congressional commission to codify the interstate commerce laws, and also favoring a recommendation made by the Interstate Commerce Commission that suits under the interstate commerce act shall be brought in the name of the commission instead of the government. The league also endorsed the recommendation made by the National Association of Railway Commissioners urging a standardization of state laws regulating commerce. A plan for a national traffic conference to be held next year at the San Francisco exposition was referred to the executive committee.

The officers of the league were all re-elected for the ensuing year: President, H. G. Wilson, traffic commissioner Traffic Bureau of the Toledo Commerce Club, Toledo, Ohio; vice-president, J. Keavy, commissioner of freight and traffic division Indianapolis Chamber of Commerce; secretary-treasurer, O. F. Bell, traffic manager, Crane Company, Chicago; chairman executive committee, H. C. Barlow, traffic director Chicago Association of Commerce. A. W. McLaren, traffic manager, Morris & Co., was added to the executive committee.

The annual banquet of the league was held on Thursday evening at the Congress hotel. D. P. Chindblom, assistant secretary of the league, spoke on the organization and purposes of the league, with a plea for more extensive co-operation between the railroads and the shippers. William Heath, vice-president of Larkin & Co., of Buffalo, spoke in place of E. E. Clark, of the Interstate Commerce Commission, who had been expected to be present. Walter L. Fisher, ex-secretary of the Interior and a member of the Chicago Railway Terminal Commission, spoke on "Railway Terminals," criticizing the railways of Chicago for uneconomical use of some of the most valuable property in the city, and urging some form of co-operation between the railways to secure unified use of the terminals, possibly under one operating company to operate all of the Chicago terminal facilities with a separate charge for terminal service.

Trap Car Charge at Chicago Opposed

The National Industrial Traffic League, through its attorneys, Borders, Walter & Burchmore, has filed with the Interstate Commerce Commission a petition asking the commission to investigate and suspend tariffs filed by the eastern and western railways, imposing a charge for trap car service, as recently reported in the *Railway Age Gazette*. The petition applies especially to the tariffs filed for the Chicago district, but it is stated that supplemental petitions will be filed when the numbers of the other tariffs become known. The term "trap car" is defined in the tariff as follows: "The term 'trap car' is applied to a car placed at an industry and loaded with less-than-carload freight (except perishable freight requiring refrigerator car protection), to be forwarded to a freight station of the road on which the industry is located, for handling of contents, or, at issuing carrier's option, sent to one of its freight stations or transfer points for handling of contents, or, at issuing carrier's option, sent to destination; also a car containing less-than-carload freight forwarded, at issuing carrier's option, from point of origin, or contents handled at a transfer point or freight station and forwarded to an industry."

The petition states that under these tariffs each of the originating or delivering carriers at Chicago will move trap or ferry cars without any charge over the Chicago rate when such trap cars move from or to freight stations on their own lines in the Chicago switching district from or to so-called universal freight stations on foreign lines in the Chicago switching district, provided the freight is received at such freight stations by street vehicles, and provided each trap car contains not less than a minimum aggregate weight of less than carload freight. Charges are provided to be assessed on trap cars when moving to or from industries either situated on the road-haul carrier or off the line of the road-haul carrier. The result is that a shipper having an industry on the Michigan Central, for example, must pay 4 cents per 100 lb. for the movement of a trap car from his plant to the freight house or transfer point of the Michigan Central, the movement from such industry to such transfer point or station being at the expense of the Michigan Central, but without allowance or payment by that company to any other company. On the other hand, in the case of a trap car loaded

at one of the universal freight stations of the Chicago & North Western, for example, and containing the specified minimum weight of less-than-carload freight, such freight having reached said station by street vehicle through public driveway entrance, the Michigan Central will pay the terminal lines the switching charges necessary to move the car to the station or transfer point of the Michigan Central, amounting to a minimum of $6 per car, and in addition the Michigan Central will perform practically all of the services that it performs in the corresponding case of an industry on its own line, while the freight in such trap car loaded at the North Western freight station will pay no charge in addition to the flat Chicago rate. These facts and others, the petition states, represent serious questions of transportation theory and practice, and involve discriminations that are prima facie unjust and undue. The petition also states that these tariffs were filed with the commission by order of the executive officers of the railways, without due consideration and recommendation of the traffic officials of the railways by whom changes in transportation rates ordinarily are considered and proposed.

Car Surpluses and Shortages

Arthur Hale, chairman of the committee on relations between railroads of the American Railway Association, in presenting statistical bulletin No. 179, giving a summary of car surpluses and shortages by groups from June 30, 1913, to November 1, 1914, says:

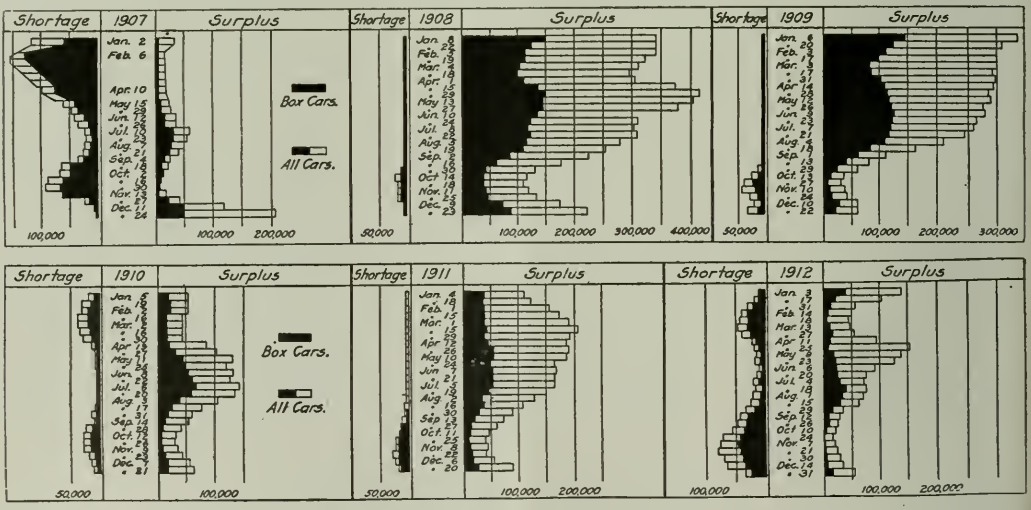
There is a further increase in surplus cars of almost 18,000, bringing the total up to 172,325, the largest surplus for the same period in any year since the committee began the publication of these reports, which was in 1907.

The total surplus on November 1, 1914, was 172,325 cars; on October 15, 1914, 154,342 cars; on November 1, 1913, 38,276 cars, and on October 28, 1908, 110,912 cars.

CAR SURPLUSES AND SHORTAGES

Date	No. of roads.	Surpluses: Box.	Flat.	Coal, gondola and hopper.	Other kinds.	Total.	Shortages: Box.	Flat.	Coal, gondola and hopper.	Other kinds.	Total.
Group *1.—November 1, 1914	9	0	609	631	550	1,790	591	0	0	50	641
" 2.— " 1, 1914	33	3,053	399	11,131	3,187	17,770	0	0	0	0	0
" 3.— " 1, 1914	28	8,790	2,073	32,532	5,106	48,501	0	4	0	112	116
" 4.— " 1, 1914	12	5,854	1,862	6,904	1,539	16,159	0	0	10	0	10
" 5.— " 1, 1914	23	3,629	1,481	6,339	1,573	13,022	50	0	0	0	50
" 6.— " 1, 1914	28	12,290	1,913	4,773	5,646	24,622	2	7	0	1	10
" 7.— " 1, 1914	4	1,406	33	824	1,057	3,320	0	0	0	0	0
" 8.— " 1, 1914	15	1,337	369	1,535	2,896	6,137	549	9	136	41	735
" 9.— " 1, 1914	13	1,016	254	202	734	2,206	0	0	3	5	8
" 10.— " 1, 1914	22	5,800	1,554	2,748	8,983	19,085	157	0	125	42	324
" 11.— " 1, 1914	5	16,336	1,836	0	1,541	19,713	0	0	0	335	335
Total	192	59,511	12,383	67,619	32,812	172,325	1,349	20	274	586	2,229

*Group 1 is composed of New England lines; Group 2—New York, New Jersey, Delaware, Maryland and Eastern Pennsylvania lines; Group 3—Ohio, Indiana, Michigan and Western Pennsylvania lines; Group 4—West Virginia, Virginia, North and South Carolina lines; Group 5—Kentucky, Tennessee, Mississippi, Alabama, Georgia and Florida lines; Group 6—Iowa, Illinois, Wisconsin and Minnesota lines; Group 7—Montana, Wyoming, Nebraska, North Dakota and South Dakota lines; Group 8—Kansas, Colorado, Missouri, Arkansas and Oklahoma lines; Group 9—Texas, Louisiana and New Mexico lines; Group 10—Washington, Oregon, Idaho, California, Nevada and Arizona lines; Group 11—Canadian lines.



Car Surpluses and Shortages, 1907 to 1914

The greater part of the surplus increase is in coal cars. This class of equipment increased 11,706 cars in group 3 (Middle) and 5,882 cars in group 2 (Eastern).

Box cars show a heavy decrease in group 6 (Northwest), and smaller decreases in group 8 (Middle Western), group 10 (Pacific), and group 11 (Canada), while a considerable increase is noticeable in group 3 (Middle) and group 5 (Southern).

The total shortage on November 1, 1914, was 2,229 cars; on October 15, 1914, 2,360 cars; on November 1, 1913, 40,118 cars, and on October 28, 1908, 10,839 cars.

There is very little change in the shortage.

The accompanying table gives car surplus and shortage figures by groups for the last period covered in the report and the diagram shows total bi-weekly surpluses and shortages from 1907 to 1914.

Commission and Court News

INTERSTATE COMMERCE COMMISSION

Examiner Kelly held a hearing at Chicago on November 10 on a proposed increase of 25 cents a ton in the rates on anthracite coal from West Virginia points to Chicago. Members of the Chicago Coal Dealers' Association appeared in opposition to the advance.

Examiner Kelley held a hearing at Chicago on November 13, on complaints filed by the Illinois Manufacturers' Association, the Wholesale Grocers' Exchange and the Chicago Association of Commerce against the proposed addition of switching charges to the rates on coal shipments to Chicago, which have heretofore been absorbed.

The commission has issued the following in reference to applications for relief from the assessment of the demurrage charges upon embargoed shipments of live stock, held on account of the quarantine declared to prevent the spread of the foot-and-mouth disease. The commission will be glad to contribute whatever it can toward affording relief at the present juncture. Should the carriers petition this commission to make effective upon one day's notice tariffs which will suspend the assessment and collection of demurrage occasioned by the order of the Department of Agriculture, this commission will be glad to give prompt and favorable consideration to such applications.

Rates on Flour from Inman, Kan.

Enns Milling Company v. Chicago, Rock Island & Pacific et al. Opinion by Commissioner Harlan:

The commission finds that defendants' rates on flour, bran and shorts from Inman, Kan., to various destinations in southwestern Missouri are unreasonable to the extent that they exceed 14½ cents on flour and 13 cents on bran and shorts. A fourth section application for permission to continue lower rates from Hutchinson and McPherson, Kan., is denied, the carriers since the hearing having withdrawn the lower rates to these points. (32 I. C. C., 38.)

Reparation Awarded

George R. Worn et al. v. Boca & Loyalton et al. Opinion by Commissioner McChord:

The commission finds that the carrier discriminated against Boca, Cal., by maintaining from February 20 to November 7, 1910, a rate of $1 per ton on dry lumber from Star, Cal., to Boca on traffic destined to Truckee, Cal., while maintaining a rate of $1.50 per ton from Star to Boca, applicable on traffic to Verdi, Nev., and other interstate points. The present rate of $1.50 from Star to Boca, however, is not found unreasonable nor discriminatory, as it is applicable on all traffic irrespective of destination. Reparation awarded. (32 I. C. C., 58.)

Rates on Potatoes to Independence and Coffeyville, Kans.

Kansas Wholesale Grocery Company, et al. v. Ahnapee & Western, et al. Opinion by Commissioner Meyer:

The commission finds that a rate of 35 cents per 100 lb. on potatoes from producing territory in Wisconsin, Minnesota and Michigan to Independence and Coffeyville, Kans., is prejudicial to the two latter points as compared with the rate to Chanute, Kans., and Bartlesville, Okla., and other Kansas and Oklahoma points, in so far as it exceeds the rate to Pittsburg, Chanute and Parsons, Kan., by more than 1½ cents. It is also held that the rate to Coffeyville should not in any case exceed the rate to Bartlesville, Okla. (32 I. C. C., 139.)

Cement Rates from Mitchell, Ind.

Opinion by Commissioner Clark:

The commission finds that a rate of 11 cents per 100 lb. on cement from Mitchell, Ind., to Memphis, Tenn., established by a note to a tariff excepting Michell from the application of a group rate of 14 cents as to shipments to Memphis was not cancelled by a supplement to the tariff, which merely transferred Mitchell to a group taking a rate of 9 cents. The commission also finds that the carriers have justified a proposed increase in a rate on cement from Mitchell to New Orleans and New Orleans group points. (32 I. C. C., 93.)

Refrigeration Rates from Kenner, La.

Kenner Truck Farmers' Association v. Illinois Central et al. Opinion by Commissioner McChord:

The commission finds that the Illinois Central's practice of permitting shippers of fruit and vegetables from New Orleans to ice their own cars if they so choose, while denying a like privilege to shippers from Kenner and other Louisiana points on defendant's line north of New Orleans is not discriminatory. It is also found that the carrier has justified certain increased charges for icing shipments from New Orleans and points north thereof to Chicago. In the same case reparation is awarded on a shipment of vegetables from Kenner, La., to Chicago, which moved via New Orleans and was charged the combination of rates on that point. (32 I. C. C., 1.)

Grain Rates from St. Paul, Minn.

Opinion by the commission:

The commission finds that the carriers have justified a proposed cancellation of joint rates on grain from stations on the Great Northern in Minnesota and Iowa to Kansas City, Mo., and points in Missouri, Kansas, Oklahoma and Colorado. The rates in question apply to Kansas City via a three line haul over the Great Northern to Sioux City, Ia.; the Chicago, Burlington & Quincy to St. Joseph; and the Atchison, Topeka & Santa Fe beyond; or to the other points via the Great Northern to Sioux City; the Chicago, Burlington & Quincy to St. Joseph or Kansas City, and the Atchison, Topeka & Santa Fe, the Missouri, Kansas & Texas or the St. Louis & San Francisco beyond. The commission holds that the rates via these routes are relatively lower than the rates from the producing territory in Nebraska to Chicago, whereas there is no necessity for such low rates. There will also still be in effect rates via the Great Northern and the Chicago, Burlington & Quincy which although higher are reasonable. (32 I. C. C., 96.)

Rates on Whiskey from Midway, Ky.

S. J. Greenbaum Company v. Louisville & Nashville et al. Opinion by Commissioner Clark:

It is alleged that the carload and less than carload rates on whiskey and the carload rates on distillers' dried grain, from Midway, Ky., to various destinations and their inbound carload and less than carload rates on bottles, boxes and bottle-carrying boxes from certain points to Midway are unreasonable and discriminatory as compared with the rates to and from Lexington and Louisville, Ky.

Rates on whiskey and distillers' dried grain. The commission finds that the rates on these commodities via the Southern Railway and the Cincinnati, New Orleans & Texas Pacific and their connections from Midway via Cincinnati to points in central freight association territory are not unreasonable or discriminatory.

The following rates, however, are termed discriminatory: Rates on distillers' dried grain and whiskey in carloads from Midway, via the same carriers through Cincinnati to points in trunk line, New England, and Atlantic seaboard territories and rates on whiskey in carloads via Cincinnati to Virginia cities in so far as they exceed the carload rates from Lexington via Cincinnati by more than the following amounts: distillers' dried grain, two cents; whiskey in wood in bulk, three cents; whiskey in glass, packed in barrels or boxes, four cents. The rates over the Louisville & Nashville and its connections on whiskey and distillers' dried grain via Lexington to points in central freight association, New England, trunk line and Atlantic seaboard territories in so far as they exceed the rates from Louisville via Lexington. Rates on whiskey and distillers' dried grain to points in New England, trunk line, and Atlantic seaboard territories when moving through Lexington, in so far as they exceed the rates from Louisville via Lexington. Rates on whiskey to Virginia cities via Lexington in so far as they exceed the rates from Louisville to Virginia cities. Authority to grant lower rates from Louisville and Lexington to points in central freight association, New England, trunk line, or Atlantic seaboard terri-

tories or to Virginia cities on whiskey moving via the Louisville & Nashville from Louisville through Lexington or from Lexington via Louisville than from Midway and other intermediate points is denied.

Rates on bottles, boxes and bottle carrying boxes The following rates are termed discriminatory: Rates to Midway via Louisville in so far as they exceed the rates via Louisville to Lexington; rates to Midway via Lexington to the extent that they exceed the rates to Louisville via Lexington, and rates to Midway via the Southern and the Cincinnati, New Orleans & Texas Pacific through Cincinnati in so far as they exceed the rates via Cincinnati to Lexington by more than two cents on bottles and three cents on boxes and bottle carrying boxes.

The record does not present a clear basis for fixing less-than-carload rates on whiskey from Midway via Cincinnati, or on bottles, boxes, etc., from the points of origin complained of to Midway via Cincinnati. It is ordered that these rates be brought into proper relation with the carload rates, and also with the less-than-carload rates on whiskey from Lexington via Cincinnati to the same destination, and the rates on bottles, boxes, etc., from the points of origin complained of to Lexington, via Cincinnati. (31 I. C. C., 699.)

Joint Rates With the Birmingham Southern

In the matter of the investigation and suspension of new joint class and commodity rates for the transportation of freight originating at and destined to points on the Birmingham Southern. Opinion by Commissioner Meyer:

In August and September, 1911, the Atlanta, Birmingham & Atlantic filed tariffs naming new joint rates between it and the Birmingham Southern. A complaint has been filed against these schedules by the Louisville & Nashville, the Southern and other carriers, it being alleged that the Birmingham Southern has no right to participate in joint rates and receive divisions thereof, because it is a mere plant facility, and that even if it is a common carrier, the amount of the divisions it would receive under the proposed rates is excessive.

The Birmingham Southern is owned directly by the Tennessee Coal, Iron & Railroad Company. It operates a main line about 43 miles in length and has 85 miles of yard tracks and sidings, most of which are within and about the plant of the Tennessee company. The tonnage of the latter is about 40 per cent of all the traffic originating in the Birmingham district and about 93 per cent of that handled by the Birmingham Southern. The road is the only one of several industrial lines in the Birmingham district that has been incorporated as a common carrier; and it alone makes reports and files its tariffs with the commission.

At the present time for long hauls the trunk lines apply the Birmingham district rate to or from competitive points. At Birmingham, Ensley and Bessemer the trunk lines absorb the switching charges of each other to all industries. At the same points they absorb the switching charges of the Birmingham Southern for deliveries to or from all shippers not affiliated with the Tennessee company, in conformance with a decision of the Alabama Railroad Commission in 1908 which ordered the Birmingham Southern to reduce its switching charge from $3 per car to $2, and further ordered the trunk lines to absorb the same. On traffic to and from points on the Birmingham Southern, outside of these switching limits, the charges are the group rates plus the individual rates of the Birmingham Southern. On traffic to or from the plants of the Tennessee company, no absorption of the Birmingham Southern's charges is made at any point.

The commission holds that the Atlanta, Birmingham & Atlantic may properly enter into joint rates with the Birmingham Southern and arrange with it concerning divisions out of the through rate. "If the Birmingham Southern were owned by interests independent of the Tennessee company, the protest of the Louisville & Nashville would probably never have been filed. Generally speaking, the mere fact of ownership should make no difference in the status of a common carrier as such. The record shows that the Birmingham Southern is a common carrier. It is so situated that it can and it does serve the public. The fact that other common carriers can serve the great majority of the industries which the Birmingham Southern seeks to serve can have little or no weight in the consideration of the issues here presented. A railway independently owned and having the present and prospective tonnage of the Birmingham Southern would doubtless be looked upon as desirable railway property. The proposed extensions southward, apparently in anticipation of the opening of the Panama Canal, will greatly enhance the strategic importance of its location."

The commission also concludes that a division of 6.5 cents per ton on carload traffic to be paid by the Atlanta, Birmingham & Atlantic to the Birmingham Southern would be just and reasonable. It is held that the carriers should establish a proper relation between the less-than-carload and carload rates. The suspended tariff did not contemplate the payment of more than $2 per car switching charge on freight originating at Birmingham proper and Bessemer, and it is assumed that no change is contemplated in this respect. The carriers will be expected to reissure their tariffs, effective within 60 days, modified in accordance with the above views.

In a dissenting opinion Commissioner Harlan states that he is unable to see why the Birmingham Southern should be given different treatment from that accorded to the other railways serving industries in the Birmingham district, and that it is his opinion that the Birmingham Southern like these other railways is no more than a plant facility. He also states: "It seems to me logically to follow from the principle announced that facilities, physically and economically a part of an industrial plant and necessary to its successful operation, when turned over to an incorporated railroad company owned by the industry take on a new relation to it, and that the cost of their operation may then lawfully be transferred from the industry to the trunk line carriers with all the additional advantages and privileges that follow, notwithtsanding the resulting discriminations against other industries. In other words, so long as a correct outward form is created the real relation between the industry and its subsidiary railroad company appears not to be open to inquiry. I assume that the manufacturing concerns of the country will not be slow, as the result of the rulings here made, to make the necessary arrangements to relieve themselves of the cost of operating their plant facilities of this character." (32 I. C. C., 110.)

STATE COMMISSIONS

The Illinois Public Utilities Commission has suspended proposed advances in the rates on milk, of approximately five per cent, by the railroads throughout the state.

At the request of the railroads the Texas Railroad Commission has postponed until January 14, 1915, the proposed hearing on the application of the railroad companies for a general advance in freight rates throughout the state. The hearing has been set for December 1.

COURT NEWS

The Court of Appeals of Kentucky has handed down a decision holding that the Louisville & Nashville, in providing only one lavatory in the passenger car assigned to negroes, while it furnishes separate lavatories for males and females in the cars assigned to white passengers, has made no illegal discrimination. In this decision the court reverses a lower court, which had imposed a fine on the railroad company of $500 for violation of the separate coach law. The decision says that equality of accommodation does not mean identity of accommodation. It appeared that the average number of passengers carried in the negro compartment was much less than the number usually traveling in the white compartment of the car.

Judge Landis of the United States district court for the western district of Illinois at a hearing at Freeport on November 9, denied an appeal from his recent decision ordering Frederick W. Ellis, vice-president of the Armour Car Lines, to answer questions put to him by the Interstate Commerce Commission at a hearing in Chicago last January in connection with its investigation of private car lines, regarding the relations between the car lines and the railroads. Frank B. Kellogg, counsel for Ellis, argued his right to present the entire matter to the United States Supreme Court. Judge Landis decided that no final order could be entered in the case until Ellis is recalled as a witness before the commission. If he persists in his refusal the final order will be entered.

Railway Officers

Executive, Financial, Legal and Accounting

O. L. Dickeson has resigned as president of the White Pass & Yukon, the resignation to take effect about February 1.

E. W. McKenna, vice-president of the Chicago, Milwaukee & St. Paul, with headquarters at Chicago, has been retired.

Harry L. Miller, general freight agent of the Southern Railway at Knoxville, Tenn., has been elected president of the Interstate Railroad, with headquarters at Big Stone Gap, Va., succeeding Daniel B. Wentz, resigned.

The officers of the Shreveport, Alexandria & Southwestern Railway System are now as follows: R. A. Long, president; F. J. Bannister, vice-president; R. S. Davis, second vice-president and general manager in charge of operation and traffic; J. D. Tennant, third vice-president; R. T. Demsey, secretary; P. C. Rickey, general auditor, and W. R. Thurmond, general counsel. The headquarters of the company are at Kansas City, Mo.

Operating

O. S. Jackson, superintendent of motive power of the Chicago, Terre Haute & Southeastern, has been appointed general superintendent, with headquarters at Terre Haute, Ind., succeeding J. C. Muir, deceased.

Fred B. Oren, roadmaster of the Illinois Central at Carbondale, Ill., has been appointed trainmaster of the Peoria and Mattoon districts, with headquarters at Mattoon, Ill., to succeed Roldin A. Brown, resigned.

Walter Tuttle Spencer, whose appointment as superintendent of the Old Colony division of the New York, New Haven & Hartford, with headquarters at Taunton, Mass., has already been announced in these columns, was born on July 5, 1869, and was graduated from Sheffield Scientific School of Yale University in the class of 1890. He began railway work in September 1890, as a rodman on the New York, New Haven & Hartford. From 1892, to 1893, he was transitman and then was appointed division engineer. On September 1, 1914, he was transferred from the engineering department to the operating department and was made trainmaster, with headquarters at Providence, R. I., which position he held at the time of his recent appointment as superintendent of the Old Colony division of the same road, as above noted.

Traffic

C. J. Birchfield has been appointed assistant general advertising agent of the Atchison, Topeka & Santa Fe, with headquarters at Chicago, succeeding N. H. Reed, resigned to engage in other business.

Engineering and Rolling Stock

A. Sturrock has been appointed district master mechanic of the Canadian Pacific, with office at Nelson, B. C., succeeding A. Mallinson.

W. F. Weigman has been appointed general foreman of the car department on the Charleston & Western Carolina, with headquarters at Augusta, Ga.

H. F. Staley, formerly master mechanic of the Carolina, Clinchfield & Ohio at Erwin, Tenn., has been appointed master mechanic of the Boyne City, Gaylord & Alpena, with office at Boyne City, Mich.

H. B. Hayes, master mechanic of the Cincinnati, New Orleans & Texas Pacific at Somerset, Ky., has been transferred to Birmingham, Ala., as master mechanic of the Alabama Great Southern.

Milo M. Backus has been appointed roadmaster of the Springfield division of the Illinois Central, with headquarters at Clinton, Ill., in place of Lewis H. Bond, who has been transferred to Carbondale, Ill., as roadmaster of the St. Louis division, succeeding Fred B. Oren, transferred.

A. G. Kantman, who has resigned as superintendent of machinery of the Nashville, Chattanooga & St. Louis, had been employed by the Nashville, Chattanooga & St. Louis for some 20 years in various capacities—as mechanical engineer, later as assistant superintendent of machinery, and recently as superintendent of machinery. Mr. Kantman has taken active part in M. C. B. Association affairs, and is for the present at his home at 1916 Adelcia street, Nashville, Tenn., attending to his various private matters.

OBITUARY

George F. Clough, commercial agent of the Lake Shore & Michigan Southern at Cleveland, Ohio, died on November 8, aged 38 years.

James Geddes, assistant to general manager of the Louisville & Nashville since September, 1901, with office at Nashville, Tenn., died in that city on November 13, at the age of 87.

H. A. Jones, who resigned last August as assistant treasurer of the Southern Pacific Company, at San Francisco, Cal., on account of ill health, died recently in San Francisco, at the age of 63.

L. F. Day, formerly vice-president and general manager of the Minneapolis & St. Louis and the Iowa Central, died on November 12 in New York City, aged 56 years. He began railway work in 1885 as clerk in the general freight office of the Texas & St. Louis. From June, 1886, to February, 1887, he was traveling freight and passenger agent for the St. Louis, Arkansas & Texas and its successor, the St. Louis Southwestern, remaining with the latter road until April, 1892, successively as chief clerk general freight office, assistant general freight agent, general freight agent and freight traffic manager. He was chairman of the Southwestern Traffic Association from November, 1893, to June, 1897, and then became general manager of the Minneapolis & St. Louis. In October, 1899, he also was made vice-president of that road, and in June of the following year he was appointed vice-president and general manager also of the Iowa Central. Mr. Day retired from active railway service about five years ago.

Railway Construction in Italian North Africa.—On October 2, 1914, a section of railway was opened to public use between El Maia and Zavia in Tripolitania. This marks the completion of the Tripoli-Zavia division, which, with the exception of the Tripoli-Azizia line, is the longest stretch of track in the colony. The new road is 11 miles long, and the total distance from Tripoli and Zavia is about 31 miles. Construction will now be pushed beyond Zavia to Zuara, a port about 35 miles farther on, and work is so advanced on the section beyond Azizia that it is predicted that by the end of the year the railway will be completed to the foot of the Gharian mountains, about 20 miles beyond Azizia and 70 miles from Tripoli. The greatest engineering difficulties yet met in railway building in this province have been encountered in that region, in consequence of which progress has been much slower than on the line to the west.

The Madeira-Mamoré Railway of Brazil.—The Madeira-Mamoré Railway, the Maine corporation, which with its controlling company, the Brazil Railway, has recently been placed in the hands of receivers, has met with difficulties almost from its beginning. The line was built primarily to avoid the danger, delay and expense of porterage and transshipment caused by the series of cataracts obstructing the waterway between the town of Santo Antonio on the river Madeira, and Guajaramirim, on the river Mamore. Between these two points cargo—principally consisting of rubber from Bolivia and goods of every description from Europe—had always been carried in *batelones* (large boats manned by a crew of about 15 men carrying paddles) at a cost of many lives and the loss of immense quantities of freight annually. Trains have been running on the line with more or less regularity since early in 1911. The cost of operation, however, has been so great that but little net revenue has been realized. The development of the region served, in addition, has been much slower than was anticipated and there has been no improvement in the steamship service from Europe to Porto Velho, which was depended on to feed the railway. The supplementary river service beyond the railhead has also failed to satisfy expectations. It has been evident that Bolivia could be much more likely to benefit from the operation of the line than Brazil; but it has happened that the Farquhar interests which have been responsible for the operation of the line have withdrawn from their holdings in Bolivia.

Equipment and Supplies

LOCOMOTIVE BUILDING

The Quebec Central has ordered 2 American type locomotives to be built in its own shops.

The Central Fe Railway of Cuba has ordered one Mogul type locomotive from the Baldwin Locomotive Works.

The Chicago, Milwaukee & St. Paul has ordered 9 electric freight and 3 electric passenger locomotives from the General Electric Company. (See General News section.)

The Russian Government Railways are said to be considering the purchase of something over 100 locomotives in addition to the 30 reported as ordered last week. This item has not been confirmed.

CAR BUILDING

The Chilean Government is reported to have asked prices on 250 freight cars. This item has not been confirmed.

The Russian Government Railways are said to be in the market for approximately 8,000 freight cars. This item has not been confirmed.

The Southern Pacific has ordered 24 all-steel interurban cars from the Pressed Steel Car Company for service on the Pacific Electric.

The Louisville & Nashville has ordered 8 coaches, 6 baggage cars, 4 combination baggage and mail cars and one dining car body from the American Car and Foundry Company.

The National Transcontinental Railway has ordered 250 50-ton all steel freight cars of the Eastern Car Company, 200 50-ton all-steel flat cars of the Nova Scotia Car Works, and a number of sleeping cars from the Preston Car Company.

Railway Supplies for the Swedish Railways.—The Swedish railway authorities are stated to be preparing a list of the materials which will be required in the course of the next few years, and as soon as it is complete it is intended to place orders with various engineering and other firms to a value of about $2,000,000. This is being done for the purpose of assisting to keep the various factories of the country running, and so diminishing unemployment.—*The Engineer.*

Scottish Railways Defy the Elements.—The railway from Dunblane to Oban is liable suddenly to be impeded by large stones dashing down the mountain side. In order to protect the traffic a number of signals are connected to a wire fence alongside the track. In the event of a stone striking the screen and forcing its way through it, the fact of the wires being broken causes the signals to assume the danger position, and, at the same time, starts electric alarm bells ringing in the signal boxes. The Highland Railway goes in largely for "blowers," to prevent snow or sand drifts. The "blowers," which are constructed of galvanized iron, are erected in the cut itself, and not on its edge. Their roofs dip towards the foot of the slopes, thus contracting the orifice through which the snow or sand reaches the rails. This contraction increases the velocity of the wind, or, rather, that of its lower layers, causing it to blow the snow or sand out of the cut before it can settle. The Levens Viaduct, in Morecambe bay, on the Furness Railway, occupies a very exposed position. A train crossing the viaduct during a gale was blown over on its side. A wind pressure gage was then placed in the middle of the viaduct, and so arranged that when it records a pressure of 32 lb. per square foot, electric bells ring in the nearest signal boxes. All traffic across the viaduct is suspended as long as the bells ring, and for a further period of 15 minutes after they have ceased.

Supply Trade News

C. E. Harrison has resigned as co-receiver of the Barney & Smith Car Company, and H. M. Estabrook will continue as sole receiver.

A. L. Moler has been elected vice-president, manager and a director of the Durbin Train Pipe Connector Company, Ltd., Montreal, Que. Mr. Moler has been connected with several large railways as master mechanic and superintendent of motive power in the course of the past 16 years.

J. A. Smythe has been appointed boiler expert of the Lukens Iron & Steel Company, and the Jacobs-Shupert U. S. Firebox Company, with headquarters at Coatesville, Pa., effective November 1. Mr. Smythe was formerly associated with the Parkesburg Iron Company, Parkesburg, Pa., in a similar capacity.

J. Vipond Davies, vice-president of Jacobs & Davis, Inc., consulting engineers, New York, on November 3 was awarded the Telford Gold Medal of the Institution of Civil Engineers of London for his paper on the "Extensions of the Hudson River Tunnels of the Hudson & Manhattan." This medal is the premier medal of the institution and is awarded annually for a paper presented in the minutes of the proceedings of the institution. It dates back to the year 1835, funds for the purpose having been bequeathed by the celebrated engineer Thomas Telford, the first president of the institution.

The representatives of the Sherwin-Williams Company, Cleveland, Ohio, brimful of optimism, are just now getting down to work after the thirty-fourth annual convention of the company held at the Hotel Statler, Cleveland, on November 9-12. Nearly 400 representatives, both traveling and local, attended and listened to talks by their fellow representatives and the department heads concerning the various branches of the company's activities and the successful methods used to get increased business. Particular emphasis was placed on the results of the company's "Forward Again Campaign" instituted last February which has met with splendid success despite the war. The officers and representatives of the company have announced it to be their intention to go forward unhesitatingly with the plans of expansion laid down before the war, an idea well expressed in the president's message to his staff, reading: "We feel confident in the near future that this country will benefit commercially from the sad misfortunes of the great powers now engaged in a life and death struggle. We on this side of the Atlantic not only enjoy the inestimable blessings of peace, but by reason of our abundant harvest and the great demand for our products, a very large section of our population is enjoying unusual prosperity. The financial difficulties resulting from the war and some interference with the shipment of our products abroad are being straightened out, and we believe all who have the courage, the energy and the faith to keep on perseveringly will meet with proper reward."

TRADE PUBLICATIONS

Gate Valves.—Jenkins Brothers, New York, have issued a folder descriptive of the Jenkins Brothers brass gate valves.

Telephone Switchboards.—The Western Electric Company has issued a bulletin in Spanish on Western Electric switchboards for the Central and South American trade.

Power Hammers.—Beaudry & Company, Inc., Boston, Mass., have issued an eight-page booklet illustrating some of the Beaudry power hammers and giving the sizes and dimensions of each.

Foundry Cranes and Equipment.—Catalog No. 99 recently issued by the Whiting Foundry Equipment Company, Harvey, Ill., contains illustrations of the cranes, overhead-trolley systems, air hoists, cupolas, cupola charging machines, core ovens, ladles, tumblers and other foundry equipment made by the company. The various machines and appliances illustrated are briefly described and information given concerning the various variations of types which may be supplied.

Railway Construction

Algoma Central & Hudson Bay.—The line from Oba, Ont., north to Hearst, 50.3 miles, has been opened for operation.

Arkansas Roads.—The A. L. Clark Lumber Company has awarded a contract for the construction of a six-mile railway at Glenwood, Ark., to J. N. George & Son.

Atchison, Topeka & Santa Fe.—This company has begun the construction of eight coach-washing tracks on the river-front property between Seventh and Ninth streets, at Los Angeles, Cal., with the necessary push tracks and air, steam and water lines. The combined length of the coach tracks will be 11,300 ft. In addition to the construction of these new tracks 810 ft. of old track will be relocated. The embankment for the tracks will require 10,000 cu. yd. of dirt and 9,000 cu. yd. of gravel. This improvement is to be completed by January 1, 1915, and will relieve the congestion caused by the increasing traffic due to the Panama-Pacific Exposition. The work is being done by the company's own forces, and the cost will be approximately $52,000.

Battle Creek, Coldwater & Southern (Electric).—According to press reports work will be started as soon as financial arrangements can be made on a line to connect Battle Creek, Mich., with Girard and Coldwater. T. A. Hilton, president; J. F. Thompkins, vice-president, Girard; E. F. Pangburne, secretary, and A. J. Dorrance, treasurer, Coldwater.

Butler County.—This road has been extended from Linstead, Mo., to Poplar Bluff, one mile.

California Terminal.—Right-of-way is being secured, it is said, for an interurban line to be built from San Rafael, Cal., northeast to Sacramento, about 90 miles, through Marin, Sonoma, Napa, Solano, Yolo and Sacramento counties. C. W. Conlisk, San Francisco, is said to be interested.

Canadian Pacific.—The line of the Alberta division, formerly operated from Java, Sask., to Prussia, has been extended from Prussia, Sask., northwest to Empress, Alta., 23.3 miles, and a new sub-division called the Bassano sub-division has been opened for business on this division from Empress west to Bassano, 118.3 miles. An extension of the Weybourne extension has been opened for operation from Govanlock, Sask., to Altawan, seven miles. The Winnipeg Beach sub-division has been extended from Gimli, Man., north via Flaxa, Arnes and Jellicoe to Riverton, 25.4 miles.

Fort Smith, Subiaco & Eastern.—This company, which operates a 14-mile line from Paris, Ark., east via Subiaco to Scranton, has surveys made for the extension which was projected last year from Scranton east to Dardanelle, 23.4 miles.

Great Southern.—This company, which operates a 42-mile line from The Dalles, Ore., via Dufur to Friend, has surveys made for building an extension from Friend to Juniper Flats, 29 miles.

Gulf, Florida & Alabama.—This company has secured funds, it is said, to complete the work on the extension from Broughton, Ala., to Pine Hill, 50 miles. (March 20, p. 703.)

Lakeville Holding & Development Company.—Preliminary surveys are being made by this company, it is said, to build a double track electric line from the terminus of the Dual Rapid Transit Line at Verona, L. I., and Creedmoor east to Lake Success. The plans provide for building a viaduct over the meadows and Flushing creek; also for constructing a bascule bridge. The line may eventually be extended east to Roslyn, in all about 15 miles. W. K. Vanderbilt, Jr., New York, and J. A. Wigmore are said to be interested.

Lorain, Ashland & Southern.—A new line called the Northern division has been opened for business from Ashland, Ohio, via Ashland Junction north to Lorain, 45.5 miles. (October 2, p. 624.)

Mascot & Western.—An officer of this company, which was incorporated last summer, writes that the final location is now being made for a line about 35 miles long, to be built from Kelton, Cochise county, Ariz., the junction point of the El Paso & Southwestern and the Arizona Eastern, north to Mascot, which is just north of Dos Cabezos. The line will be built this coming year. John A. Street, general counsel, 1611 Harris Trust building, Chicago. (July 21, p. 227.)

Metolius, Prineville & Eastern (Electric).—This company, which was incorporated early this year in the state of Washington with $500,000 capital to build from Prineville, Ore., northwest to Metolius, about 32 miles, has surveys completed, it is said, and the right of way secured. Definite plans have not yet been decided upon in regard to the construction of the line. H. B. Scheel, Prineville, president. (April 24, p. 966.)

Mexico North Western.—This company will build a temporary track, it is said, around the tunnel at Cumbre, Mexico, in the Sierra Madres, to expedite traffic while the tunnel is being repaired. This tunnel was wrecked by revolutionists more than a year ago. The proposed line will be about 25 miles long. As soon as the tunnel is reopened through traffic between Juarez and Chihuahua via Pearson and Madera will be resumed.

Northampton & Hertford.—This company, which operates a 9-mile line from Gumberry, N. C., south to Jackson, is making surveys for an extension to be built from Jackson east to Ahoskie, 30 miles.

Pacific, Peace River & Athabaska.—This company, which was organized in Canada, to build from a point on the Pacific coast east to Prince Albert, Sask., about 1,500 miles, has asked the Canadian parliament for authority to build railway lines from tidewater near the head of the Kitimat arm, British Columbia, along Kitimat river, in a northerly direction and via the valley of the Lakelse lake and river to the Skeena river, which is to be crossed by a high level bridge, thence to the valley of the Nass river, near Aiyansh, about 112 miles; also to build a 57-mile line from a point on the Nass river to the summit between the Blackwater river and the Galankeest river, thence to the Skeena river, and up the Skeena river to the mouth of Bear river. Pringle, Thompson, Burgess & Cote, Ottawa, Ont., are solicitors for applicants. (April 24, p. 967.)

St. Joseph Valley.—A new line has been opened for business from Angola, Ind., to North Metz, 9.8 miles. (December 26, p. 1249.)

Tampa & Gulf Coast.—This company is building with its own forces a branch from Baskin, Fla., west to Indian Rocks, 2.5 miles.

Texas Roads (Electric).—L. M. Hewett and associates of Bryan, Tex., are promoting the construction of an interurban electric loop line from Bryan, south via Independence and William Penn to Navasota, thence north to Bryan, about 45 miles. Connection is to be made at Bryan with the Bryan & Central Texas Interurban.

Texas Southern Electric.—According to reports from Corpus Christi, Tex., this company has been granted a franchise in Nueces county to build an interurban electric line between Corpus Christi and Bishop, 35 miles. It is said that the company plans to construct a network of interurban railways to connect the different towns in this section of Texas.

RAILWAY STRUCTURES

Brooklyn, N. Y.—The New York Public Service Commission, First district, is asking for bids until December 1, for the reconstruction of the DeKalb avenue station on the line of the Fourth avenue subway in the borough of Brooklyn. The new work calls for the construction of additional cross-overs and certain station finish work.

Delray, Mich.—The Detroit, Toledo & Ironton will build with its own forces, a frame five-stall roundhouse with concrete engine pits, and a frame freight house 20 ft. by 90 ft. in area, and with a platform surface of 2,500 sq. ft., at Delray, Mich. The approximate cost will be $15,000.

Duluth, Minn.—The Minneapolis, St. Paul & Sault Ste. Marie has awarded a contract for the grading on the site for its proposed freight house on Twenty-ninth and Superior streets,

Duluth, to Fred Baxter. The estimated yardage is 7,000 cu. yd. The freight house, which will be 24 ft. by 64 ft., will be erected by the company's own forces.

Lynchburg, Va.—According to press reports the Chesapeake & Ohio, the Southern Railway, and the Norfolk & Western, have entered into an agreement to build a reinforced concrete viaduct over the James river at Lynchburg. The city of Lynchburg and Amherst county will pay part of the cost of the approaches on both sides of the river and the bridge proper is to be paid for by the railways. The bridge will carry tracks for the operation of street railway cars.

Prince George, B. C.—The Grand Trunk Pacific raised the counterbalance lift section of its bridge across the Frazer river at Prince George for the first time last week to permit steamers to pass up the river. The lift span is 100 ft. long and is raised vertically, a distance of 30 ft. The entire bridge is 2,654 ft. long and has 12 fixed spans and one lift span. A 12-ft. roadway for vehicular traffic is provided on each side.

Rutherford, N. J.—The Erie expects to let contracts early next year for improvemnts to be carried out at Rutherford, including a new station. There will be an island platform and waiting sheds on the opposite side of the tracks which will be connected with the station proper by a subway. The improvements include the elimination of two grade crossings and the construction of a plaza. All the work, including the grading of streets, surrounding the station is to be carried out by the railway company, and the cost of most of the improvements will be paid jointly by the railway and the town of Rutherford.

St. Catharines, Ont.—An officer of the Grand Trunk writes regarding the report that the company will build a new station at St. Catharines, that the question has been under consideration for some time, but has not progressed beyond the preliminary stage. The company has not yet decided when the work will be carried out. (November 13, p. 925.)

St. Petersburg, Fla.—An officer of the Tampa & Gulf Coast writes that work is now under way on the new passenger station in St. Petersburg. The new building is to be of fireproof construction and will cost about $20,000. (November 13, p. 925.)

Wilkinsburg, Pa.—We are told that the Pennsylvania Railroad will ask for bids early in 1915 for building a new station at Wilkinsburg, near Pittsburgh. The station proper is to be of stone and brick construction, 50 ft. by 100 ft., and will cost about $60,000. It is to be built at the street level and the railway tracks will be elevated at that point. The station will have baggage and express facilities in the basement to be reached by wagon from the street level and a waiting room, ticket office and other facilities on the ground floor at the street level. There are to be two tunnels or subways under the tracks with elevators for baggage, and stairs to the platforms. The plans call for the construction of two island platforms of concrete, each 30 ft. wide and 1,000 ft. long built to the level of car floors similar to the arrangement at North Philadelphia, with shelters and shelter waiting rooms. The cost of the platforms and shelters will be $60,000.

Wilkesbarre, Pa.—A contract has been given to the Neeld Construction Company, Pittsburgh, Pa., for constructing a bridge over the tracks of the Delaware & Hudson, the Central of New Jersey and the Lehigh Valley from Butler street on Pennsylvania avenue to Kidder street in Wilkesbarre. The improvements will cost about $87,000. (October 31, page 818.)

German South-West Africa Railways.—The principal line of railway in German South-West Africa is of 3-ft. 6-in. gage and runs from Swakopmund inland via Karibib to a point about 180 miles from the coast. It then turns southward and goes via Windhuk and Keetmanshoop to Seeheim, where it bends coastward, terminating at Luderitzbucht. From Seeheim a branch runs southward to Warmbad. The total length of the line from Swakopmund to Luderitzbucht is 790 miles and of the branch line from Seeheim to Warmbad 139 miles. There is also a narrow gage (2 ft.) line from Swakopmund to Tsumeb, 370 miles, with a branch from Otavi to Grootfontein. The various distances are as follows: Luderitzbucht to Warmbad, 338 miles; Luderitzbucht to Windhuk, 545 miles; Swakopmund to Karibib, 125 miles; Swakopmund to Windhuk, 244 miles, and Warmbad to Windhuk, 484 miles.

Railway Financial News

Baltimore & Ohio.—The stockholders have approved the making of a general refunding and improvement mortgage under which bonds can be issued to the amount of $600,000,000, and have approved of the purchase of the subsidiary lines in Ohio.

John R. Morron has been elected a director, succeeding James Stillman, resigned.

Grand Trunk Pacific.—A press despatch from Ottawa says that the Grand Trunk Pacific has sold $6,000,000 of the $15,000,000 bonds which were guaranteed by the Dominion government last year. This will give sufficient money to carry on its construction work this year.

Liberty White Railroad.—This road, which runs from McComb City, Miss., to Liberty, 40 miles, has been placed in the hands of a receiver.

Missouri Pacific.—This company and the St. Louis, Iron Mountain & Southern have sold to Philadephia bankers $800,000 5 per cent equipment trust notes maturing semi-annually in the next ten years. The proceeds of the sale are to be used to pay in part for 73 all-steel passenger cars now ready for delivery to the railroad.

San Antonio & Aransas Pass.—This company, operating 724 miles of road in Texas, earned in the fiscal year ended June 30, 1914, $4,648,000, a decrease, as compared with 1913, of $461,000. Operating expenses amounted to $3,985,000 in 1914, an increase of $209,000. After the payment of expenses, taxes and interest charges the company had a deficit of $391,000 in 1914 as compared with a surplus in 1913 of $203,000. Operating revenues were seriously affected by the floods and extraordinary rains and washouts that occurred in Texas last year and operating expenses were very much increased from these same causes.

The San Antonio & Aransas Pass, or Sap, as it is spoken of locally, lies wholly within the state of Texas. Its main line runs from San Antonio to Aransas Pass, and it has in addition lines running from Waco to Kennedy on the main line about half way between San Antonio and Aransas Pass, and from Houston to Kennedy. The total quantity of freight carried in 1914 amounted to 1,369,000 tons, which is less by 5 per cent than the tonnage in 1913. Of the total tonnage carried in 1914, stone, sand, etc., furnished 13.76 per cent, lumber and other forest products 13.09 per cent, merchandise 8.44 per cent, cotton and cotton seed 14.00 per cent, and livestock 5.56 per cent. A little less than half of the total traffic carried originates on the line, and the principal decreases were in the tonnage of lumber and other forest products and in the tonnage of fruit and vegetables and of cotton seed. The average length of haul was 135 miles, a decrease of 5.41 per cent from the average in 1913. The average revenue per ton per mile was 1.613 cents, a slight decrease from the previous year. The average trainload in 1914 was 226 tons, an increase over the previous year of 6 tons, or nearly 3 per cent. The total number of passengers carried in 1914 was 1,292,000, a decrease of 1.65 per cent, the average length of journey being 43 miles, almost exactly the same as in the previous year. The average revenue per passenger per mile was 2.420 cents, a decrease of 3.35 per cent.

The Sap had at the end of the year a total of $25,700,000 capital securities outstanding, of which $1,000,000 was stock and the remainder bonds and notes. This is at the rate of $35,497 per mile. There was on hand at the end of the year $159,000 cash, which is less by $416,000 than the cash on hand at the beginning of the year. There were no loans and bills payable, and total working assets amounted to $810,000.

Toronto, Hamilton & Buffalo.—This company has made an application to the Canadian railway commission for permission to merge with it the Erie & Ontario. The main line of the Toronto, Hamilton & Buffalo runs from Waterford, Ont., to Welland Junction, with some branches, making a total of 92 miles.

Railway Age Gazette

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WE GUARANTEE, that of this issue 8,750 copies were printed; that of these 8,750 copies 7,409 were mailed to regular paid subscribers to the weekly edition, 250 were provided for counter and news companies' sales, 1,055 were mailed to advertisers, exchanges and correspondents, and 36 were provided for samples and office use; that the total copies printed this year to date were 449,350, an average of 9,362 copies a week.

VOLUME 57 NOVEMBER 27, 1914 NUMBER 22

Contents

*Illustrated.

Economy in Railway Shops

A few weeks ago we mentioned the advantages to be obtained by operating railway shops in such a manner that the progress of the work may be carefully watched with a view of eliminating lost motion and correcting unprofitable practices. There is another point of attack that is open for the road that realizes the opportunity of decreasing its operating expenses by the practice of economy in the maintenance of equipment. We refer to the installation of the improved equipment that is now available for the railway shop. A careful analysis of the shop equipment field will show the intelligent shop engineer machine tools and devices that will materially reduce the cost of production. Of course, money is required to purchase these improved devices, but money is required in almost every case where improvements are to be made. The main question is: Where can the money that is available be spent to the best advantage? Industrial concerns find it profitable to employ the most improved methods in manufacturing their products, the automobile industry being an illuminating example. Much progress can also be made in railway shops if the problems are carefully studied and scientifically analyzed. A dollar saved in maintaining equipment is as valuable as a dollar saved in transportation expenses.

Prosecutor, Judge and Jury

What would be said if the district attorney prosecuting a case were to be suddenly made judge and given also the right to dispense with a jury, and proceeded to hear the remainder of the case which he had begun as public prosecutor? Yet the prosecuting lawyer in the anthracite coal case was, when the case was partly completed, appointed examiner for the Interstate Commerce Commission and sat as examiner through the rest of the case. On the report of this examiner and on the record the Interstate Commerce Commission will decide this tremendously important and highly complicated case. The more conscientious of the commissioners may make some attempt to study the record for themselves, but it would seem to be an impossibility for any one of them to make a thorough study of this very voluminous collection of documents, and the opinion of the majority of them will be based on the report of the examiner; in other words, on the report of the man who began the case as prosecutor. Regardless of how high the ethical standard of this particular lawyer is, his study of the case was originally made with the object of showing that the railroads were wrong. Only by so doing could he add to his reputation as a successful lawyer. It seems hardly possible that any man, no matter how conscientious, would not be to some extent influenced in his way of looking at things by such a preliminary study. This hearing of cases by examiners is another instance of absentee landlordism on the part of the commission, and besides this it is open to objection for other reasons, as in the instance mentioned above. Furthermore, the commission appoints a special counsel to act as a district attorney, as it were; that is, prosecutor. Now the prosecutor may quite possibly be a friend of the examiner who hears the case. This may or may not have ever taken place, but it is a possibility. The only way that the prosecutor can make a reputation for himself is by winning his cases. He is liable, therefore, to become a persecutor rather than a prosecutor, and the influence he can bring to bear on the mind of the examiner may be far stronger than that of the attorneys for the railroad involved in the case. The commission in most cases goes on the report of the examiner in making its decision. This is by no means a wholly fair proceeding to the railroad.

Car Shortage and Surplus Statistics

At the meeting of the American Railway Association in Chicago last week, it was decided to discontinue the compilation of the statistics regarding car surpluses and shortages and car balance and performance. This action was recommended by a special committee composed of some of the leading operating officers of the country. The *Railway Age Gazette* hesitates to disagree with the conclusions of such men, and yet it is most decidedly of opinion that this action was a serious mistake. It may or may not be true that the statistics in question can be so used as to increase the efficiency of operation of individual roads; but railway managements have something else to do besides operate their properties efficiently. They have to defend the properties against unjust regulation. In order that they may do this they must have and use information showing that the attacks made are unjust. Now, some years ago there were serious car shortages. These resulted in the passage of numerous reciprocal

demurrage laws which were intended to compel the roads to furnish cars promptly and were predicated on the assumption that the railways had been negligent in developing their facilities. Periods of traffic congestion and car shortage will come again. The railways will then be criticized again and other proposals will be made for action to compel them to furnish cars promptly. The most effective answer to such proposals would be the presentation of the statistics of car surpluses. The passage of a very little unfair and burdensome legislation would cost the roads more than they would save in many years by discontinuing the compilation of these figures. The railway managers have a great capacity for forgetting and repeating the errors of omission and commission which have got them into their present troubles.

WHAT IS THE MATTER WITH THE RAILWAYS AND REGULATION?

THE attitude which railway men have assumed toward railway regulation, especially within the last few years, has been puzzling to many intelligent persons. These persons know that before the present policy of regulation was adopted the railways made their own rates and managed their own affairs. They know that the rates made then averaged in some years lower and never much higher than now. They know also that there was a progressive increase in the prosperity of the roads before the present system of regulation was adopted. Why, therefore, they naturally ask, do railway men complain so much about regulation? If the roads could prosper before, why can they not now? These questions have to a large extent remained unanswered. Therefore the suspicion has been engendered that railway men have been attacking the policy of regulation followed because they resent any public control and desire entirely to destroy it. The questions referred to deserve to be answered. It is most important that they shall be answered. Briefly stated, then, *the reason why railway men are justified in criticizing the current policy of regulation is that it is steadily undermining the vitality of the railway industry;* and the reason why it is *doing so is that it is based on theories and principles drawn from the experience of the railways before effective regulation was begun and on the assumption that their experience following the adoption of this policy would be and has been the same as it was before, whereas, largely by a coincidence, the course of developments since the present policy of regulation was adopted has been entirely different from what it was before, and for this reason the assumptions and principles on which the present policy of regulation is predicated are wrong.*

Let us briefly survey the course of developments just before the present policy of regulation was adopted and their course since, and we shall see that the foregoing statements are conclusively supported by the facts.

There had been more or less regulation for a good many years. But the present policy dates from August, 1906, when the Hepburn Act went into effect, this being immediately followed by the passage of a mass of state legislation relating to railways. Therefore, between the time when this policy was entered on and the end of the last fiscal year for which we have complete statistics of the Interstate Commerce Commission, June 30, 1913, there was a period of seven years. Let us, therefore, survey the course of developments in the seven years ending on June 30, 1906, and in the seven immediately following.

The former period was one of remarkable expansion in all business, and especially in the railway business. At its beginning railway facilities were built in advance of traffic. There were no considerable advances in the wages of railway employees during this period. There was a rapid growth of traffic and as at its beginning railway facilities exceeded the demands on them, every increase of traffic resulted in each unit of traffic being handled at a lower cost, both in property investment and in operating expenses. Therefore the railway business during this period was economically one of so-called "increasing returns." This would have been so in the absence of an upward tendency of rates; and, as a matter of fact, both the average passenger rate and the average freight rate increased slightly. All the conditions were favorable for a substantial increase in railway earnings and in the percentage of return on investment, and in consequence, the prosperity of the railways did increase to a marked degree.

These developments inspired a spirit of optimism regarding the future of the railways in railway managers, investors and speculators and the public. Investors, speculators and railway managers were so optimistic that the prices of railway securities soared to unheard of figures and the control of some railways by others was purchased at prices which were obviously predicated on the assumption that increases in railway net return would continue indefinitely. But the public was not disposed to let promoters, investors and speculators enjoy all the benefits of the railways' increasing prosperity. It was argued by economists and others that the public should share in it through reductions of rates, and therefore the Hepburn Act empowered the Interstate Commerce Commission not only to correct discriminations, but to reduce rates which it found excessive. Soon afterward there was a flood of state legislation reducing freight and passenger rates; and in 1906 Congress provided in the Mann-Elkins Act that the burden of proof should be upon the railways to establish the reasonableness of any advance in rates made after January 1, 1910. No power was given the commission to raise rates or prevent reductions. The entire system assumed that the tendency of rates should be downward.

Thus the present policy of regulation was begun. By a coincidence the year 1906 not only marked the beginning of the new policy of regulation, but also closed a cycle in railway development. In the fall of that year came the greatest congestion of traffic and car shortage ever known. The traffic had caught up with and now exceeded the facilities. Business conditions and public opinion demanded the investment of enormous sums of new capital in the railways to provide additional facilities, and large new investments were made. In 1907 the railway brotherhoods began extensive and successful movements for large increases in wages. The states and nation quickened the pace at which they were raising railway taxes. And beginning in 1907 there was a marked slowing down in the growth of railway traffic.

The resultant of all these tendencies would have been that the railway business would have ceased to be one of increas-

	1899	1906	1913	Increase 1906 over 1899	Increase 1913 over 1906	Per cent increase 1906 over 1899	Per cent increase 1913 over 1906
Passengers hauled one mile per mile of line	77,821	114,529	143,067	36,708	28,538	47.17	24.92
Average rate per passenger mile	1.925c	2.003c	2.008c	.078c	.005c	4.05	.25
Tons hauled one mile per mile of line	659,565	982,401	1,245,158	322,836	262,757	48.94	26.74
Average rate per ton mile	.724c	.748c	.729c	.024c	.019c*	3.31	2.54*
Investment in road and equipment per mile	$56,079	$59,624	$66,900	$3,545	$7,276	6.32	12.23
Gross earnings per mile	$7,005	$10,460	$12,873	$3,455	$2,413	49.32	23.07
Average wage per employee	$562	$588	$758	$26	$170	4.62	28.91
Average operating expenses per mile	$4,570	$6,912	$8,939	$2,342	$2,027	51.24	29.32
Average net earnings per mile	$2,435	$3,548	$3,934	$1,113	$386	45.70	10.8
Average taxes per mile	$247	$336	$521	$89	$185	36.03	55.06
Average operating income per mile	$2,188	$3,212	$3,413	$1,024	$201	46.85	6.25
Per cent net operating income on property investment	3.9	5.33	5.1	1.43	.23*	36.66	4.31*

*Decrease.

ing returns and become, for a time at least, one of decreasing returns, even if the new policy of regulation had not been adopted and rates had remained unchanged. But the new policy of regulation was applied to these new and changed conditions. Instead of rates being increased the average freight rate was reduced. There were thus converged upon the railways, first, influences tending to turn their business from one of increasing returns to one of decreasing returns, and, second, a policy of regulation predicated on the theory that the business was always one of increasing returns and that wherefore the tendency of rates ought always to be downward.

That the course of developments in the periods before and since 1906 has been as we have said is clearly demonstrated by the statistics. The reader's attention is invited to the table on the preceding page.

It will be seen that this table shows that practically every condition favored an increase of income greater in proportion than the increase in outgo in the first period, while practically every condition favored an increase in outgo greater than the increase in income in the second period. The density of passenger traffic increased 47 per cent in the first period and less than 25 per cent in the second. The density of freight traffic increased almost 49 per cent in the first period and less than 27 per cent in the second. The average rate per ton mile increased 3⅓ per cent in the first period and declined 2½ per cent in the second. Gross earnings increased over 49 per cent in the first period and only 23 per cent in the second.

On the other hand, investment in road and equipment increased only 6⅔ per cent in the first period and over 12 per cent in the second. *The average annual wage of labor increased only* 4.4 *per cent in the first period and* 29 *per cent in the second.* Operating expenses increased 51 per cent in the first period and only 29 per cent in the second, but this was because there was a smaller increase in the traffic to be handled in the second period; and it will be noted that the increase in operating expenses in the second period was relatively greater than the increase in either freight or passenger traffic. The increase in taxes per mile was 36 per cent in the first period and 55 per cent in the second. The resultant of the operation of all these forces is summarized in the figures for average net operating income per mile, the increase which in the first period was almost 4/ per cent, and in the second period only 6.25 per cent, as compared with an increase in investment per mile in the first period of only 6.32 per cent and an increase in the second period of 12.23 per cent!

It should be borne in mind, in this connection, that in 1913 the earnings of the railways were the greatest in their history, the total per mile being over 23 per cent larger than in 1906. Enough is known about the results in the fiscal year 1914 to show that when the complete figures for that year are available they will demonstrate even more strikingly than do those for 1913 how true it is that since 1906 the railway business has been one of decreasing instead of increasing returns. For example, we know that in Official Classification Territory the net return on property investment in 1914 was only 3.99 per cent, the lowest figure reached in 15 years. It may be said that the railways earned so much before 1906 that they should have had enough left to carry them through the period of decreasing returns since then. But while the increase in net earnings before 1906 was relatively great, the average earned even in 1906 was not absolutely great, the rise being from 3.9 per cent in 1899 to 5.33 in 1906.

The summation of the whole matter is that beginning in 1906 the country adopted a policy of regulation based on an experience in the preceding decade which led railway financiers, railway officers, shippers and the public to look on the railway business as one of increasing returns, and therefore as one in which the tendency of railway rates should always be downward, and the machinery of the state and national governments have therefore been used since then to hold railway rates down and reduce them. But experience since has been entirely different from experience before 1906. Experience in these two periods has shown that the railway business may be during one period economically a business of increasing returns and in another one of decreasing returns. It has been the latter kind of business since 1906. When economic conditions in general tend to cause diminishing returns, regulation should be such, if the vitality of the railways is not to be undermined and the public prosperity is not to be menaced, as to permit an upward tendency of rates; and the reason why regulation has been and is doing great harm, is that it has run and is running counter to the plain economic tendencies of the time. The trouble is that the railways have been and are still being ground between the lower mill stone of natural and irresistible economic tendencies and the upper millstone of a system of regulation intended to be applied to entirely different and opposing economic tendencies.

What is the remedy? The only remedy is a recognition by the public and the regulating authorities of the plain facts and a change of the policy of regulation accordingly. There is strong reason for believing that developments in the railway business go in cycles; that, in accordance with certain economic laws, there are periods when on any given basis of rates the net return tends to increase and other periods in which on any given basis of rates the net return tends to decrease. If regulation is not to be destructive of the welfare of the railways and the public it must be made flexible enough not only to hold down and reduce rates when these things are justified, but also to maintain and advance rates when these things are needed.

AN UNUSUAL LOW GRADE DEVELOPMENT

JAMES J. HILL is generally recognized as the pioneer exponent of low grade lines as a means of increasing the trainload, and the Great Northern stands today as a practical example of the working out of his ideas. When control of the Burlington was secured by the Great Northern and Northern Pacific, the purpose, of course, was to give the Hill System an entrance to Chicago and access to the large area in the middle west between that point and Denver. The two points of contact between the Burlington and the Great Northern-Northern Pacific lines are St. Paul and Billings. It is not surprising therefore that one of the most comprehensive developments of low grade trunk lines should be carried out on that part of the Burlington leading southeast from Billings, the purpose being to give the Hill system a low grade line from the Pacific coast to Chicago and the Ohio river, and also to Denver and the Gulf of Mexico, as described on another page of this issue.

While we have previously emphasized in these columns the fact that there is a limit to the expenditure which a road is justified in making to secure a low grade line, in this case the cost is moderate when the entire development is considered, while in addition to the local traffic which will follow the opening of the various sections of these lines, there already exists a fairly heavy through traffic which will be turned over to them.

The point of special interest in this entire project is the way in which these various links are being built with reference to the project as a whole, through the rougher and heavier, as well as the more level country, so that when it is all finished it will be possible to run trains from Billings or from the Ohio river to the opposite terminal with almost no breaking up at intermediate terminals to adjust the tonnage for different grades. Practically the only line of similar length on which this condition is found is that of the Santa Fe from Chicago to Belen, N. Mex., a distance of almost 1,400 miles, over which trains are despatched with the same tonnage from one end to the other, the differences in the ruling grades on the several divisions being compensated for by the adjustment of motive power.

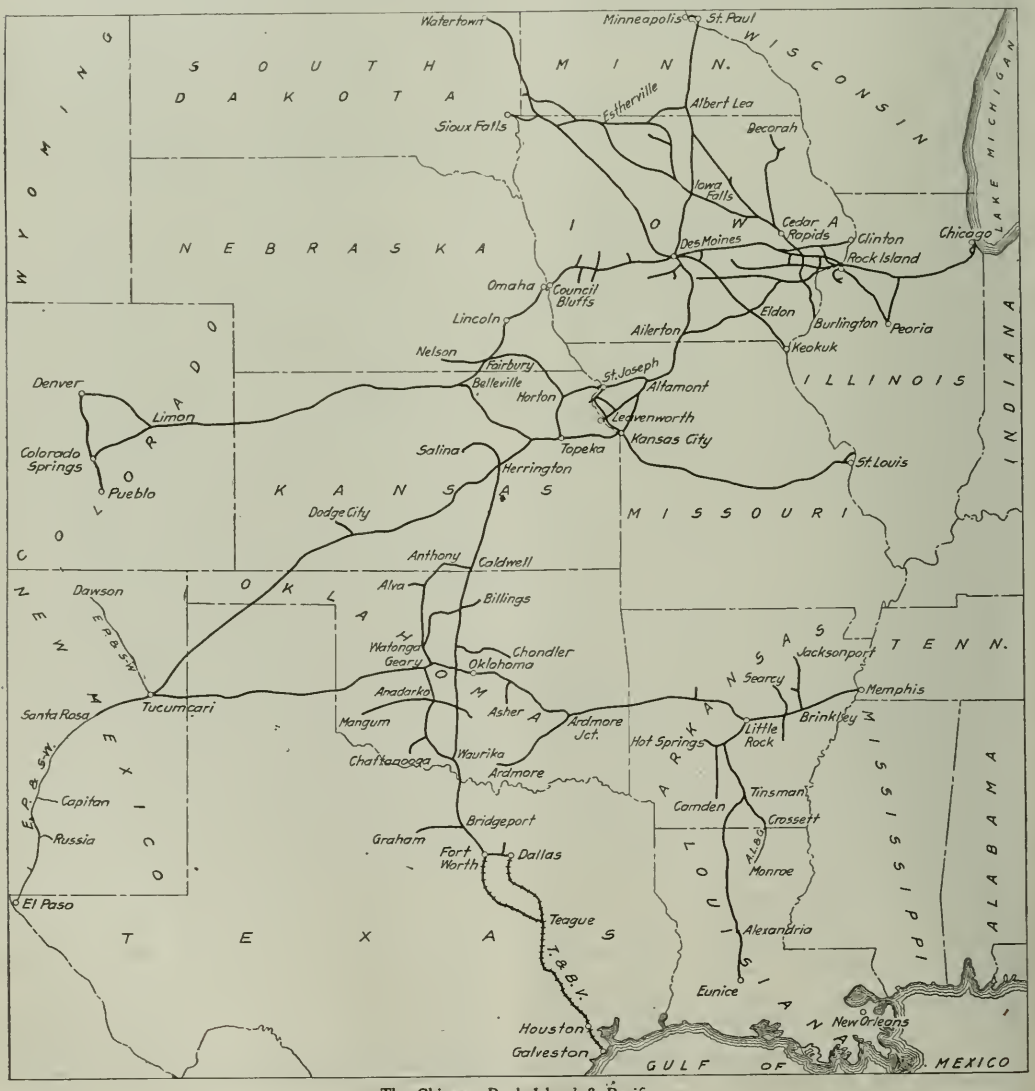
While the economy of reducing grades over a single division is generally recognized, this economy is materially increased when the reductions are extended over connecting divisions so that the cost of breaking up trains because of different tonnage ratings is eliminated. Local conditions seldom permit the development

of a system of low grade lines as extensive, as that here outlined; and the utilization to such an extent of the opportunities that do exist is so rare as to be of unusual interest.

An interesting detail of this project is the evident belief of those in control of the Hill Lines that a considerable increase in the north and south traffic is to be expected, as indicated by the taking over of the Colorado & Southern in 1909, and by the extension of the low grade line of the Burlington to the Ohio river, where the construction of a $4,000,000 bridge was authorized a few weeks ago.

CHICAGO, ROCK ISLAND & PACIFIC

JOSEPH W. FOLK, as prosecuting attorney for the Interstate Commerce Commission, would lay all the present troubles of the Rock Island to evil financial practices of the group of men who have been in control since 1902. President Mudge, in the annual report for the fiscal year ended June 30, 1914, would, by implication, lay the Rock Island's present troubles to reduction in rates, increased rates of wages, increased expenses due to legislative enactments, increased taxes per unit of value and increased cost of capital funds. The truth lies between the two. Mr. Mudge attempts to show that during the years from 1902 to 1914 the property has been improved to an extent that might fairly be said to keep it abreast of its competitors. Capital securities have not been unduly added to, increased operating efficiency has kept pace with the progress of the science of railroading, and the gain in traffic on the Rock Island has been commensurate with the growth of the territory served. Mr. Folk's accusations are so oratorically general, and the strikingness of the picture that he draws is so much a matter of splashes of color indiscriminately applied, that it is impossible to summarize in work-a-day language just what the crime is that has been committed; but in substance it is that in some way the control of the Chicago, Rock Island & Pacific Railway Company by the



The Chicago, Rock Island & Pacific

unfortunate and badly conceived holding company, in turn controlled by a small group of individuals, has resulted in bringing the railway company to the verge of bankruptcy.

In the first place, as of June 30, the railway company was not on the verge of bankruptcy, and although today it is badly in need of some new capital, its earning power is not really impaired and its securities hold out possibilities as a semi-speculative investment that are very far from suggesting a property on the verge of bankruptcy.

Although the Rock Island's history has often been described in the *Railway Age Gazette*, a brief summary of it properly belongs with the comments on this year's annual report. In January, 1902, Chicago, Rock Island & Pacific Railway common stock was selling at 154, and by October 1 was selling at 200. During 1901 the stock had ranged in price from 117 to 136, and during that time D. G. Reid, W. H. Moore and W. B. Leeds had bought sufficient stock to control the board of directors. A plan was put through by which two holding companies were formed—the Chicago, Rock Island & Pacific Railroad and the Rock Island Company. Stockholders of the old company, the Chicago, Rock Island & Pacific Railway were offered $100 in Rock Island common, $70 in Rock Island preferred and $100 in railroad 4 per cent collateral bonds for each $100 of their railway stock; this railway stock to be deposited as the collateral for the 4 per cent railroad bonds. Voting control of the three companies rested in the preferred stock of the Rock Island company. There was in this scheme absolutely no inflation of the railway company's securities; there was simply an exchange of pieces of paper for other pieces of paper with a very much larger nominal value. The income of both holding companies has been nothing more nor less than the dividends which the railway company paid each year on its stock, of which it had at that time about $60,000,000 outstanding, since increased only to $75,000,000.

Operating at a 61.60 per cent ratio in 1902, the company was earning 12 per cent on its $60,000,000 stock, although paying but 4 per cent, while in 1914 the company operated at a 75 per cent ratio and failed by over $3,000,000 to earn a 5 per cent dividend on its $75,000,000 stock, which would have been necessary to pay the interest on the collateral trust railroad 4's.

Briefly summarized, Mr. Mudge's review of the history of the property from 1902 to 1914 is as follows: The mileage increased from 4,094 miles to 8,328 miles; renewal of rails had changed the character of road from one on which a quarter of the mileage was laid with 80-lb. rail and three-quarters with 70-lb. rail, or less, to one on which four-sevenths was 80, 85, 90 and 100-lb., and three-sevenths 70-lb., or less, and tie renewal had resulted in nearly half of the total ties now in track being treated ties. In 1902 about half of the road was ballasted, much of it poorly; in 1914 5,440 miles out of the total 8,328 was ballasted, most of it with rock, burnt clay and gravel; bridges had been strengthened; the mileage of tracks block signaled increased from 20 to over 2,300; terminal facilities and shops had been added to to the extent of $15,000,000; available tractive power of locomotives had been tripled; capacity of freight cars had been more than doubled; passenger equipment had been added to and replaced, making the comparison between 1902 and 1914 as 475 wooden cars to 817 wooden cars and 346 all-steel cars. In the meantime outstanding securities had increased only from $45,713 per mile to $46,730; the capital stock showed a decrease, while the funded debt showed an increase of from $28,088 per mile to $36,604.

All this leads Mr. Mudge to the "indisputable" conclusion that the "primary and fundamental causes for the failure of your company to earn dividends are" those enumerated at the beginning of these remarks. This conclusion hardly seems indisputable.

The Chicago, Burlington & Quincy earned nearly 13 per cent on its capital stock in 1914, compared with less than 10 per cent earned on the same amount of capital stock in 1902. The Burlington's mileage increased only from 8,124 miles in 1902 to 9,264 miles in 1914. The outstanding capital stock remained the same, $110,000,000, and the funded debt outstanding increased only from $18,700 per mile of line operated in 1902 to $19,700 per mile of line operated in 1914. The Burlington's passenger-mile rate in 1902 was 2.12 cents, and its ton-mile rate 7.72 mills; in 1914 the passenger-mile rate was 1.89 cents and the ton-mile rate 7.29 mills. In 1902 the passenger-mile rate on the Rock Island was 2.17 cents and the ton-mile rate 1.06 cents; in 1914 the passenger-mile rate was 1.92 cents and the ton-mile rate 8.6 mills. There is considerably more of a reduction in the ton-mile rate on the Rock Island than on the Burlington; but just as difference in character of traffic largely accounts for difference between the present Rock Island and Burlington rates, so it in part accounts for the difference between 1902 and 1914 rates on the Rock Island. In 1902 the Burlington's average revenue trainload was about 252 tons, and in 1914, 479 tons. The Rock Island's trainload in 1902 was 183 tons, and in 1914, 306 tons.

There is something here besides adverse legislation and general conditions to explain why the Burlington, affected by the same general conditions and by adverse legislative interference, has been able to offset these conditions, while the Rock Island has not. The holding company device *per se* is not an adequate explanation; it was rather the way in which this device was used.

The great and fundamental difference is that the Burlington, besides spending the proceeds of the sale of capital securities on additions and betterments to its property, has made an additional investment in the property through surplus income of $145,683,808. The Burlington's stock outstanding has remained the same, as has the Rock Island's since it was deposited in accordance with the offer of 1902 for exchange of securities.* Whereas the Burlington was able to make its capital expenditures out of surplus without an additional stock issue, the Rock Island was not, and the fact that the agreement under which the stock was deposited prohibits the issue of more stock, either common or preferred, has prevented any financing being done in this way. To this extent the holding company device is directly responsible for the failure of the company to finance its needs through an additional stock issue.

The Rock Island has been well maintained and has been, and is, very well operated. It was in the broader policy of management that the mistakes were made. Neither Judge Moore nor D. G. Reid was a railroad man, nor had they ever taken the time to become railroad men. While the Burlington was spending millions of dollars in grade revision, the Rock Island was operating over the same old 1½ and 2 per cent grades. During all this time from 1902 to 1914 the small group of New York directors held the purse strings. There were able men in the operating management of the Rock Island, but their influence with the New York directors was not sufficient to enable them to awaken the latter to a realization of the opportunity they were missing and to secure a change in policy. All of the things which are recited in the 1914 report as having been done for the betterment of the property added to the value of the service which the road gave; but the essential expenditures for grade revision which were needed to reduce cost of transportation per unit were not made. All of this may be summed up by saying that the management of the road was controlled from New York by a group of shortsighted financiers whose knowledge of railroading was of the slightest. The holding company device permitted control of the road by this small group through a very much smaller actual investment than would have been necessary without the device; and it was the mistaken policy of the men in control, rather than the mere holding company device, that caused the mischief.

The loss of something over $8,000,000 in connection with the merger with and later separation from the St. Louis & San Francisco, is another phase of this same matter, although a more *directly* serious one to the property, since the $8,000,000 loss was a direct drain on the assets of the railway company.

When we have made the allowances indicated above, President Mudge's conclusion is modified as far as it needs to be modified. All of the things which he points out as having tended to re-

*The increase from $60,000,000 to $75,000,000 in stock took place before the stock was deposited as collateral for the railroad 4's.

duce the net of the Rock Island have taken place. If the genius of a Hill or a Harriman, with strong banking support, might during the years between 1902 and 1914 have offset these adverse conditions as it did in the case of the Burlington and of the Union Pacific, this is no reflection whatsoever on the operating management of the Chicago, Rock Island & Pacific, nor need it be a subject of undue alarm, either to investigator Folk or the security holders of the railway company.

The present condition of the Chicago, Rock Island & Pacific Railway is critical, but very, very far from hopeless. Dividends on the railway company's stock having been discontinued, the railroad 4's have necessarily defaulted in their interest payments, and the collateral securing the 4's, which consists of railway stock, has been ordered sold under foreclosure. The railway company operates 8,205 miles of road. In 1914 its total operating revenues amounted to $67,667,000, or 4.50 per cent less than in the previous year. Its total operating expenses amounted to $51,000,000, or 2.86 per cent less than in the previous year. Other income fell off by 84 per cent, and interest and rentals increased by 5.62 per cent, so that there was a net income available for dividends of but $451,000, as compared with $4,058,000 in the previous year. The two quarterly dividends in the first half of the present fiscal year were paid, calling for $1,872,000, so that there was a deficit of $1,421,000. In part, the falling off in other income was due to the failure to receive 4 per cent on the Toledo, St. Louis & Western $5,447,000 4 per cent stock held by the Rock Island. There is no very clear and concise statement in the annual report of the increase in funded debt outstanding in the hands of the public. The statement that $30,519,000 is the net increase in the funded debt is followed by the statement that of such bonds and notes issued during the year and outstanding on June 30, 1914, only $11,986,000 were sold, the balance remaining in the treasury or being pledged as collateral for loans. A total of $20,532,000 was spent on capital account during the year, of which $12,347,000 was for the acquisition of the St. Paul & Kansas City Short Line, the Malvern & Camden and the Rock Island, Stuttgart & Southern. Cash on hand at the end of the year amounted to $5,828,000, comparing with $5,120,000 on hand at the beginning of the year. Up to June 30 the company had borrowed $4,800,000, and the total working liabilities, including these $4,800,000 loans and bills payable, was $12,986,000. Probably the amount of loans and bills payable is considerably larger now than it was on June 30.

The Rock Island is a fine property, with very great possibilities of development. The report which was made by E. W. McKenna, until recently vice-president of the Chicago, Milwaukee & St. Paul, found that between forty and sixty million dollars ought to be spent on the property in the near future. This estimate was high. Any business man can make a study of someone else's business and discover that the other man ought to make innumerable improvements. The McKenna report was that kind of a report. No one can doubt that if $40,000,000 were available it could be spent on the Rock Island to great advantage; but few people who know the property intimately believe that any such large amount is immediately required to restore in a large measure the earning capacity of the road. A strong financial control and the sale of $20,000,000 preferred stock would put the Rock Island in an enviable position.

The following table shows the principal figures for operation in 1914 as compared with 1913:

	1914.	1913.
Average mileage operated	8,205	8,048
Freight revenue	$44,309,636	$46,428,045
Passenger revenue	18,824,651	19,777,431
Total operating revenue	68,208,113	71,364,935
Maint. of way and structures	8,838,586	9,885,324
Maint. of equipment	9,820,703	10,072,854
Traffic expenses	1,924,090	1,999,138
Transportation expenses	28,449,907	27,772,587
General expenses	1,966,660	1,774,199
Total operating expenses	50,999,946	52,504,102
Taxes	3,315,632	2,946,438
Operating income	13,892,534	15,914,395
Gross income	14,060,855	16,944,190
Net income	450,621	4,058,355
Dividends	1,871,763	3,743,525
Surplus	*1,421,142	314,830

*Deficit.

Letters to the Editor

A PLEA FOR THE YARDMASTER

Minneapolis, Minn.

To the Editor of the Railway Age Gazette:

Railroad terminals are becoming more and more important each year, and require deeper study than any other branch of railroad operation today. Business is continually increasing while terminal yards seem to grow smaller. Heretofore a yardmaster has been given slight consideration and his assistance has been classed as insignificant. Was the yardmaster ever taken into the official family and given an opportunity to discuss his problems and to help his superior officers to make suggestions to bring about changes for the benefit of all concerned? I think not. He was merely the stumbling block. The burden of blame was placed upon his shoulders and he wiggled out of it the best he knew how. But times have changed and the yardmaster has become the skilled chess master of the railroad. Today you find him rubbing elbows with everyone. His views are accepted while the officials offer him suggestions which give him a broader view and renewed courage.

My contention is that the general yardmaster needs a little diversion from his regular routine to stimulate him and show him both sides of a problem. Show me a yardmaster today who is not working hard for promotion. If this is true, why cannot our superior officers train us, as we are willing students and wish to broaden out and learn? Even though we are not promoted, the general knowledge is an education, and I know it is no burden to carry around a little new-found knowledge.

In our yard it is customary to hold yardmasters' meetings, and I can say that every man in our yard knows just as much about the work or changes as the general yardmaster. Let us see what bringing the men together means. The chief clerk in the general yardmaster's office has been taught to handle the detail work and to distribute all instructions and orders. His word is accepted by all concerned, leaving the general yardmaster free of this work.

A line up of each track in every yard and an accurate line up of all transfers from one yard to another, the number of cars and whom they are for, the amount of each kind of empties, the number of cars for all connecting lines, a list of the available engines and crews, with the time they are ready for duty and the number of cars, the tonnage and the class of freight to move, is made out in detail each morning, ready for the general yardmaster at 7 a. m. The general yardmaster puts these lists in his pocket, and no matter where he is, he can talk intelligently on any subject in the yard. Every assistant yardmaster also carries his list and there can be no dispute as to what cars he has and how many. At a glance a general yardmaster can transact such business as may be important and go to any point in the yard where his presence may be needed. Every engine foreman can tell exactly what he has in his territory and what he can do and how he can handle cars of any description. This organization today is handling more cars than ever before and every man is waiting for the end of the month to find out how much we beat the corresponding month of the preceding year.

If the yardmasters' meetings have taught us economy and team work, what would the taking in of the general yardmaster into the official family mean? It would give him ideas he never dreamed of and he in turn could educate his men to higher ideals and make his work a joy instead of drudgery. There are many good points talked over and the spirit of economy would spread not only to the yard but all over the entire system. The terminal problems would be solved and the handling of cars increased far beyond anyone's comprehension.

Fred P. Grossman,
General Yardmaster, C. St. P. M. & O., Minneapolis, Minn.

A Comprehensive Low Grade Trunk Line Development

The Burlington Is Completing One Link of a New Route from Billings to the Ohio River and Denver

The Chicago, Burlington & Quincy has been working for several years on one of the most comprehensive low grade trunk line developments ever projected in this country. Briefly, this includes a low grade route from Billings, Mont., to Paducah, Ky., a distance of 1,500 miles, with a connecting low grade line from Wendover Junction, Wyo., to Denver. This line also connects, at Lincoln, Neb., with the present main line to Chicago.

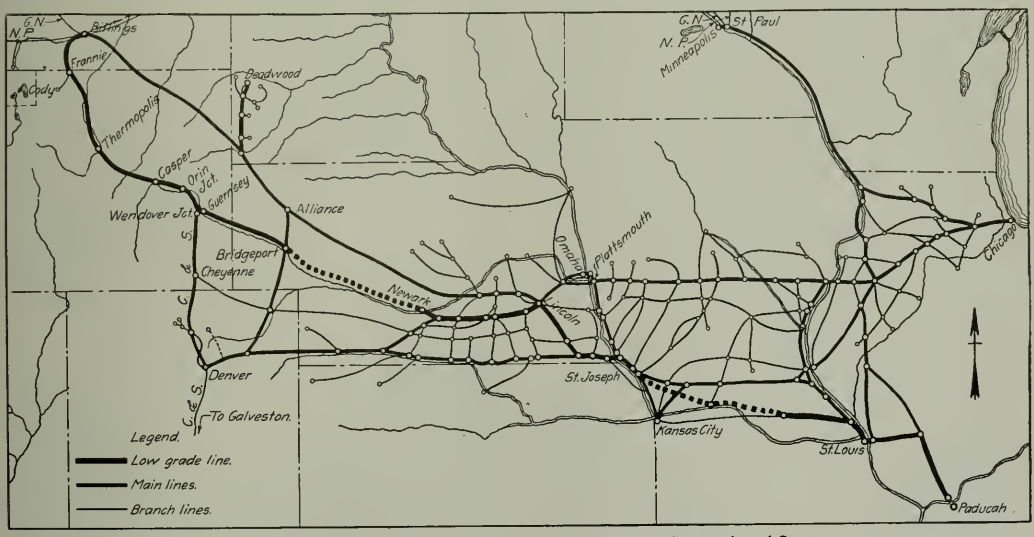
When the work is completed, the maximum grade eastbound will be 0.3 per cent from Billings south 225 miles to Alkali Summit, Wyo., 55 miles west of Casper, and 0.15 per cent from Alkali Summit to the Missouri river at Plattsmouth, Neb., a distance of 674 miles, with practically no adverse grade. From Plattsmouth there will be a maximum grade of 0.3 per cent to Paducah. Westbound this maximum grade has been established at 0.4 per cent from Paducah west to Lincoln, Neb.; 0.3 per cent from Lincoln to Casper, Wyo., and 0.45 per cent from Casper to Alkali Summit. From Alkali Summit to Billings there is practically no adverse grade, with the exception of 35 miles of 0.5 per cent ruling grade from Kane, Wyo., 80 miles southeast of Billings, to Warren, and this will probably be operated as a helper grade. The ultimate plans also provide for a low grade line with a maximum grade of 0.5 per cent from a connection with the Billings-Paducah line, 120 miles north of Cheyenne, Wyo., south via Cheyenne to Denver. As the Burlington is controlled jointly by the Great Northern and the Northern Pacific, and as it in turn controls the Colorado & Southern, this will give the Hill lines direct low grade outlets from Puget Sound points to the Ohio river and to Denver, with the possibility of also securing a low grade outlet to Galveston by reducing the grades on the Colorado & Southern.

The carrying out of the project involves the use of the tracks of the Northern Pacific from Billings south 37 miles to Fromberg, Mont.; the construction of a new line from Fromberg southeast 358 miles to Orin Junction, Wyo.; the use of the Colorado & Southern line from Orin Junction southeast 31 miles to Wendover Junction; the construction of a new line from this point east 8 miles to Guernsey, Wyo.; the use of the present Guernsey branch of the Burlington southeast 98 miles to Bridgeport, Neb.; the construction of a new line from Bridgeport southeast along the North Platte to Newark, Neb., 232 miles; the use of the present line of the Burlington from Newark via Lincoln and Plattsmouth to St. Joseph, Mo.; the construction of a new line from St. Joseph, Mo., to Mexico, Mo., about 200 miles, and the use of existing lines from that point to the Ohio river at Metropolis, Ill., where work has been started on the construction of a new bridge to cross the river and a 12 mile extension to enter Paducah, Ky.

COMPARISON OF NEW AND OLD LINES

Billings has been an important gateway to the northwest for many years. Here the Burlington connects with the Northern Pacific and the Great Northern for Spokane, Seattle and other western points. Since the acquisition of the Burlington by these two roads the amount of traffic exchanged with it at Billings has increased materially. The importance of a low grade line from Billings to points in the central states is, therefore, evident. The present line from the Missouri river, via Lincoln, Neb., and Alliance, is one of relatively high grades, ranging from 1 per cent to 1.6 per cent, with many of 1.25 per cent, especially west of Edgemont, North Dakota.

The new line will avoid these heavy grades and have practically no greater mileage. It will also open up a large territory in northern and central Wyoming, which is now entirely without railroad facilities. While largely a grazing territory, this section is now being rapidly settled up, especially in the Big Horn valley. This line will also provide a new route from Denver to the northwest. At the present time the Burlington handles traffic between Denver and Billings via



Map of Burlington Lines Showing Relation of New Line to Remainder of System

Brush, Colo., and Alliance, Neb. The new line will provide a route of lower grades and is about 75 miles shorter.

At present this new low grade route has been completed and is in operation from Billings south to Orin Junction, where connection is made with the Colorado & Southern. A new line has also been built from Cheyenne to Fort Collins, Colo., completing the new outlet to Denver, although considerable grade reduction work will have to be done on the Colorado & Southern north of Cheyenne. A cut-off is projected from Greeley, Colo., on the Colorado & Southern south to Hudson on the Burlington to complete the low grade line into Denver.

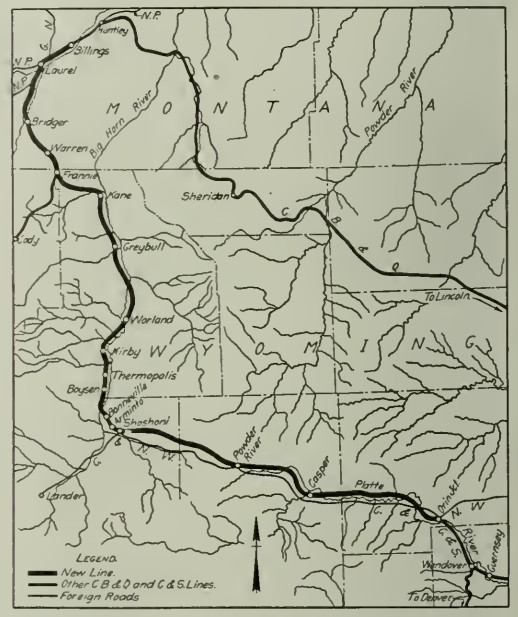
Work was started but is now temporarily discontinued on the construction of an 8 mile connection from Wendover Junction, Wyo., to Guernsey, where a connection is made with the present 0.3 per cent line to Bridgeport. From Bridgeport to Newark no work has been authorized, up to this time, but the construction will be light, as the line will follow the North Platte river for the entire distance. Nothing has been authorized between St. Joseph, Mo., and Mexico, but as stated above, work has recently been authorized between Metropolis, Ill., and Paducah, Ky. It will be seen that work either has been completed or is under way on all but two portions of this 1,500 mile line. West of the Missouri river the only gap is that between Bridgeport and Newark, 232 miles, and an alternate line can be used via Alliance and Lincoln, which is but 45 miles longer, although with heavier grades.

WIND RIVER CANYON

The most interesting portion of this entire project from an engineeering and construction standpoint is that between Billings and Casper and especially that portion south of Thermopolis, Wyo., which was completed late last year. Immediately south of Thermopolis the line passes through Wind river canyon for 12 miles, involving some very heavy construction work costing about $250,000 per mile.

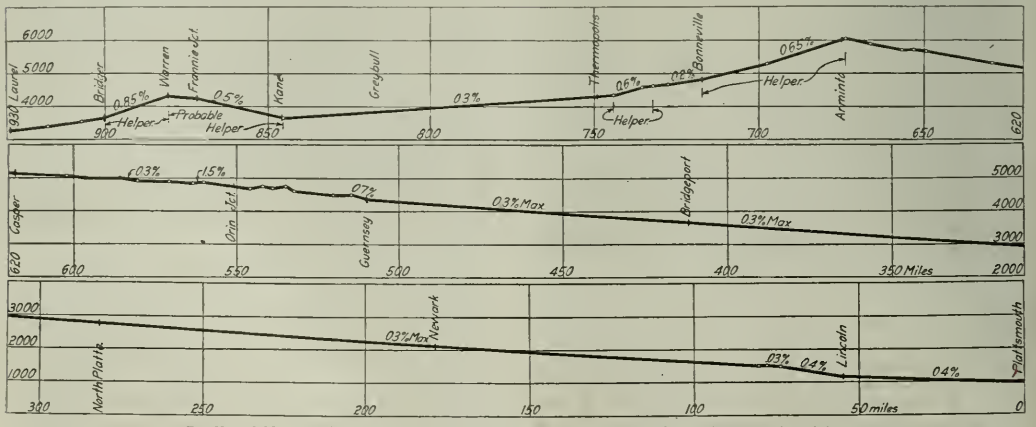
The maximum grades have been given above and are also shown on the profile. The maximum curvature is 1 deg. 30 min. from Orin Junction west to Casper, and 2 deg. west of Casper, with the exception of four 4 deg. and one 3 deg. curves in the canyon.

The heaviest work on the entire line was encountered in Wind river canyon, starting at a point 4 miles south of Thermopolis, and extending south 12 miles to Boysen. At this point the Big Horn or Wind river has cut a narrow channel through a heavy rock formation, forming a gorge 900 ft. deep and in many places less than 200 ft. wide at the bottom. The ruggedness of this canyon and the problems encountered in construction are indicated by the difficulty of locating the line. It was necessary to make the location in the winter in order to get into the canyon on the ice, as there was only one point at which it was possible to descend into it from the top. The presence of several springs along the lower 2 miles made it impossible to work there even on the ice. There was only one point at which the stream could be forded. At times the locating parties were able to spend only one to two hours a day at the work, the remainder of the time being taken in getting in and out. A site for a camp was finally selected in the canyon, and it required a pack train of five burros an entire week to move the camp and provisions a distance of six miles, and cost $165.



New Burlington Line from Billings (Mont.) to Orin Jct. (Wyo.)

The contractors encountered the same difficulty later in



Profile of New Burlington Low-Grade Line from Laurel (Mont.) to Plattsmouth (Neb.)

getting in their equipment and supplies, one man spending a month on the construction of a pack trail in from the north end to his camp. Eventually a trail was completed on the opposite side of the canyon from the line at a cost to the contractors of over $10,000 for the 12 miles. Because of the lack of room beyond the limits of the excavation all camps were established on the opposite side of the canyon from the line. Several cable suspension bridges were erected across the stream by which men and supplies were brought in to the work. The contractors employed a pack train of 40 burros continuously to bring in their supplies. One Japanese sub-

Rock Fill Across Channel of Big Horn River, North of Thermopolis

contractor also lowered considerable material over the cliff with ropes.

The line was located on the west side of the canyon for the entire distance, as it was possible to secure a somewhat better location as regards curvature, as well as to protect it better against the river. The presence of a small dam for power development at the upper or south end of the canyon required the adoption of a 0.6 per cent grade through the canyon, where a 0.5 per cent line could otherwise have been built at a saving of $150,000.

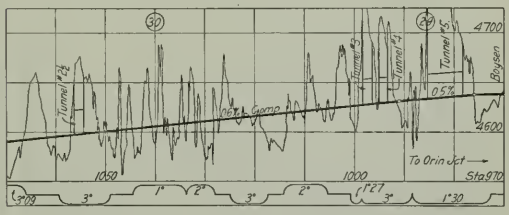
Because of the inability to get heavy equipment in to the scene of the work all material was handled by hand, being hauled out on the fills in many cases in small carts. In constructing the fills a narrow bank was first made with the heavi-

Heavy Work in the Canyon

er rock on the outside to protect it against the stream until it was widened to its full section. At one point a "shoo fly" line was located around a high point, and after the track had been laid through the canyon a steam shovel removed 170,000 cu. yd. of material from this point which was used to widen the embankments to their full section. By this means, the use of rip rap as such was avoided, although the toe of the slope was in the stream for almost the entire distance.

The cuts averaged in general from 100 ft. to a maximum of 238 ft. in height on the high side. In numerous instances they were "daylighted" and the material later placed in the fills. There was some trouble with loose or sliding materials, in which cases it was necessary to remove all this material from the face of the cliff.

In one instance a contractor removed a heavy rock face entirely in a single shot. He drove a tunnel 50 ft. into this face at the center, and then 50 ft. at right angles in each direction, loading it with 60 per cent dynamite and powder. The preparation of this shot, including the explosives, cost



Profile of Heavy Two-Mile Section in the Canyon

$3,500, while the blast threw 8,000 cu. yd. of rock into the adjoining fill, and brought down over 22,000 cu. yd. additional, 15,000 yd. of which was later placed in the embankment.

At another point, the shooting down of a vertical face 125 ft. high completely blocked the river for a time until the water had risen 8 ft., when it cut a channel 65 ft. wide through the debris. The narrowing of the channel at various points through the entire canyon has resulted in a noticeable rise in the surface of the stream.

Six tunnels were constructed in the canyon, the longest of which was 725 ft. The most northerly one was taken out entirely by hand. It was possible to operate air drills at the others, the contractor erecting a compressor plant at the north end of the south or longest tunnel, which was located at the south end of the canyon. Four tunnels were located in the southerly two miles of line in the canyon, three of which were within a distance of 2,000 ft. It was at this point

Trapping Side Hill Debris into Small Cars

that the heaviest work in the entire canyon was encountered, the grading for 3 miles requiring the moving of over 425,000 cu. yd. of rock, in addition to the driving of the tunnels, and costing $450,000, while for one mile the grading alone cost $210,000.

Mud seams in the rock made it necessary to line all the tunnels throughout, except the long tunnel, only the portals of which were timbered. The timber lining for the two norther-

ly tunnels was placed by company forces, while the others were timbered by the contractors as the work progressed. The character of the rock encountered in driving these tunnels and the excavation in the canyon varied widely. At the north end a soft sandstone was found which changed to a hard sandstone, and then to a limestone. At the northerly tunnel a red granite was found, which gave way to a very hard black dyerite near the south end of the canyon.

BOYSEN TO ORIN JUNCTION

Leaving the canyon, the line follows Wind river for 10 miles south of Boysen. It then swings to the east on a 40

After the Heavy Shot was Fired, Bringing Down 30,000 cu. yds. of Rock

min. curve two miles long and follows Badwater creek for 24 miles, after which it ascends Alkali creek to Alkali Summit. In this section there was no work of special interest, the material generally encountered being a clay, with shale in some few instances.

At Alkali Summit a tunnel 830 ft. long was driven through a moderately soft sandstone. Work was carried on from the east end only, and all drilling and handling of material were done by hand. The wall plate drifts were first driven on each side, after which the center section was removed and the full arch centers placed. The bench was then removed in two lifts, the material being loaded in standard gage dump cars. The tunnel has recently been completed and it is now being lined with concrete deposited by air from a mixer located on a car, as described in the *Railway Age Gazette* of November 20.

From the summit to Powder river the work was generally light and presented no special problems. From Powder river to Casper the line follows Casper creek, from which point it parallels the North Platte river to Orin Junction. Ultimately this line will follow the North Platte river from Casper, Wyo., to Newark, Neb., a distance of 437 miles. The grading between Powder river and Orin Junction was mostly earth and amounted to over 5,000,000 cu. yd., the greater part of which was handled by teams.

In a number of instances the force of streams was utilized in an interesting manner in cutting their own channels. Three miles north of Thermopolis it was necessary to change the channel of the Big Horn river, as Wind river is known north of the canyon, to avoid two crossings of the stream. To

North Portal of the Long Tunnel—Boysen Dam at the Left

move the river a small ditch was dug at the proposed location of the stream. A fill of heavy rock was then constructed from the upstream bank on the center line of the road, the forward end of the dumping trestle being carried on a boat. As the fill progressed, the stream was crowded over into its new course and cut its own channel. Under similar conditions one mile south, the old channel was shut off and the stream forced to a new location by sinking a timber crib in the channel, while one mile south of Thermopolis end dumping cars were employed in building an embankment in the channel.

At Bonneville Badwater creek ran close to the line for over one mile, and threatened to cause serious damage at flood stage. A ditch 10 ft. wide was dug some distance from the track with a small dike on the track side. On the first heavy storm the water started down this ditch, widening it to 100 ft., and deepening it so that a permanent channel was established, and danger of further trouble was eliminated. The same plan was adopted at Fetterman, where a drag line excavated a 50 ft. channel for the North Platte river, which the river itself has since widened to accommodate its entire flow.

The bridge work on this line was relatively light. Wind

river is crossed twice at the north end of the canyon and once at the south end on permanent structures. The south Powder river is crossed at Powder river on a high framed timber trestle, and the North Platte is crossed just above Casper on a timber structure. Between Casper and Orin Junction the line crosses the North Platte river four times on permanent bridges. Numerous smaller streams and ravines are crossed by pile bridges. Whenever it was possible to haul material in to the line, cast iron pipe was used for small openings; where pipe was inserted after the track was laid, concrete pipe was used.

Leaving the South End of the Canyon

It was necessary to give close attention to the development of water supplies, both for use during construction and for permanent operation. South of the canyon all water is highly alkali for a considerable distance, rendering it unsuitable for camp use. A large spring of good drinking water was found 1,000 ft. above the grade line, four miles north of the south end of the canyon, and the water from this point was hauled to all the camps along the line. This water was not suitable for boiler use, however, and a pumping station was erected at Boysen during the early stages of the construction. Water secured from Wind river at this point was hauled for the steam shovels working along the line as far south as 62 miles.

In addition to the water station at Boysen permanent supplies have been secured from surface reservoirs at Bonneville, Lysite, Arminto (Alkali Summit) and Powder river, all of which are gravity supplies, except the last. At Powder river the water is impounded by the roadbed embankment, while at the other points reservoirs have been constructed away from the line. At Lysite a six-inch wood stave pipe line was laid from the reservoir to the tank, but all the others were of cast iron. Between Casper and Orin Junction water is secured directly from the North Platte river.

Division terminals have been established at Greybull, 112 miles south of Laurel; at Bonneville, 100 miles further south, and at Casper 100 miles southeast of Bonneville. Passing tracks 4,000 ft. long have been built at intervals of 10 miles, with provision for one every five miles eventually. Slack grades have been introduced at all passing tracks.

The track is laid with second-hand 75 lb. rail west of Casper and new 90 lb. rail east of that point, with square joints on tangents and staggered joints on curves. Treated ties are laid on gravel ballast secured from a pit four miles north of Thermopolis, and another near Casper. Tie plates are used on all ties. The track was laid with a McCabe & Steen track-laying machine, which has laid an average of 7,500 ft. of track daily with a gang of 115 men.

Striking Lighter Work a Short Distance Out of the Canyon

Work on this extension south from Thermopolis to Powder river was started in 1909, and was completed late last year.

The section from Powder river to Orin Junction was started last year. Between Wendover Junction and Guernsey, the contractor has begun driving three tunnels, 3,052, 1,600 and 1,900 ft. in length, respectively.

This entire project has been developed under the direction of T. E. Calvert, chief engineer. A. L. Hoagland is engineer in charge of construction, and C. H. Cartlidge, bridge engineer, has been in charge of the design and construction of all bridges. MacArthur Brothers of New York were the contractors for the construction of the line from Thermopolis

Channel Created by One Storm at Bonneville

to Powder river, and Twohy Brothers of Portland, Ore., did the grading of that part of the line from Powder river to Orin Junction. Kilpatrick Bros. & Collins, of Beatrice, Neb., have the contract for the work between Guernsey and Wendover. Including the station men in the canyon McArthur Brothers had 86 sub-contractors on their part of the work at one time. All track and bridge work was handled by company forces.

REVIEW OF CANAL TRAFFIC

[From the Canal Record]

During the period of two months, from August 15 to October 15, that the Panama canal has been open to traffic, the commercial vessels which have been using it have carried through 583,949 tons of cargo. The traffic has followed fairly well defined trade routes, and the course of the great majority of vessels may be roughly classed in four great groups.

The heaviest traffic has been between the Atlantic and Pacific coasts of the United States. Manufactured goods of great variety and general merchandise are carried from the Atlantic seaboard, principally from New York, and secondarily from Boston, Philadelphia and New Orleans, to the principal California and Puget Sound ports; also, to Honolulu. On the eastbound voyage, these vessels carry chiefly canned fruits, vegetables and salmon, lumber, grain, sugar, pineapples and wine. This trade is restricted to vessels of American registry, and nearly all the American vessels which have used the canal have been engaged in it. During the period of canal operation, 24 vessels have passed through eastbound on this route with 151,290 tons, and 25 westbound with 135,214 tons. These passages, 49 in all, have constituted approximately 44 per cent of all the 113 passages through the canal. The total cargo carried on this route, 286,504 tons, has been almost exactly 50 per cent of all cargo.

A route between the eastern coast of the United States and the west coast of South America has been second in cargo through the canal. Northbound vessels carry principally nitrates from the fields of Chile, with secondary cargo of raw material products of the western countries of South America, and southbound vessels carry manufactured goods from the United States and Europe. The northbound traffic, passing 13 vessels with 93,139 tons through the canal during the two month period, has considerably exceeded the southbound, consisting of three vessels with 18,800 tons, and one in ballast, though the latter seems to be getting under way.

There has been a marked, though probably seasonal, traffic from the Pacific ports of the United States and southwest Canada to Europe with grain. Ten vessels, each heavily laden, have gone through eastbound, with 71,560 tons, and eight vessels, all of foreign registry, have gone from the Atlantic to the Pacific in ballast, to return on this route with grain. In addition, one vessel, which went through the canal with 6,000 tons of manufactured goods, from Antwerp to Tacoma, is to return with grain.

The fourth great route has been from the Atlantic seaboard of the United States to China and Japan, with refined petroleum in bulk and in cases, and other petroleum products. Four vessels have gone through in this trade from the Gulf of Mexico, with 24,931 tons, and four from Philadelphia and New York, with 26,570 tons, an aggregate of 51,501 tons. No vessels have gone in the other direction on this route.

Next to the four principal routes just described, the most notable development has been the coal traffic from the middle Atlantic seaboard of the United States to the Pacific coast of North and South America. Five vessels, four from Norfolk, with 22,535 tons, and one from Baltimore, with 6,000 tons, have carried coal to the upper Pacific, and one vessel from Baltimore has carried 6,010 tons to Valparaiso. The total coal carried has been 34,545 tons. None of these vessels have returned through the canal to this time, but it is understood they will load with Pacific coast products for the eastern United States and for Europe.

The development of a line from Liverpool around South America, with vessels sailing both ways, via the canal, has been arrested by the European war. The only vessel to have used the canal in this route was the steamship Potosi, which passed through the canal on September 25, on its way south, along the west coast of South America. It was held in the bay at Balboa, awaiting orders, but sailed on October 14.

The steamship Desabla, which passed through the canal on October 12, in ballast, was on its way from Rio de Janeiro to San Pedro for a cargo of fuel oil.

The military service of the United States has used the canal for the passage of one army transport and one navy collier, both from Pacific to Atlantic.

In the week from noon, October 20, to noon October 27, following the resumption of traffic through the canal after the opening of the channel opposite the new Culebra slide, 17 vessels were put through the canal from the Pacific to the Atlantic, and 21 from the Atlantic to the Pacific, a total of 38 vessels in seven days. Up to the end of the week, 71 commercial vessels and three launches had passed through the canal in the 27 days of October. The tolls collected on tonnage in this period amounted to $329,704.72, as compared with the total of $369,706.29 collected prior to October 1, in which are included charges for 115 barges towed through the canal before its formal opening to commercial traffic on August 15.

Exports of Cars and Locomotives.—The Wall Street Journal has compiled figures showing that in September, 1914, there were 19 locomotives, having a value of $129.193, exported from this country, as compared with 38 locomotives exported in September, 1913, having a value of $360,788. In the nine months ending on September 30, 1914, the exports of locomotives numbered 222 and their value was $2,240,959, whereas in a like period in 1913, there were 383 locomotives exported, having a value of $3,447,798. The falling off in exports of cars for steam railroads was even larger in proportion than that in locomotives. In September this year the total value of cars exported was $119,531, including those for passenger service. This compares with $929,037 for the same month of last year. The decrease for the nine months period is even greater, the exports in 1914 being valued at $2,303,123 as compared with $9,288,378, four times as great.

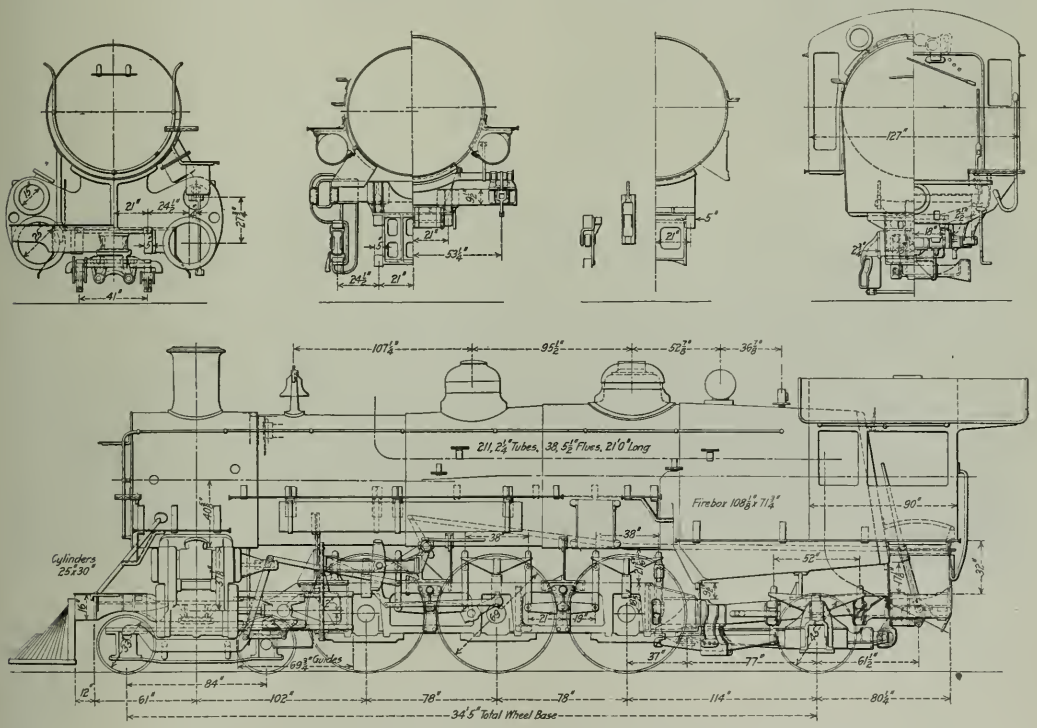
Pacific Type Locomotives for the Clinchfield

Designed for Moderate Speed Service on Heavy Grades; Weight on Drivers, 176,900 lb.; Tractive Effort, 46,000 lb.

The Carolina, Clinchfield & Ohio traverses a mountainous country, and although steep grades were avoided as far as possible during its construction, it is far from level. There are numerous grades from 0.5 to 0.8 per cent, the maximum for a comparatively short distance being 1.7 per cent, while one of the hardest stretches is an unbroken grade of 1.2 per cent approximately 20 miles long. On a line of this character, passenger service is necessarily worked at moderate speeds over the greater part of the distance and the locomotives employed must have capacity to maintain a high drawbar pull for sustained periods, rather than the ability to run at unusually high speeds. This requires sufficient starting tractive effort, backed by ample fully utilized. This is especially true of class P-2, which, as far as tractive effort is concerned, is one of the most powerful six-coupled locomotives thus far built.

The boiler of the class P-2 locomotive is of the extended wagon-top type, 85⅞ in. diameter at the largest course, and is fitted with a 38-element superheater of the Schmidt type; the furnace equipment includes a brick arch. The design has been so worked out that a Hanna stoker can be subsequently applied should such equipment be found necessary. The construction of the boiler is in accordance with the regular practice of the builders, and presents no unusual features of design.

The cylinders have Sheedy by-pass valves and graphite lubri-



Elevation and Sections of Pacific Type Locomotives for the Carolina, Clinchfield & Ohio

boiler power to maintain full steam pressure when working with a relatively long cut-off at moderate speeds.

These qualities are realized in two designs of Pacific type locomotives built for the road by the Baldwin Locomotive Works in 1910 and 1914, and known respectively as classes P-1 and P-2. Three of the former and two of the latter are in service. The leading dimensions of these locomotives are as follows:

Class	Cylinders	Driv-ers, diam.	Steam pres-sure, lb.	Grate area, sq. ft.	Water heat-ing sur-face, sq. ft.	Super-heat-ing, sur-face, sq. ft.	Weight on drivers, lb.	Weight total, lb.	Trac-tive effort, lb.
P-1	23 in. x 30 in.	69 in.	190	54	4,095	...	152,900	233,050	37,200
P-2	25 in. x 30 in.	69 in.	200	53.8	3,982	955	176,900	280,300	46,000

In both these designs, the weight available for adhesion is

cators. The cylinder and steam chest bushings are of Hunt-Spiller metal, as are also the bull-rings and packing rings used in the valves and pistons. The piston heads are of the built up type, with cast steel bodies of dished section to which the bull-rings are riveted. The valves have cast iron bodies, and the bull-rings are carried on cast steel spiders. The valve motion is of the Walschaert type, and the valves are set with a lead of ¼ in. The locomotive is balanced according to the Master Mechanics' Association rule, and careful attention was heen given to the design of the reciprocating parts in order to eliminate unnecessary weight. The driving-tires, driving-axles, and crank pins, are of chrome vanadium steel, and the engine springs and frames are of steel with vanadium content.

The main frames are 5 in. wide, with single rail sections 12 in.

deep under the cylinder castings. The guide yoke is bolted to a steel casting which has long bearings on the upper frame rails, and extends the full depth of the leading driving pedestals. Midway between the first and second pairs of driving wheels is placed another broad casting, supporting a transverse plate to which the link and reverse shaft bearings are bolted. This casting also supports a boiler waist sheet. A similar casting is placed between the main and rear pairs of driving wheels, and a deep brace is placed at the main driving pedestals. The rear driving pedestals are braced by a large casting, which carries the radius bar pin for the trailing truck. This casting also has bolted to it a vertical expansion plate which supports the front end of the mud ring. The rear end of the mud ring is supported in a similar manner by a plate which is bolted to the foot plate.

The tender wheels are steel tired, and the trucks both have side bearings. The tender frame is composed of 12 in. channels, the center sills weighing 40 lb. per foot and the side sills 25 lb.

On the basis of tractive effort, the class P-2 locomotives rank with many large Consolidation and Mikado type engines employed in heavy freight service.

The following table gives the principal dimensions and data:

General Data

Gage	4 ft. 8½ in.
Service	Passenger
Fuel	Soft coal
Tractive effort	46,000 lb.
Weight in working order	280,300 lb.
Weight on drivers	176,900 lb.
Weight on leading truck	52,300 lb.
Weight on trailing truck	51,100 lb.

Boiler

Style	Wagon top
Working pressure	200 lb.
Outside diameter of first ring	78 in.
Firebox, length and width	108⅛ in. by 71¾ in.
Firebox plates, thickness, sides and crown, ⅜ in.; back, 5/16 in.; tube, ½ in.	
Firebox, water space	Front, 5 in.; sides and back, 4 in.
Tubes, number and outside diameter	211, 2¼ in.
Flues, number and outside diameter	38, 5½ in.
Tubes, length	21 ft.
Heating surface, tubes	3,744 sq. ft.
Heating surface, firebox	208 sq. ft.
Heating surface, firebox tubes	30 sq. ft.
Heating surface, total	3,982 sq. ft.
Superheating surface	955 sq. ft.
Total equivalent* heating surface	5,414 sq. ft.
Grate area	53.8 sq. ft.
Smokestack, diameter at choke	19 in.

Tender

Wheels, diameter	36 in.
Journals, diameter and length	5½ in. by 10 in.
Water capacity	8,000 gal.
Coal capacity	14 tons

*Total equivalent heating surface = evaporative heating surface + 1½ times superheating surface.

THE OPERATION OF A BUSY FLAT YARD*

By R. R. Farmer

Trainmaster, Missouri, Kansas & Texas, Parsons, Kan.

In the operation of a flat yard, the terminal for six divisions, handling an average of 1,800 cars per day, and with a total car capacity of yard tracks of 840 cars, it is absolutely necessary to keep all cars moving. The average number of trains in and out of this terminal each day is 58 freight and 38 passenger trains,

Carolina, Clinchfield & Ohio Pacific Type Locomotive

Weight of engine and tender in working order	435,000 lb.
Wheel base, driving	13 ft.
Wheel base, total engine	34 ft. 5 in.
Wheel base, engine and tender	66 ft. 9¾ in.

Ratios

Weight on drivers ÷ tractive effort	3.84
Total weight ÷ tractive effort	6.09
Tractive effort × diam. drivers ÷ total equivalent* heating surface	5.86
Total equivalent* heating surface ÷ grate area	100.5
Tube heating surface ÷ firebox heating surface	17.9
Weight on drivers ÷ total equivalent* heating surface	32.6
Total weight ÷ total equivalent* heating surface	51.8
Volume both cylinders, cubic feet	17.06
Total equivalent* heating surface ÷ vol. both cylinders	317
Grate area ÷ vol. cylinders	3.16

Cylinders

Kind	Simple
Diameter and stroke	25 in. by 30 in.

Valves.

Kind	Piston
Diameter	15 in.
Lead	¼ in.

Wheels

Driving, diameter over tires	69 in.
Driving, thickness of tires	3½ in.
Driving journals, main, diameter and length	11½ in. by 13 in.
Driving journals, others, diameter and length	11 in. by 13 in.
Engine truck wheels, diameter	33 in.
Engine truck, journals	6½ in. by 12 in.
Trailing truck wheels, diameter	45 in.
Trailing truck, journals	8 in. by 14 in.

making a train movement in or out every 15 min. and a freight train movement each 28 min. The average amount of terminal overtime is 1 hr. and 30 min. daily.

All trains are broken up, switched and started from this yard. Trains arriving are carded by the carding clerks. After checking the waybills seal clerks and car repairers go over the trains and card all heavy repair cars with full bad order cards and all light repair cars with one-half bad order cards. The trains are then pulled up over the lead, broken up and switched to the various tracks. All heavy repair cars are taken to the car shops and the light repair cars are placed on light repair tracks contiguous to the yards. All cars are classified to the various tracks for the different divisions, which necessitates holding tonnage for some divisions from three to eight hours to get full trains for the slow service freights and to protect tonnage of high class freight such as stock or fruit.

The yard is equipped with an air compressor plant and all train tracks are piped so that the air test may be made by inspectors before the road engine is placed on the train. All crews are required to be in attendance 30 min. before the time

*A paper submitted in the Terminal Yard Contest.

called to leave. We use no engine herder, the head breakman taking the engine to and from the house, leaving it 30 min. before the departure of the train.

The yard force consists of one general yardmaster day and night, one assistant yardmaster day and night, one yardmaster's clerk day and night, who handles all crews and directs the calling of crews, keeps all stock records, terminal delays and rest records; a chief register clerk day and night, with one assistant; two sealers day and night, two carders, one weighmaster and a diverting clerk day and night.

The yardmaster personally checks all details which are furnished from the terminal or point where the train originates, showing loading time on all stock and the release information, etc. This enables him to determine the amount of tonnage and the commodities that are en route to the terminal from four to six hours in advance. Twenty-five per cent of the trains passing the terminal are allowed only 45 min. in the yard and 25 per cent are allowed 1 hr. and 30 min. This includes the time for the trains to be broken up and switched and the re-icing of meats and other perishables, 3 min. per car being allowed for re-icing, which includes all time consumed in spotting the cars to the icing station, re-icing and the air test.

The foreman of the lead engines keeps a check of all tonnage on the various tracks as it is classified, both short and through, which can be furnished to the yardmaster at any time, and is furnished every hour. The yard is equipped with a telephone system with bells at intervals of 150 ft., and telephones are located at convenient points so that the yardmaster is in touch with the engine foremen at all times, and at all points in the yard.

The yardmaster's office is located in the second story of a two-story building at one end of the yard, the first floor being occupied by the operators and yard clerks, and messages being handled from one floor to the other by means of a dumbwaiter. The location of this office gives the yardmaster a full view of the yard and the telephones with the various bells enable him to direct the work of any crew working in the yard at any time.

The yardmaster confers with the chief despatcher frequently by telephone, and at 4 o'clock each evening the chief despatcher furnishes a "starting sheet" to the yardmaster, assistant yardmaster, engine foreman, callers, roundhouse foreman, register clerks and car inspectors, containing general instructions, car orders, special services to be performed, work trains, special cars, and movements of circuses or show troops. This starting sheet usually contains from 30 to 70 special orders. Copies of the starting sheet for the engine foremen are sent to the yardmaster, who checks off the work for the various engines and the foremen are instructed in the work assigned to their engines. As the work is done it is reported hourly to the yardmaster and is checked off on his sheet. This sheet is checked by the yardmaster personally at 7 p.m., 12 midnight, 7 a.m. and 12 noon, and on the last check any work that has not been done is placed on the delay pickup sheet which is used between 12 o'clock noon and 4 p.m. All work that has not been done and cars that have not been gotten out are then given preference over other work.

All foreign cars arriving under load destined to this terminal without home route cards are placed for unloading and immediately on their arrival telegraphic request is made for the home route so that the cars may be moved home promptly when released. All cars passing the terminal destined to stations on the district under the same jurisdiction as the terminal, have a slip attached to the billing instructing the agent at destination to wire for the home route as soon as the car arrives. All bad order cars under load are reported to the chief register clerk by the yard inspector, who "bad orders" the car on a slip showing the number and initial of the car, whether or not a transfer of the load will be necessary and whether the car requires light or heavy repairs. The register clerk then makes copies of this slip in triplicate, sending one copy to the yardmaster, one to the car accountant and one to the foreman of either the light or heavy repair track, as the case may be. When the car is "O. K.'d" on the repair track, the foreman of the repair track fills out the slip showing the time the car was set and the time O. K.'d and sends the slip back to the register clerk, who takes the bill out of the bad order box. The yardmaster is then furnished with this notice after the register clerk has signed it, and checks for the car in the classification tracks after the repair tracks have been pulled. The car accountant holds his slip until the yard is checked at 8 a.m. the following day, and if the car is still on hand advises the yardmaster and trainmaster and the foreman of the car department that the car has been in the yard 12 hours for repairs. All repair tracks are pulled at 12 noon and at 6 p.m. Light repair tracks are also pulled at 12 midnight. With the heavy power and heavy tonnage on this line the average number of bad order cars repaired at the terminal is about 5,000 per month and the average cost of handling cars is about $0.20 per car, which includes wages and fuel.

All engines are assigned to regular work on a ten-hour basis, taking the meal hour in the sixth hour. In order to keep engines in the yard at all times, this necessitates starting them at 6, 7 and 8 o'clock. This system has a tendency to keep down overtime and is more satisfactory to the men, as it enables them to have regular meal hours and the senior men in the service have the engines with the best hours, so they can be at home at the most desirable part of the day.

We make our own switchmen to a great extent by promoting yard clerks and young road brakemen and use great discretion in employing experienced men for the positions of engine foremen. As a rule too little attention is paid to this most important feature. The engine foreman is the one man in the organization that the greatest care should be taken in choosing. He should not be too old or too young and should be cool-headed, steady and sober and should have a fair education. As a rule our yardmasters are chosen from the ranks. They must be instructors as well as governors and must have tact, enthusiasm, friendliness and patience. They must be honest and loyal, and be organizers and disciplinarians.

We keep a permanent record at the yard office of all cars handled, the cost of handling, and the yard damages; comparative statements are made each month with the preceding month and the same month of the previous year, showing all decreases and increases in cost of operation, yard damages, personal injuries and yard and terminal overtime. Any item showing an increase calls for a complete analysis and explanation. All the force takes a lively interest in reducing the cost of operation and yard damages and in decreasing the number of personal injuries. We have a safety committee which makes a periodical trip of inspection over the yards and reports all unsafe conditions and practices which are given immediate attention and either remedied or eliminated.

The yard is patrolled day and night by special watchmen who hold commissions as city or county officers, and all unauthorized persons are kept out of the yards as far as possible. Merchandise trains are guarded by these watchmen all of the time they remain in the yards.

Disinfecting Railway Cars in Russia.—In the year 1910, experiments were made in Russia in the disinfection of railway cars by steam and formalin, the latter being sprayed from a mechanical sprayer worked by naphtha. The results as regards destruction of germs—plague, typhoid, tuberculosis, etc.—and insects have recently been reviewed. They have been fairly satisfactory. At the commencement of the operation the temperature of the inside of the car—which is completely closed—is raised by the admission of steam to 65 deg. C. This occupies from 15 to 20 minutes, according to the design and size of the car. But it has not proved an easy matter to get a uniform temperature. The spray is then applied for 20 minutes. In practice the entire process occupies on an average about 45 minutes. Stress is laid upon the necessity for maintaining the internal temperature at or near 65 deg. C. Lately ammonia has been used with formalin. The vapors affect some of the paints used in the carriages, and that least injured appears to be the white lead paint used in the interior of the fourth-class cars.

RAILWAY AFFAIRS IN OTHER COUNTRIES

H. A. Walker, general manager of the London & Southwestern, in a speech at a dinner in London last week said that when the government took control of the English railways a period of 60 hours was allowed the railways in which to transport troops in 350 special trains to given points. The whole job was accomplished in 48 hours. Mr. Walker said that his own road had handled at the docks at Southampton 75 special troop trains in one day. These trains came from every part of the Kingdom, and were scheduled to arrive at 12-minute intervals. Every train kept to its schedule to the minute, yet in that 12-minute interval each preceding train unloaded troops, horses, etc., and got out of the way of the succeeding train. Mr. Walker paid a warm tribute to Henry W. Thornton, the American general manager of the Great Eastern, saying he had been received by his colleagues in that spirit of friendliness which dominated English and American railway men. Mr. Thornton made a speech, praising the efficient organization and spirit of patriotic co-operation manifested when the railways of England were suddenly called on to handle one of the biggest transportation problems in the world.

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Railway Bridge in Poland Destroyed by Austrians to Check the Russian Advance

* * *

The first electrification of a steam railway within the Polar zone has been practically completed by the Swedish government on the Kiruna-Riksgraensen section of the line from Lulea, Sweden, on the Gulf of Bosnia, across the Scandinavian Peninsula to Narvik, Norway, on the Atlantic Ocean, a distance of 293 miles. Electrification was determined upon for the section from Kiruna, which is about 87 miles north of the Arctic Circle to Riksgraensen on the border line between Sweden and Norway, a distance of 80 miles, for the purpose of increasing the capacity of the line in preference to double tracking. Practically the only freight business is the transportation of iron ore, of which 3,000,000 tons were hauled in 1913 by steam. It was desired to increase the capacity to 5,000,000 tons a year, and electricity was adopted to permit heavier trains and an average increase of about 25 per cent in speed. The large amount of available water power and the scarcity of coal were also important factors. The electrified line runs through an uninhabited country where temperatures of from 25 to 35 deg. below zero are common in January and February. Although a period of two years was allowed in the contract for completing the work, the actual time available on account of weather conditions was only about seven months. The power station is located at Porjus Falls, 74 miles south of Kiruna, and power is transmitted at 80,000 volts by a tower transmission line to four substations, where the potential is stepped down to 15,000 volts for the contact trolley line. Electric locomotives hauling passenger trains of 200 metric tons and ore trains at 1,855 tons will be used, and the contract specifies speeds of 31 miles an hour on level track and 18.6 miles an hour on 1 per cent grades. The equipment will include two passenger and 13 freight locomotives.

SAFETY BAGGAGE RACK

The Atchison, Topeka & Santa Fe has placed in service on some of its through passenger train cars a new type of baggage rack designed by the engineer of car construction. These racks were designed to provide ample storage capacity. They are provided with gates which slide on the frame of the rack and serve to keep the bags, parcels, wraps, or whatever may be placed in the rack, in place. The illustration shows the racks installed in one of the day coaches recently built by the Santa Fe, and also shows the way in which the gates are operated by the passengers. There are two gates to each rack, so arranged that each may be operated independently of the other.

Safety Baggage Rack in Santa Fe Coaches

The racks are of special advantage, especially on through trains where a considerable amount of hand baggage is often carried by the passengers, in that they will hold more than the ordinary rack now used, and at the same time prevent the luggage from falling on the heads of the passengers. In this way it eliminates damage claims from these causes and provides sufficient capacity to hold all the baggage of the passengers, thus keeping the aisles free from obstruction. The construction is so substantial that the gates will slide easily when the rack is loaded to its full capacity.

The National Association of Railway Commissioners

Convention at Washington, D. C. Abstract of Committee Reports and Addresses. Valuation Discussed and Criticized

The twenty-sixth annual convention of the National Association of Railway Commissioners was held at Washington, D. C., on November 17 to 20. Delegates were present from 27 states and from Canada. Judson C. Clement, of the Interstate Commerce Commission, presented an address of welcome in which he urged the necessity for co-operation between state and federal authorities for the purpose of bringing about a uniformity of regulation, pointing out that unless there be uniformity in state policy the discrimination against which regulatory legislation is aimed will be perpetuated. He said that a state which declares a policy of low passenger fares places a burden on interstate commerce which must be borne by states which allow higher fares, and that the same is true with regard to low scales of freight rates.

Lawrence B. Finn, of Kentucky, president of the association, in his annual address, also discussed the conflict between state and federal legislation, saying that if the Interstate Commerce Commission ignores state-made rates, as it has announced its intention of doing in a number of cases, discriminations will continue. He referred to the conflict created by the differences between the policies of the federal commission and the state commissions as "competition in regulation," calculated to perpetuate discrimination. "Suppose a state commission has fixed intrastate rates," he said, "and the courts have refused to hold them to be unreasonable; subsequently these rates are investigated by the Interstate Commerce Commission, and are found to discriminate against interstate commerce. On an appeal to the courts the state rates are found not to be confiscatory; on an appeal to the federal Supreme Court, the finding of the Interstate Commerce Commission that they are discriminatory is sustained, which judgment shall prevail? If the former judgment prevails the discrimination continues. If the judgment concerning the act of the Interstate Commerce Commission prevails, then the state is deprived of rates which the courts refused on the first appeal to condemn."

Charles A. Prouty, director of valuation of the Interstate Commerce Commission, presented a discussion of the work of the commission in its valuation of the property of the railroads. Mr. Prouty said that probably the most important practical question before this country today is its treatment of the railroads, and that he has felt that this valuation must have a profound influence upon its discussion. The question as to whether the government is to take over these agencies of transportation or whether they shall be left to the operation of private capital can never be satisfactorily answered in the minds of most people until we know what relation the actual value bears to the present outstanding securities. Assuming that we are to leave the discharge of this function to private enterprise, there arises the even more difficult question as to what the treatment of this private capital shall be, and what rates shall be accorded in order that the present investment may be fairly dealt with. In the past this question has not been acute for rates have been sufficient to maintain railroad credit, but it is evident that the time is at hand, if it is not already here, when there is grave doubt as to whether these rates must not be generally increased. This question cannot be satisfactorily answered until there is a national valuation of these properties. He said the commission has not yet determined the relation between present value and reproductive value, nor has it determined what value is to prevail in the final valuation of the property itself. Great doubt, he said, exists as to what ought to be attempted as to original cost to date. An attempt has been made to go back to the beginning and to rewrite the accounts for the carrier down to the present time, but that the work was so voluminous and expensive, as well as difficult, that a simpler plan had to be evolved. He estimated the cost of making the valuation at from $25,000,000 to $35,000,000 for the railroads, and about $12,500,000 for the government, if no attempt is made to find the original cost to date in too minute detail.

The discussion of the conflict between state and federal authorities also came up in connection with the report of the committee on amendment of the act to regulate commerce.

The Committee on Car Service, Demurrage, Reciprocal Demurrage and Storage Rules advocated reciprocal demurrage, and recommended that there be a meeting between the committee of the association and the National Industrial Traffic League demurrage committee, and the Committee on Relations Between Railroads of the American Railway Association to consider the subject.

The Committee on Express Rates and Express Charges, of which Martin S. Decker, of New York, is chairman, presented a report showing that the gross operating revenues of the express companies had been reduced from $168,800,000 for the fiscal year ending June 30, 1913, to $158,000,000 for the year ending June 30, 1914, while the operating income was reduced from $4,413,459 to $404,529. The report made no attempt to analyze the figures.

The Committtee on Rails and Equipment, of which C. C. McChord of the Interstate Commerce Commission is chairman, presented a report saying that rail statistics should be gathered and made available, which will show the causes of failure.

The Committee on Statistics and Accounts, of which B. H. Meyer of the Interstate Commerce Commission is chairman, recommended that the state commissions adopt completely the various accounting orders of the Interstate Commerce Commission on the ground that such adoption will secure a uniformity in accounting not otherwise practicable, and will permit the accumulation of a body of statistics which will become increasingly valuable as the period of years covered becomes greater. The committee also recommended that the committee for the ensuing year be instructed to revise the state forms for annual reports of steam railway companies to conform as closely as practicable to the revised form of annual reports adopted by the Interstate Commerce Commission.

The Committee on Railroad Taxes and Plans for Ascertaining the Fair Valuation of Railroad Property, of which John M. Eshleman, of California, is chairman, submitted a report outlining in detail the work done thus far by the Interstate Commerce Commission in its valuation of the property of the railroads. The committee made no recommendations, but suggested that those who framed the statute under which the commission acts were not as well informed on the problems to be met as might have been desirable, and suggested the necessity of a study of the statute both by representatives of the states and of the Interstate Commerce Commission, with a view to recommendations to Congress in the way of suggested amendments as the work proceeds. The committee expressed the belief that the work mapped out in the statute is impossible to be accomplished in its entirety, but that the commission will develop the difficulties of the plans. The committee also expressed the belief that the value of the work will not meet with the expectations of those who framed the statutes under which the work was undertaken.

The Committee on Uniform Classification and Simplification of Tariffs, of which E. E. Clark of the Interstate Commerce Commission is chairman, submitted a progress report, and recommended the adoption of a resolution which had been adopted in the previous two years, providing that there should be appropriate legislation by Congress authorizing and directing the Interstate Commerce Commission, assisted by a body of disinterested experts appointed by the commission and paid by the fed-

eral government, to frame and promulgate a classification of rates to apply uniformly over the United States.

The committee on Railway Service and Railway Accommodations, of which O. H. Hughes of Ohio is chairman, urged greater attention on the part of commissions to station accommodations. The committee said that "it is reasonable to say that more deaths are occasioned by improper ventilation of train coaches and waiting rooms than by train accidents." The report also considered a large number of the various details of railway service in which it found material for criticism, and recommended that the Interstate Commerce Commission be given full power and authority to prescribe the character of equipment to be used in interstate commerce, also authority to prescribe the manner of using or hauling the same.

The Committee on Rates and Rate-making submitted a report in which it said that while rates continue to be made by carriers and to be passed upon by regulatory commissions by the exercise of individual judgment, rather than by the application of any accepted formula or standard, there are two very noticeable present tendencies in the theory and practice of making and regulating rates. These are to give greater weight to cost in rate-making and to recognize the close relationship between railroad securities and railroad rates. One member of the committee is of the opinion that cost of service can be and ought to be made the basis of transportation charges.

The executive committee of the General Committee on Physical Valuation, of which Milo R. Maltbie of New York is chairman, submitted a report reviewing at length the work done by the Interstate Commerce Commission in connection with its valuation of the property of the railroads of the United States, and describing what has been done by the committee in an advisory capacity. The report states that generally the committee has taken the position that the department of valuation should report to the Interstate Commerce Commission the vital and fundamental facts necessary to a complete appraisal, but should not attempt to settle the questions of public policy, finance and law that are involved. These must be settled by the Interstate Commerce Commission, and if the department of valuation were to prejudge them, and if the department were not in accord with the commission, much of the work done by the department might be useless or subject to expensive revision. The report reviews a large number of questions in connection with the valuation which the committee has considered and on which it has expressed its views before the department of valuation. At the last conference the committee took the position that the railroad companies should state or the accountants of the department should ascertain to what extent existing property has been paid for, (1) by the issuance of securities or other obligations, (2) out of surplus income or, (3) out of operating expenses. This suggestion brought forth a statement from the railroad companies that if a company owned property used for railroad purposes it was entitled to have that property valued, and that it did not matter whether or not its cost had been included in operating expenses. To this the committee replied that the discussion of this subject involved questions of public policy and of constitutional law, and that the Interstate Commerce Commission should have before it a statement showing the sources of the funds used to pay for the property.

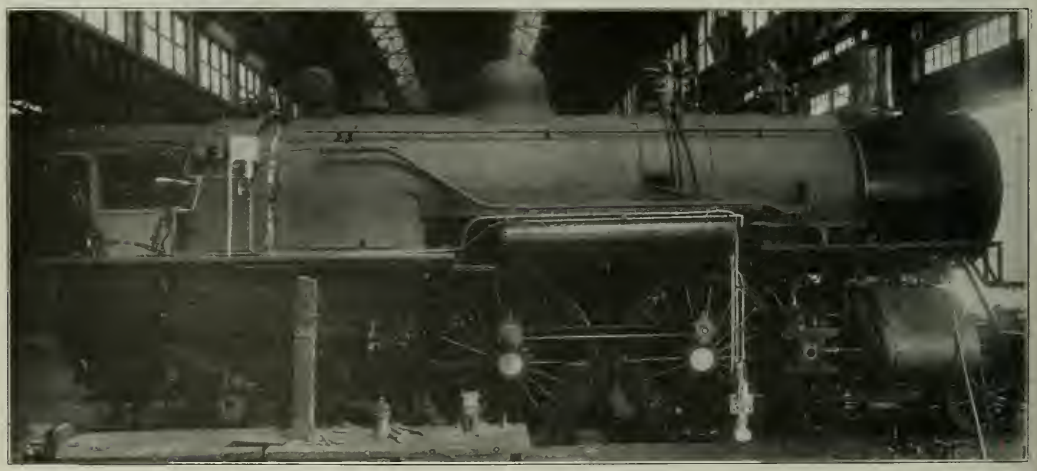
Arthur Hale, general agent of the American Railway Association, presented a paper on "The Danger of Freight Congestion."

Officers were elected for the ensuing year as follows: President, Clifford Thorne, of Iowa; first vice-president, R. B. Prentis, of Virginia; second vice-president, Max Thelen, of California. William H. Connolly, now secretary, was elected secretary for life, and James B. Walker, of New York, was made assistant secretary. It was decided to hold the next convention in San Francisco on October 12, 1915.

AUTOMATIC TRAIN STOPS ON THE CHICAGO & EASTERN ILLINOIS

The Miller automatic train stop apparatus, which has been in use on the Chicago & Eastern Illinois for a year past, constitutes the most extensive installation of the kind in America. The officers of the road have given us some account of their experiences with it; and for the first time we have some notes on the behavior of apparatus of this kind in a situation where both long and short trains are run and where both low and high speeds, with both passenger and freight trains are common in everyday service.

This device has been developed by the Miller Train Control Corporation, of Staunton, Va., a new concern in this field; and the installation on the Chicago & Eastern Illinois tracks has been made by it, at its own expense. A brief description of the system was published in the *Railway Age Gazette*, June 5, 1914, page 1246. Ninety locomotives have been equipped with the apparatus and the length of the road embraced in the in-



Automatic Stop Apparatus on Chicago & Eastern Illinois Locomotive

Cab Removed; Special Apparatus Painted White.

stallation is 107 miles, all double track, on the Chicago division. On 24 miles the stops have been in use for a year. The apparatus is electro-mechanical, so called. A ramp fixed on the ties, 22 in. outside of the track rail, engages a member depending from the engine. The ramps are fixed in the rear of each automatic block signal a sufficient distance to allow room in which to stop fast trains. The ramp, when not electrified, causes an application of the air-brakes; when electrified it energizes an electro-magnet on the engine which prevents the operation of the brake-applying apparatus. There is no visual or audible signal, and no speed recorder; neither is the operation of the apparatus affected in any way by the speed of the train; though these additional features have been worked out, so that they could be readily applied.

Each ramp is 180 ft. long with a short insulated section in the middle, making virtually two contact pieces. The outgoing end of the ramp is kept constantly electrified, so that an engine moving backward, as in switching operations, would never be stopped. The ramps are made of 35 lb. standard T-iron.

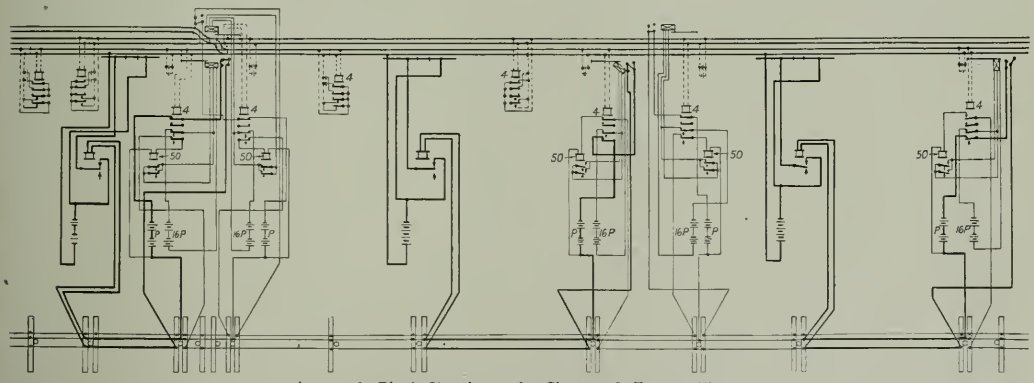
The contact member on the locomotive consists of a shoe fastened to the bottom of a vertically movable piston working against a strong spring, the whole being supported on the back end of the crosshead guides. The piston is raised three inches when it engages the ramp, the ramp being three inches higher in the center than at the point near the end where the shoe strikes it. The movement of the piston opens a valve, allowing air pressure from the air-brake train line to enter a small air cylinder in the cab of the locomotive. This pressure forces a piston upward; and this piston operates a crank controlled by an electric lock. The lock, mounted on an axle, revolves if its magnet is de-energized, but does not revolve if the magnet is energized. Revolving, an arm attached to it operates a three-ported valve, allowing air pressure from the train line to enter the operating cylinder. This opens the engineman's air-brake valve, giving a service application of the brakes; and closes the throttle. The electric lock is operated by a current from the road-side battery conveyed through a wire extending from the shoe upward through a pipe to the box in the locomotive cab which contains the lock.

Thus the absence of the electric current at a ramp, from any cause, will result in the application of the air-brakes. There is train line pressure in all pipes and a failure of pipes or their connections also causes a stop.

In the drawing, ramps are shown on the lower or eastbound track only. The wires which are added to the signal system for the operation of the stop are shown in heavy lines. The three eastbound signals shown in this drawing, it will be seen, are successively in the clear, caution and stop positions. At the signal which is at stop the circuit-breaker is open, de-energizing the relay which opens the circuit connecting with the ramp in the rear of this signal. At the other two signals the circuit-breakers connected with the signals are closed and the corresponding ramp relays hold the local circuits closed.

Immediately after the first installation was put in service, two enginemen were employed by the manufacturers as traveling inspectors, with orders to make surprise tests. In this way, check has been kept on the operating conditions developed; enginemen never knew when or where one of the traveling inspectors would board the train. The inspectors were required to report on daily forms the exact conditions met, on each train, when passing each ramp and each signal. During the entire time nothing has ever been encountered showing a false clear condition. In every case where there was a signal failure or an unnecessary stop, a careful analysis has been made to determine the exact cause. The inspectors report on each trip to the division engineer, and after investigations of any stops requiring explanation, a report is made to the superintendent, and a copy sent to the engineer of the train control company; the development of the system has very closely followed the information given in these reports. Some minor details have been changed to meet operating conditions more efficiently. There have been unnecessary or "safe" stops, but the number of these has been gradually reduced by investigating the causes and removing them.

The signal maintainers are required to report the ramp voltage on each ramp-stop report, and to test and report the ramp voltage weekly to see if there is any depreciation. The train speed has been required on ramp-stop reports, this to furnish data by which to determine whether the ramps are placed the right distances from the signals. These distances were estimated on a basis of a speed of 60 miles an hour. The reports also require information regarding the condition of the rail, whether there is sleet, rain or snow, and whether it is foggy or clear, and the direction and estimated velocity of the wind.



Automatic Block Signals on the Chicago & Eastern Illinois

Wires for train control apparatus are shown by heavy lines

As all of the ramps are fixed at or beyond the estimated necessary braking distance in the rear of the automatic block signals, and as, therefore, the engineman has no warning as to what to expect at any given ramp (except as he can see far ahead, or may be able to guess the conditions of the block which he is about to enter) the apparatus has come into use many times. In other words the system has been used not merely as an adjunct or a warning, or as a provision against emergencies, but has been worked regularly, along with the stop signals. There is no provision for warning the enginemen, to enable them to avoid being stopped by the operation of the shoe at any given ramp. In a given month for example, there were 122 cases of trains being stopped by the ramps. Of these, 107 are to be classed as normal; that is to say, the engineman found the visual signal against him.

Fifteen stops were caused by defects of apparatus, the block in advance being clear. These causes are classified as follows: two because of a broken wire on the engine magnet; one by a broken wire at the shoe; one because of wires crossed; six by the burning out of relays at the ramp; one by failure of battery; four by defective relays at the ramp.

To test the practicability of applying air-brakes safely on long trains by means of an automatic apparatus, the Chicago & Eastern Illinois has made a number of experiments; and as a result of these experiments all of the locomotives used on long and heavy freight trains have been fitted with a control device which applies the air-brakes but does not close the throttle. With the lighter locomotives used on passenger and fast freight trains, the brakes are first applied and then the throttle is shut off after the reduction in pressure has had time to reach the rear end of the train. With the long and heavy freight trains, however, it was found that the automatic apparatus closed the throttle too soon. The throttle is now in complete control of the engineman. On passenger trains and light freights, the stops made by the apparatus are regarded as satisfactory.

In order to get a good idea of the performance of the train stops in bad weather, orders were given to the maintainers not to touch the ramps or to clear snow and ice from them during last winter, nor to adjust them during the summer when track was surfaced. A recent inspection of the ramps showed that none of them had been displaced a half-inch out of line in the entire length. No damage had been done to any of the ramps by parts dragging from cars. The ramp is fixed close to the running rail and the ends of it are bent downward and safely buried under the ties.

None of the ramps shows an appreciable effect of the wear of the shoes during service of more than a year. The wear on the shoes, which are made of hard metal, has resulted in a change in the device so that new wear blocks may be inserted in them by loosening two small bolts and exchanging the old wear block for a new one. There has been no mechanical maintenance charge for ramps to date, although a dragging freight car door came in contact with one of them.

It is estimated that the battery, of 16 cells, R. S. A. Standard, will last two years, the local circuit being closed only when a locomotive is passing over the ramp.

A good example of the successful operation of the apparatus under adverse conditions is given in the report of Inspector Wamba of the trip of passenger train No. 4 on February 23, 1914, when there were snow drifts six and eight feet deep in the cuts and the temperature was about zero. The storm had begun on the morning of the day before and continued all night, snow falling continuously and drifting badly, with a strong northeast wind. The windows of the cab of the locomotive were covered with snow on the outside and with a good deal of ice on the inside, caused by the melting and subsequent freezing of snow which was drawn into the cab by suction. The engineman's clothing was so badly frozen by the snow, which was blown in and covered everything in the cab, that he had to be relieved for a part of his trip by the inspector, who had been an engineer on the road. Most of the signals were not seen at all, and dependence was placed entirely on the automatic apparatus. All of the 16 signals shown on the report indicated "proceed" except one, No. 106, at which the train was stopped by the control apparatus. After the train had been stopped, the signal was seen to be red. The train made practically its running time, the engineman declaring that he felt safe because of his knowledge of the reliability of the train control apparatus. At the end of the trip the apparatus—shoe, wiring, piping and all details—was examined and found to be in perfect condition, although the shoe was a solid mass of ice and frozen snow.

Losses of Towels from English Railway Cars.—It was stated in a police-court prosecution at Newport, lately, that the Great Western had 30,000 towels stolen from its car lavatories last year.

EFFICIENT MARKETING OF FARM PRODUCE*

By D. G. Mellor

Manager, Order, Commission and Food Products Department, Wells, Fargo & Co.

Our food products department was organized in August, last year. We are a part of the traffic department, with a manager in New York City, assisted by seven industrial agents located in Baltimore, Cleveland, Chicago, St. Louis, Kansas City, Houston and San Francisco. The territory in which the company operates is definitely divided between them. Their duties are of a very general character, and cover anything that promises to be useful to producer, dealer or consumer. They familiarize themselves with the products now obtainable in their territory, their general quality and quantity; when they mature, how packed, and where marketed. We learn what produce that might be sold to good advantage is not grown in certain districts, and endeavor to interest someone in it. We secure data regarding the kind and size of packages required by law or practice in convenient markets, and advise where they may be bought. The names of dealers, hotels, restaurants, and other consumers living in towns along our lines are tabulated and given to producers who are interested in better markets, and the names of producers located on our lines are given to dealers and others who are anxious to secure more and better produce. This starts correspondence, and the movement of fruit, vegetables, butter, eggs, etc., from the farm, not only to the large cities, but to many small towns that under ordinary circumstances would not receive any of the melons, peaches, berries, etc., grown practically at their door. This results in a quick, cheap and very general distribution and minimizes the opportunity for glutted markets in which prices are often forced below the cost of transportation.

On July 1, Wells Fargo succeeded the United States Express on the Baltimore & Ohio. When this change had been decided on the Baltimore & Ohio officials called our attention to a large new crop of particularly fine peaches maturing almost immediately at several points on their line in West Virginia, in what may be termed the Cumberland district. I went there immediately and found the crop was all it had been reported to be. We suggested that we would undertake to circularize our agents at all fair-size towns on lines we operated east of Chicago and St. Louis, and tell them about the fine fruit, when it would begin to mature, and instruct them to call upon all dealers in their cities, and leave with each one a list of the growers which we had prepared and which was sent with our circular letter. This idea appealed to the leading orchardists, and the advice was sent out within a day or two. In the circular we also called for information regarding quantity and quality and maturing date of any locally grown fruit. This data opened up additional opportunities for business, and gave advance information that enabled us to avoid over-supplying certain districts and pointed out those offering the best market. We also asked for the names of dealers in each city, and how many baskets they thought they could sell daily. This data was compiled in convenient form and given to the growers. People at each end of the line began to write those at the other end. New opportunities for trade sprang up. Two thousand carloads of fruit moved to a very large number of markets and was sold at good prices, much better than would have been possible had they gone to only a few markets. No glut occurred anywhere.

To facilitate the movement of early fruits and vegetables from southern California, south Texas near the Mexican frontier, and other districts having a favorable climate, a fleet of up-to-date refrigerator cars have been built and are operated anywhere on the company's lines. They will soon begin to move early lettuce, peas, beans, etc., from the territory farthest south to St. Louis, Chicago, New York, Boston, Philadelphia, and other large northern cities where local consumption is considerable and from

*Abstract of paper presented before the Railway Development Association, Chicago, November 11, 1914.

which distribution to less important centers can conveniently be made. As the season advances the cars are loaded at more northerly producing points. By the closest possible supervision they are kept busy practically the whole year and offer sufficient refrigerator service to move all crops that mature and require refrigerator service by passenger train from points on our lines. The work of these cars is supplemented by a considerable number of pony refrigerators that are carried in ordinary express cars in care of our regular train messengers who attend to reicing whenever necessary. For the past month they have been moving regularly from southern California loaded with the first strawberries. Later they will carry the earliest cherries from the neighborhood of Sacramento. These little boxes, about as large as a good-sized trunk, moved from California last winter and spring to practically every northern state and to many important cities in Canada, Quebec and British Columbia. They made it possible for the grower to market his crop efficiently and are coming into more general use each season.

Our food products department is also doing a great deal of work on the direct-from-farm-to-table idea, something that appeals more directly to people generally than does the work I have just spoken of. When we find someone with good things to sell at fair prices, we tell interested consumers about it. Orders and cash are given to our agents who send both to the agent at the producing point. The orders are promptly filled and shipped. All concerned are benefited. So far the number of consumers who use this marketing medium has been steadily gaining.

Each Monday morning we receive quotations at New York and some other important cities, on various kinds of produce. These prices hold good for the whole week. This data is tabulated and a weekly bulletin is sent off each Monday to agents and to people who have asked for them. Against each kind of produce we show where it can be had and how it is packed. With this data it is an easy matter to see if there is an advantage and how much. In New York City and in the Jersey suburbs we have a large number of branch offices. To each of these we send one or more bulletins, for information and distribution. A large number of individuals outside our service are also supplied. Many orders for produce are given to our agents to fill. Eggs are another commodity that moves advantageously in small lots direct from producer to consumer. During the past year we have heard from a great number of shippers and have moved many hundreds of cases. Usually 15 or 30 dozen can be had for about five cents per dozen less than the retail city price. Many families cannot use a large quantity of either butter or eggs. For such people we have shippers who put up 10 lb. of butter and 10 doz. of eggs in one package, or any other quantity that will suit better, but less will not be economical.

Farmers are putting up bushel boxes of either apples or potatoes, also boxes containing a half bushel of each. At 10 cents per quart a bushel would cost $3.20. Good potatoes are delivered in New York for 90 cents per bushel and apples from $1 to $1.50. Honey is another product with which our success has been marked. Thirty tons were shipped last season in small lots from one station in Michigan. We are advised that this successful movement has resulted in the production of 40 tons this year and that orders are coming in fast. Ham and bacon, maple sugar and syrup, country sausage, fancy cheese, buckwheat flour, and dressed poultry, either by itself or in combination boxes with eggs and butter, are popular. Chestnuts and pecans are also seasonable products that take well. Last year between Thanksgiving and New Year's we took many orders for a combination box consisting of a turkey, celery, cranberries, and sweet potatoes. This year there is a great demand for the same package.

For the purpose of developing trade in California specialties we made a rate last year of four cents per pound, with a minimum of 35 cents per package, to apply on all kinds of food products from the Pacific Coast to any point reached by Wells Fargo, the American, Adams, or United States Express. In other words, the rate applied entirely across the continent to the farthermost point in Maine. A little booklet of 20 pages, mentioning many of the products for which California is famous, was printed and distributed from our important offices east of the Missouri River. In this booklet we explained that raisins, prunes, figs, olives, nuts, oranges, and all kinds of dried and preserved fruits and vegetables would be delivered at the door for a certain price. A gallon of ripe olives cost only $1.28. Eight pounds of freshly packed prunes were delivered for $1.13. Orders were received by hundreds. Between November 1 and May 1 80,000 packages of these delicious products moved directly from producer to consumer. Many housewives learned for the first time that these home grown fruits were the best in the world. This year's booklet came out last week; already orders are coming in. Judging from results during the few days since distribution and by the numerous calls we had for the booklet before it was issued, we expect that the volume of business this year will be even greater than last.

In this direct marketing idea one difficulty developed early. That was, the inability of small families to buy much at one time of many things in almost daily use. Our buying clubs are the result of this condition. In offices, stores, factories, police and fire stations, also in post offices, men have seen the advantage to be secured through collective buying. Ten men decide that between them they can use 30 dozen eggs or 20 pounds of butter. One of them acts for the club, collects the cost of the eggs and butter from his fellows, and takes it with the order to our nearest agent. He issues a money order and sends both to the producer. The eggs and butter are promptly shipped. On arrival a division is made and each man carries his share home. All are actually doing something themselves to reduce their cost of living. They can usually save about five cents per dozen on eggs and five cents per pound on butter.

TESTS FOR COLOR BLINDNESS IN NEW SOUTH WALES

Dr. G. H. Taylor, chief medical officer of the government railways of New South Wales, reports that in examinations of men for defective vision, he is making use, with very satisfactory results, of Stilling's plates and Nagel's anomaloscope. The regular examinations on the New South Wales roads are by Holmgren's wools and Williams' lantern, but in any case which is doubtful resort may be had to these other schemes.

Stilling's plates are a series of plates arranged two on a page in book form, each plate about 4 by 3½ in. They were designed by Professor Stilling, of Strassburg. On each plate there are numbers, some 2½ in. in height, made up of a series of reddish dots, of different shades; and, forming a background for these reddish figures, is a groundwork of dots of different sizes and shades, and of such colors as the color blind are likely to confuse with colors in the figures. When a person with normal vision is shown these charts he has no difficulty in reading the numbers, but one with defective color sense, especially for red and green, finds it difficult or impossible to distinguish the color of the figures from that of the background; and so he cannot read the figures.

The anomaloscope is made by Dr. Nagel, of Berlin. One of them was shown by Dr. Williams at the meeting of the Ophthalmological Section of the American Medical Association at Atlantic City last June. It is very useful in testing doubtful cases, but is not available for use in the routine examination of large numbers of men on account of the care necessary in its manipulation and the difficulty of transporting it safely. It uses pure prismatic colors, and is so arranged that as one looks into the eyepiece he sees a circular field, the lower half of which is lighted by a pure sodium yellow, which can be varied in intensity, while the upper half is lighted by a mixture of pure red and green. These colors, in certain proportions, make a yellow which corresponds to the yellow in the lower half of the field, if it is of a certain brightness.

The tests are made (*a*) by seeing what mixture of red and green the person under examination will make to match the

sodium yellow, and then (*b*) by seeing what brightness of the yellow he will make to match the red-green mixture, the mixture being varied to show a marked red, or a marked green. The normal eye cannot make a match under these last two conditions, but the person with defective vision is satisfied with a match made of the two halves of the field by altering the intensity of the yellow.

Dr. Taylor says that in the year 1913 the number of candidates for employment on the New South Wales lines who were rejected because of defective color sense was 800 out of a total of 13,803 applicants, or 5.8 per cent; and for the past six years the average percentage rejected was 5.5. Furthermore, in a study of 200 consecutive examinations this last year he found 15 rejections, or 7.5 per cent. Of these 15, seven, or nearly one-half, passed Holmgren's wool test successfully, but all failed when tested by Williams' lantern.

In the early years of the investigation of color blindness—a physical defect which, broadly speaking, is congenital and incurable—it was everywhere accepted as a fact that among men (not including women) the universal percentage of color-blinds was four; in any large number of men, one in twenty-five would always be found defective. Whether these higher percentages reported from Australia are the result of more searching tests or are due to some difference in Australian subjects, as compared with men examined in Europe and America, does not appear.

In all of the 200 examinations just referred to, Stilling's plates were used; and, in addition, 52 consecutive cases were tested with the anomaloscope. Writing concerning these cases, Dr. Taylor says:

"The method of examination in this railway service is by regulation confined to the modified Williams' lantern and Holmgren's wools. Men in the service and employed on the running lines are periodically examined by the lantern only.

"My method of examining by Stilling's plates is to take candidates in batches of four, after the examination by the wools and lantern. A large majority of partial failures was in mistaking the 3 for an 8, or the 7 for a 2. In a second attempt they named the numbers correctly. A failure was recorded when a man did not correct his mistake, although he may have named one of the two numbers correctly. Red-green-blinds by the lantern are in my experience always convicted of color blindness by Stilling's plates. A candidate who can name all of the plates without hesitation is rare, although I have seen an uneducated laborer do so. I have examined a very large number of candidates by Stilling's plates. In my opinion it is an admirable method of testing color sense, and is of more assistance to the examiner and much more reliable than is Holmgren's wool test. It is indeed the best single test I have seen. But it would be unwise to trust entirely to Stilling's plates, as occasionally a feeble color sense is not detected by that method, and a defect by Stilling's method may not be so clearly defined to an ordinary observer as by the lantern. The education of a defective color sense by Stilling's test depreciates the value of the test, as it does with the wools, the lantern and the anomaloscope, but there is a limit in each person beyond which the education of a defective sense cannot go.

"Complete blindness in the numbers of any of Stilling's first five groups should, in my opinion, be enough to reject a candidate, although he is able to pass the lantern test without mistake.

"Stilling's method is of great assistance in determining the fate of green-white men. A green-white man by the lantern, in my opinion, if he fail completely in any plate of Stilling's first nine groups should be rejected without the right of appeal. If he fail in the lantern test, but does not fail in Stilling, he should be allowed a re-test. If he fail only in Stilling he should be allowed a re-test. Every color tester of wide experience must have seen, as a rare case, a green-white man convict himself in a second examination of red-green-blindness by the lantern.

"When large numbers of men are examined, it would be necessary that each pair of numbers in Stilling's plates should be separated from the book and pasted on a flat surface and used as a card.

"With the anomaloscope, persons with a normal color sense and trained in color will be found to vary on different days. Some persons are more consistent in their appraisement than others.

"Has the tobacco or alcohol habit an equal effect upon the appraisement of color in persons with a keen and in persons with a feeble sense of color? Is a temporary disorder of body or mind, which may slightly disturb the judgment of an ordinary man, more liable to cause error in color discernment in a person with a feeble sense than in a person with a keen color sense? Is it safe to allow a person who has at any time been convicted of having a feeble color sense to act as a driver or fireman on the running lines? These are interesting questions concerning which science has not yet spoken definitely. But the examiner can take no risk."

Dr. Taylor sums up his experience with Stilling's plates by the statement that in his opinion these plates should replace Holmgren wools, as a test for color vision in the railway service, and be used in conjunction with the Williams lantern, as modified by him.

STRIKE ON THE ST. LOUIS SOUTHWESTERN

As noted in a recent issue the circuit court of the city of St. Louis (Mo.) has issued an injunction restraining the firemen, trainmen and conductors' brotherhoods on the St. Louis Southwestern from striking on account of the discharge of a conductor for intoxication. The following extracts from the court's opinion reveal some of the methods adopted by the brotherhood to prevent the exercise of discipline by the management, and their manner of taking a strike vote. The decision relates the history of the case, showing that after Conductor Tillman had been discharged for intoxication he filed a grievance with the committee of the Order of Railway Conductors, which in due course reached the defendants in the case, the chief officials of the federated organizations on the railway. A complete investigation was held in the president's office, and a large amount of testimony was taken on both sides. That testimony was printed and distributed in booklet form by the railway company on September 4, but on September 2 the officers of the organizations ordered a strike ballot of the engineers, conductors, firemen and trainmen, and although they were informed by President Britton that he would have the testimony printed in full and furnished to all the members of the order, they declined to wait for the testimony. The result of the vote by the engineers was against a strike. The other three orders voted for a strike, the conductors by a very small majority.

The court says:

"The method of taking the vote was to send a messenger to call upon the members of the order, and after they had voted to deliver the vote to the messenger, to be returned to the defendants. In most cases they declined to let the members take the vote and brief home with them or to have any chance to examine them, except right there at the time.

"The strike ballot purports to convey to the members of the orders the facts which had come into the possession of these defendants with reference to the intoxication of the conductor at the time he was alleged to have been intoxicated.

"The ballot sent out was a printed document, purporting to present to the members at least a synopsis or resumé of the facts and testimony that the defendants had taken, and to be a fair presentation of the facts to the members, so that they could vote intelligently, and that undoubtedly is a necessary requirement, because the members themselves know nothing about the proceeding except what they may gather in a general way, and from this statement; and they undoubtedly relied very much upon what this strike ballot contained in deciding how they should vote.

"It was a matter of a good deal of importance with them whether a strike should be ordered or not, and the statement should contain a fair synopsis of the testimony and of all the facts.

"After the vote had been taken and reported, and before it was declared, the pamphlet of the 4th of September, which was published by the railway company, was sent out, containing all the testimony. There was an effort then made by the members of the orders, or quite a number of them, to have either a new vote taken, or to have the strike declared off. They held meetings at points on the road, and some of them telegraphed and some sent by letter requests to have their votes changed. The committee refused to accept those orders to change any of the votes. The testimony shows that they claimed that before they were received the votes had already been canvassed, counted and the result declared. I do not think that the testimony establishes that fact. Some of those telegrams at least came before that was done. I think that was not done until about the 15th or 16th of September. In passing it is well enough to say that there is no question but that a member should have a right to have his vote changed at any time before the vote is canvassed and the result finally declared. The method of doing that should only have required such means as would properly and certainly inform the committee that that particular member wanted his vote changed, whether by telegram, a letter or in person; provided the committee was assured of the verity of the demand.

"Finally, a large number of the members of these orders came to St. Louis, and there was a meeting held at which some of the defendants were present a part of the time, and the result was that the members who came here did not succeed in any way and they were informed by the chief officer who had the right to declare a strike that they had received the authority to do so, and he was going to do it whatever might happen. I think his language was that he would declare a strike if only one man went out and the orders went to perdition.

"Having failed to get any relief in that way, certain members filed this suit to enjoin the defendants from declaring a strike on the vote which had been taken. I think there were five members to begin with, all conductors. Afterwards a large number of the members sent their written requests to counsel representing the plaintiffs, to have their names entered as plaintiffs. Afterwards quite a number of those made affidavits stating that they wanted their names withdrawn as plaintiffs.

"A comparison of the matter set out in the strike vote or strike ballot and the printed testimony contained in the pamphlet of September 4 last and a careful consideration of all the testimony leave no doubt whatever in my mind that the matter set forth in the strike ballot does not present to the members such a statement as would enable them to intelligently pass upon the question of the intoxication of Mr. Tillman.

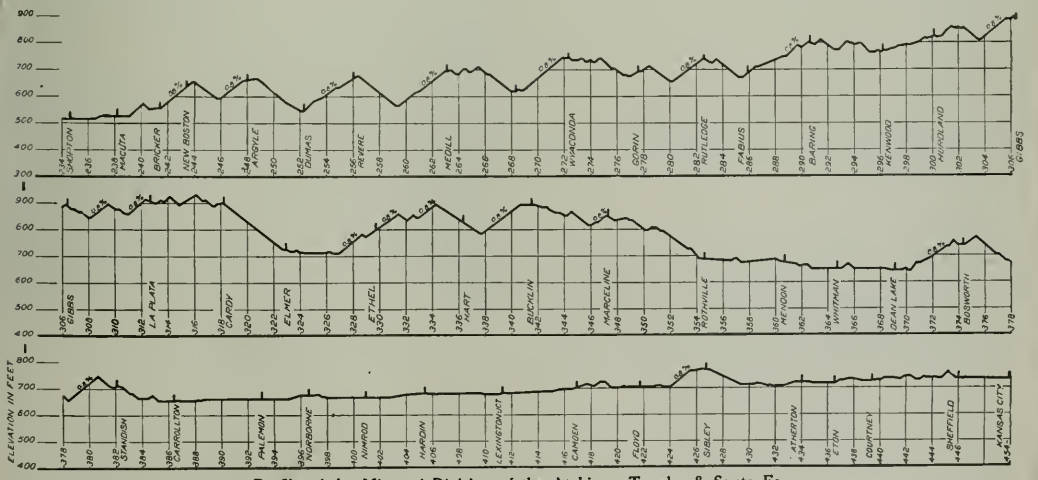
"The members in a case of this kind must necessarily depend to a large degree upon the officials who investigate it and they are entitled to a fair statement of the facts. If they attempt to give the facts which they ought to do, because these members who vote act somewhat in the capacity of a jury, as it were, they ought to give the facts on both sides so the men can vote intelligently and determine for themselves whether a strike should be ordered or not. It must be a two-thirds vote. The engineers, as I have stated, voted not to go out, and the conductors, I find from the testimony, so far as it bears on that, had a very small majority.

"The conclusion, therefore, is that that paper called the strike vote or ballot, does not contain that full and fair statement that it should, which necessarily results in a finding in favor of the plaintiffs. A temporary injunction will be granted on plaintiffs' giving a bond for $3,000.00. The injunction will not interfere with the defendants' taking another vote if they choose to do so."

PERFORMANCE OF SANTA FE BALANCED COMPOUND PACIFIC TYPE LOCOMOTIVE

In the early part of the present year the Atchison, Topeka & Santa Fe received 35 balanced compound Pacific type locomotives, some of which were put in service on the Missouri division. These locomotives, which were illustrated and described on page 1519 of the June 19, 1914, issue of the *Railway Age Gazette*, have a total weight of 277,700 lb., develop a tractive effort of 34,000 lb. and, owing to the continually increasing weight of passenger trains, are being used to replace balanced compound Atlantic type locomotives, on this division. As will be seen from the profile the Missouri division is very hilly with a ruling grade of .8 per cent; and from Shopton, Ia., to Carrollton, Mo., a distance of 152 miles, about two-thirds the length of the division, the curves are numerous with but little straight track. While none of the grades are long, many are too long to be considered as momentum grades.

On September 24 a test run was made with one of the Pacific type locomotives on train No. 7, between Shopton, Ia., and Big Blue Junction, at which point the Santa Fe joins the Kansas City Terminal. No. 7 is a fast express and mail train leaving Chicago at 2:15 a. m.; it is delivered to the Missouri division at Shopton, which point it is scheduled to leave at 8:16 a. m. The test train consisted of one dynamometer car, one test car, two mail cars, 10 baggage and express cars, three coaches, and one business car, making a total of



Profile of the Missouri Division of the Atchison, Topeka & Santa Fe

18 cars, weighing 1,085 tons. On the first district between Shopton and Marceline, a distance of 112.7 miles, the train is scheduled at an average speed of 40 miles an hour, including two regular station stops. Over the second district from Marceline to Big Blue Junction, a distance of 99 miles, the schedule speed is 37 miles an hour including three stops. The test train left Shopton at 8:21 a. m., five minutes late; arrived at Marceline at 11:07 a. m., two minutes late and left that point at 11:14, four minutes late. At Deans Lake, 21 miles west of Marceline the train was on time and remained so until after passing Carrollton. It left Lexington Junction at 12:45, seven minutes late, but made up this time before passing Eton and finished the run on time, arriving at Big Blue Junction at 1:42 p. m. Owing to a number of recent slides and slight washouts there were several slow orders, a total delayed time of 28 min. occurring between terminals. In ascending what is known as Ethel hill, a slow order was encountered which made it necessary to reduce the speed to 10 miles an hour on the hardest part of the grade, but the engine accelerated the train to a speed of 28 miles an hour before reaching the top of the hill two miles beyond. Including stops the train made an average speed over the division of 40 miles an hour; deducting stops the average speed was 43 miles an hour. The maximum speed attained was 65 miles an hour and with one exception the engine was able to keep the speed above 35 miles an hour on the most difficult ascending grades. In ascending New Boston hill the speed was reduced to 26 miles an hour on account of the brakes sticking on two cars. On the straight and practically level track of the second district the engine had no difficulty in maintaining a period of 47 miles an hour. During the trip the engine consumed 13.1 tons of coal and used 16,140 gal. of water.

ENGINEMEN'S EXPERIENCES—YOUTHFUL RECKLESSNESS*

By F. Henry

My first experience hauling a passenger train (or in fact any train) was when I had been firing for about three or four years. Promotions were slow in those days. I was called to go to a certain city some fifty miles distant, and pilot a B. of L. E. excursion train, consisting of twelve coaches and two baggage cars, to a lake resort situated on our line. The train had started from a point on another road, and none of the men being familiar with the road over which they were about to go, a pilot was necessary. When I reached the aforementioned city, the train was waiting for its pilot. As I stepped upon—or rather climbed upon the engine, it being a large class X engine with 80 inch drivers—the engineer said to me, "Are you an engineer or a conductor?" The first thought that entered my mind was, he wants to know whether I am one of the engine or train crew; sometimes a conductor was sent as a pilot, and sometimes an engineer; so I answered offhand, "engineer." "Here, take her; I am going back with the boys," was his answer. And before I could stop him, he had disappeared in the coaches in the rear.

Well, I realized that I was up against it, and it was up to me to get that train with its thousand and more souls safely to their destination.

We started; the roadbed was good, and I had right over all opposing trains; the engine rode nicely, and I gave her her head. The first stop was twenty-five miles from the starting point, and before I realized it, I was there; after coming to a stop, I looked at my watch; and I had made the twenty-five miles, from a stand-still, in nineteen minutes. I thought my watch must have stopped, and asked the fireman to give me the right time. He did so, and I found my watch was correct.

Not being familiar with the engine I was running, and not having taken into consideration the large size of the driving wheels, I had made, I think about the fastest time that had ever been made over that piece of track, and reached my destination without mishap. Needless, to say, there were many comments from the occupants of the coaches in regard to the nerve of the "engineer" who was pulling them.

Years passed, and working conditions not being to my liking, I crossed the Continent and took a position on another road.

There being a shortage of engineers, I was called to go out, the first night after my arrival, without having had a chance to learn the road or in any way familiarize myself with the engines in use, or learn their system of doing things. My trip started with sea level, and ended high up in the mountains; I arrived safely, for a wonder. Then having had about half the sleep I needed, I was called to take a train of 13 coaches, back to the place I had started from the night before.

It was a night of a winter month, dark and stormy; however, I reached my destination without mishap; but I have often wondered what would have been the thoughts of those 1,000 people who were depending on me for their safety, could they have known that the engineer pulling them half the time didn't know where he was.

General Sherman said "War is hell." Railroading is not hell, but oftentimes General Sherman's *bon mot* comes to mind. Think of the collisions and derailments now and then, reminding the engineer that any moment may be his last. Even when we shut our eyes to the dangers there are plenty of rough places. We get in from a run, eat and go to bed for a much needed rest; we perhaps have bought tickets for a theater, or if Sunday, start with our family for church; the call boy is after you; it doesn't matter where you are, he comes for you, and you have to go. Never a minute to call your own; never can count on going anywhere; or doing anything like other people. It is a wonder an engineer's nerves do not go all to pieces; but they don't. There are few railroad managements that recognize the importance of the engineer's position; the Pennsylvania is the only one I know of. On that road engineers are consulted when a new time table is being prepared. If on the road, and the superintendent wants to know what time you can get to such and such a point, so he can arrange a meet to advantage, he asks the engineer; not the conductor, as is done on most roads. If a good run is made, the engineer is congratulated; not the conductor.

*This is the third of a series of articles, made up of useful hints to locomotive runners, which were written in connection with the prize competition of several months ago. The first and second articles of this series were printed September 25 and October 2.—Editor.

AUTOMATIC MAIL EXCHANGE SYSTEM

With the contract awarded to the Hupp Automatic Mail Exchange Company, Chicago, by the Chicago & Alton for the installation of its mail exchange system on mail cars and 33 mail exchange stations between Chicago and St. Louis a new step has been taken in the transfer of mail from moving trains. The limit of mail exchanged under speed has been one bag per station, but with the Hupp system, as it is now developed, 12 bags may be caught at each station. The interesting feature of this system is that the discharging and receiving of the mail is done automatically. The mechanism performing the work is driven from a worm attached to the middle of one of the axles of the mail car. This worm engages with the worm wheel on the driving shaft of the mechanism, which is provided with a double knuckle and slip joint to allow for the oscillation and swerving of the body of the car. It is geared to operate cams 124 times slower than the car axle revolves.

The mechanism is thrown into gear by means of a trip located outside of the rail on the roadway, just 390 ft. from the exchange station. When the machinery is set in motion the car door begins to open and continues opening while the train covers a distance of 180 ft. The next step is the opening of the receiving arms, which are attached to the side of the car.

They open at the forward end in the manner of a gate, and become fully extended as the train travels another 180 ft. At the same time the delivery chute is automatically moved out of the door and by the time it reaches the station receiving trough, as shown in the illustration, the bottom of the delivery chute is at an angle of 45 deg., and the mail bags slide from the car by their own weight. The mechanism then brings the chute back inside of the car, closes in the receiving arms and closes the

Hupp Automatic Mail Exchange System Receiving Mail from Cranes

door. By the time the train has traversed the third 180 ft. these arms have been returned to their original position at the side of the car. It is necessary for the car, however, to travel several hundred feet more before the cam wheel completes its revolution and is automatically locked out of action. The receiving arms start to extend outward about 30 ft. before the delivery chute starts out of the car, but the delivery chute returns before the receiving arms are folded. It takes 1,080 ft. for the mecha-

Hupp Automatic Mail Exchange System Delivering Mail Into Receiving Trough

nism to perform a full cycle, but it is so arranged that the car passes only 780 ft. from the time the door begins to open until it is entirely closed.

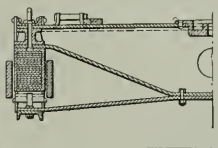
The pouches or sacks to be caught are placed in crane clamps of special design, which hold the sack at the top and bottom. When the pouch is taken from the crane the clamps swing automatically out of line with the travel of the train, thus tending to eliminate the wear and tear of the pouches. With this device it is not necessary for any of the mail clerks to go near the door while the train is running. They are warned the instant the mechanism is tripped by signal from a 6-in. gong. They are only required to place the sacks in position in the chute for delivery. In case it is not desired to discharge or receive any mail at the prescribed stations a lever is provided by which the mechanism can be thrown out of gear, and it also permits of reversing the gear so that the car may be used in either direction.

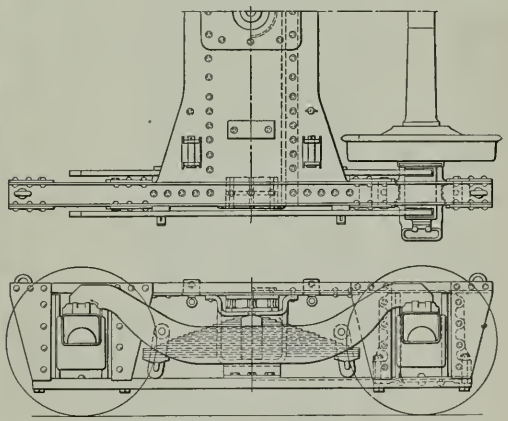
As will be noticed from the photograph, the delivery chute deposits the mail pouches in a trough along the side of the track, the drop being less than a foot. The mail bags slide along this trough until the force of their momentum is expended, which is done with practically no damage to the contents of the bag. This trough is about 150 ft. long. The advantages claimed for this system are that a greater amount of mail may be handled at the stations without stopping; that the apparatus is automatic and eliminates danger to the mail clerks when catching mail; that the mail will be more carefully deposited at the station, and that on many roads it will eliminate stops that are now necessary for the collection of mail. This apparatus will handle mail at a speed of 60 miles an hour.

STRUCTURAL STEEL TENDER TRUCK

A structural steel tender truck of the equalized pedestal type has recently been introduced by the Canadian Locomotive Company, Ltd., Kingston, Ont. The construction has been developed and patented by Messrs. Casey and Cavin, with the view to increasing strength and durability, and at the same time effecting a considerable reduction in weight.

Owing to the inherent tendency to internal strains and shrinkage cracks which exists in cast steel bolsters, much trouble has been experienced on many Canadian roads with the present type of equalized pedestal truck. In order to preserve an adequate factor of safety the bolster castings are necessarily much heavier than they would be if a more reliable material were used. The





Structural Steel Pedestal Tender Truck

new truck is built up, with two exceptions, entirely of rolled sections in which the strength of the material is uniform and definitely known. The bolster is of pressed steel, flanged with a

deep section at the center and decreasing in depth toward the ends. It has a large cover plate hydraulically riveted to the flanges at the top. The ends of this plate, which are secured to the side frames, are considerably wider than the bolster, thus forming a strong diagonal bracing for the whole truck structure. Apertures are provided in the cover plate for the center casting and brake hangers. The hangers are supported from lugs punched and bent from the cover plate and forming an integral part of it. Both the top and bottom rails of the side frames are of channel sections and are connected by plates which form the pedestals for the journal box. The ends of the bolster at the spring seat are stiffened by light cast steel fillers inserted between the bolster and cover plate.

Owing to the limited space between the spring and equalizers a drop forged T-head hanger has been substituted for the usual type of U-hanger used on this type of spring suspension. These hangers extend through slots in the ends of the springs and are held in position by gibs in the manner commonly used in driving spring suspension. The saving in weight effected by this construction is claimed to be about 1,500 lb. per truck, making a total of 3,000 lb. reduction in dead weight per tender.

COLE HOT BLAST STOVE

One field in fuel economy has been overlooked on many roads, and that is the heating of small stations, freight houses, signal towers, etc., which are heated by the common, ordinary stove. The Cole Manufacturing Company, Chicago, has a stove on the market for such service which is claimed to save one-third of the fuel that would be consumed in any lower draft stove of the same size with soft coal, slack or lignite. A report of the service that one of the stoves rendered in a station having an interlocking plant in the office in a small town in Central Illinois states that the fuel consumption for heating was reduced from 30 to 35 tons to 15 to 18 tons, or about 50 per cent. This multiplied by the number of stations and similar buildings where stoves are used would represent a saving in fuel that should not be overlooked and on some of the larger roads would amount to $75,000 or $100,000 per year.

Cole Hot Blast Stove Showing Interior Arrangement

The special feature of the Cole stove and that which it is claimed is responsible for its economy, is the top hot blast draft which admits the air to the top of the fire rather than through the grate, as is generally the custom. The illustration shows its construction clearly. It consists of a double shell and a boiler plate bottom of air tight construction. The fire pot and lining are of cast iron and are supported by legs, which simply rest on the bottom of the stove with no fastening whatever. The grate is cone shaped. The ashes are removed through the flap door shown at the base of the stove, the joints being ground in order to maintain an air tight fit. The fuel is admitted through a similar door at the top of the stove. The air is admitted through a damper opening at the top of the stove and conducted down to the top of the fuel bed by the pipe shown in the illustration. This furnishes the air where it is most needed and insures the complete combustion of the gases driven off from the coal.

The stove is easily maintained. A new fire pot may be dropped into place by removing the top of the stove, which is held in place by three bolts. The cost of maintenance, as shown by one of the northern roads which has had over 1,000 of these stoves in service for about 10 years, is about 39 cents per stove per year. It is also claimed that these stoves will hold a fire for 36 hours without attention with either soft or hard coal. Advantages are also claimed from a fire risk standpoint, a special anti-puffing draft being supplied to eliminate explosions that sometimes occur in such stoves; in addition there is no opportunity for live coals to fall from the stove, as the fuel door is at the top.

FEDERAL ACCIDENT COMPENSATION LAW

The total number of claims filed during the first five years of the Federal accident compensation law was 14,963, of which 14,046 were allowed, 911 disallowed, and 6 were still under consideration at the end of that period. Of the cases allowed 437 were for fatal accidents. The total compensation paid for all accidents during the five years amounted to over $1,800,000. Of this more than $732,000 was paid to 6,315 employees of the Isthmian Canal Commission.

In the fiscal year 1912-13 the average compensation reported for 3,320 non-fatal and 56 fatal cases was $107 and $661 respectively. Of the non-fatal cases 996 were Isthmian Canal Commission employees, who are largely unskilled and are exposed to great hazard. Of the fatal cases 11 were Isthmian Canal and 45 other employees, the compensation averaging $410.77 and $722.31 respectively. The failure to recognize properly permanent partial disability results in inadequate compensation in many cases. Thus in a case of the loss of a right arm the injured workman received less than $50, while in three cases of the loss of both legs, occurring during the third year, the average compensation was $377.

This accident law, passed on May 30, 1908, providing compensation for accidents to certain employees of the Federal government, has now been in force five years. It was the pioneer general accident compensation law in this country, but since its enactment 24 states have made provision for compensation in some form, all of them, however, on a more liberal basis. It is estimated that 95,000 persons are covered by the provisions of the law, somewhat less than one-fourth of the civilian employees of the federal government. The act is administered by the Secretary of Labor, except as it affects employees of the Isthmian Canal Commission. It allows compensation only for accidents sustained in the course of employment without negligence or misconduct, causing disability exceeding 15 days or resulting in death. Compensation is on the basis of full wages, but payment is limited to one year even in cases of death and total permanent disability.

General News Department

Citizens of Port Huron, Mich., have subscribed $100,000, which is to be offered to the Grand Trunk Railway to induce the road to rebuild the shops in that city recently destroyed by fire.

The American Concrete Institute will hold its eleventh annual convention, February 9-12, 1915, at Chicago, Ill. The work of the convention will cover concrete roads, sidewalks and bridges, concrete and reinforced concrete tests and design, concrete art and architecture, and plant management and costs.

The owners of the Atlantic Southern, extending from Atlantic to Villisca, Iowa, 35 miles, have given public notice of their intention to discontinue operation on December 31, claiming that the road has been operated at a loss. It is reported that the people in the towns along the line are preparing to enter a protest before the State Railroad Commission against the closing of the line.

Members of the Order of Railway Conductors employed on the St. Louis Southwestern are taking a second strike vote to determine whether they shall call a strike in the event a conductor discharged over a year ago for intoxication is not reinstated. A strike vote was taken some time ago, but the calling of a strike was enjoined by the state circuit court on the petition of a number of conductors who claimed that the strike ballot which was issued contained a one-sided statement of the controversy arising from the discharge of the conductor. The court, in enjoining the taking of a strike vote, said the officers could order a second vote if they desired. The conductors who took the matter to the court have been expelled from the Order of Railroad Conductors; and it is said that some enginemen have suffered for their independence, in the same way.

The Chicago, Milwaukee & St. Paul cleaned and disinfected 5,000 stock cars between November 12 and November 23. It is also cleaning and disinfecting all its stock yards in quarantine territory, in accordance with government orders issued as a precaution against the spreading of the hoof-and-mouth disease. This order reads in part: "No railroad cars or boats, within the area hereinbefore quarantined, which have carried livestock shall be moved interstate until the said cars or boats have been cleaned and disinfected with a 5 per cent solution of carbolic acid, or a 3 per cent solution cresol compound, U. S. P., or other disinfectant permitted by the chief of the Bureau of Animal Industry." The cost of cleaning and disinfecting stock cars is $3 for a single-deck and $4 for a double-deck car. Other roads carrying stock are also taking prompt action in stamping out the disease.

Ralph Peters, chairman of the railroads' committee on mail pay has published a letter, which he has written to the chairman of the Senate committee on post offices and post roads, summarizing the arguments which the committee believes should induce Congress to reject both of the bills now before it designed to revise the method of payment for the transportation of the mails. The Moon bill is wholly objectionable; and the Bourne Committee's proposal, while in many respects acceptable to the railroads, will be opposed by them because its main feature, calling for payment by space in cars instead of by weight, is objected to as an untried experiment; and also because the rate per linear foot is too low. The railroads prefer that the present basis of payment (by weight) should be retained, the injustice to the roads being remedied by (a) weighing the mails every year instead of once in four years; (b) relieving the roads from performing side service, delivering mail bags to post offices, etc., and (c) payment for all cars used for distributing the mails. Under the law as it now stands a road receives a fixed sum for the use of a post office car if it be of full length; but for a part of a car, no space payment whatever is made.

Peter Hoffman, coroner of Cook county, Illinois, and also chairman of the Cook County Public Safety Commission, has issued a report for the year 1913, showing a reduction of 108 in fatalities on steam railroads in the county during the year, and a reduction in the same time of 21 in the street car fatalities. With the report he discussed the trespassing question and announced that the commission proposed to take steps toward influencing legislation to prohibit trespassing. Coroner Hoffman pointed out the large number of trespassers killed on railroads in the United States, saying: "By far the greater number is drawn from the resident population, laborers and others who make the tracks a thoroughfare on their way to and from work, or who walk upon the tracks when the public highways are muddy, or to make a short cut. An analysis of the character of fatalities on railroads in Cook county indicates clearly the direction which must be taken in the future. Of the 360 deaths in 1913, nine were passengers, 132 were employees and 219 were trespassers. It is up to the state and community to eliminate the useless deaths among trespassers. To that end the safety commission has taken steps toward the drafting of an anti-trespassing bill."

New York-San Francisco Water Lines

J. C. Lincoln, chief of the traffic bureau of the Merchants' Association of New York City, in announcing the abolition of numerous special freight rates on commodities by railroad to the Pacific Coast, which results in advances in the charges on these commodities, prints the following schedule showing sailings of vessels from New York to the Pacific Coast through the Panama Canal:

American-Hawaiian Steamship Company—26 vessels—To San Diego, Los Angeles Harbor, San Francisco, Portland, Seattle and Tacoma; sailing every 5 days; time in transit to San Francisco, 23 days.

Luckenbach Steamship Company—7 vessels—To Los Angeles Harbor and San Francisco; cargo for North Pacific Coast ports transshipped at San Francisco; sailing every 10 days; time in transit to San Francisco, 27 days.

Atlantic & Pacific Steamship Company, W. R. Grace & Company, agents—4 vessels—To Los Angeles Harbor, San Francisco, Portland and Puget Sound; sailing every 14 to 18 days; time in transit to San Francisco, 20 days.

Arrow Line, A. H. Bull Steamship Company, agents—3 vessels—To Los Angeles Harbor and San Francisco; sailing every 20 days; time in transit to San Francisco, 24 days.

Sudden & Christianson Steamship Company, D. B. Dearborn & Company, agents—6 vessels—To San Pedro, San Francisco and Seattle; sailing every 20 days; time in transit to San Francisco, 23 to 25 days.

Tolls amounting to $735,182 were collected from vessels using the Panama canal in the three months ending November 1. Before the canal was open to merchant ships, $11,610 had been collected on barge traffic, making the gross income to November 1 total $746,792. In October 45 vessels passed through southbound and 40 northbound, paying $377,000.

American Society of Mechanical Engineers

The annual meeting of the American Society of Mechanical Engineers, which will be held in the Engineering Societies building, New York, on December 1-4, promises to be of more than ordinary interest. The Railroad Session will be held on Wednesday afternoon to consider a report on "Steam Locomotives of Today" This was published in our issue of November 20, page 947. The indications are that it will prove to be a most successful session, as a large number have already signified their intention of being present and taking part in the discussion. Another paper which will be of special interest to railroad men is one by Robert W. Hunt on "The Mechanical Elimination of Seams in Steel Products, Notably Steel Rails." This will be presented at the Iron and Steel Session, which meets on Thursday afternoon at 2 o'clock. At this session a paper on "Factors in Hardening Tool Steel" will also be presented and there will be a topical discussion on alloy steels.

New York Railroad Club

At the meeting of the New York Railroad Club in New York on November 20, Frederick C. Syze, trainmaster of the Baltimore & Ohio at St. George, Staten Island, N. Y., was elected president, succeeding George W. Wildin. Other officers elected were: Burton P. Flory (N. Y. O. & W.), first vice-president; James Milliken (P. B. & W.), second vice-president; A. J. Stone (Erie), third vice-president, and R. M. Dixon, treasurer. The report of the secretary shows that during the year the club had gained 318 new members and that on November 1, the membership was 2,364.

MEETINGS AND CONVENTIONS

The following list gives names of secretaries, dates of next or regular meetings, and places of meeting.

Air Brake Association.—F. M. Nellis, 53 State St., Boston, Mass. Next convention, May 4-7, 1915, Hotel Sherman, Chicago.

American Association of Demurrage Officers.—A. G. Thomason, Demurrage Commissioner, Boston, Mass. Annual convention, April, 1915, Richmond, Va.

American Association of Dining Car Superintendents.—H. C. Boardman, D. L. & W., Hoboken, N. J. Next meeting, October, 1915.

American Association of Freight Agents.—R. O. Wells, Illinois Central, East St. Louis, Ill. Annual meeting, May 21-24, 1915, Richmond, Va.

American Association of Passenger Traffic Officers.—W. C. Hope, C. R. R. of N. J., 143 Liberty St., New York.

American Association of Railroad Superintendents.—E. H. Harman, Room 101, Union Station, St. Louis, Mo. Next meeting, May 20-21, 1915, San Francisco, Cal.

American Electric Railway Association.—E. B. Burritt, 20 W. 39th St., New York. Annual convention, October, 1915, San Francisco, Cal.

American Electric Railway Manufacturers' Association.—H. C. McConnaughy, 165 Broadway, New York. Meetings with American Electric Railway Association.

American Railroad Master Tinners, Coppersmiths and Pipefitters' Association.—W. E. Jones, C. & N. W., 3814 Fulton St., Chicago. Annual meeting, Chicago.

American Railway Association.—W. F. Allen, 75 Church St., New York. Next session, May 19, 1915, Atlantic City, N. J.

American Railway Bridge and Building Association.—C. A. Lichty, C. & N. W., Chicago. Next convention, October 19-21, 1915, Detroit, Mich.

American Railway Engineering Association.—E. H. Fritch, 900 S. Michigan Ave., Chicago. Next convention, March 16-18, 1915, Chicago.

American Railway Master Mechanics' Association.—J. W. Taylor, 1112 Karpen Bldg., Chicago. Annual meeting, June 9-11, 1915, Atlantic City, N. J.

American Railway Safety Association.—L. F. Shedd, C. R. I. & P., Chicago.

American Railway Tool Foremen's Association.—Owen D. Kinsey, Illinois Central, Chicago. Annual meeting, July, 1915.

American Society for Testing Materials.—Prof. E. Marburg, University of Pennsylvania, Philadelphia, Pa.

American Society of Civil Engineers.—Chas. W. Hunt, 220 W. 57th St., New York. Regular meetings, 1st and 3d Wednesday in month, except June, July and August, 220 W. 57th St., New York.

American Society of Engineering Contractors.—J. R. Wemlinger, 11 Broadway, New York. Regular meetings, 2d Thursday in month, at 2 P. M., 11 Broadway, New York.

American Society of Mechanical Engineers.—Calvin W. Rice, 29 W. 39th St., New York. Annual meeting, December 1-4, 1914, New York.

American Wood Preservers' Association.—F. J. Angier, B. & O., Mt. Royal Sta., Baltimore, Md. Next convention, January 19-21, 1915, Chicago.

Association of American Railway Accounting Officers.—E. R. Woodson, 1300 Pennsylvania Ave., N. W., Washington, D. C. Annual convention, April 28, 1915, Atlanta, Ga.

Association of Manufacturers of Chilled Car Wheels.—George W. Lyndon, 1214 McCormick Bldg., Chicago.

Association of Railway Claim Agents.—C. W. Egan, B. & O., Baltimore, Md. Annual meeting, third week in May, 1915, Galveston, Tex.

Association of Railway Electrical Engineers.—Jos. A. Andreucetti, C. & N. W., Room 411, C. & N. W. Sta., Chicago. Annual meeting, October, 1915.

Association of Railway Telegraph Superintendents.—P. W. Drew, Soo Line, 112 West Adams St., Chicago. Annual meeting, June 22-25, 1915, Rochester, N. Y.

Association of Transportation and Car Accounting Officers.—G. P. Conard, 75 Church St., New York. Next meeting, December 8-9, Richmond, Va.

Bridge and Building Supply Men's Association.—L. D. Mitchell, Detroit Graphite Co., Chicago, Ill. Meetings with American Railway Bridge and Building Association.

Canadian Railway Club.—James Powell, Grand Trunk, P. O. Box 7, St. Lambert (near Montreal), Que. Regular meetings, 2d Tuesday in month, except June, July and August, Windsor Hotel, Montreal, Que.

Canadian Society of Civil Engineers.—Clement H. McLeod, 176 Mansfield St., Montreal, Que. Regular meetings, 1st Thursday in October, November, December, February, March and April. Annual meeting, January, Montreal.

Car Foremen's Association of Chicago.—Aaron Kline, 841 Lawler Ave., Chicago. Regular meetings, 2d Monday in month, except July and August, Lytton Bldg., Chicago.

Central Railway Club.—H. D. Vought, 95 Liberty St., New York. Regular meetings, 2d Friday in January, May, September and November. Annual meetings, 2d Thursday in March, Hotel Statler, Buffalo, N. Y.

Engineers' Society of Western Pennsylvania.—Elmer K. Hiles, 2511 Oliver Bldg., Pittsburgh, Pa. Regular meetings, 1st and 3d Tuesday, Pittsburgh.

Freight Claim Association.—Warren P. Taylor, R. F. & P., Richmond, Va. Annual meeting, June 16, 1915, Chicago.

General Superintendents' Association of Chicago.—A. M. Hunter, 321 Grand Central Station, Chicago. Regular meetings, Wednesday, preceding 3d Thursday in month, Room 1856, Transportation Bldg., Chicago.

International Railway Congress.—Executive Committee, 11, Rue de Louvain, Brussels, Belgium. Next convention, June 23 to July 6, 1915, Berlin.

International Railway Fuel Association.—C. G. Hall, C. & E. I., 922 McCormick Bldg., Chicago. Annual meeting, May 17-20, 1915, Chicago.

International Railway General Foremen's Association.—Wm. Hall, 829 W. Broadway, Winona, Minn. Next convention, July 14-17, 1915, Sherman House, Chicago.

International Railroad Master Blacksmiths' Association.—A. L. Woodworth, C. H. & D., Lima, Ohio. Annual meeting, August 17, 1915, Philadelphia, Pa.

Maintenance of Way and Master Painters' Association of the United States and Canada.—T. I. Goodwin, C. R. I. & P., Eldon, Mo.

Master Boiler Makers' Association.—Harry D. Vought, 95 Liberty St., New York. Annual convention, May 26 to 28, 1915, Chicago, Ill.

Master Car and Locomotive Painters' Association of the United States and Canada.—A. P. Dane, B. & M., Reading, Mass. Next convention, September 14-17, 1915, Detroit, Mich.

Master Car Builders' Association.—J. W. Taylor, 1112 Karpen Bldg., Chicago. Annual meeting, June 14-16, 1915, Atlantic City, N. J.

National Railway Appliances Association.—Bruce V. Crandall, 537 So. Dearborn St., Chicago. Next convention, March 15-19, 1915, Chicago.

New England Railroad Club.—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass. Regular meetings, 2d Tuesday in month, except June, July, August and September, Boston.

New York Railroad Club.—Harry D. Vought, 95 Liberty St., New York. Regular meetings, 3d Friday in month, except June, July and August, 29 W. 39th St., New York.

Niagara Frontier Car Men's Association.—E. Frankenberger, 623 Brisbane Bldg., Buffalo, N. Y. Meetings monthly.

Peoria Association of Railroad Officers.—M. W. Rotchford, Union Station, Peoria, Ill. Regular meetings, 2d Thursday in month, Jefferson Hotel, Peoria.

Railroad Club of Kansas City.—C. Manlove, 1008 Walnut St., Kansas City, Mo. Regular meetings, 3d Friday in month, Kansas City.

Railroad Master Tinners, Coppersmiths and Pipefitters' Association.—U. G. Thompson, C. & E. I., Danville, Ill. Annual meeting, May, 1915.

Railway Business Association.—Frank W. Noxon, 30 Church St., New York. Annual meeting, December 10, 1914, Waldorf-Astoria Hotel, New York.

Railway Club of Pittsburgh.—J. B. Anderson, Room 207, P. R. R. Sta., Pittsburgh, Pa. Regular meetings, 4th Friday in month, except June, July and August, Monongahela House, Pittsburgh.

Railway Electrical Supply Manufacturers' Association.—J. Scribner, 1021 Monadnock Block, Chicago. Meetings with Association of Railway Electrical Engineers.

Railway Fire Protection Association.—C. B. Edwards, Fire Ins. Agt., Mobile & Ohio, Mobile, Ala. Next meeting, October, 1915.

Railway Signal Association.—C. C. Rosenberg, Times Bldg., Bethlehem, Pa. Next meeting, March 15, 1915, Chicago. Annual meeting, September 21-24, 1915, Salt Lake City, Utah.

Railway Storekeepers' Association.—J. P. Murphy, L. S. & M. S., Box C, Collinwood, Ohio. Annual meeting, May 17-19, 1915, Hotel Sherman, Chicago.

Railway Supply Manufacturers' Association.—J. D. Conway, 2136 Oliver Bldg., Pittsburgh, Pa. Meetings with Master Car Builders and Master Mechanics' Associations.

Railway Telegraph and Telephone Appliance Association.—G. A. Nelson, 50 Church St., New York. Meetings with Association of Railway Telegraph Superintendents.

Richmond Railroad Club.—F. O. Robinson, C. & O., Richmond, Va. Regular meetings, 2d Monday in month, except June, July and August.

Roadmasters' and Maintenance of Way Association.—L. C. Ryan, C. & N. W., Sterling, Ill. Annual meeting, September 14-16, 1915, Chicago.

St. Louis Railway Club.—B. W. Frauenthal, Union Station, St. Louis, Mo. Regular meetings, 2d Friday in month, except June, July and August, St. Louis.

Salt Lake Transportation Club.—R. E. Rowland, Hotel Utah Bldg., Salt Lake City, Utah. Regular meetings, 1st Saturday of each month, Salt Lake City.

Signal Appliance Association.—F. W. Edmunds, 3868 Park Ave., New York. Meeting with annual convention Railway Signal Association.

Society of Railway Financial Officers.—Carl Nyquist, C. R. I. & P., La Salle St. Sta., Chicago. Annual meeting, September, 1915.

Southern Association of Car Service Officers.—E. W. Sandwich, A. & W. P. R. R., Atlanta, Ga. Next regular meeting, January 21, 1915, Atlanta, Ga.

Southern & Southwestern Railway Club.—A. J. Merrill, Grant Bldg., Atlanta, Ga. Regular meetings, 3d Thursday, January, March, May, July, September, November, 10 A. M., Candler Bldg., Atlanta.

Toledo Transportation Club.—Harry S. Fox, Toledo, Ohio. Regular meetings, 1st Saturday in month, Boody House, Toledo.

Track Supply Association.—W. C. Kidd, Ramapo Iron Works, Hillburn, N. Y. Meetings with Roadmasters' and Maintenance of Way Association.

Traffic Club of Chicago.—W. H. Wharton, La Salle Hotel, Chicago.

Traffic Club of New York.—C. A. Swope, 291 Broadway, New York. Regular meetings last Tuesday in month, except June, July and August, Waldorf-Astoria, New York.

Traffic Club of Pittsburgh.—D. L. Wells, Erie R. R., Pittsburgh, Pa. Meetings bimonthly, Pittsburgh. Annual meeting, 2d Monday in June.

Traffic Club of St. Louis.—A. F. Versen, Mercantile Library Bldg., St. Louis, Mo. Annual meeting in November. Noonday meetings October to May.

Train Despatchers' Association of America.—J. F. Mackie, 7122 Stewart Ave., Chicago. Annual meeting June 15, 1915, Minneapolis, Minn.

Transportation Club of Detroit.—W. R. Hurley, Superintendent's office, L. S. & M. S., Detroit, Mich. Meetings monthly, Normandie Hotel, Detroit.

Traveling Engineers' Association.—W. O. Thompson, N. Y. C. & H. R., East Buffalo, N. Y. Annual meeting, September, 1915, Chicago.

Western Canada Railway Club.—W. H. Rosevear, P. O. Box 1707, Winnipeg, Man. Regular meetings, 2d Monday, except June, July and August, Winnipeg.

Western Railway Club.—J. W. Taylor, 1112 Karpen Bldg., Chicago. Regular meetings, 3d Tuesday in month, except June, July and August, Karpen Bldg., Chicago.

Western Society of Engineers.—J. H. Warder, 1735 Monadnock Block, Chicago. Regular meetings, 1st Monday in month, except January, July and August, Chicago. Extra meetings, except in July and August, generally on other Monday evenings.

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF SEPTEMBER, 1914

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses						Net operating revenue (or deficit).	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
					Maintenance									
		Freight.	Passenger.	Total. inc. misc.	Way and structures.	Of equipment.	Traffic.	Trans-portation.	Miscel-laneous.	General.	Total.			
Ann Arbor	292	$152,589	$50,569	$216,491	$29,508	$31,163	$4,790	$76,599	$470	$7,669	$150,199	$66,292	$13,880	$52,412	$2,619
Arizona Eastern	367	101,431	24,644	140,479	3,423	43,844	2,028	46,184	603	10,481	106,574	33,905	13,100	20,803	—46,736
Louisville, Henderson & St. Louis	200	85,528	39,526	134,646	30,423	18,054	5,592	41,315	.....	2,996	98,380	36,266	3,800	32,465	—6,600
THREE MONTHS OF FISCAL YEAR ENDING JUNE 30, 1915															
Ann Arbor	292	$409,927	$174,641	$625,284	$73,174	$82,925	$14,233	$223,207	$1,674	$21,302	$416,515	$208,769	$41,640	$166,987	$11,920
Arizona Eastern	367	441,603	91,396	573,475	81,949	86,930	6,694	155,981	2,428	29,375	363,316	210,160	39,938	169,974	—29,676
Chicago Great Western	1,427	2,512,935	913,739	3,738,623	565,321	594,643	146,599	1,288,777	20,614	104,176	2,655,436	1,083,188	146,005	935,917	—111,395
Chicago, Indiana & Southern	359	937,650	91,807	1,069,032	157,030	239,274	19,776	345,129	5,152	38,588	804,949	264,082	57,385	206,592	122,602
Chicago, Indianapolis & Louisville	618	1,207,141	484,886	1,841,175	242,824	336,435	54,159	630,261	496	54,014	1,316,540	524,636	79,978	444,602	—32,078
Chicago Junction	12	.....	.....	487,603	65,994	54,318	2,974	249,422	.....	14,526	387,254	100,369	6,614	93,705	—79,961
Chicago, Milwaukee & St. Paul	10,015	17,070,607	5,627,473	25,254,395	3,386,687	3,317,964	460,547	9,186,412	209,570	428,889	16,270,221	8,984,174	1,233,643	7,736,865	983,634
*Chicago, Peoria & St. Louis	255	238,941	63,731	319,917	51,229	51,020	11,123	119,057	.....	10,595	243,023	76,894	11,400	65,494	79,272
Chicago, Rock Island & Gulf	477	513,004	163,902	732,059	106,383	105,344	29,477	287,415	5,479	22,169	556,268	175,791	26,444	149,231	—2,340
Chicago, Rock Island & Pacific	7,852	12,337,414	5,238,900	18,852,822	2,818,631	3,156,114	433,678	6,943,088	135,968	403,480	13,873,498	4,979,324	746,895	4,231,414	491,050
Chicago, St. Paul, Minn. & Omaha	1,753	2,992,203	1,591,745	4,934,766	739,086	631,467	88,434	1,631,668	49,340	106,435	3,246,429	1,668,337	273,859	1,413,830	329,974
Chicago, Terre Haute & Southeastern	375	521,431	56,517	595,379	92,117	128,680	8,801	163,945	2,560	27,922	424,025	171,354	34,500	136,854	58,365
Cincinnati, Hamilton & Dayton	1,015	2,090,805	472,714	2,856,096	389,477	466,099	56,046	1,178,776	.....	56,180	2,146,578	709,519	115,494	593,055	168,894
Cincinnati, New Orleans & Texas Pacific	337	1,854,912	444,750	2,435,444	263,798	701,571	74,573	754,680	13,121	63,697	1,871,440	564,004	93,000	471,004	—250,272
Cincinnati Northern	246	344,191	75,699	439,204	65,620	75,477	8,163	134,082	.....	9,861	293,204	145,999	18,000	127,741	131,301
Cleveland, Cincinnati, Chic. & St. Louis	2,361	6,504,485	2,525,106	9,883,428	1,120,891	1,892,423	224,991	3,569,404	78,040	184,094	7,057,243	2,826,185	384,500	2,440,544	1,303,165
Colorado & Southern	1,127	1,348,265	503,488	1,989,617	318,770	473,145	33,693	612,070	15,798	56,124	1,509,599	480,018	106,875	372,831	—265,783
Colorado Midland	338	393,263	97,990	542,178	104,372	115,971	24,518	209,905	5,144	16,953	476,808	65,370	25,590	39,780	34,767
Cumberland Valley	164	560,048	192,718	795,732	145,592	94,526	12,885	264,859	2,360	23,092	543,313	252,418	17,732	234,687	—26,987
Delaware & Hudson Co.—R. R. Dept	881	4,765,539	1,063,828	6,169,416	434,881	851,076	81,313	2,115,193	43,620	175,164	3,692,481	2,476,935	168,750	2,308,062	.....
Delaware, Lackawanna & Western	960	7,723,642	2,518,258	11,324,747	1,562,990	1,791,236	212,585	3,354,785	107,086	217,195	7,182,783	4,141,964	555,000	3,586,591	—42,218
Denver & Rio Grande	2,562	4,436,924	1,480,879	6,381,747	1,157,628	1,136,470	119,864	1,774,136	104,202	170,466	4,456,905	1,924,841	270,000	1,654,687	—48,358
Denver & Salt Lake	255	323,864	142,813	494,919	56,927	85,010	8,802	148,665	.....	16,859	313,579	181,340	14,000	167,340	—10,284
Detroit & Mackinac	400	179,779	98,296	302,668	38,131	48,029	5,947	102,918	992	7,977	203,993	98,675	27,397	71,277	—16,076
Detroit & Toledo Shore Line	79	335,694	.....	336,705	51,371	26,443	4,530	96,364	.....	7,723	186,430	150,275	17,700	132,575	—40,906
Detroit, Grand Haven & Milwaukee	191	386,000	201,000	674,116	125,008	99,752	22,303	325,751	3,456	14,276	590,545	83,571	10,080	73,382	—51,451
Detroit, Toledo & Ironton	441	434,989	59,303	525,697	60,324	59,453	10,065	261,618	.....	18,366	409,827	115,871	18,000	97,871	253,393
Duluth & Iron Range	292	1,952,241	58,801	2,081,585	291,289	227,583	3,904	376,650	11,363	25,362	936,151	1,145,434	110,793	1,034,642	—965,498
Duluth, Missabe & Northern	364	2,320,370	92,976	2,466,458	244,199	238,938	6,646	383,792	10,483	27,976	912,035	1,554,423	125,810	1,428,614	—1,004,269
Duluth, South Shore & Atlantic	627	478,099	298,587	866,010	179,932	112,768	24,498	299,088	13,027	37,194	666,506	199,504	57,000	142,472	—14,984
Duluth, Winnipeg & Pacific	185	269,664	57,519	335,855	95,872	65,765	6,826	123,847	2,166	18,871	313,346	22,509	16,793	5,716	—75,781
El Paso & Southwestern Co	1,028	1,518,837	334,459	2,019,172	252,928	281,615	53,618	539,402	17,850	66,634	1,212,049	807,123	114,632	692,160	131,464
Elgin, Joliet & Eastern	777	2,352,154	23	2,495,563	252,391	425,729	15,228	664,917	.....	52,358	1,410,369	1,085,193	98,499	986,694	—160,514
Erie	1,988	10,855,453	2,801,408	14,923,540	1,663,312	3,467,759	275,155	5,032,238	105,559	298,730	10,811,203	4,112,337	415,640	3,691,307	—326,946
Florence & Cripple Creek	87	234,011	65,877	305,221	42,169	28,801	6,610	94,454	.....	12,906	184,941	120,281	17,030	103,250	—63,945
Florida East Coast	696	458,105	323,617	905,565	190,044	149,473	18,337	365,661	8,414	65,507	784,813	120,752	60,000	60,706	136,451
Fort Worth & Denver City	454	795,402	435,660	1,307,109	131,694	192,316	26,706	495,634	11,348	41,488	899,186	407,924	36,597	371,042	94,004
Galveston, Harrisburg & San Antonio	1,338	2,101,206	846,284	3,139,416	398,636	511,125	82,703	1,233,753	27,553	103,831	2,355,350	784,067	118,276	665,482	2,161
Georgia	307	458,745	230,798	747,734	89,385	153,203	37,023	336,815	.....	23,005	639,431	108,303	10,317	97,938	6,327
Georgia, Southern & Florida	395	338,546	190,027	602,649	80,418	130,876	23,010	239,244	23	28,562	502,135	100,514	32,828	67,326	6,760
Grand Rapids & Indiana	575	753,239	681,144	1,571,034	172,977	200,364	29,473	591,625	11,430	40,248	1,046,117	524,917	72,712	452,205	86,620
Grand Trunk Western	347	1,219,000	570,000	1,903,697	286,346	354,868	62,241	743,486	30,321	44,159	1,521,421	382,276	107,760	274,358	40,516
Great Northern	8,023	15,456,885	4,406,885	21,838,135	2,274,811	1,973,231	319,158	5,088,783	247,272	318,893	10,203,561	11,634,573	1,176,560	10,457,222	743,972
Gulf & Ship Island	308	315,566	93,852	436,132	55,245	86,885	7,687	114,023	774	22,197	286,812	149,320	21,955	127,320	—79,935
Gulf, Colorado & Santa Fe	1,937	2,972,467	915,936	4,094,741	524,999	595,340	84,095	1,391,922	.....	99,879	2,696,235	1,398,506	153,166	1,244,318	516,142
Hocking Valley	353	1,517,301	256,007	1,913,394	258,290	344,444	24,908	557,246	.....	38,838	1,223,726	689,668	116,400	573,268	—194,027
Houston & Texas Central	854	1,131,812	465,912	1,711,072	327,996	262,472	46,101	675,395	4,955	51,274	1,367,123	343,950	72,141	271,548	—128,987
Houston East & West Texas	191	223,261	101,539	342,632	82,212	61,567	5,960	131,967	.....	8,966	290,460	52,172	12,747	39,342	—51,986
Illinois Central	4,769	11,813,684	3,693,699	16,770,905	2,508,819	3,787,581	296,878	5,728,978	91,178	362,029	12,713,679	4,057,226	825,000	3,226,327	337,896
Indiana Harbor Belt	105	.....	.....	863,646	122,436	98,600	7,806	338,266	.....	23,137	590,245	273,401	23,355	249,826	81,078
International & Great Northern	1,160	1,499,771	561,635	2,227,540	437,791	385,458	73,509	1,065,917	8,993	92,621	2,064,290	163,250	80,000	82,993	—637,975
Kanawha & Michigan	177	794,201	99,667	913,649	117,824	205,574	7,249	244,955	12	20,493	596,108	317,541	35,462	282,064	—1,742
Kansas City Southern	827	2,008,015	432,893	2,690,074	306,285	330,947	79,768	859,226	.....	123,866	1,697,114	992,960	141,843	850,488	—25,056
Lake Erie & Western	906	1,290,788	245,165	1,612,392	209,575	230,595	38,947	579,426	.....	35,082	1,093,625	518,767	73,000	444,809	201,831
Lake Shore & Michigan Southern	1,852	8,482,754	3,782,947	14,086,708	1,605,623	2,689,914	217,718	4,567,599	166,326	277,547	9,524,727	4,561,981	589,500	3,970,524	—323,530
Lehigh & Hudson River	97	416,659	32,590	456,697	72,226	57,399	4,012	159,280	.....	10,544	303,460	153,237	12,450	140,787	58,210
Lehigh & New England	294	670,363	4,759	705,037	90,865	94,610	5,272	164,624	.....	17,814	373,185	331,852	17,009	314,843	142,238
Lehigh Valley	1,444	9,268,097	1,372,499	11,268,255	1,215,540	2,294,362	228,163	3,688,883	43,730	207,362	7,678,041	3,590,215	417,000	3,171,047	—101,758
Long Island	398	954,245	2,840,784	4,325,012	381,440	352,379	44,550	1,519,590	19,158	77,221	2,394,336	1,930,676	195,711	1,733,943	256,135

REVENUES AND EXPENSES OF RAILWAYS

THREE MONTHS OF FISCAL YEAR ENDING JUNE 30, 1915—CONTINUED

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses						Net operating revenue (or deficit).	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
		Freight.	Passenger.	Total. inc. misc.	Maintenance—Way and structures.	Maintenance—Of equipment.	Traffic.	Transportation.	Miscellaneous.	General.	Total.				
Louisiana & Arkansas	279	$377,705	$66,676	$457,550	$94,444	$75,016	$7,907	$115,738	.....	$13,078	$306,059	$151,491	$18,750	$132,741	—$11,997
Louisiana Ry. & Navigation	351	391,768	73,263	497,594	101,357	47,976	17,034	188,733	.....	15,104	370,204	127,391	24,500	102,891	18,463
Louisiana Western	208	352,717	182,114	566,459	60,767	102,498	20,560	154,059	$9,155	19,525	366,508	199,951	26,206	173,691	20,579
Louisville & Nashville	5,020	9,988,534	3,194,584	14,110,885	2,272,643	2,866,495	332,216	4,722,215	46,036	308,266	10,540,519	3,570,366	552,825	3,015,662	—250,755
Louisville, Henderson & St. Louis	200	259,530	116,287	390,191	81,303	53,688	15,611	120,039	.....	9,454	280,095	110,096	11,400	98,687	2,294
Maine Central	1,209	1,691,368	1,212,704	3,137,868	443,317	431,354	42,041	1,125,252	27,505	79,779	2,149,249	988,620	156,388	832,232	105,268
Michigan Central	1,800	5,208,215	2,778,893	9,000,384	935,537	1,326,971	192,115	3,340,609	147,932	161,423	6,104,587	2,895,797	402,000	2,493,501	785,663
Midland Valley	380	228,210	117,435	367,742	82,820	80,930	6,102	123,917	.....	17,042	310,810	56,932	19,746	36,998	—24,184
Minneapolis & St. Louis	1,646	1,927,865	585,620	2,664,454	317,000	397,587	54,670	929,550	250	59,484	1,758,542	905,912	113,304	792,608	79,128
Minn., St. Paul & Sault Ste. Marie	4,102	5,368,965	1,911,568	7,875,659	1,081,116	1,129,079	143,424	2,333,363	51,223	150,139	4,866,928	3,008,730	350,238	2,658,492	28,791
Missouri & North Arkansas	365	190,131	118,586	331,508	88,607	61,593	11,608	149,828	.....	18,082	329,718	1,790	18,000	—16,391	—63,465
Missouri, Kansas & Texas System	3,865	5,195,798	2,316,518	8,108,774	1,125,746	1,319,664	174,433	2,917,655	85,977	273,159	5,830,192	2,278,582	337,064	1,940,338	—238,534
Missouri, Oklahoma & Gulf	332	224,144	67,538	307,008	60,684	47,321	12,524	127,961	291	16,095	264,876	42,132	19,392	22,562	10,590
Missouri, Oklahoma & Gulf of Texas	19	25,780	1,320	27,858	3,616	7,489	647	13,293	.....	1,615	26,659	1,199	590	609	2,221
Missouri Pacific	3,920	5,967,590	1,398,089	7,993,666	991,655	1,408,023	182,776	2,755,269	27,208	189,154	5,554,085	2,439,581	295,770	2,142,652	745,931
Mobile & Ohio	1,122	2,508,153	386,827	3,056,952	377,493	685,908	125,152	1,171,019	8,682	86,531	2,454,784	602,168	99,736	502,406	—171,020
Monongahela	67	268,743	6,953	281,343	53,623	19,956	2,046	66,407	.....	5,983	148,014	133,329	6,300	127,029	—104,298
Morgan's La. & Tex. R. R. & S. S. Co	405	732,240	281,448	1,091,062	143,267	240,933	33,645	432,665	7,988	35,848	894,228	196,834	61,176	134,679	—8,680
Nashville, Chattanooga & St. Louis	1,231	1,960,517	763,977	2,966,708	410,653	617,623	131,994	1,153,317	30,890	87,718	2,432,195	534,512	81,639	452,659	54,840
Nevada Northern	165	274,563	33,501	320,097	59,517	44,579	1,375	72,568	179	11,903	190,121	129,976	16,925	113,051	—88,588
New Orleans & North Eastern	204	690,939	451,642	923,625	100,171	203,077	28,910	325,573	17,434	34,649	709,814	213,811	44,700	169,111	—42,558
New Orleans Great Northern	283	301,893	88,410	429,122	51,229	62,151	7,692	126,871	583	19,186	267,712	161,410	9,500	151,910	—38,849
New Orleans, Mobile & Chicago	403	372,270	92,891	491,987	89,948	75,504	12,045	160,372	—17	20,710	358,562	133,425	18,549	114,851	—71,636
New Orleans, Texas & Mexico	286	322,899	64,165	407,241	87,076	48,313	13,570	151,895	.....	23,407	324,261	82,980	4,863	78,117	14,000
New York Central & Hudson River	3,692	15,628,945	9,928,627	29,971,014	3,566,308	5,279,346	463,993	10,037,024	565,982	695,051	20,607,764	9,363,250	1,535,448	7,826,944	566,265
New York, Chicago & St. Louis	568	2,225,851	451,110	2,816,601	403,056	309,586	120,400	1,222,301	18,026	57,711	2,131,079	685,521	126,000	559,229	37,243
New York, New Haven & Hartford	2,003	7,838,656	7,698,201	17,314,921	2,342,449	2,397,344	114,596	6,235,880	138,949	382,422	11,605,373	5,709,548	735,000	4,973,473	—66,783
New York, Ontario & Western	568	1,668,600	769,995	2,815,260	387,840	442,672	25,289	943,424	.....	45,318	1,844,543	970,717	58,749	911,938	—14,758
New York, Philadelphia & Norfolk	112	853,780	157,794	1,106,703	107,764	202,980	13,814	436,263	14,235	28,479	803,535	303,168	26,100	277,068	20,928
New York, Susquehanna & Western	140	525,519	149,558	746,849	79,810	85,008	6,264	318,368	.....	17,238	506,636	240,213	37,750	191,066	45,364
Norfolk & Western	2,037	10,020,471	1,386,014	11,831,020	1,879,935	2,232,418	178,038	3,303,329	28,180	199,836	7,681,904	4,149,116	420,000	3,729,115	173,974
Norfolk Southern	900	587,116	332,689	1,001,122	154,529	159,053	22,317	360,885	.....	59,048	755,831	245,291	37,000	208,291	—53,157
Northern Pacific	6,409	12,431,140	4,500,226	18,601,841	2,973,269	2,764,768	296,962	5,196,495	281,139	264,599	11,477,505	7,124,336	1,233,801	5,890,099	521,867
Northwestern Pacific	401	453,504	632,851	1,202,701	183,286	120,379	14,498	373,197	.....	28,019	704,214	498,487	47,955	450,532	—39,637
Ohio Ry. & Land Co	109	332,553	70,740	421,995	31,092	30,355	1,888	69,758	.....	11,518	144,612	277,383	21,750	255,633	38,496
Oregon Short Line	2,160	3,988,623	1,357,223	5,778,768	856,305	695,371	87,428	1,372,699	91,673	163,850	3,221,953	2,556,815	349,500	2,206,788	—229,249
Oregon-Washington R. R. & Nav. Co	1,935	2,833,458	1,367,212	4,540,088	468,549	491,287	112,108	1,400,874	43,455	168,126	2,647,104	1,892,984	291,214	1,601,418	177,816
Panhandle & Santa Fe	668	728,519	182,713	957,637	169,441	187,187	11,253	295,977	.....	26,611	690,470	267,168	27,701	239,108	146,060
Pennsylvania *Company*	1,750	11,558,935	2,860,917	15,966,068	2,181,555	2,623,460	222,480	5,300,415	116,084	329,501	10,773,496	5,192,572	818,508	4,373,754	—794,538
Pennsylvania *Railroad*	4,519	34,477,099	10,997,372	49,838,198	6,311,012	9,016,596	568,926	17,537,594	723,925	1,212,550	35,370,603	14,467,595	1,970,422	12,492,227	504,924
Pere Marquette	2,321	3,005,751	1,327,246	4,747,397	452,459	891,706	95,461	1,670,123	18,103	152,822	3,278,528	1,468,868	159,551	1,308,803	831,530
Philadelphia & Reading	1,198	9,627,426	1,852,918	12,031,895	1,313,830	2,190,893	139,302	4,080,380	40,055	204,437	7,968,897	4,062,998	302,368	3,759,156	—261,163
Philadelphia, Baltimore & Washington	717	2,871,363	2,167,125	5,570,034	840,909	988,930	77,161	2,270,470	41	130,883	4,308,394	1,261,639	170,470	1,090,998	241,221
Pittsburgh & Lake Erie	224	3,709,183	494,504	4,380,986	536,407	981,166	39,899	1,051,665	11,113	82,898	2,703,148	1,677,838	155,350	1,522,488	—663,980
Pittsburgh, Cincinnati, Chic. & St. Louis	1,472	7,303,584	2,331,218	10,780,557	1,399,898	1,881,591	190,578	3,628,854	77,243	231,360	7,409,523	3,371,033	499,760	2,870,888	386,943
Pittsburgh, Shawmut & Northern	294	412,927	37,920	457,962	139,773	154,237	4,543	149,546	.....	12,380	460,478	—2,516	4,953	—7,468	—49,438
Port Reading	21	290,304	.....	355,902	50,421	33,066	115	112,711	.....	1,740	198,054	157,848	36,000	121,848	646
Richmond, Fredericksburg & Potomac	88	373,573	225,909	684,042	62,166	90,490	10,966	255,270	4,111	20,899	443,902	240,140	22,911	217,200	21,792
Rutland	468	510,062	339,570	968,226	124,451	168,380	26,560	364,643	3,981	16,307	704,321	263,904	51,556	212,349	—68,491
St. Joseph & Grand Island	258	355,305	88,896	477,398	99,999	59,461	14,646	159,956	.....	17,092	351,154	126,244	21,131	105,105	43,641
St. Louis & San Francisco	4,746	7,055,863	3,044,882	10,773,251	1,422,306	1,705,833	201,951	3,562,848	.....	255,831	7,148,768	3,624,484	351,118	3,270,613	—285,859
St. Louis, Brownsville & Mexico	548	362,789	220,668	636,393	114,403	62,301	15,720	238,095	.....	31,700	455,275	181,119	20,250	160,869	—51,472
St. Louis, Iron Mountain & Southern	3,365	5,913,531	1,554,045	8,040,720	1,136,737	1,461,622	161,573	2,486,071	29,003	179,271	5,454,297	2,586,423	339,096	2,245,237	—165,507
St. Louis, Merchants' Bridge Terminal	9	.....	.....	746	478,392	62,954	17,269	2,247	229,547	.....	21,472	333,489	144,904	22,240	122,664	80,517
St. Louis, San Francisco & Texas	244	228,506	90,981	341,672	79,016	52,648	7,359	150,668	.....	14,934	304,625	37,047	3,982	33,062	—97,500
St. Louis Southwestern	943	1,365,269	355,441	1,826,567	223,446	309,961	76,661	486,970	11,036	74,295	1,181,921	644,646	88,878	555,570	—198,947
St. Louis Southwestern of Texas	811	567,723	289,927	934,903	242,419	235,152	35,968	421,591	3,173	48,642	984,939	—50,036	40,500	—90,801	—72,380
San Antonio & Aransas Pass	724	704,822	361,612	1,135,670	176,481	193,388	20,154	502,904	.....	33,615	926,542	209,128	36,000	172,992	—290,081
San Pedro, Los Angeles & Salt Lake	1,132	1,521,347	686,797	2,334,756	285,355	393,197	95,917	774,574	42,314	55,003	1,646,360	688,395	121,436	666,487	—9,338
Seaboard	3,098	3,321,496	1,222,574	5,099,035	617,065	818,334	197,857	1,913,567	19,979	161,489	3,726,034	1,373,001	273,000	1,099,506	—205,314
Southern	7,036	10,432,916	5,051,655	16,902,895	2,390,453	3,151,261	578,420	6,190,921	114,237	519,255	12,926,315	3,976,580	660,182	3,312,304	—842,922
Southern in Mississippi	281	144,437	98,135	265,366	73,228	27,894	7,454	122,150	.....	10,734	241,460	23,906	23,250	597	7,849
Southern Pacific	6,501	16,494,786	7,521,107	26,491,226	2,709,432	3,755,986	466,350	8,135,001	425,859	686,923	16,148,812	10,342,415	1,274,695	9,061,918	—780,639
Spokane International	163	174,217	55,211	241,542	39,703	15,831	6,948	68,245	.....	10,650	141,378	100,165	11,789	88,375	—29,912

Traffic News

The trunk lines have filed at Washington freight tariffs, to take effect December 15, in which the rates on grain and grain products from the west to the Atlantic seaboard are increased one cent per 100 lb. For example, from Chicago to New York grain, now 16 cents per 100 lb. for domestic delivery and 13 cents for export, will be 17 cents and 14 cents respectively. The proposed advances in the rates on livestock have been made the subject of complaint presented to the commission at Washington, charging unreasonableness.

The increases in freight rates which have been filed by the western railroads have been complained of in a petition, presented to the Interstate Commerce Commission, which it is said has the signatures or endorsement of the state commissioners of Iowa, Nebraska, North Dakota, South Dakota, Montana, Minnesota, Missouri, Kansas, Texas, Oregon, Washington and California. The federal body is asked to suspend the new tariffs. These tariffs do not as a rule affect class rates but make advances in a large number of important commodities.

On the occasion of the Yale-Harvard football game at New Haven, November 21, the New York, New Haven & Hartford carried 33,378 persons to New Haven, delivering them all within four hours. Including the travel to New Haven the night before the big game, about 37,500 persons were carried to New Haven from all points on the New Haven system. This breaks all records for travel on that road. The performance of the morning, when this crowd was transported to New Haven within four hours, was repeated Saturday evening. Between 5:20 and 6:20 Saturday evening there were taken out of the station at New Haven approximately 18,000 people, or 300 a minute. A total of 65 trains and 618 cars were used in moving the football crowd. Forty-three of these trains were special trains. These 65 trains were moved over the road and their 33,378 passengers loaded and unloaded without serious mishap of any kind. Within the four-hour period Saturday morning 27 trains were despatched from New York carrying 17,800 passengers; 18 from Boston carrying 7,474; 5 from Springfield carrying 3,907, and 3 from Hartford carrying 1,254. Twelve trains from New London, Waterbury, Maybrook, Bridgeport, Pittsfield, Northampton and Willimantic carried 2,943 passengers, bringing the total carried to New Haven in the morning up to 33,378. Of the 43 special trains run into New Haven on Saturday 16 arrived ahead of schedule time; 18 were less than 5 minutes late and only 9 more than 5 minutes late. The total time lost by the 43 specials was 166 minutes, which would mean an average of only 3½ minutes per train. The first special returning to New York left New Haven at 4:40 p. m., and the last at 8:02 p. m.

Increased Passenger Fares

Extensive changes in passenger tariffs, making small advances in the rates, together with other changes in suburban fares around Philadelphia were noticed last week, page 980. Further details of the changes on long distance routes are noted below. In addition to these announcements there are other increases in fares, literally too numerous to mention. Changes in suburban rates, similar to those announced at Philadelphia, are to be made also at Baltimore. The regular weekly circular of the New York State Public Service Commission, Second district, contains a dozen or more announcements of withdrawals of certain forms of tickets, mostly round trip local tickets sold at considerable reductions from the single trip rate, these being issued by the Erie, the New York Central, the Lackawanna, the Lehigh Valley and the Pennsylvania. These withdrawals all mean increased fares. The New York, Ontario & Western, which for a good many years has had a uniform passenger rate of two cents a mile, announces an increase to 2½ cents, taking effect December 15. These numerous New York tariffs include also some reductions in rates.

Citizens in and around Philadelphia have complained of the proposed advances in rates to and from that city, both to the federal and the state authorities. The Public Utilities Commission of New Jersey has suspended for three months all increases in such of the tariffs as are subject to the authority of that commission. The Pennsylvania Public Service Commission announces that it has no power to suspend the proposed increases, but that probably it will require the railroads to issue conditional rebate certificates with sales of tickets at the advanced rates, with a view of ordering refund of a part of the money in case, on investigation, the commission shall decide that the advances are not justified.

New Trunk Line Passenger Fares

The railways in the Trunk Line Association have filed with the Interstate Commerce Commission tariffs advancing passenger fares in Trunk Line territory and between points in Trunk Line and Central Passenger Association territories to a basis of approximately 2½ cents a mile, effective on December 15. Increased fares in Central Passenger Association territory, as previously reported, have been filed to become effective on December 1. Some of the principal changes in the standard fares are shown in the following tables:

From New York

To—	Present rate	New rate
Pittsburgh	$10.50	$11.00
Cleveland	13.00	13.10
Columbus, O.	14.60	15.78
Cincinnati	17.00	18.68
Louisville	20.00	21.68
Indianapolis	18.50	20.15
Chicago	20.00	21.10
St. Louis	24.25	24.75

From Chicago

To—	Present rate	New rate
Cincinnati	$ 6.00	$ 7.00
Detroit	7.00	7.40
Toledo	5.50	5.85
Buffalo	12.00	13.10
Indianapolis	3.70	4.60
Washington	17.50	18.00
Baltimore	17.50	18.00
Philadelphia	18.22	19.10
New York	20.00	21.10
Boston	22.00	23.10
St. Louis	5.80	7.50

From St. Louis

To—	Present rate	New rate
Chicago	$ 5.80	$ 7.50
Cincinnati	8.00	8.65
Toledo	10.80	11.10
Cleveland	12.30	13.25
Buffalo	16.30	17.35
Pittsburgh	14.00	15.48
Washington	20.25	22.00
New York	24.25	24.75
Boston	24.80	26.35

By the differential lines the advances are the same, for example, New York and Chicago, the advance is from $18 to $19.10.

Quarantines

The restrictions on the transportation of live stock, imposed because of the prevalence of the foot and mouth disease continue strict throughout the Central States, and at many points outside those states. The requirements as to inspection and certificate apply not only to animals but also to straw imported from foreign countries, used as packing for merchandise, and also (at many places) wool. It is said that in the state of New York, the disease has been confined to 13 farms. Here and elsewhere the authorities appear to feel satisfied that the epidemic has been satisfactorily checked, but precautions are continued.

In northern New York the federal government has imposed a quarantine on potatoes because of the existence in that region of powdery scab.

In parts of Maine, New Hampshire, Massachusetts and Connecticut, the Department of Agriculture has imposed a quarantine on the transportation of stone taken out of quarries, the reason being that stone has been found to carry eggs of the gipsy moth. The Boston office of the United States Department of Agriculture, 43 Tremont street, issues regulations under which stone may be transported in interstate commerce.

Reductions in Passenger Train Service

A large number of reductions in passenger train service have been announced by railroads both east and west of Chicago to take effect on or about November 30. Both the Chicago & North Western and the Chicago, Burlington & Quincy on November 29 will take off one train a day between Chicago and Denver, and from Chicago to Denver trains now leaving in the evening will be changed to a morning schedule to take the place of other

morning trains taken off. From Denver to Chicago a train now leaving in the morning will be changed to leave in the evening. The Burlington's Denver Limited, now leaving Chicago at 5 p. m., will take the place of the train now leaving at 9:45 a. m. The train on the Union Pacific between Omaha and Denver, which connects with the North Western train to Omaha will be discontinued, but the North Western will continue the train to Omaha, discontinuing another train from Omaha to Chicago. The Burlington will also discontinue one train between Kansas City and St. Joseph, and will make other reductions in local train service, making a total reduction of about 76,000 train miles a month. The Denver & Rio Grande will discontinue four trains between Denver and Ogden, and the Western Pacific will make a reduction in service between Salt Lake City and San Francisco. East of Chicago a number of reductions will be made in local train service.

Car Balance and Performance

Arthur Hale, chairman of the committee on relations between railroads, of the American Railway Association, in presenting statistical bulletin No. 180, covering car balances and performances for July, 1914, says:

The committee presents herewith statistical bulletin No. 180, covering car balance and performance for July, 1914.

The average miles per car per day were 22.5, compared with 22.7 for June. This figure for July, 1913, was 23.7.

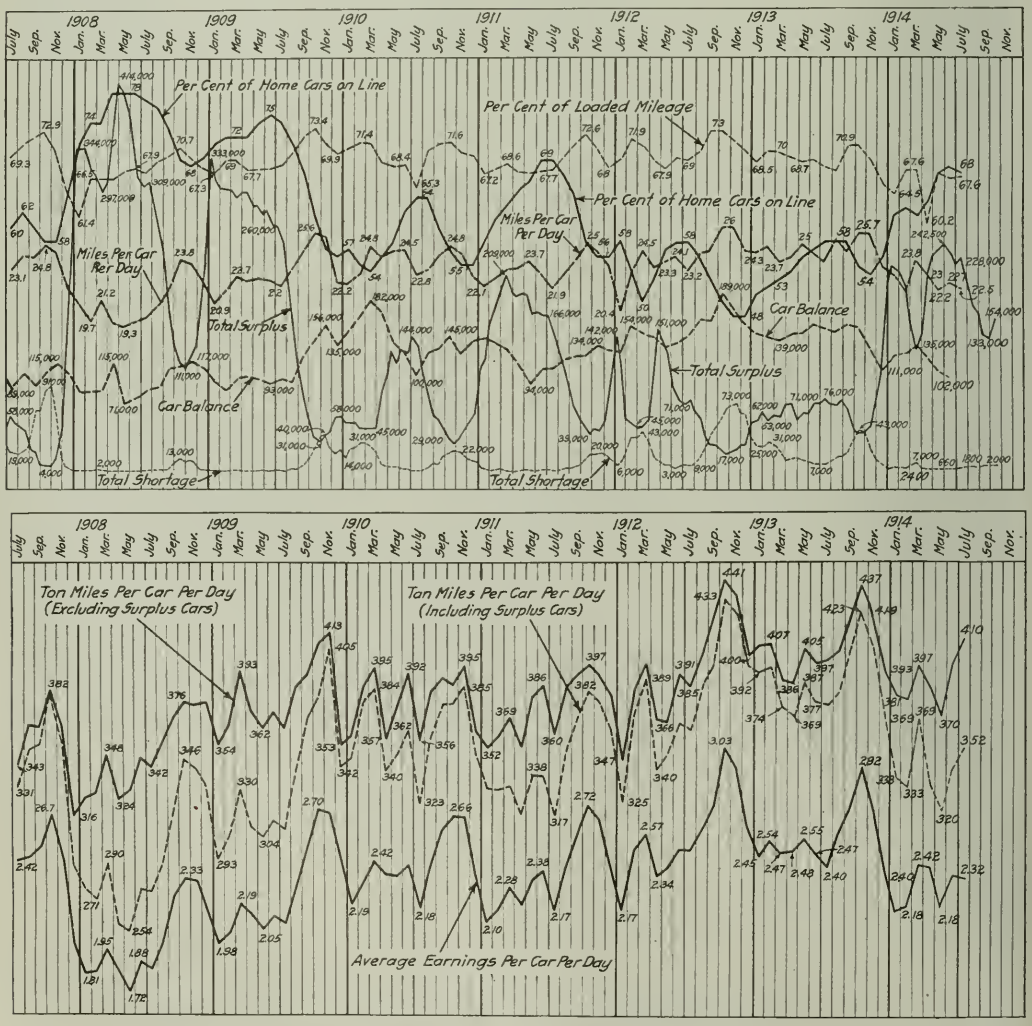
Ton miles per car per day for July were 352, compared with 345 for June. This is a decrease of 6.13 per cent compared with the figure for July, 1913, which was 375.

The proportion of home cars on line was 68 per cent, compared with 69 per cent in June. This is an increase of 9 points over July, 1913.

The per cent of loaded car mileage was 67.6 per cent, which is the same as the June figure. This figure for July, 1913, was 68.1 per cent.

The average earnings per car per day for all cars on line was $2.32. This figure for July, 1913, was $2.40.

The accompanying table gives car balance and performance in the month covered by the report, and the diagram shows car earnings and car mileage and different car performance figures monthly from July, 1907.



Freight Car Mileage, Earnings and Performance, 1907 to 1914

CAR BALANCE AND PERFORMANCE FOR JULY, 1914

	New England.	N. Y., N. J., Del., Md., Eastern Pa.	Ohio, Ind., Mich., Western Pa.	Va., W. Va., No. and So. Carolina.	Ky., Tenn., Miss., Ala., Ga., Fla.	Iowa, Ill., Wis., Minn., Dakotas.	Mont., Wyo., Neb.	Kan., Colo., Okla., Mo., Ark.	Texas, La., New Mex.	Ore., Idaho, Nev., Cal., Ariz.	Canadian Lines.	Grand Total.
Revenue freight cars owned	81,556	716,093	205,384	199,089	174,967	456,105	23,724	144,970	31,784	143,694	179,770	2,357,136
Average number of system cars on line	54,922	468,041	153,467	129,728	111,432	347,385	11,067	93,990	24,974	84,334	129,727	1,609,067
Railway-owned cars: Average foreign on line	31,416	214,487	84,750	51,565	46,293	114,985	9,605	52,981	19,680	38,673	29,405	693,840
Total railway-owned cars on line	86,338	682,528	238,217	181,293	157,725	462,370	20,672	146,971	44,654	123,007	159,132	2,302,907
Excess	4,782	*33,565	32,833	*17,796	*17,242	6,265	*3,052	2,001	12,870	*20,687	*20,638	*54,229
Per cent of cars on line to total owned:												
Home	67	65	75	65	64	76	47	65	78	59	72	68
Foreign	39	30	41	26	26	25	40	36	62	27	16	30
All railways	106	95	116	91	90	101	87	101	140	86	88	98
Private cars on line	3,101	30,809	8,648	4,254	10,560	16,060	2,056	9,837	3,215	9,692	2,913	101,145
Total, all cars on line	89,439	713,337	246,865	185,547	168,285	478,430	22,728	156,808	47,869	132,699	162,045	2,404,052
Per cent of cars in shop	10.06	8.40	13.36	11.17	11.62	6.05	5.94	10.04	8.60	6.46	5.50	8.82
No. of freight engines owned	1,214	11,311	3,099	3,286	2,972	7,369	492	2,966	875	2,918	2,616	39,118
Average cars on line per freight engine owned	74	63	80	56	57	65	46	53	55	45	62	61
Total freight-car mileage	46,825,051	479,762,771	141,806,659	143,136,152	137,690,142	325,693,597	30,571,253	102,501,387	38,307,038	122,173,411	104,836,406	1,673,303,867
Average miles per car per day	16.9	21.7	18.5	24.9	26.4	22.0	43.4	22.0	25.8	29.7	20.9	22.5
Per cent loaded mileage	69.6	65.3	65.9	64.5	69.1	69.5	66.0	69.6	68.6	69.6	72.0	67.6
Ton-miles of freight, including company freight	543,014,974	7,995,858,261	2,430,341,881	2,393,429,983	2,002,004,169	3,616,961,272	431,302,765	1,146,484,641	414,039,448	1,767,542,182	1,511,529,639	24,252,509,215
Average ton-miles, including company freight:												
Per car-mile	11.6	16.9	17.7	16.7	14.5	14.3	14.1	13.9	14.3	14.7	14.4	15.5
Per loaded car-mile	16.7	25.8	26.8	25.9	21.0	20.6	21.4	19.9	21.2	21.2	20.0	23.0
Per car per day	196	367	329	416	384	315	612	323	384	435	301	352
Gross freight earnings	$6,080,625	$48,235,016	$13,377,466	$12,590,358	$12,286,169	$33,231,973	$3,123,934	$11,517,037	$4,046,547	$17,340,854	$10,710,127	$172,540,106
Average daily earnings: Per car owned	$2.41	$2.18	$2.10	$2.04	$2.26	$2.35	$4.25	$2.56	$4.11	$3.91	$1.92	$2.36
Per railroad car on line	2.27	2.28	1.81	2.24	2.32	2.32	4.87	2.53	2.92	4.56	2.17	2.42
All cars on line	2.19	2.18	1.75	2.19	2.36	2.24	4.43	2.37	2.73	4.23	2.13	2.32

*Denotes deficiency.

Commission and Court News

INTERSTATE COMMERCE COMMISSION

Special Examiner Kelly held a hearing in Chicago on November 19, on complaints of shippers of blooded livestock regarding the present rates, weights and requirements for the shipment of livestock in less-than-carload lots.

The commission has suspended until March 31 tariffs which have been filed by both eastern and western roads, increasing charges for so-called trap car service. These trap car tariffs, so far as they affect intrastate traffic have been suspended in Illinois by the state commission.

Examiner Pattison held a hearing at Denver last week on complaints filed by the Gould lines against the notice recently issued by the Union Pacific, which would have the effect of closing the Ogden gateway to through passenger traffic from the east over the Gould lines, when destined to certain points in the northwest.

Compression of Export Cotton

Inman, Akers & Inman et al. v. Atlantic Coast Line. Opinion by Commissioner McChord:

The commission finds that the railway's practice of allowing for compression of cotton shipped over the Atlantic Coast Line from points on the Georgia Railroad and intended for export at such ports as Norfolk, Wilmington or Charleston, after the transportation service of the railroads is terminated, is unlawful, the service rendered being in no sense connected with the transportation. (32 I. C. C., 146.)

Rates Between Shreveport and Texarkana

In re class and commodity rates between Shreveport, La., and Texarkana, Ark. Opinion by Commissioner Meyer:

The commission finds that the carriers have justified proposed increased class rates between Shreveport, La., and Texarkana, Ark., and proposed increased rates on beer, beer substitutes, and agricultural implements in carloads from Shreveport to Texarkana, and on candy in less than carloads from Texarkana to Shreveport. (32 I. C. C., 180.)

Fabrication-In-Transit Privileges Refused Railway Car Industry

Middletown Car Company v. Pennsylvania Railroad et al. Opinion by Commissioner McChord:

The commission finds that there was no peculiar requirement incident to the pressed steel car industry, as is the case in the bridge and structural steel industry, which necessitates the extension of the fabrication-in-transit privilege to the pressed steel car industry with respect to the steel underframes for railroad cars. The fact that the fabricated articles are similar cannot warrant a similarity of treatment where it also appears that the similar articles are in no wise competitive. (32 I. C. C., 185.)

Rates on Lard Substitute from Greenville, Tex.

Texas Refining Company v. Alabama & Vicksburg et al. Opinion by Commissioner Meyer:

The commission finds that the present rates on lard substitute from Greenville, Tex., to points in Oklahoma, Arkansas, Louisiana, Mississippi and New Mexico are unreasonable and that the rates on this commodity should be the same as the rates on packing-house products. It is also held that the mileage-scale rates on packing-house products should apply on lard substitute from Greenville as a distinct point of origin and not as a common point with Fort Worth and Dallas. (32 I. C. C., 192.)

Joint Rates with the Iowa & Southwestern

Iowa & Southwestern v. Chicago, Burlington & Quincy. Opinion by Commissioner McChord:

The commission finds that the defendants should establish in connection with the complainants operating a line from Blan-

chard, Ia., to Clarinda through routes via Clarinda, Ia., with joint rates which shall place College Springs on a rate parity with Coin, Bradyville, and Shambaugh, Ia. The defendants will also be required to receive cars from complainants at Clarinda for switching to industries located on defendants' tracks at that point, and to establish a reasonable switching charge for the service. (32 I. C. C., 172.)

Rates on Coffee from New Orleans

In re coffee from New Orleans, La., Mobile, Ala., and Pensacola, Fla., to Jacksonville, Fla., and other points. Opinion by the commission:

The commission finds the carriers have justified the proposed cancellation of the commodity rates on coffee to Jacksonville, Fla., of 35 cents per 100 lb., from New Orleans; 30 cents from Mobile and 26 cents from Pensacola, and a proposed restoration of the fifth-class rates of 44 cents from New Orleans, 39 cents from Mobile and 35 cents from Pensacola. These rates were reduced in order to allow New Orleans to compete with New York for the coffee trade to Jacksonville, but it has been found that although the rates are unreasonably low New Orleans has been unable to get a large portion of the total trade. (32 I. C. C. 90.)

Rates on Bakery Goods in the Pacific Northwest

Portland Chamber of Commerce et ol. v. Chicago, Milwaukee & St. Paul et al. Opinion by Commissioner Meyer:

The commission finds that the classification of bakery goods in boxes and barrels, second class, and in cartons and tins in crates, first and second class, for interstate shipments in less than carloads from points in Oregon and Washington to points in Oregon, Washington, California, Idaho, and Montana, is unreasonable. It is held that such shipments should be rated not higher than third class, it being the general practice elsewhere in western classification territory for this traffic to move at commodity rates about equal to third class rates. (32 I. C. C., 188.)

Rates on Excess Baggage

National Baggage Committee v. Atchison, Topeka & Santa Fe et al. Opinion by Commissioner Hall:

In this complaint, filed in December, 1912, by the National Baggage Committee, representing numerous commercial organizations, against 69 carriers, operating in all sections of the country, the commission finds that the present rates on excess baggage are not unreasonable, but that the rates on baggage of excess value are unreasonable and should not exceed certain prescribed maxima.

Baggage of excess weight. As a general rule a purchaser of a first class ticket is entitled to receive the transportation of not more than 150 lb. of baggage of a value not exceeding $100. The rates are based as a rule upon 16⅔ per cent of the first class fare with a minimum of 15 cents per 100 lb., and a minimum charge of 25 cents. In some sections of the west the basis is 12 per cent instead of 16⅔ per cent, and in New England there is a minimum charge of 15 cents with an arbitrary scale graduated until the fare amounts to $4.20, from which point the 16⅔ per cent basis applies.

The commission is unable to sanction the basis proposed by complainant whereby there would be a graduated scale ranging from 12½ per cent for short distances, except those covered by the minimum rate, down to 8 per cent for long hauls. Complainant showed that for express service, claimed to be more valuable than excess baggage service, the railroads receive on an average 50 per cent of the gross revenues of the express companies; and claimed that for 100 lb. of excess baggage a reasonable rate would be one-half of the 100-lb. express rate plus a reasonable terminal charge, estimated at from 5 to 10 cents at each end. The commission rejects this theory and sees no necessary relation between the rates for the various services. The claim that the commercial traveler should have a lower rate than the occasional traveler is rejected. Congress has to some extent permitted the continuance of mileage books, with special privileges, but whether or not the principle should be extended is a question of policy with which the commission has nothing to do.

Much of the testimony on both sides consisted of opinions, speculation and surmise. The carriers were unable to give any data concerning the cost of the service or other factors which were considered in establishing the excess baggage rates, and whether these rates are reasonable or not is something not disclosed in the record and the commission can make no finding upon this point.

Baggage of excess value. The charge imposed for baggage valued in excess of $100 is, for each $100 or fraction thereof, generally equivalent to 10 per cent of the rate for 100 lb. of excess baggage, with a minimum rate of 10 cents per $100 and a minimum charge varying from 10 to 25 cents for increased valuation. Complainant proposes a charge which shall not exceed one-tenth of 1 per cent for each $100, with a minimum charge of 10 cents.

The commission, drawing attention to the fact that the allowance, included in the ticket, is 150 lb. of baggage of a value not exceeding $100 notes that apparently the carriers have proceeded on the assumption that the value of 150 lb. of baggage is usually $100. This arrangement is held to be unreasonable; to assume that $100 is a fair average value for 150 lb. of baggage is an unlawful attempt on the part of the carriers to limit their liability for loss and damage.

Attention is also drawn to the findings *in re Express Rates,* etc. (24 I. C. C., 380) in which it was said:

> The insurance charges almost universally prevailing on shipments conveyed by parcel post or other parcel-carrying systems in other countries are substantially one-tenth of 1 per cent—that is to say, 10 cents for each $100 or fraction thereof. This also is a customary rate with private insurers. Therefore it would seem to be a reasonable rule that the charges of express carriers in the United States based upon valuation in excess of $50 should not exceed this general standard, and that hereafter the valuation charge shall be 10 cents for each $100 or fraction thereof in excess of $50, and this irrespective of the rate of carriage.

It is ordered that the tariffs of the carriers should be amended so that the charges for excess value shall not exceed the following:

> Unless a greater sum is declared by the passenger and charges paid for increased valuation at time of delivery to carrier, the value of baggage, up to and including 150 lb., . . . shall be . . . agreed to be not in excess of $100 . . . and the value of baggage . . . exceeding said allowance of 150 lb. . . . upon which charges are paid . . . shall be . . . agreed to be not in excess of 66⅔ cents per lb.
>
> If the passenger, at the time of checking baggage, declares a value greater than $100 for the baggage . . . or, in case the weight of the baggage exceeds that allowed under the tariffs in connection with the transportation of a passenger, declares a value greater than 66⅔ cents per lb., there will be an additional charge at the rate of 10 cents for each $100, or fraction thereof, above such agreed maximum values.
>
> The minimum charge for increased valuation will be 10 cents. (32 I. C. C. 152.)

STATE COMMISSIONS

The Illinois Public Utilities Commission has suspended until March 30, the proposed charge for less-than-carload trap car service in Chicago on intrastate business, which was recently announced by the railway companies to become effective Decembr 1.

The Kansas railroads last week filed a petition with the Kansas Public Utilities Commission, asking the restoration of the three-cents-a-mile passenger fare which was in effect before 1907, when the railroads reduced rates to two cents, pending a final decision in the Nebraska rate case.

The executive council of the state of Maine, taking note of a widespread demand that the new Public Utilities Commission shall not consist of three lawyers, has refused to confirm the nomination of S. W. Gould, though it has accepted Benj. F. Cleaves and William E. Skelton, who are both lawyers. The governor has now named Hon. Charles W. Mullen of Bangor, a former mayor, and a prominent business man, for the third commissionership.

A complaint has been filed with the Public Service Commission of Missouri against the Quincy, Omaha & Kansas City and the Chicago, Burlington & Quincy, alleging that since July, 1912, the Quincy, Omaha & Kansas City has been owned and operated by the Burlington, and that this ownership does not entitle it to the exemption made by the Supreme Court of the United States in the state rate case decision, and that therefore it is not entitled to charge more than two cents a mile for passengers. The road is now charging 2½ cents.

COURT NEWS

Judge Harris, of the Circuit Court of Fulton, Mo., has sustained the demurrer of the Missouri, Kansas & Texas Railway to the suit brought by the attorney-general of Missouri to recover $2,000,000 alleged overcharges in freight and passenger rates during the litigation over the state rate laws.

Frank B. Kellogg, counsel for the Armour Car Lines in the investigation being conducted by the Interstate Commerce Commission into private car lines, has secured an order from a judge of the United States Supreme Court enjoining further hearings before the commission on the questions asked of the Armour Car Lines pending a review by the Supreme Court of an order issued by Judge Landis ordering Vice-President Frederick W. Ellis to answer the questions put to him by the commission regarding the relations of the car lines to the railroads. On November 9 Federal Judge Landis denied the petition for an appeal and ordered Mr. Ellis to appear before the commission and answer the questions.

The suit brought by John C. Fetzer, a real estate broker, against the Chicago & Western Indiana Railroad to set aside the decision of E. C. Field as arbitrator of the claims of the Chicago & Western Indiana against Fetzer, Benjamin Thomas, former president of the road, and C. R. Kappes, former real estate agent of the road, ordering the restoration of money alleged to have been misappropriated, was the subject of a hearing last week at Chicago, before Judge Sullivan. In 1910 the Western Indiana filed suits against the three men named, charging them with having misappropriated large sums of money in connection with real estate purchases for the road, and the case was settled out of court by arbitration, in which Mr. Field decided that the three men should pay to the Western Indiana $525,000. Fetzer then brought suit to have the award set aside on the ground that the money had been turned over by him to persons designated by the directors of the road, to be used for political purposes.

Railway Taxes in New Jersey

The New Jersey Court of Errors and Appeals, in a suit against the Long Dock Company, of Jersey City, concerning taxes on its railway property, sets aside the doctrine enunciated by the court below that the State Board of Assessors is a judicial tribunal whose findings can not be reviewed unless the principle upon which their determination was reached was "inherently and legally vicious." The opinion for the Court of Errors was written by Justice Swayze. It is held also that the members of the State Board of Assessors, even though they be regarded as a judicial body, may be subjected to cross examination as to their personal knowledge of values of railroad property, where that knowledge is employed in determining an assessment. Under the railroad tax law it is the duty of the Supreme Court to afford relief as well in cases where the amount of the tax is excessive or insufficient as in cases where the principle upon which the assessment is made is erroneous. The manifest intention of the legislature was to afford the railroads equal protection of the laws in common with other citizens.

Justice Swayze's opinion reverses the Supreme Court and sets aside assessments aggregating $7,383,180, levied by the State Board of Assessors upon the property in question. The decision is interpreted as limiting, to a great extent, the powers of the State Board of Assessors. Railroad tax case hearings, says the court, must be real and not sham hearings. It is expected that other railroads will take advantage of the decision to proceed against assessments believed to be excessive. Justice Swayze's decision affects the state assessors only, as that was the body dealt with in the opinion. The State Board for the Equalization of Taxes is a separate body and handles individual appeals in general matters.

French Railway Delays.—A Reuter telegram from Bordeaux states that a government ordinance has been issued laying down the rule that railway lines are responsible for losses or damage when these are caused by the culpable mistakes of their agents and cannot be attributed to the war. Nevertheless, their responsibility does not extend to damage or waste which by nature of the merchandise concerned may arise owing to the length of time taken in transit, and railway lines do not incur any responsibility for the time taken in carrying merchandise.

Railway Officers

Executive, Financial, Legal and Accounting

David McNicoll, vice-president of the Canadian Pacific at Montreal, Que., has resigned on account of ill health, effective January 1, next, and will be succeeded by George Bury, vice-president at Winnipeg, Manitoba. Mr. McNicoll will remain as a member of the board of directors.

C. G. Austin, Jr., whose appointment as general solicitor of the Chicago & Western Indiana and the Belt Railway of Chicago, with headquarters at Chicago, has already been announced in these columns, was born in Highgate, Vt., February 6, 1879. He received his academic education at Brigham Academy in Vermont and was graduated from the University of Wisconsin in 1902 with the degree LL.B. He was admitted to the bar of Vermont in 1901, the year before his graduation from law school, and was engaged in the general practice of law in St. Albans, Vt., with his father and brother under the firm name of C. G. Austin & Sons, from the time of his graduation until June, 1909. He then removed to Cedar Rapids, Iowa, where, as assistant solicitor for the Chicago, Milwaukee & St. Paul, he acted as trial attorney for that company for the state of Iowa. He resigned in April, 1910, to accept a position in the law department of the Chicago & Western Indiana and the Belt Railway of Chicago, where he has since remained, now assuming full charge of the law departments as general solicitor, as above noted.

E. W. McKenna, whose retirement from the position of vice-president of the Chicago, Milwaukee & St. Paul, has already been announced in these columns, was born October 24, 1848, at Pittsburgh, Pa. He began railway work in May, 1862, with the Pennsylvania, and was messenger and operator until June, 1864, when he was in United States military telegraph service. From April, 1866, to December, 1869, he was with the Pittsburgh, Cincinnati & St. Louis as operator, freight clerk and general superintendent's clerk. He was then for one year train despatcher, and from February, 1871, to April, 1880, superintendent, of the Indianapolis & Vincennes, and the following five years was superintendent of the Jeffersonville, Madison & Indianapolis. During 1886 he was engaged in special work under the direction of the general manager of the Pennsylvania Lines West of Pittsburgh. Mr. McKenna became connected with the Chicago, Milwaukee & St. Paul in June, 1887, and was division superintendent until October, 1890, when he was appointed assistant general superintendent of that road. He left the St. Paul in August, 1894, to become general superintendent of the Eastern district of the Great Northern at St. Paul, Minn., resigning that position to engage in the business of renewing steel rails, being the inventor of a process for securing that result. He organized the McKenna Steel Working Company, of which he was president for a number of years. Mr. McKenna returned to the Chicago, Milwaukee & St. Paul in February, 1904, as assistant to the president, and in September of the following year he was made second vice-president. In September, 1909, he became vice-president of the same road in charge of operation and construction.

E. W. McKenna

Operating

P. R. Albright, assistant to general manager of the Atlantic Coast Line at Wilmington, N. C., has been elected assistant general manager.

T. R. Ryan, formerly traffic manager of the Mexico North-Western, who went to Brazil last January as traffic director of the Brazil Railway Company and its subsidiary companies, in addition to his former duties, has been made sub and acting managing director of the Brazil Railways and general superintendent of the Sorocobana Railway Company, one of the subsidiary companies, with headquarters at Sau Paulo, Brazil.

Traffic

A. F. Pilcher has been appointed general agent of the Rock Island lines at Sioux Falls, S. D.

Samuel W. Carder has been appointed commercial agent of the New York Central Fast Freight Lines, with headquarters at Omaha, Neb., succeeding J. J. Monks, promoted.

H. L. Hudson has been appointed district freight agent of the Union Pacific at Seattle, Wash., and L. M. Foss has been appointed district freight and passenger agent at Lewiston, Idaho.

Herbert L. Fairfield has been appointed manager of baggage and mail traffic of the Illinois Central and the Yazoo & Mississippi Valley, with supervision over the handling of baggage, mail, express and milk traffic, with headquarters at Chicago.

I. L. Graves, coal freight agent of the Southern Railway at Atlanta, Ga., has been appointed general freight agent, with headquarters at Knoxville, Tenn., succeeding H. L. Miller, resigned to go to another company, and the office of coal freight agent at Atlanta has been abolished.

Charles S. Lee, general passenger agent of the Lehigh Valley at New York has been appointed passenger traffic manager. George W. Hay, general baggage agent at South Bethlehem, Pa., has been promoted to general passenger agent, with headquarters at New York. A. J. Simmons, general eastern passenger agent at New York, has been appointed assistant general passenger agent, with office at New York, and Paul S. Millspaugh, general agent of the passenger department at Ithaca, N. Y., has been appointed assistant general passenger agent, with headquarters at Buffalo.

Engineering and Rolling Stock

E. H. McCann has been appointed master mechanic of the San Antonio, Uvalde & Gulf, with headquarters at Pleasanton, Tex., succeeding J. H. Ruxton, resigned, whose title was superintendent of motive power.

OBITUARY

Harry Dean, division freight agent of the Pere Marquette at Detroit, Mich., died on November 22, in Detroit. He had been in the service of this company for the past 18 years.

James Bissett, formerly master mechanic of the St. Louis & San Francisco, at Springfield, Mo., died on November 11, in Springfield at the age of 74. He began railway work at the age of fourteen, with the North Madison Railway, at North Madison, Ind., and subsequently served on different railroads. In October, 1899, he entered the service of the Kansas City, Fort Scott & Memphis at the South Side shops, Springfield, and later served as master mechanic of its successor, the St. Louis & San Francisco, until his retirement, under the pension rules of the company, about two years ago.

John C. Muir, general superintendent of the Chicago, Terre Haute & Southeastern, died at Terre Haute, Ind., on November 4, aged 50 years. Mr. Muir began railway work in June, 1879, as messenger for the Atchison, Topeka & Santa Fe, with which road he remained until August, 1895, being employed successively as telegraph operator, station agent, traveling auditor, train despatcher, and chief train despatcher. He then went to the Chicago & Eastern Illinois as chief train despatcher, and subsequently was trainmaster and superintendent until June, 1911, when he was appointed general superintendent at Danville, Ill. In November of the following year he became superintendent of the Chicago division at Danville, resigning in March, 1913, to go to the Chicago, Terre Haute & Southeastern as general superintendent at Terre Haute, Ind.

Equipment and Supplies

LOCOMOTIVE BUILDING

The Maine Central has ordered 7 Mikado type locomotives from the American Locomotive Company.

The A. Guthrie Construction Company, St. Paul, has ordered 3 heavy-switching locomotives from the Baldwin Locomotive Works.

CAR BUILDING

The Pere Marquette has ordered 200 center constructions from the Pressed Steel Car Company.

The Atchison, Topeka & Santa Fe has ordered 100 tank cars from the Pressed Steel Car Company.

The United States Government, Department of Reclamation Service, has ordered one 55-ft. all-steel, 200-hp., 75-passenger motor car from the McKeen Motor Car Company for its Yuma Valley Railway in Arizona.

Railway Farm Demonstration Work in the Philippines.—A report of the progress of the agricultural demonstration coach sent out by the Philippine Bureau of Agriculture over the Manila Railroad has been issued. The car, which was on the road from March 26 to August 5, made one to three day stops at all the towns on the main and branch lines between Bauan, La Union Province, and Pagbilao, in Tayabas Province. This was the second tour of the car through the same territory. It passed through 11 provinces and made stops at 84 towns. It is stated that 22,176 persons visited the car during the tour, and 5,702 agricultural publications were given out and 66 illustrated lectures were given, with a total attendance of 36,552 people. The car was in charge of the trained employees of the bureau, who gave demonstrations during the day and illustrated lectures at night, the subjects covered in the latter being rice and sugar production, animal industry, locust extermination, and vegetable and fruit culture. Some 200 lantern slides were used. The car also carried modern farm implements for demonstration purposes. A noticeable result of the tour is the disposition of the farmers along the route to discard old agricultural implements and acquire the more modern and effective ones.

Argentine Railway Results.—The present year has been a decidedly adverse period in Argentine railway history, revenue having fallen off, while flood difficulties have also had to be contended with. Floods commenced in August and September, 1913, and resulted in considerable loss of traffic and damage to the property of the Buenos Ayres Great Southern, amounting to over $500,000. No sooner was the flood difficulty got over, than Argentina was visited by hot, dry winds and drought, which caused the failure of cereals in the southern portion of the company's zone. Rains, which set in again in the latter part of the company's financial year, caused dislocation of agricultural business and delayed the transport of the maize crop, a great part of which still remains to be carried. During the past financial year 145 miles of extensions were opened for traffic by the Buenos Ayres Great Southern, bringing its total completed lines up to 3,727 miles. The company is now restricting its expenditure upon capital account, only absolutely essential works being undertaken. In view of the working difficulties experienced by the Great Southern Railway in 1913-14, it is not surprising to find that the traffic receipts declined to $26,557,898, as compared with $31,927,007 in 1912-13. On the other hand, the working expenses were brought down to $15,552,452, as compared with $18,037,121, so that the decline in the net revenue was reduced to $2,944,450. A transporter bridge built for road traffic between the capital and Avellaneda and the Sud Dock were brought into operation in June, and by a presidential decree the government formally accepted the bridge from the company.—*Engineering.*

Supply Trade News

Eli F. Hart, one of the founders and the chairman of the board of the Rodger Ballast Car Company, Chicago, died at his home in Chicago on November 23. Mr. Hart was born at Rochester, N. Y., in 1832.

After sixteen years service with Hermann Boker & Co., New York, Ellsworth Haring has terminated his connection with that company, and has organized a business in tool steel and related specialties, with temporary offices at 684a Hancock street, Brooklyn, N. Y.

E. A. Sterling, forest and timber engineer, 1331 Real Estate Trust building, Philadelphia, Pa., has moved to 925 Commercial Trust building, Fifteenth and Market streets. This change of address also includes the offices of Clark, Lyford & Sterling, and the Philadelphia-Vancouver Timber Company.

TRADE PUBLICATIONS

Concrete Mixers.—The T. L. Smith Company, Milwaukee, Wis., has just issued folder No. 430, which is devoted to illustrations and the description of its latest type of non-tilting concrete mixer, known as the Smith Mixerette.

Steel Fence Posts.—The Carbo Steel Post Company has recently issued a 32-page booklet describing the construction and principles of its spring steel field fence post, and illustrates how they should be installed. It also gives a comparison of prices of the steel with the wooden posts.

Coaling Stations.—The Roberts & Schaefer Company, Chicago, has issued a four-page folder illustrating some of the latest reinforced concrete Holmen coaling plants. The bulletin shows briefly the method of operation of some of the coaling stations furnished by the company, and contains a list of the installations made since January 1.

The Kewanee Union.—The National Tube Company, Pittsburgh, Pa., has recently issued a circular relating to its male and female pattern Kewanee union. The following saving is said to be effected by this union: one nipple; the time required for making one less joint; one gasket; the time required for cutting and fitting that gasket, and the cost of one malleable union, an average net saving of 16 cents.

Train Lighting System.—"Safety Electric Light" is the title of an attractive booklet which has been recently issued by the Safety Car Heating & Lighting Company, New York, descriptive of the Safety Axle Driven Car Lighting System. The booklet describes the system in detail and contains illustrations of the various parts of the dynamo, the dynamo regulator, etc. There is also a section giving instructions for operation and installation, and another, giving cross-sections of the various safety dynamos and the names and numbers of their parts.

Electrical Apparatus.—The General Electric Company has recently issued a number of bulletins as follows: Bulletin No. 40,500, entitled "Alternating Current Generators for Direct Connection to Reciprocating Engines," illustrates and describes some of the recent improvements in the alternators built by the company for direct connection to steam, oil and gas engines. Bulletin No. 46,018 describes the company's type P-8 Portable Voltmeter. This is an unusually small instrument enclosed in a mahogany case, suitable for use on both alternating and direct current. Bulletin No. 44,404 describes one of the company's new line of Ventilated Commutating Pole Motors. This motor has a rate capacity of 80 hp. on 600 volts. The motor has a special feature in its induced ventilation, and is said to have a greater service capacity than motors of the closed type having the same hourly rating. Bulletin No. 41,500 is entitled "Small Direct and Alternating Current Motors of the Drawn Shell Type." These are all fractional horse-power motors, which have been specially designed for application to the diversified forms of small machines which may be driven by electricity.

Railway Construction

Boston Subways.—Bids are wanted by the Boston Transit Commission, Boston, Mass., until December 5, for constructing that section of the Dorchester tunnel which will pass under Fort Point channel, thence to the corner of West Second street and Dorchester avenue in South Boston. This section will be about 3,200 ft. long.

Charles City Western.—An officer writes that this company has projected an 18-mile extension from Charles City, Iowa, to a point on the Chicago Great Western. The company now operates a line from Charles City, southwest to Marble Rock 13 miles.

Chattahoochee Valley.—An officer writes confirming the report that surveys have been made for a proposed extension from McCulloch, Ala., to a connection with a line to Columbus, about 15 miles. The right of way has also been secured but construction work has not yet been started. (August 21, p. 369.)

Chicago, Peoria & Quincy (Electric).—This company, which was organized last year to build from Peoria, Ill., southwest about 120 miles to Quincy, is now making surveys for the line, but has not yet started construction work. The Chapman Company, 1710 Steger building, Chicago, may be addressed. (June 12, p. 1356.)

Grand Marais & Northwestern.—An officer writes that a contract has been given to John Bergman, Duluth, Minn., and work is under way building from Grand Marais, Minn., west to Cascade Junction, 20 miles, and that surveys are being made for an extension from Cascade Junction west to Ely, 55 miles. A. Mitchell, president, Duluth, Minn. (January 16, p. 149.)

Kinston Carolina Railroad & Lumber Company.—We are told that this company has projected an extension from Pink Hill, N. C., south to Chinquapin, 15 miles. (October 23, p. 779.)

Lula-Homer.—We are told that this company has been organized to build from Lula, Ga., southeast to Homer, 14 miles. The line is to have maximum grades of 2.5 per cent and maximum curvature of 9 deg. It has not yet been decided when bids will be asked for building the line. The principal commodities to be carried will be farm produce and the products of mines. D. G. Zeigler & Son, Lula, may be addressed. (November 13, p. 924.)

Morgantown & Wheeling (Electric).—An officer of this company writes that grading work has been finished and track laying is to be started at once from Cassville, W. Va., west to Blacksville, 15 miles. Keeley Brothers & Gilmore, Morgantown, W. Va., are the contractors. Track has been laid on about a half mile at Cassville. Surveys have been made and most of the right of way secured for an extension from Blacksville to Wheeling, 52 miles. R. D. Hennen, chief engineer, Morgantown. (May 15, p. 1118.)

New York Subways.—Bids are wanted by the New York Public Service Commission, First district, until December 11, for the construction of Section No. 4 of Routes Nos. 4 and 36, that part of the new Broadway subway in the borough of Manhattan extending northerly under Seventh avenue from Fifty-first street to a connection with the crosstown part of the line in Fifty-ninth street.

Quebec Central.—An officer writes that work is now underway by P. J. Wolfe, Sherbrooke, Que., on a section of 10 miles, and by Z. C. Howard & Co., also of Sherbrooke, on a section of 5 miles, of an extension being built from a point 10 miles east of St. Sabine, Que., to Lac La Frontier. (July 3, p. 40.)

Rome & Northern.—An officer writes that surveys are now being made for the extension to be built from Gore, Ga., north to Subligna, 8.4 miles.

Temiskaming & Northern Ontario.—An officer writes regarding the report that a line may be built from Cochrane, Ont., to Port Nelson, that the provincial government has not seriously considered building such an extension as it would involve the construction of about 750 miles of railway and much of the route

would be through an unexplored wilderness. A reconnaissance survey for an extension from Cochrane to Moose Factory at the south end of James Bay, 185 miles, has been made. It will be practicable to develop a harbor at this place which is the nearest point on James or Hudson Bay to the settled portions of eastern Canada along the Great Lakes and St. Lawrence river.

Tennessee Railway.—An officer writes that surveys are now being made for building an extension from Charleys Branch to Petros, Tenn., 11.25 miles.

Toronto Eastern (Electric).—An officer of this company which was organized to build a line through Pickering, Whitby, Oshawa and Bowmanville, Ont., writes that track has been laid on a total of 14.53 miles, which includes the section from Whitby to Bowmanville, 11.47 miles, and work is now under way between Whitby and Pickering on five miles. Ewan MacKenzie, Toronto, Ont., is the contractor. Surveys are now being made for an extension from Pickering to a point in the township of Scarboro, 15 miles. E. W. Oliver, chief engineer, Toronto. (January 9, p. 102.)

RAILWAY STRUCTURES

Houston, Tex.—The International & Great Northern is building a one-span Strauss bascule bridge over Buffalo Bayou, near Houston. The contract for the steel, amounting to 468 tons, was awarded the Wisconsin Bridge & Iron Company, and the contract for erection went to the American Construction Company. Work is about 10 per cent completed. The total estimated cost is $36,000.

Pawtucket, R. I.—A contract for building the new station for the New York, New Haven & Hartford on the dividing line between the cities of Pawtucket and Central Falls to replace two old stations has been given to Norcross Brothers, Worcester, Mass. The new structure is to be of brick and stone construction. It will be an overhead station built 21 ft. above the track level, which at this point is located in a deep cut. The station will have two island platforms 900 ft. long, reached by six stairways. The waiting room will be 92 ft. long, 64 ft. wide and 32 ft. high. The building will be 84 ft. by 162 ft. with two wings, and the work will cost about $200,000. A contract was given last summer to C. W. Blakeslee & Sons on a unit price basis for the foundations. This improvement is part of the grade crossing elimination work at Pawtucket and Central Falls under way for the past two years. The work involves the elimination of all grade crossings, and the four tracking and relocation of tracks to take out the curve on the main line at this point.

Portsmouth, Va.—We are told that a contract has been given by the Seaboard Air Line to the Richardson Construction Company, Inc., Norfolk, Va., for work on the general office building and terminal station at High street in Portsmouth. The plans call for a structure five stories high on pile foundation, to be from 60 to 72 ft. wide and about 155 ft. long, with brick walls and reinforced concrete floors and roof.

Notes on English Railway Signaling—History.—Although neither fixed signals nor the block system were first introduced on the London, Brighton & South Coast, that company's line may be regarded as being the garden within which they grew and multiplied. Stewart's Lane Junction and the Hole-in-the-Wall signal towers were among the very first erected, and at Brighton, in 1861, a tower was provided with 37 levers installed therein. No doubt the fact that both John Saxby and J. S. Farmer had been connected with that railway had something to do with the progress signaling made on the Brighton. It was on that railway also that fish-tailed arms for distant signals were introduced. This was done in August, 1872, when two distant signals at Norwood Junction were so distinguished. The Brighton Company cannot claim to be the first to adopt the "lock-and-block." W. R. Sykes—the last survivor of the old school—must be given the credit for inventing patent No. 662 of 1875—the first complete method of interlocking the fixed signals with the block instruments; but after the Arlesey accident of December, 1876, Charles Hodgson, of Saxby & Farmer, invented patent No. 400 of January, 1877—a lock-and-block system, which was installed on a section of the Brighton Railway.

Railway Financial News

Bangor & Aroostook.—In the fiscal year ended June 30, 1914, this company, operating 631 miles in the state of Maine, had gross revenue from operation of $3,795,413, an increase of $542,991 over the previous year and the largest in the company's history. The net income after the payment of expenses, rentals, taxes and interest was $205,731, as against a net loss of $84,307 in 1913. The increase in gross revenue was shown in both passenger and freight traffic, but that the amount is so large is mainly due to a tonnage of potatoes of 526,578 (of a total of 1,902,745) as against 372,681 tons in 1913. The company, on the other hand, also had increased expenditures, very largely the result of the severe winter.

The Bangor & Aroostook operates a line through the state of Maine from Penobscot Bay and Bangor north through Aroostook county to points on the Canadian border such as Houlton, Fort Fairfield, Van Buren, Fort Kent and St. Francis. It also has a branch to Greenville in the Moosehead Lake region. The road thus serves a large portion of the hunting district of Maine. It is not part of a through route but derives the larger portion of its revenue from the traffic in potatoes, lumber and other forest products, and paper which originates in its own territory; the tonnage of these products in 1914, being potatoes, 526,578; lumber, 352,847; other forest products 304,481 and paper, 168,264, of a total of 1,902,745 tons.

In the fiscal year ended June 30, 1914, the road earned $6,019 per mile of road, of which $4,693 was freight revenue, as compared with $5,158 revenue per mile of road of which $3,890 was freight revenue, in 1913. The ton-mile rate in 1914 was 1.225 cents as against 1.146 cents in the previous year, the total ton mileage carried being 1,902,745 tons, as noted above, as against 1,620,065 in 1913. The number of passengers carried in 1914 was 817,282 as compared with 781,519 in 1913, the average receipts per passenger mile being 2.350 cents and 2.309 cents in 1914 and 1913, respectively. The company during the year paid 3½ per cent dividends. On June 30, 1914, it had on hand $450,226 cash with loans and bills payable of $1,215,000.

Erie.—The stockholders, at a special meeting on November 17, approved the making of a refunding and improvement mortgage under which a total of $300,000,000 bonds may be issued. This provides for the refunding of all outstanding securities.

Kanawha & Michigan.—The annual report of this company shows that in the fiscal year ended June 30, 1914, it had net income after the payment of expenses, rentals, taxes and interest of $816,448, as compared with $1,005,396 in 1913. This decrease of $188,948 is the result of strikes at the coal mines which began in Ohio April 1, 1914, and in West Virginia on May 1, and continued until after the close of the fiscal year.

The Kanawha & Michigan operates a total of 177 miles of line. The main line extends from Corning, O., to Hobson and from Kanauga, O., to Gauley Bridge, West Va. In the fiscal year ended June 30, 1914, the company earned operating revenue per mile of road of $17,611, as compared with $18,705 in 1913. The total ton mileage of revenue freight was 660,476,000, a decrease of 7.27 per cent. The average receipts per ton per mile were 4.02 mills, about the same as in 1913, and the average trainload was 959 tons, an increase of 22 tons, or 2.35 per cent. During the year there was an actual loss of coal and coke traffic of $230,353, nearly all of which was due to the strike in April, May and June. This loss was even greater than the loss in total revenue, which makes it worth noting that over three-quarters of the Kanawha & Michigan's total tonnage of freight is made up of bituminous coal. The total number of passengers carried in the fiscal year was 1,231,119 as compared with 1,269,783 in 1913. The average passenger receipts per passenger mile in 1914 were 1.94 cents, and in 1913, 1.91 cents. Dividends paid during the year amounted to $450,000 at the rate of 5 per cent. The balance carried to credit of profit and loss, therefore, was $366,448. At the end of the year the company had on hand cash to the amount of $139,129. The total working assets were $1,016,661, and the total working liabilities were but $693,606. The expenditures for additions and betterments in 1914 totaled $273,042.

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WE GUARANTEE, that of this issue 8,750 copies were printed; that of these 8,750 copies 7,410 were mailed to regular paid subscribers to the weekly edition, 250 were provided for counter and news companies' sales, 1,053 were mailed to advertisers, exchanges and correspondents, and 37 were provided for samples and office use; that the total copies printed this year to date were 458,100, an average of 9,349 copies a week.

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VOLUME 57 DECEMBER 4, 1914 NUMBER 23

Contents

*Illustrated.

The New Haven road is receiving unstinted praise from the newspapers for the very successful way in which it took 33,000 passengers to and from the New Haven football game in one day. President Elliott's letter reviewing the work done is noticed in another column; and a significant paragraph in the letter is that wherein he says that "a well-equipped, well-organized, well-managed and well-manned railroad should be able to perform this task satisfactorily." In other words, he expected the fine results which were produced. And he had good grounds for the expectation. The New Haven road has done excellent work with the football crowds before. The special passenger movement this year was heavier than ever before, but the company during the past year has carried out a careful and thorough scheme of expansion of its facilities; and it was to be expected that what the officers set out to do they would do. To those newspapers which have so generously praised the New Haven in connection with this special passenger movement, we offer the suggestion that commendatory mention of railway efficiency would be quite appropriate in many other cases. Beginning with the assumption that the New Haven has been very bad, it is easy to make a glowing paragraph concerning what is seen to be very good. But the striking antithesis is not essential. A 2,000-mile railroad is too big a machine to be thus dealt with. Its good and its bad cannot be tossed off in a paragraph. We make these observations in this connection because they are believed to be worth consideration in connection with other railways and by all newspapers.

Good Work as an Every-day Task

Scrip dividends on railroad stocks have not been very common, but when they have been declared they have always been in the form of a registered warrant or certificate. The Southern Railway declared the last semi-annual dividend of 2 per cent on its preferred stock as payable in scrip, bearing interest at 4 per cent and due in five years. On the New York Stock Exchange 100 shares is the common unit in which trading is done, but the Southern has taken 50 shares as the unit for its scrip dividends. Two per cent on 50 shares would, of course, be $100. The dividend warrants, which are in reality notes of the railway company, are payable to bearer, and each $100 note has attached to it 10 coupons representing semi-annual interest during the period of five years. Fractional scrip has been issued to those holding less than 50 shares, which are exchangeable, when presented in $100 amounts, for the coupon notes above described and which fractional scrip notes bear interest at 4 per cent per year payable at the due date. This is an entirely new form of payment of scrip dividends and the importance of it lies in the step which is made toward convenience for the small holder of securities. The notes are lithographed in a sufficiently intricate pattern to prevent forgeries, but are not so elaborate as to be expensive. It has probably been found that it actually costs the company less to issue this form of scrip dividend than to go to the expense of recording and keeping track of the holders of the stock as of the date of the dividend, and certainly it is infinitely more convenient for stockholders. Incidentally it affords an opportunity for investment to the man who would like to buy railroad stock in $10 or $20 lots.

A New Form of Scrip Dividend

Arthur Wyman, assistant to the president of the Chicago Railway Equipment Company, has contributed to American Industries for November an interesting and able article, entitled "Send Business Men to Congress." Mr. Wyman calls attention to the fact that most of the problems which now come before Congress involve economic and business questions with which men of business training and experience are the best fitted to deal. Therefore, the business interests of the country should take steps to secure the election of such men. Furthermore, he points out, the nucleus for an organization to accomplish this result exists in such organizations as the American Bankers' Association, the National Association of Manufacturers, the Railway Business Association and the many chambers of commerce throughout the country which have been united in the Chamber of Commerce of the United States. "If," says Mr. Wyman, "every man affiliated directly or indirectly with the Chamber of Commerce of the United States would take upon himself the task of disseminating sound doctrine within the radius of his personal acquaintance, how many times multiplied would be the effect of its splendid propaganda. Imagine a condition where every

"Send Business Men to Congress"

man connected with a business concern conceived it to be his duty to 'plug' for the principles in which he believes with the same degree of energy, tact, fairness and constructive ability which he employs in the keen competition of his own business." Certainly, the needs for more business men in Congress, and for a more active participation by business men in public affairs, are fully as great as Mr. Wyman says. Unfortunately, the business interests have in the past worked at cross purposes. Each class of them has sought for what it has conceived to be its own selfish advantage instead of for what would be for the interests of the country as a whole. For example, commercial bodies and industrial concerns have worked for regulation of railways to promote their own interests, to a large extent, regardless of the effect on the railways and the prosperity of the nation as a whole. Meantime, organized labor has acted more wisely. It has stood together as a class in advocating and opposing legislation, and in consequence has usually got what it has wanted. Can the business men of the country, little and big, be brought to a realization of the fact that, broadly speaking, their interests are mutual and not antagonistic, and that therefore they should stand together in advocating legislation which will be beneficial to them all and in securing the election of business men who are fitted to cope with business problems?

Inefficient Government and Public Ownership

The mayor of Chicago recently made an address at the Mayors' Convention in Philadelphia telling why American cities should own and operate public utilities. The government of Chicago, of which the mayor is the head, is charged with the duty of giving its citizens police protection. On November 29 the newspapers of Chicago reported that up to that time there had been 401 homicides in that city in the year 1914, of which 181 were known to have been murders. This is probably the worst record made in 1914 in any community in the civilized world. The government of Chicago demonstrates its incapacity to perform the primary duty of a government; and then in the open season for murders in his bailiwick the mayor sallies out to tell how much better it would be for the public to have government manage the street railways, the light and power plants, and so on, than to have them managed by corporations! Or, take another example: Except the much advertised boulevards, are there worse streets in any other large city than in Chicago? If the city cannot build and maintain good streets, how can it be assumed it could successfully maintain and operate street railways and other public utilities? Those who advocate municipal ownership of utilities usually advocate government ownership of railways, also. They ask, if our governments can successfully build and maintain highways, why could they not successfully build, maintain and operate railways? The answer is easy: they can't successfully build and maintain highways—or, at least, they don't. Most of our public highways, under government construction and maintenance, are among the worst in the world. The advocates of public ownership of public utilities and railways cite foreign experience in support of their argument. But the foreign cities and nations which are successful in managing public utilities and railways show their efficiency by also suppressing crime, by properly building and maintaining streets and highways and by performing their other functions satisfactorily. Their success, to such extent as they really are successful, in managing public utilities and railways is due to their general efficiency; and the failure of our governments with similar enterprises would be due to the same cause as their failure in almost everything they try to do now, viz., to their general inefficiency. And they will always be inefficient while they are run by men who show their statesmanship by constantly seeking to extend the functions of the governments instead of by devoting themselves to getting the present functions of the governments performed respectably.

FOLLOWING THE COMMISSION'S ADVICE

THE newspapers recently have published plans of a committee of western railroad commissioners, headed by Clifford Thorne, for opposing a "general advance" in rates by the western railways which Mr. Thorne last week told the Chicago papers would amount to $70,000,000 a year. Some papers also have expressed surprise at tariffs filed by the eastern railways advancing certain rates more than the 5 per cent which was allowed by the Interstate Commerce Commission on part of the tonnage of the Central Freight Association roads. All this shows misunderstanding or misrepresentation of what the railways are doing.

In its opinion in the eastern rate case the commission made three groups of suggestions as to how the carriers might increase their revenues in other ways than by a general advance. The first suggestion was for an increase in passenger fares. The second was "that all railroads in Official Classification territory examine carefully their freight rates, rules and regulations, with a view to increasing rates that are found to be clearly unremunerative, and modifying burdensome rules and regulations relating to minimum weights and similar matters where this may justly be done." The third suggestion related to free or special services, such as spotting cars, trap car service, lighterage, loading, unloading and storage, etc. "These three suggestions," the commission said, "will necessarily lead to some increase of the transportation charges. But the carriers' revenues will be increased more than the shippers' burdens, for these will be lessened through the removal thereby of many unjust discriminations."

All three of these suggestions have been promptly followed by the railroads: not only by those in Official Classification territory, but to a considerable extent also by the western roads, whose officers had been watchfully waiting for the decision for some indications as to how they could improve their own situation. Whereupon loud protests by Clifford Thorne, the American Meat Packers' Association, and possibly some others less vociferous. Mr. Thorne gets his $70,000,000 a year by taking about 10 per cent of the gross freight earnings of the western roads. But the western roads have not asked for a 10 per cent advance. Some western railroad officers have said they ought to have such an advance, and for a time a plan was considered for a general readjustment of rates on some traffic and a 10 per cent advance on the rest, together with the imposition of special charges for special services. This plan was outlined in a private and confidential letter issued by J. M. Johnson as chairman of a meeting of western traffic officers held last May, which Mr. Thorne in some way got hold of and published. The plan discussed in this letter was admittedly tentative, in anticipation of the decision of the commission in the eastern case.

That the roads are merely trying to carry out what they understand to be the policy favored by the commission is clearly shown by a comparison of the commission's opinion with the steps which the railways have taken. First, the 5 per cent advances allowed in Central Freight Association territory were put into effect, while the passenger departments of the eastern roads have been busy in revising their passenger fares upward in accordance with suggestion No. 1. Then the eastern roads began to "examine carefully their freight rates, rules and regulations, with a view to increasing rates that are found to be clearly unremunerative," and have transferred a considerable number of rates from exceptions back to the higher classification basis, from which they had been taken through force of competition. Both eastern and western roads also filed tariffs effective on December 1, advancing rates on grain, grain products, hay, packing house products and dressed meats, and tariffs have been filed from time to time imposing charges for trap car and other special services. The eastern roads have also filed advances in livestock rates, and the western roads have announced their intention of doing so in the near future, and other commodities in the "unremunerative" class are slated for advances. The western roads also are figuring on advancing their pas-

senger fares, but it will take some time to work out the tariffs.

While attempting to give the impression that all rates in the west are to be advanced, Mr. Thorne confined his specific remarks to the rates on grain and packing house products, in which he is especially interested as attorney for the shippers. Others who may not have the same means of access as Mr. Thorne to private and confidential letters may find some of the principal commodities to be raised by perusing certain tables in the opinion of the Interstate Commerce Commission which the commission referred to as follows: "The compilation prepared by the commission of answers of the carriers to our questions in this proceeding, calling for a statement of their earnings on representative traffic, discloses many rates which yield barely enough in revenue to pay adequately for the mere use of the equipment. Our compilation also shows that a large proportion of traffic in many commodities is yielding less than seven cents per loaded car-mile, although the record shows that railroad men ordinarily consider that the average earning per loaded car-mile should be more than twice that amount. Many unremunerative rates had their origin in fierce competition for traffic or under the menace of the big traffic of powerful shippers. Many such rates have doubtless been continued through ignorance of the loss they entail upon the carriers." The carriers were required to submit statements showing for interstate carload traffic in October, 1913, the relative earnings under existing rates on 30 different commodities moving in greatest volume, and as to representative movements, to establish, among other things, the ton-mile revenues, the car-mile earnings and other facts bearing upon the profitableness of the traffic. To this list the railroads added data for 15 additional commodities and the commission summarized the figures, remarking that they "show for similar lengths of haul, very wide variation in the car-mile earnings."

Of the 45 commodities listed the average net revenue per loaded car-mile (which the commission defined in a footnote as "gross revenue less certain amounts paid out for arbitraries or for special services") ranges from 6 to 28 cents, and the average rate per ton-mile from 2.73 mills to 12.34 mills. Thirty commodities in this table yield earnings of less than 14 cents per loaded car-mile. The lowest car-mile revenue in the list is shown for cattle, 6 cents, and for hogs and sheep the figure given is 7 cents. It is not surprising, therefore, to find that the eastern railways have filed tariffs advancing the rate on cattle from Chicago to New York from 28 to 33 cents, and on hogs and sheep in double-deck cars from 28 to 33 cents, and in single-deck cars from 35 to 38 cents per hundred pounds. The western roads also have announced their intention of advancing livestock rates by a maximum of 2½ cents from the Missouri river and 1 cent from the Mississippi river to Chicago.

Oats, in the commission's table, show car-mile earnings of 8 cents; feed, 8 cents; flour, 9 cents; hay, 9 cents; and corn, 11 cents, and tariffs have been filed advancing the rates on grain and grain products 1 cent, and on hay 2 cents per hundred pounds. Fresh meats show earnings of 10 cents and packing house products 11 cents per car mile. The rates on these commodities also were among the first to be advanced, the increases being, from the Missouri river to Chicago, 3½ cents, and from Chicago to New York, 5 cents.

Copper bullion shows car-mile earnings of 11 cents and a ton-mile revenue of only 2.73 mills. The rates on this commodity, which have long been the ground for some of the severest condemnation of the railways, are also to be substantially advanced.

The American Meat Packers' Association has filed a formal complaint against the advances in meat and livestock rates on the ground that its members are discriminated against by rates so much out of proportion to increases on other commodities. Representatives of the Chicago packers have given interviews, saying that they were willing to stand a general 5 per cent advance, but that they are opposed to a greater advance on their own commodities. It was to avoid just such complaints about the relations of rates that the eastern roads asked for a horizontal advance, but the packers do not mention in their interviews that their rates, by reason of their compelling power of large tonnage, have long been among the very lowest and most unfairly discriminatory in the United States, especially when the expedited service and the empty back-haul are considered. In fact, they are so low that the principal railways between Chicago and the Missouri river have for several years relinquished a great deal of the meat traffic to the Alton and the Wabash rather than meet the low and utterly indefensible rates maintained by these roads.

The railroads need greater revenues and are adopting the course that seems most likely to secure them. But the most salutary feature of the case is that the rates they are now seeking to raise ought to be raised even in the absence of financial necessity. It has been notorious for years that some rates have been so low as to work a discrimination against other traffic, and that these survivals of the days of rebating have seriously militated against efforts to place all rates on an adequate basis. The commission has warned the roads to come into court with clean hands before complaining of a general situation for which such practices as some of these low rates represent are largely responsible. That these unremunerative and discriminatory rates are now to be subjected to greater advances than others is but delayed justice.

HEAVIER LOADING OF CARS

UNDER the caption "Buy a Car of Coal," a little magazine issued by the Milwaukee-Western Fuel Company called "Screenings," recently published a short article giving advice to retail coal dealers which, if followed, would yield advantages to all concerned—the coal mine operator, the wholesaler, the retailer, the consumer and the railroad. It was pointed out that when a dealer places an order for 20 tons of coal the car in which it is hauled is only partially loaded, but is moved and delivered at practically as great expense as if it were loaded to capacity. A little later another partly loaded car is shipped, and so on until a time of car shortage comes, when the railroad becomes unable to deliver coal promptly. Then the retailer finds his bins empty, the consumer clamors for fuel, and the railroad is blamed for not delivering coal promptly! In other words, everybody suffers inconvenience, or worse, while railway equipment and other valuable facilities between the mine and the consumer have been used wastefully.

The traffic committee of the Lumbermen's Association of Chicago has been trying to educate shippers and users of lumber, also, as to the importance of heavier loading of cars. It is sending out circulars calling attention to the fact that as the commercial load of each car is increased the percentage of the dead weight to the total weight to be hauled is decreased. Therefore, the operating efficiency of the carriers is increased, while the car supply is conserved in times of car shortage.

We have referred in the past to the excellent results obtained by the Universal Portland Cement Company and the National Tube Company by urging their customers to order in full carloads. Work of this kind on the part of large industrial concerns is the most effective kind of co-operation with the railroads. Many shippers believe an advance in freight rates is desirable because it would enable the railroads to give more efficient service. Others believe that if the railroads would increase their efficiency they would not need an increase in rates. The campaign for heavier loading of cars affords an opportunity for all shippers of carload freight to help the railroads increase their efficiency in the best way possible; for in no single way could more be saved than by increasing the average load per car.

If coal shippers and other shippers of heavy commodities could be induced to load cars to their full capacity this would be of as much benefit to the roads as an increase in rates, because, like an increase in rates, it would increase earnings per car mile. There are many opportunities for economies by which the railroads cannot benefit without the co-operation of shippers; and this is one of the most important. If dealers order shipments

in amounts equal only to the low minimum carload weights that prevail, the railroads are obliged to furnish them cars for such light loading regardless of the resulting economic waste. Many carload minimums ought to be advanced, but to do so involves a long and most difficult procedure. The fact that at present there is a large surplus of freight cars rather than a shortage shows a need even greater than usual on the part of the roads for practicing the most rigid economy; and every form of assistance which the shippers give them will ultimately redound to the benefit of the shippers themselves.

ALABAMA GREAT SOUTHERN

THE Alabama Great Southern, operating a line running diagonally across the state of Alabama from Meridian, Miss., to Chattanooga, Tenn., is that important link in the Queen & Crescent route which connects the lines from Shreveport and New Orleans, La., to Meridian with that from Chattanooga to Cincinnati. It is thus a part of the Southern Railway System's north and south line from New Orleans and Mobile to Cincinnati, and of particular importance also in that it serves the prosperous and rapidly growing cities of Birmingham and Chattanooga. The company operates a total of 309 miles of road, 295 of which is main line, mostly single track. The road is in the rather enviable position of having no branches, the remainder of the 309 miles consisting of trackage rights over the Southern Railway and the Woodstock & Blocton. The gross operating revenues in the fiscal year 1914 were $5,385,307 as compared with $5,231,985 in 1913, the increase being almost entirely due to increased freight revenues of $3,662,745, as against $3,488,041 in 1913. Operating expenses, however, increased in greater proportion from $3,815,904 to $4,227,464, primarily because of an increase of $228,895, or 19.43 per cent, in maintenance of equipment expenses due to greater expenditure for maintenance of wooden freight cars and to charges for the retirement of light capacity cars. The net revenue of $1,151,237, therefore, was a decrease of $257,469. The net income after the payment of expenses, rentals, taxes and interest was $757,187, as compared with $1,134,620 in 1913. The company paid the regular 6 per cent dividends on its preferred stock, calling for $202,821, leaving a surplus for the year of $554,366 as compared with $931,799 in 1913, there having been no dividends paid on the common stock in either year.

The Alabama Great Southern's bonded debt, including equipment trust obligations of $998,507, was on June 30, 1914, $9,175,107, an average of $29,693 per mile. During the year there had been issued $2,500,000 5 per cent first consolidated mortgage bonds, part of a total authorized issue of $25,000,000, the portion sold at this time being to provide funds for additions, betterments and improvements in 1914, 1915 and 1916. The total funded debt, however, was increased but $2,245,507 over 1913, there having been $366,701 equipment trust obligations retired on maturity during the year. During 1914 the company spent a total of $306,321 for additions and betterments. It has recently spent large sums on signaling, structures and similar facilities. It has also begun to double track its main line and has already completed a section of double track from Birmingham northward. Perhaps the most important of its present projects, however, is the construction of a three mile line from Wauhatchie to the Lookout Mountain line of the Southern Railway leading to the terminal facilities at Chattanooga now reached by trackage rights over the Nashville, Chattanooga & St. Louis. The directors, with these improvements in mind and feeling the need of additional capital, proposed late in 1913 to make a new first consolidated mortgage to secure $25,000,000 of 30-year bonds bearing interest not exceeding 5 per cent, $2,500,000 of these bonds to be issued at once as noted above, and the remainder to be issued as follows: $5,686,600 to refund the 5 per cent first and general mortgage bonds maturing in 1927; $9,000,000 to provide for future double tracking and for the construction of the line from Wauhatchie to the Southern's Lookout mountain line, to be issued as the work is done, and $7,813,400 for general improvements in and after 1917 at about $500,000 a year. Largely because of the sale of the new issue of bonds there was an increase in the amount of cash on hand from $611,307 in 1913 to $2,789,464 in 1914. The company at the end of the year had a surplus of $2,893,714.

The freight traffic of the Alabama Great Southern consists mainly of lumber, coal and ore, and articles of manufacture, principally iron and steel. In the fiscal year ended June 30, 1914, it carried a total of 3,742,000 tons of revenue freight, as compared with 3,690,000 tons in 1913. The total revenue ton miles were 575,047,000, as against 538,502,000, and the average distance each ton was carried increased from 145.95 to 153.66 miles. The company's freight train revenue per mile of road likewise increased from $11,273 to $11,838, and the total operating revenue per mile of road from $16,910 to $17,405. There was an increase in revenue trainloading during the year from 418 to 422; the revenue car loading per loaded car averaged 20 tons.

The passenger traffic in the two years was about the same. In 1914 there were 1,018,000 passengers carried as compared with 1,009,000 in 1913. The passenger receipts were $1,298,781 in 1914, and in 1913, $1,291,317. In 1914 the average distance each passenger was carried was 59.55 miles; the average revenue per mile 2.14 cents, and the passenger-train revenue per mile of road, $4,971.

The following table shows the principal figures for operation in 1914 as compared with 1913:

	1914	1913
Average mileage operated	309	309
Freight revenue	$3,662,745	$3,488,041
Passenger revenue	1,298,781	1,291,317
Total operating revenues	5,385,307	5,231,985
Maint. of way and structures	688,650	627,364
Maint. of equipment	1,406,891	1,177,997
Traffic expenses	162,171	154,664
Transportation expenses	1,832,894	1,736,409
General expenses	136,858	119,471
Total operating expenses	4,227,464	3,815,905
Taxes	189,857	176,041
Operating income	961,380	1,232,664
Gross income	1,338,882	1,719,098
Net income	757,187	1,134,620
Dividends	202,821	202,821
Surplus	554,366	931,799

COLORADO & SOUTHERN

THE strike in the coal mines in Colorado was, of course, the dominant factor in the history of the Colorado & Southern in the fiscal year ended June 30, 1914. The coal tonnage, which furnished 29.39 per cent of the total tonnage in 1913 and the revenue from which was 24.93 per cent of the total freight revenue in that year, furnished but 21.21 per cent of the total tonnage in 1914, and the revenue from this business amounted to but 18.03 per cent of the total revenue. Not only did the strike in the coal mines cause a loss in freight revenue to the Colorado & Southern, but it also very much increased operating expenses, it being necessary to buy fuel coal from mines not on the lines of the company. Fuel cost the Colorado & Southern 17.2 cents per locomotive-mile in 1913, and 22.4 cents per locomotive-mile in 1914.

The Colorado & Southern operates 1,866 miles of road, of which 906 miles is in Colorado and 711 miles in Texas. In 1914 the road earned $7,083 per mile as compared with $8,152 per mile in 1913. Of its total operating revenues under normal conditions about 70 per cent is freight revenue and 22 per cent passenger revenue. Under normal conditions about 63 per cent of its total freight tonnage is furnished by products of mines and about 16 per cent by products of agriculture.

Total operating revenues in 1914 amounted to $13,223,000 as compared with $15,078,000 in 1913. Operating expenses amounted to $9,746,000 as against $10,623,000 the year before. All of the saving which was made was in maintenance. After the payment of interest and 2 per cent each on first and second preferred there was a surplus in 1914 of but $66,000, while in 1913, after the payment of 1 per cent on the common and 4 per cent each on the first and second preferred, there was a surplus of $675,000.

The following table shows the percentage of each class of expenses to total operating revenues:

	1914	1913
Maintenance of way and structures	13.75	12.65
Maintenance of equipment	16.52	20.64
Traffic expenses	1.64	1.53
Transportation expenses	38.23	32.50
General expenses	3.57	3.14
Total	73.71	70.45

The smaller expenditure on maintenance of equipment was probably in part the result of a considerably smaller mileage made by both locomotives and freight-train cars. The increase in transportation expenses, despite a saving in train mileage, was due to the higher cost of fuel already mentioned, and to very severe winter weather, which made operation more difficult, etc.

The total number of tons of freight carried in 1914 was 6,125,000, a decrease of 1,328,000 from 1913, and the ton mileage was further decreased by a much shorter average haul, 143 miles in 1914 as against 154 miles in 1913. Apparently, therefore, the Colorado & Southern gets a long haul on its coal. The smaller proportion of coal tonnage, however, made the average ton-mile rate higher in 1914—1.033 cents—than in 1913—0.944 cents. With a decrease of about 24 per cent in ton mileage, the total mileage of freight locomotives was 3,079,000 in 1914 as against 3,740,000 in 1913, a decrease of 17 per cent. Loaded freight car mileage was 45,972,000 in 1914 as against 55,373,000 in 1913, a decrease of 9,401,000. Empty car mileage was 22,704,000 in 1914 as against 25,785,000 in 1913, a decrease of 3,081,000. The falling off in coal tonnage is reflected in the average trainload, which in 1914 was, for standard gage lines, 302 tons as against 332 tons in 1913.

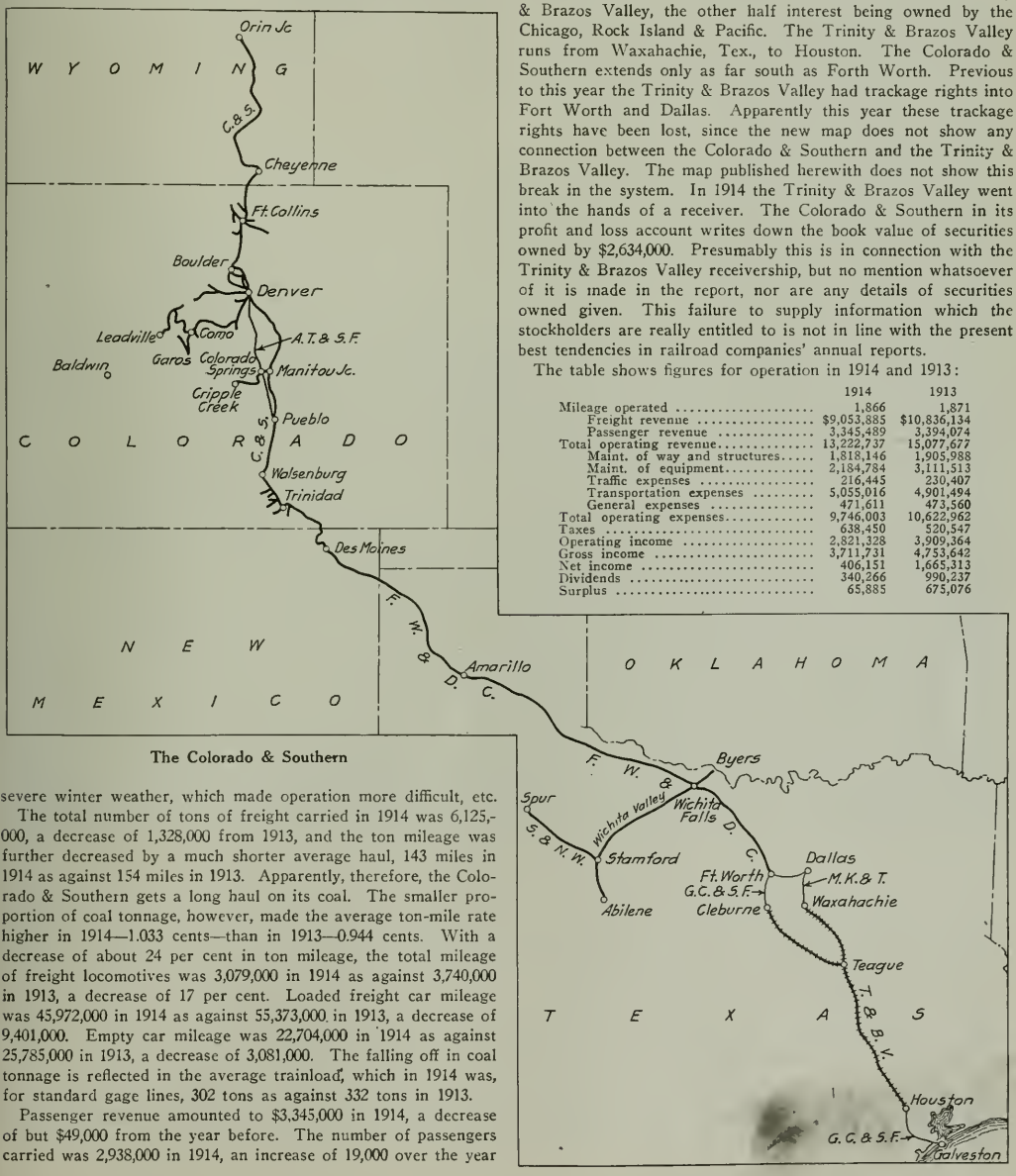
Passenger revenue amounted to $3,345,000 in 1914, a decrease of but $49,000 from the year before. The number of passengers carried was 2,938,000 in 1914, an increase of 19,000 over the year before; but the average passenger journey was 44 miles in 1914 as against 46 miles in the previous year. The receipts per passenger per mile were 2.597 cents in 1914 and 2.555 cents in 1913.

No securities were sold by the Colorado & Southern in 1914, and the outstanding funded debt in the hands of the public decreased by $407,000, principally because of the payment of maturing equipment trust certificates. A total of $166,000 was spent for additions and betterments. At the end of the year the company had on hand $663,000 cash, with total working liabilities of $1,722,000, which included $116,000 loans and bills payable. At the beginning of the year the company had $908,000 cash, no loans and bills payable, and $1,508,000 total working liabilities.

The Colorado & Southern owns a half interest in the Trinity & Brazos Valley, the other half interest being owned by the Chicago, Rock Island & Pacific. The Trinity & Brazos Valley runs from Waxahachie, Tex., to Houston. The Colorado & Southern extends only as far south as Forth Worth. Previous to this year the Trinity & Brazos Valley had trackage rights into Fort Worth and Dallas. Apparently this year these trackage rights have been lost, since the new map does not show any connection between the Colorado & Southern and the Trinity & Brazos Valley. The map published herewith does not show this break in the system. In 1914 the Trinity & Brazos Valley went into the hands of a receiver. The Colorado & Southern in its profit and loss account writes down the book value of securities owned by $2,634,000. Presumably this is in connection with the Trinity & Brazos Valley receivership, but no mention whatsoever of it is made in the report, nor are any details of securities owned given. This failure to supply information which the stockholders are really entitled to is not in line with the present best tendencies in railroad companies' annual reports.

The table shows figures for operation in 1914 and 1913:

	1914	1913
Mileage operated	1,866	1,871
Freight revenue	$9,053,885	$10,836,134
Passenger revenue	3,345,489	3,394,074
Total operating revenue	13,222,737	15,077,677
Maint. of way and structures	1,818,146	1,905,988
Maint. of equipment	2,184,784	3,111,513
Traffic expenses	216,445	230,407
Transportation expenses	5,055,016	4,901,494
General expenses	471,611	473,560
Total operating expenses	9,746,003	10,622,962
Taxes	638,450	520,547
Operating income	2,821,328	3,909,364
Gross income	3,711,731	4,753,642
Net income	406,151	1,665,313
Dividends	340,266	990,237
Surplus	65,885	675,076



The Colorado & Southern

Letters to the Editor

THE DEFEAT OF THE MISSOURI FULL CREW LAW

St. Joseph, Mo.

To the Editor of the Railway Age Gazette:

The Missouri full-crew law was passed at the last session of the legislature, held at Jefferson City on January 1, 1913. The bill ran the usual gamut of such legislation, being considered, referred, reported favorably, and finally passed by both houses and signed by the governor. The legislation was urged by an active committee of the Brotherhood of Railway Trainmen, and was followed from committee to committee with great vigilance. Members of the operating departments of the various railroads were before the committees and explained the utter uselessness of an extra man on trains of 40 cars and over. The governor signed the bill after a strong protest by the railroads.

The railroads have an extra man on all freight trains doing a local business. The passenger trains have as a rule been equipped as provided for by the first section of the law.

The hardship of the law lay in its provision that on trains of 40 cars and more an extra brakeman should be employed. The average pay of a brakeman in Missouri is about $90 per month. The arguments advanced before the legislative committees by the representatives of the railroads, such as "No service to be performed by an extra man; trains were already fully equipped; the engineer and fireman, the conductor and flagman and brakeman were all that could possibly be used both for safety and efficiency," were of no avail. Neither did the fact that the railroads were in financial distress and that their business was on the decline have any weight with the legislators, whose pledge it is thought was demanded and given in some instances in advance of election to support such a bill.

With the possibility of half a million dollars increased expenses annually under this law, the railroads began to take notice and cast about for relief. A meeting was called and the various counsel of the Missouri lines decided to advise their respective companies to invoke that beneficent but heretofore dreaded provision of our constitution known as the "initiative and referendum," and it proved a timely means of escape from this unjust legislation in Missouri. The good effect is being felt all over the country, not in the spirit of hostility towards honest labor or honest organization of trainmen, but against such unwise and harmful legislation as is generally urged by agitators who are members of the brotherhood out of a job.

There was no need of this extra man on trains of 40 cars or more; a through train of 40 cars requires the same help as one of 30 or 35 cars, and no more. It isn't the length of a street car, or the length of a hoe-handle that determines the number of men that can or should be employed. The test is, what duties are there to perform for safety and efficiency, and when a full assignment to these duties is made, an extra man is a bother, not a helper.

I quote from the Railroad Trainman, July, 1914, in an article on "The Full Crew Bill in Missouri":

> So everywhere it can be done, turn loose Vox Populi, Veritas, Pro Bono Publico, Ish Ka Bibbel, Sinker, and all the rest of them in an effort to convert public sympathy and support to our purposes and have everybody understand that what helps us, helps them.

This method was literally carried out by the Brotherhood to the extent of using the picture shows in cities in which to exhibit the most distressing but imaginary scenes of accident and injury to employees, causing death and maiming for lack of enough brakemen; also exhibits on billboards all over the state, larger than the side of a car, on which were statements, such as, "One Man Killed or Injured Every Seven Minutes," and many other scarecrow devices. The railroads answered these implied accusations and overdrawn pictures by simply stating facts showing fewer accidents on trains of 40 cars and over than on trains of less than 40 cars; also by showing that less than 50 deaths of employees had occurred on all roads in Missouri within one year, and that not a single accident was occasioned on account of too few brakemen.

The people saw through the "overplay" and resented the attempt of the brotherhood to dictate the number of men that should be employed from their organization in an enterprise in which the brotherhood had no pecuniary interest. It seemed to many voters quite burden enough for the government to presume to fix terms for the detail management of railroads as to rates, etc., without assuming any responsibility for losses. The railroads showed the Missouri farmer, the Missouri merchant, mechanic and others the issue, and they caught the spirit of fair play as they always will when properly approached. Besides, there were many employees of the railroads who voted against the bill becoming a law, men whose positions on the roads enabled them to judge of the utter lack of necessity for the extra man.

It is impossible in this short space to explain the benefits from the work done in this campaign on the full crew bill. The railroad situation generally has been laid bare to the people of this state. Shippers and passengers have become interested as never before. What the railroads have done and are now trying to do for the state was made plain; the enormous amount of money derived from railroads as citizens of the state by taxation for school and other purposes; indispensible service to both shipper and passenger and the low prices for the service; the three great markets of St. Louis, Kansas City and St. Joseph maintained by the railroads; and finally, the railroads showed the voters how absurd it was to accuse the managers of the railroads of preferring to kill human beings and incur large damage suits and judgments rather than put an extra man on a through freight train when, and if, by so doing, humanity and economy would be served. Then the unanswerable argument that our public service commission had power to put an extra man on when and where needed, clinched the nail.

While the result might have been the same had no opposition been urged by the railroads; that is, while the weight of the full crew bill together with that of the other dozen amendments might have snowed it under along with the rest, still one cannot always tell for sure, and the fight the railroads made was worth the effort in more than a dozen other different ways, as time will prove.

Our constitution and law in reference to the initiative and referendum requires that a petition containing the names of 5 per cent of the voters in at least two-thirds of the congressional districts of Missouri shall be filed with the secretary of state within 90 days after the passage of the law, in order to refer an act which has been passed by the legislature, to the voters at the next general election. The law further provides that an act so referred shall not become a law unless a majority of those voting on the proposition is in favor of such law. The complete returns have not been published by the secretary of state yet, but I am advised that about 80 per cent of all voters exercised a discriminating judgment on this and other amendments. This is shown by the fact that no two amendments got anything like the same vote either in favor of or against it.

O. M. Spencer,
General Solicitor, Chicago, Burlington & Quincy.

[Official returns of the vote show that there were 159,593 votes for and 324,085 against the law, making a plurality against it of 164,492. The returns by counties also show that the bill was defeated in 102 out of the 116 counties of the state, and that contrary to the expectations of the railroad managers, it received an overwhelming defeat even in cities where it was believed that the union labor vote might prevail, and the opposition was by no means confined to the agricultural counties. Even St. Louis, where the brotherhood looked for a big majority in favor of the bill, went against it by 18,417, although in Kansas City and St. Joseph it carried. Outside of the three principal cities, St. Louis, Kansas City and St. Joseph, the measure received only about 86,000 votes in the entire state.—Editor.]

Construction of the Gwynn's Falls Arch Bridge

Four-Track Concrete Structure on Pennsylvania Railroad at Baltimore (Md.) Being Built in Two Sections

Approximately two-thirds of the Philadelphia, Baltimore & Washington (P. R. R.) line between Baltimore and Washington has four tracks, and the heavy traffic handled makes it desirable to bring the remaining third of the line to this standard as soon as possible. As one step in this development the old double-track iron bridge over Gwynn's Falls and a single-track line of the Western Maryland, near the southwestern edge of the city of Baltimore, which has limited the capacity of the line entering the city, is being replaced by a four-track reinforced concrete arch structure. The old bridge consisted of four spans of link and pin deck trusses on stone piers. The bridge was too light structurally for the traffic and the masonry was badly cracked, making it practically necessary to replace it at an early date.

Concreting the Arch Ring and Spandrel Walls of the First Half Showing the Old Steel Bridge in the Background

This work is being handled in two stages. Beginning early in 1913, the first section, wide enough for two tracks, was built just far enough west of the old structure to clear it. Traffic was turned over this half of the new bridge on December 15, 1913. The old bridge was then removed, and the east half of the new structure is now being completed.

The traffic south of Gwynn's Run, the first station north of the bridge, averages about 36 freight and 73 passenger trains per day, and, including light engines used as helpers on southbound tonnage freight trains, the total number of movements over the old bridge has reached a maximum of about 165 per day. The construction work had to be handled without interruption to this traffic.

DESIGN

The new bridge has a total length of 580 ft. and a width of 61 ft., and consists of three 115-ft. and one 75-ft. reinforced concrete arch spans. The location of the abutments and the alinement of the bridge are practically the same as in the old structure. The height of the bridge, about 90 ft. from the base of the rail to the bottom of the footings, and the desire to provide an attractive looking structure, were important factors in the choice of the type of structure. The natural conditions at the site are favorable to an arch bridge as the sides of the valley have steep slopes and rock can be easily reached in all foundations.

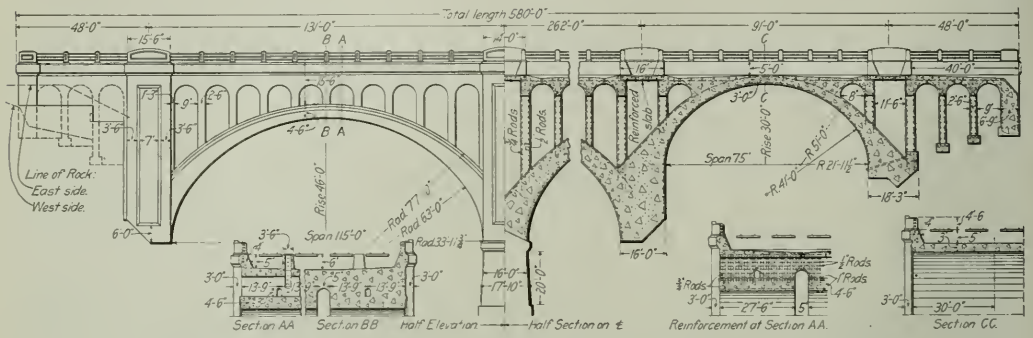
The abutments are of the hollow type, their length parallel to the track being 40 ft. The tracks over the abutments are carried on three 9-ft. arches supported by intermediate cross walls in each abutment. These arches are similar to the spandrel arches over the main spans, with the exception that their ends are closed by the side walls of the abutment. The three piers rest on footings 19 ft. 10 in. wide by 66 ft. long, and are of solid concrete up to the intersection of the extradosal lines. Above this, the piers are hollow, the ends being closed by pilasters which rest on offsets at the level of the springing line. These pilasters are entirely independent of the pier walls, being tied in by rods to the floor slab which spans the width of the piers at the top. The minimum width of piers is 16 ft. The arch rings have a three-centered intrados and a semi-circular extrados. In the 115-ft. spans the rise is 46 ft. and the crown thickness

4 ft. 6 in., while in the 75-ft. span the rise is 30 ft. and the crown thickness 3 ft. The spandrel arches have a span of 9 ft. and a wall thickness of 2 ft. 6 in., except at the piers, where the thickness is increased to 3 ft. 6 in.

The main arch rings are separated into two parts along the center line of the bridge by an open space 5 ft. wide extending down to the haunches and up through the walls of the superimposed arches to a level with the springing line of these small arches. The minimum thickness of concrete over the spandrel arches is 2 ft. at the 6-in. drain on the center line of the bridge over each small arch. The thickness of the floor is increased to 3 ft. along both edges of the bridge. The elevation of the base of rail is 5 ft. above the highest elevation of the floor. The tops of the main arches are level transversely, the drainage from the roadway being carried through small openings 2 ft. wide by 3 ft. high in the arch walls. The drainage, which is carried down over the extrados of the arch ring into the hollow pier, is led to one end of the pier by the pitch of 1 ft. and is there carried through the arch ring and discharged. Four manholes are provided in the floor, two over the central span and one over each abutment, allowing access to the space above the main arches.

A 1½-in. expansion joint is provided along each side of the 12-ft. slabs which cover the hollow piers. Two expansion joints are also provided in the parapet walls over each arch. The floor over each arch is continuous. The balustrade consists of concrete posts 18 in. square supporting three rails of 3½ in. galvanized pipe.

All concrete in the structure is a 1:2:4 mixture, the total quantity amounting to 28,000 cu. yd. with 470 tons of reinforcing steel.



Elevation and Sections of Four-Track, Four-Span Reinforced Concrete Arch Bridge Near Baltimore

East Side of First Half Completed, Showing Concrete Distributing Tower in Position for Work on Second Half

CONSTRUCTION

A large part of the material used in construction was handled by a cableway having a capacity of 5 tons. The span of the cable was 650 ft. and the supporting towers were 60 ft. high. A 1¼-in. cable with a Flory carriage was used. The contractor

also installed a saw-mill and shop adjacent to the stream near the bridge site and two steam plants for operating the mixer, concrete hoist and cable engine.

The foundations were excavated through rock, most of which required blasting. A stiff-leg derrick and clam shell bucket were used to handle the excavated material. The footings were carried down about 7 ft. at the deepest point, open cofferdams being used in these pits. The water in Gwynn's Falls is normally very low, having a depth at the bridge site of about 14 in. It is subject to high stages, however, which, it is reported, reach a maximum of 25 ft. Only one of the piers was located in the channel, from which water was diverted during the excavation and the placing of the concrete. In the erection of the main arch rings, the contractor used Blaw steel centers consisting of six three-hinged steel arches for each span. Derricks were used in conjunction with the cableway to place these centers, which were erected one rib at a time. The centers were

View Along Center Line of First Half, Showing Material Cableway and Concrete Distributing Tower

supported by six-post timber bents under each side, each post consisting of two 12-in. by 12-in. timbers. The wall plates were 6-in. by 24-in. timbers on which 4-in. wedging was used to adjust the position of the centers. After finishing the first half of the bridge, the centers were struck and allowed to remain in that position until needed on the second half, when they were rolled laterally into the new position without dismantling. The Blaw semi-circular steel forms were used for most of the spandrel arches, although as the number of forms in use was not sufficient to push the work as rapidly as desired, some timber forms were used in addition to the steel. Blaw special forms of galvanized iron were used for the parapet wall. All form material for the portion above the main arch ring was handled by the cableway.

The concrete mixing plant was located west of the bridge on the north side of the valley. A siding from the main line was located over sand and gravel storage bins into which the material could be dumped directly from the cars. A conveyor belt transferred the sand and gravel from the storage bins to the measuring hoppers over the mixer. The cement house was located so that the same belt could handle cement, the sacks being chuted into the house from cars on the siding above. The concrete was mixed in a Milwaukee 1-yd. machine.

A timber frame tower about 140 ft. high was used to elevate the concrete at the mixer. This tower was located about opposite the center of the first long span on the west side. The mixer was operated from the same boiler plant as the cableway engine, and another boiler was installed to run the concrete hoist. An electric motor drive was installed for the belt conveyor. A system of Lakewood chutes, with line gates, was used for distributing all of the concrete in the lower part of the structure. These chutes were supported by 2-in. cables, the minimum pitch being about 2¼ in. per foot. The maximum distance over which concrete was handled in these chutes was about 350 ft. The concrete in the upper portion of the structure at the south end was handled in buckets by the cableway, as this was more economical than to extend the tower to a height sufficient to reach

The Forms in Place for One of the Long Spans Showing Steel Arch Centers

that elevation with chutes. This mixing and distributing plant handled an average of about 30 yd. of concrete per hour, and in exceptional cases 40 yd.

The slabs over the hollow piers were designed to be cast in a slab yard and placed in 6-ft sections. The plan was changed, however, in order to allow the contractor to cast them in place. The only bond rods which were left extending from the first section to connect up with the second half were in the floor over the spandrel arches and in the upper part of the arch ring in the 75-ft. span, where the ring itself forms the floor of the bridge. The concrete in the arches was allowed to set 28 days and when the centers were struck no deflection was perceptible.

After the completion of the first section of the bridge, the cableway was moved over for use in dismantling the old bridge. False work was built up under the old structure, five bents being necessary in each span on account of the height of the bridge, which was about 80 ft. to the underside of the highest truss. The deck and the bracing of the old structure were first removed, the posts were cut from the floor beams by knocking off the rivets, and each bent was lowered to the ground by the cable

where it was divided into the separate members. The old iron, which was of no value except as scrap, was then loaded on cars for removal. After the iron superstructure was taken down the old piers were blasted out.

During the second stage of the work the mixer plant was left in the same position west of the bridge on account of the expense that would have been incurred in moving it. The distributing tower was dismantled and a new tower 192 ft. high built on the opposite side of the bridge. The concrete from the mixing plant was allowed to run by gravity from the mixer through a long chute under the completed portion of the bridge, to the foot of the distributing tower. The other operations in the construction of the second half are similar to those described for the first stage.

This work is being handled under the direction of A. C. Shand, chief engineer, E. B. Temple assistant chief engineer, and J. W. Craig, assistant engineer. The contract is being executed by the estate of Charles McDermott, Philadelphia.

THE DEVELOPMENT OF LONG ISLAND*

By H. B. Fullerton

Director of Agricultural Development, Long Island Railroad

Experimental or demonstration farms offer far and away the most convincing and most rapid means of increasing crop production and introducing crop diversification, hence increasing agricultural tonnage and lengthening greatly the period of revenue yield from farming sections.

Ralph Peters, president of the Long Island, when he took charge of this portion of the Pennsylvania system found conditions of a truly unique character; at the west end of his territory the great cities of Brooklyn and New York; along the Atlantic ocean and the Long Island sound shore, a continuous line of overlapping villages, yet occupying merely a fringe of shore line, while the entire center of this territory was but an undeveloped particularly depressing acreage of "scrub oak waste" or "pine barren"—approximately 250,000 acres purchasable at from $1 to $6 per acre. Although but 30 to 70 miles from the biggest city in the United States; although traversed by three parallel lines of railroad, seldom 5 miles apart; although within easy driving distance of prosperous villages of goodly size, this acreage was not alone a non-productive area, but an untaxed drag and holdback on the island. Without raw material of any description, without inhabitants, save tiny expiring hamlets at long distances, industrial development was impracticable.

National and state experts had for years pronounced this land valueless for agriculture and this opinion had existed through generations of Long Islanders, despite the fact that the undergrowth and "sprout" growth from oak, hickory, chestnut and ash stumpage were of record-breaking lengths and vigor, proclaiming ideal conditions of soil and climate.

Accepting nature's practical demonstration as more reliable than man's opinions or theories, President Peters purchased the smallest acreage of "scrub-oak-waste" obtainable, 18 acres located south of Wading river on the Long Island Sound side of the island, on September 7, 1905. Clearing was started and in 60 days an excellent stand of rye covered the 10 acres of land, which for nearly three centuries had been deemed worthless. No chemical fertilizer was used, city stable manure alone being applied to introduce the vegetable matter which had been destroyed by forest fires which for a period of 150 years had consumed the leaves. The cost per acre of introducing this manure substitute for nature's leaf mold or humus was but $9.50.

In the early spring of 1906 the rye was plowed under, and seven months after the first stump was dynamited out of the "scrub-oak-waste" early vegetables of the choicest variety were shipped to the editors of metropolitan dailies who were guests of the railroad when the initial blow was struck: hence, these editors being fully qualified and armed with personal recollections of the original depressing showing, wrote, each in accord with his personality, stories proclaiming Long Island's many agricultural capabilities and residential attractiveness. Advertising in unpurchasable space of dailies, weeklies, and monthlies has continued without let-up unto the present time.

Within seven months after the establishment of the first demonstration farm, practical results were secured, the first purchase and development on Long Island being made by a long time resident of Oregon. Within four years, 4,200 families were added to the island's agricultural population, the great majority of them settling on the cheaper lands of the undeveloped territory, all without a single known exception making good and so advising those in charge of the work by letter and in person. The combination of additional agriculturists and the adoption of methods which had proved practical and economical, showed an increase in agricultural tonnage of 300 per cent within four years; to this, of course, must be added the increased passenger and express revenue. Besides the agricultural population drawn to the island, the widespread heralding of the demonstration farms, marked successes with vegetables, fruits and nuts, deemed ungrowable in many sections of the United States, particularly in the North, attracted the attention of foreign capitalists, as well as those of America and Canada. So great was the throng of visitors arriving daily and greatly interfering with the systematic handling of the intricate problem that two days per week were set apart as visitors' day. "Waste lands" which had been on the market for 150 years without purchasers, sold at an average price of $50 an acre and upwards. Estate developments sent up the shore line territory from $22 to as high as $7,000 per acre, with sales being made continually at prices running between $300 and $1,000 for hilly land, of least value for agricultural purposes, but of attractive condition to develop home sites or great estates.

The older sections, where the soil had been continually tilled since 1642 were beginning to show startling crop reductions (identical with those that are responsible for the abandoned farms of New England and New York State), reducing, for example, the normal potato yield of 300 bushels to the acre, down as low as 30 bushels, and sometimes 8 or 9 bushels less than the amount of seed potatoes planted. The use of humus and of lime having proved crop increasers on the railroad's demonstration farm warranted trial by the Long Island soil tillers and that source of greatest injury in the agricultural sections of the East was checked and both last year and this all records of crop production were broken by great numbers of old-time Long Islanders and new-come foreigners.

Successes with high-quality apples, peaches, pears, plums, cherries, grapes, bush and vine fruits, resulted in the establishment of great numbers of small orchards and many quite extensive ones and of innumerable vineyards and berry farms, with most satisfactory showing in the annual freight and express receipts. The former difficult situation of having practically the entire freight haul of agricultural products forced into six weeks (at the utmost three months), was helped by rotation and introduction of new crops, which developed a traffic extending from rhubarb, asparagus and lettuce of early spring, through summer vegetables and late winter crops, such as the big paying Brussels sprouts, which are frequently gathered on Long Island from the open fields in February. We developed the "Long Island home hamper," a common crate containing six 4-qt. boxes, which were filled with an assortment of vegetables, fruit, berries, etc., as they came into season. These hampers were "created" by those in charge of the work with various objects in view, one being the development of a dependable market yielding a worth-while revenue to our agricultural community.

A trial shipment of these "home hampers" as we named them, in 1906, fairly overwhelmed us with the results obtained. They filled a long-felt want of the city consumer, and without publicity became an instant success, saving the consumers from 75 cents to $3 per hamper, according to their own reports, and yielding to the producer 98 cents net for the contents of the

*Abstract of a paper presented before the Railway Development Association, Chicago, November 10, 1914.

hamper, instead of an average of six cents obtained when shipment was made in bulk through the usual channels.

The next method adopted to keep the development work up to the highest efficiency was a little publication that first was issued as a fortnightly, and a little later as a monthly, its object being to place before Long Islanders the results obtained and methods pursued in the trying out of various plants, information as to various sources of seed, implements, packages, spray material, sources of supply, and publishing without any restrictions whatever the results, favorable or unfavorable, and furnishing names and addresses freely, noting failures, as well as successes, giving causes where causes could be definitely located, noting weather conditions, yields, things to be avoided, precautions to be taken; noting where large and small plots of land could be obtained, giving the name of the owners and prices, also names of prospective buyers of various size tracts of land and their personal predilections. The name selected for this little pamphlet was "The Long Island Agronomist."

Fairs were attended and exhibits entered in competition. The fact that the Long Island Railroad demonstration farm won a goodly majority of "firsts" impressed local people who devoted their entire time, as a rule, to one crop, while the "railroad farmers" were known to have grown hundreds (in 1913 and 1914, for example, 982 varieties) in one year's growing season.

The demonstration farms were represented in city shows and with equal success against great estates and expert market gardeners and fruit growers. At the state fair, Long Island won 143 prizes, covering a remarkably varied line—apples, peaches, plums, pears, grapes of many varieties, field crops, corn, grains—a big line of vegetable growth including French artichokes, endive, "Romaine," Spanish onions, nuts, etc.; it even received a gold medal for butter, which was won against a large number of estates, community creameries and individual dairies of long standing with top-notch reputations. The score, 99½ per cent, the highest ever obtained anywhere, placed Long Island in the dollar-a-pound class. Agricultural colleges and schools requested us to talk to their classes and this has been a continuous performance throughout the decade, with the result that many of our hearers based their theses upon the copiously illustrated practices and crops raised, placing before future classes for many years a most attractive picture of Long Island capabilities. As the bulk of these students have joined the dignified army of professors we find frequent evidence that they are teaching the possibilities and capabilities of Long Island continuously and this is helping along the good work.

The Long Island's agricultural department has found in 10 years of uninterrupted application, close study and investigation that quick action and thoroughly convincing and undeniable results can be obtained at the lowest cost per ton by the establishment of a strictly practical economically handled farm, following as closely as possible commonsense farm practice and with "the latch-string always out." Our experience has firmly convinced us that upon this demonstration farm the director of agricultural development should have his home and his office. This man must primarily be a nature lover. He must prefer farm life to all other professions. The ideal director is undoubtedly one who has had a thorough practical agricultural education, secured from those as yet scarce American agricultural colleges, whose class-room work is invariably firmly impressed and made permanent by practical out-door work and demonstration. Ralph Peters, our president, has made use of a comprehensive phrase, "Writing and talking will not do; we must deliver the goods." The demonstration farmers delivered the goods and the railroad has gained not only in freight tonnage, but in every one of its revenue yielders.

Railway Strike in Belgium.—It is reported from Amsterdam that the employees on the Belgium railways have gone on strike and refused to do work for the Germans. Many employees have started for England, and others have sought work on the French railways.

RAILWAY AFFAIRS IN OTHER COUNTRIES

After three years' work the Munster-Grenchenberg tunnel, the longest now under construction in Swiss territory, was successfully and uneventfully pierced on October 27 at 4 p.m. The tunnel, which runs through the Jura range, is 5⅝ miles long, as compared with the Hauenstein base tunnel, pierced on July 10, which is 5 miles, 94 yd. in length. The capital involved is $5,000,000, mostly French, the Eastern Railway of France, in particular, being largely interested. The new line, of which the Munster-Grenchenberg tunnel is a part, is about eight miles long and will be managed by the Swiss Federal railways. It will shorten by over 10½ miles the distance via Delle to Lötschberg, the time saved being 40 minutes. The tunnel will have a single track and the motive power used will be steam. No special engineering difficulties were encountered in its construction, but there were two serious strikes that tied up the work considerably. Besides these interruptions, work on the tunnel was also entirely stopped from August 1, when mobilization of the Swiss army was ordered, until September 22. The workmen, as is always the case with Swiss tunnels, are almost entirely Italians. The time allowed for building the new line is three years and six months, and, despite interruptions, it is believed the work will be finished almost on time.

* * *

The recently issued Administration Report on Railways in India covers the Indian financial year from April 1, 1913, to March 31, 1914. In that time the Indian state railways had better gross and net earnings than in the previous fiscal year, but owing to increased interest charges the percentage of net earnings to capital outlay fell from 6.48 to 6.19 per cent. Operation of the state and guaranteed railways resulted in a surplus to the state of $27,729,765 over and above interest charges and annuity payments connected with the purchase of railways by the state, whereas the surplus last year was $27,891,530. On March 31, 1914, the mileage of all the state and privately owned railways in India was 34,656 miles, 1,053 miles having been added during the year. The gross earnings of all the railways from April 1

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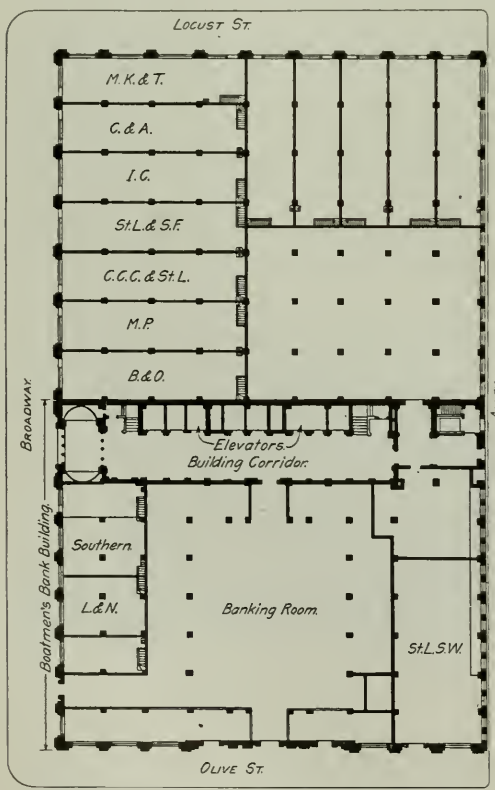
Bridge at Dannemarie, Near Belfort Destroyed by French Engineers for Reasons of Safety

to March 31 were $206,017,344, as compared with $199,936,186, an increase of $6,081,158, which was partly offset by increases in operating expenses of $5,663,518. The net earnings were thus $99,322,848, as against $98,905,209 in 1912-13. There was some increase in the passenger traffic, the number of passengers carried being 457,717,900. The passenger revenue was $68,850,322, of which by far the larger proportion, $59,519,374, was from third-class traffic. The average rate for all classes of passengers, slightly over 4 mills per mile, and the average distance traveled, 36.3 miles, have not materially changed since 1884. In freight

traffic, although there was a considerable increase in the tonnage carried, there was not a corresponding growth in earnings. This was due to a decrease in the average distance each ton of freight was carried from 199.2 miles in 1912 to 189.1 miles in 1913-14, a change caused by a falling off in the long-distance traffic to the ports, resulting from the failure of crops in the united provinces and some parts of Bengal and increased exports of grain to Europe. The aggregate tonnage of freight moved in 1913-14 was 82,613,000, the earnings therefrom being $122,390,578. The average rate per ton per mile, slightly over 7 mills, was about the same as in 1912. The volume of coal and coke carried was 17,295,000 tons, earning $16,078,498, of which the East Indian secured 9,380,000 tons and $9,030,634, and the Bengal-Nagpur 3,049,000 tons and $2,696,002.

CENTRALIZED TICKET OFFICES FOR ST. LOUIS RAILROADS

The railroads entering St. Louis, with two exceptions, have adopted a plan formulated by a special committee of passenger traffic officers for centralizing their city ticket offices. The plan provides for separate offices for the various roads, seven to be located in a new five-story building to be erected



Plan Showing Proposed Arrangement of Centralized City Ticket Office at St. Louis

on Broadway between Locust street and the Boatman's Bank building; three offices to be located in the latter building, and three in another building opposite, on Broadway. The roads which have not joined in the plan are the Vandalia and the Mobile & Ohio. Plans for consolidating the down-town ticket offices in St. Louis have been under consideration for several years.

It is believed that the plan will not only be far more economical than having separate offices in various locations, but that it will result in great convenience to the public. It is estimated that the plan will save the roads about $100,000 a year in rentals. After a decision on the location of the building had been reached the apportionment of the offices was made by lot. The Missouri, Kansas & Texas drew the corner of Broadway and Locust street, which is believed to be the choicest location. The leases of the individual offices will run for ten years. Work on the new building is to begin immediately, and it is expected to be ready for occupancy by June 1. Arrangements have been made to provide suitable space on Locust street for such roads as do not have lines into St. Louis as may desire to locate in proximity to the selling offices of the initial lines.

Each of the roads will pay $3,000 a year rental, except that for the corner location, $4,000 will be paid. Two roads now pay $15,000 a year each for the rental of their city ticket offices, and others pay from $10,000 to $14,000 a year.

The arrangement of the offices is shown in the accompanying plan. The Wabash, Rock Island and Burlington offices, which are not shown, are located on the opposite side of Broadway.

The special committee which formulated the plans was composed of J. D. McNamara, general passenger agent of the Wabash, chairman; C. L. Stone, passenger traffic manager of the Missouri Pacific; W. S. St. George, general passenger and ticket agent of the Missouri, Kansas & Texas, and W. A. Lalor, general passenger agent of the Chicago, Burlington & Quincy.

In 1911 a committee of passenger officers after a thorough investigation reported unanimously in favor of the establishment of a joint city ticket office, but the plan was not carried out. At that time the aggregate rentals paid for up-town ticket offices were $12,458 a month, and the salaries of those employed in them $6,715 a month, a total of $230,076 a year. The committee estimated that the rental of an adequate joint ticket office would be $50,000, and the cost of operating it $51,000, a total of $101,000, or a saving of about $130,000 a year. Under the plan outlined at that time, the location of the joint office was to be as central and convenient for the public as could be secured. Complaints and inquiries were to be handled by an information bureau which was to be very carefully organized. Room was to be provided in the office for the St. Louis Transfer Company, both telegraph companies, a taxicab stand, a separate Pullman office, and both telephone companies. The superintendent and assistant superintendent of the office were to be appointed by the Terminal Railroad Association, and would, therefore, be absolutely neutral. Ticket sellers were to sell tickets over any and all roads and were to observe the strictest neutrality. The street men or other representatives of the individual roads were not to be allowed to solicit or influence business inside the office, and authority was to be given to the superintendent to enforce this regulation. Two plans for the division of rentals and expenses were suggested. One was for each road to pay a minimum contribution of $1,500 a year to rent and a minimum contribution of $1,500 a year to expense account, the rest of the rent and expense to be prorated among the roads on the basis of actual ticket sales made in the office. The second plan was for each road to pay a minmum of $3,000 and a maximum of $9,000 a year for rent and expenses. The objections of one road prevented this plan from being carried out.

Australian Strategic Railways.—It is reported that the Australian Railway War Council at Melbourne, which includes the commissioners of all the state railways and the chief of the general staff, is now discussing the uniform gage question and the construction of the new railways which are strategically necessary. The results will be placed before a conference of the federal and state ministers at an early date.

Arbitration on Western Engineers' and Firemen's Demands

Hearings Begun at Chicago. Claims of Employees Set Forth by Mr. Stone of the Enginemen's Brotherhood.

Hearings before the federal board of arbitration selected to consider the demands of the engineers and firemen on 98 western railroads for increases in pay and changes in working conditions were begun at Chicago on Monday, November 30. The board organized by selecting Jeter C. Pritchard, presiding judge of the United States Circuit Court of Appeals of the fourth circuit, as chairman, and H. S. Milstead, of Washington, D. C., as secretary.

The original requests of the engineers and firemen were presented on October 10, 1913, and it was estimated by the managers that if they were granted the wages of the men would be increased by approximately $27,000,000 a year, or 40 per cent. Upon receipt of the requests the individual western railways gave notice of their desire to terminate the wage schedules in effect, and to enter into negotiations for the purpose of making new agreements. The employees' committee then came back with another proposition which asked practically all of the concessions requested originally, and included additional requests. In the agreement to submit the controversy to arbitration the employees' committee withdrew the second demands and the managers withdrew their proposition. The arbitration therefore is confined to the demands made on October 10, 1913, which are comprised in 16 articles.

Article 1 provides that 100 miles or less, 5 hours or less, shall constitute a day's work in passenger service; all mileage in excess of 100 miles shall be paid for pro rata; 100 miles or less, 10 hours or less, to constitute a day's work in all classes of service, except passenger and switching service; mileage in excess of 100 miles to be paid for pro rata, and overtime in passenger service to be computed on a basis of 20 miles per hour, and in all other service except passenger and switching service, to be computed on a basis of 10 miles per hour and paid for at the rate of 15 miles per hour; all overtime to be computed on the minute basis. Article 2 provides for increases in pay for various classes of service. Article 3 provides for a 10 per cent increase over through freight rates for local or way freight service. Article 4 provides for increased rates of pay in switching service, with overtime after 10 hours, at the rate of time and a half; all overtime to be computed on the minute basis. Article 5 provides for payment for 30 minutes of preparatory time in addition to other time or mileage made on the trip or day. Article 6 provides for additional allowances for initial terminal delay and final terminal delay, to be paid for on a minute basis. Article 7 provides that engineers and firemen arriving at a terminal at the end of a run shall be automatically released; when used again they begin a new day. It also provides for continuous time.

Article 8 provides for payment for time during which engineers and firemen are held at other than home terminals. Article 9 provides for payment for time spent in dead-heading on company business. Article 10 provides for hostlers at points where six or more locomotives are handled within 12 hours, their rates of pay and other conditions. Article 11 provides that the practice of conducting surprise tests in certain ways shall be eliminated. Article 12 provides that coal shall be kept where it can be reached by the fireman from the deck of the locomotive, and that coal of the proper size shall be placed on all tenders. Article 13 provides for two firemen on coal-burning locomotives weighing 185,000 lb. and more on drivers. Article 14 provides for relieving engineers and firemen of incidental services, such as cleaning locomotives, where they are now required to do so. Article 15 provides that railroads shall permanently post bulletins at all terminals showing accurate service weights of all locomotives for the purpose of recording weights on drivers. Article 16 provides that engineers and firemen will not be required to throw switches, flag through blocks or fill water cars.

Warren S. Stone, grand chief of the Brotherhood of Locomotive Engineers, made an opening statement in which, after outlining the history of the negotiations with the Association of Western Railroads, in 36 conferences, he stated the cases of the engineers and firemen are to be considered as a single proposition, and that all the evidence to be presented regarding the service of engineers applies also to the firemen; that they work together and should share alike in any benefits that may accrue from the award. He said that the board should recognize the changed conditions in the transportation service that demand more than ever before of the individual employes, and that new rates and working conditions must be established to compensate them for service performed.

"If there is any job in the world," he said, "which calls for more complete concentration of mind and quicker action of brain or sounder judgment than that of the engineer and the fireman in the cab of a locomotive, I have never heard of it." He then insisted that the wages of engineers and firemen should be sufficient to provide for "depreciation," saying that "if physical or technical examinations, age limits or service requirements beyond the limit of human endurance deprive men in middle life of the opportunity of earning a living at their profession, then they should receive not only a living wage, but also enough to enable them to live in comfort for the remainder of their years after their disqualification."

"With all due respect to other employees or officials on these great systems," he said, "it is the men in the cab who are the really responsible men, who by their skill and ability make it possible for a railroad to earn revenue and pay dividends. They are the men who carry the heaviest end of the load of responsibility. That responsibility becomes heavier every year. Each year traffic becomes heavier and more congested, the net work of signals increases, the public demands faster time and better service, larger and more powerful locomotives are built, the tonnage of trains increases; more and more is required of the men in the cab; the examinations become more strict and discipline more rigid. All these increased burdens fall on the same men, the number not having been increased for the purpose of dividing this work and responsibility, as there is only one engineer and one fireman in the cab. There has never been a time in the history of the railroad world when so much was being taken out of the men in the cab as now by requirements beyond the limit of human endurance."

He then outlined the experience required of a man before he is promoted to engineer, and the strict examinations that are required. He said that the occupation of enginemen is classed as extra-hazardous, and insurance companies, if they will insure them at all, charge an extra premium. He also asserted that every minute a man is on duty, regardless of the weather or other conditions; the same strict requirements are demanded of him.

Mr. Stone said it was proposed to show that during the past 24 years the western railways have made remarkable gains in productive efficiency by the installation of locomotives of greater tractive power, elimination of curves and reduction of grades, and remarkable increases in trainloads, and that the burden is borne by the enginemen. Their labor and responsibility, and their productive efficiency have been increased, but their earning capacity has declined. The railroads are not satisfied with the present conditions which have reached the limit of human endurance, but are intending to add further to the trainload. The revenue gains arising from the advances already made in

the efficiency of the railroads have been sufficient to pay all increases in operating costs and a reasonable return on the capital investment, in addition to leaving an ample surplus to remunerate the engineers and firemen for their increased work and productive efficiency.

James M. Sheean, attorney for the railroads, also made a very brief opening statement, declaring it is the belief of the railroads that their present rates of pay are full, fair and adequate, but said he would reserve his discussion of the points involved in the case until the issues had been presented in detail.

The first witness for the employees was M. W. Cadle, assistant grand chief of the Brotherhood of Locomotive Engineers, who took up the 16 articles which comprise the demands of the men, one at a time, to show that all of the proposed rules which they are asking to have adopted by all of the western roads are now in effect on some of the roads. Discussing Article 1, on the basis of a day's work, he said that 47 eastern roads, 14 western roads, and 24 southeastern roads now have the 5-hour day in passenger service. Six western roads, he said, have an 8-hour day in freight service. The other roads have a 10-hour day.

Taking up Article 2, on rates of pay, Article 3 on local or way freight service, and Article 4, on switching service, he mentioned various roads that have in effect some of the proposed rules or rates. With reference to Article 5 on preparatory time, he said that many duties are required of the engineers and firemen before the actual run begins, depending on the class of the engine and how much work is done in the shop beforehand, and that the rules on many roads require the men to have their engines ready at least 30 minutes before leaving time, and that this time should be paid for. With reference to Article 6, providing for pay for terminal delay, he said that this was in the nature of penalty time; that trains are often held at terminals at the end of a run before the enginemen can be released, that there is often a delay in leaving terminals after the time at which they are supposed to go out, that if the men are required to put in this time they should be paid for it, and that a penalty where it has been applied has the effect of reducing these delays. He said that eight western roads pay for final terminal dalays of 15 minutes or more in freight service; that 27 pay for 30 minutes or more, and some allow for one hour or more.

Referring to Article 7, providing that engineers and firemen arriving at the terminal or the end of the run shall be automatically released, and then when used again they begin a new day, W. L. Park, a member of the board of arbitration, remarked that under this rule a man could receive three or four days' pay for a few hours of work. To this Mr. Stone replied that the rule is intended to prevent an abuse now practiced by many railroads; that frequently a crew which may have worked 15 hours arrives at the end of its run and then is required to work another hour in performing some small service, to save calling another crew. With reference to Article 8, providing for payment for time when men are held away from home terminals, Mr. Cadle said that there are a number of rules now in effect that men shall not be released between terminals, except when tied up under the federal hours of service law; that the Canadian Northern pays for time during which men are held away from home terminals after 18 hours; one road pays after 12 hours, and the Chicago Great Western agrees not to hold men more than 24 hours. Six roads pay for 100 miles for each 24 hours during which the men are held away from their home terminals.

Walter Moore, schedule expert of the firemen's brotherhood, gave testimony similar to that of Mr. Cadle.

Railway Construction on the Gold Coast of Africa.—It is estimated that the extension of the Gold Coast Railway from Komfrodna to Kumasi will cost about $6,000,000. The first section, to Komfrodna, will probably be opened early next year.

A CONVERTED LIVESTOCK SHIPPER

The Breeder's Gazette recently published an article on "Railway Livestock Rates," by A. E. de Ricqles, president of the American Cattle Company and general manager of the American Livestock & Loan Company, of Denver, Col., from which the following extracts are taken:

"I would like to offer the idea that perhaps the stock growers can now afford, under the new condition of things, to assist the railroads in their request for a general 5 per cent, rate increase, so that they may continue in business and keep up with the demands from the country, because there is no element more important to the stockgrowers than the railroads. Transportation is perhaps more necessary in the livestock business than to any other of the food-producing industries, because the breeding sections are seldom the finishing or fattening countries, and either the livestock must be shipped to the feeding country or the feed shipped to the livestock.

"Livestock rates and service have been a great question befor the stockgrowers for many years. On innumerable occasions, on behalf of the livestock interests, have I appeared before congressional committees, before the Interstate Commerce Commission, state railway commissions and others, in matters of rate hearings and propositions of service and railway laws and regulations generally. A great amount of my time has been devoted to matters of this kind, and my position and activity are well known; but we have now arrived at a place where a majority of the carriers are giving good service, and showing our business the consideration it should have, and it becomes us to go to their assistance in their extremity.

"There is no doubt but that there is a crisis in this country today in connection with railroad expenses and operations. It is hardly necessary to call attention to the fact that in spite of the immense decrease in gross earnings there is a tremendous increase in expenses. Any cattle man who has this condition existing on his ranch knows that he is headed for destruction. Anything that might happen to the railroads that would result in reducing their efficiency, or retarding their advent into a new country, or prevent them from furnishing high grade service at all times, would be a catastrophe to all of us. Therefore it is of the utmost importance that the railroads be allowed to earn a fair revenue that they may be able to maintain their efficiency and keep up the high standard that stockgrowers have been demanding and are entitled to.

"There are several reasons why I have changed my views on this matter of railroad charges, and one reason is I believe the prosperity of the railroads is more important to our industry than almost any other feature of our present-day activities. Labor employed by railways is a big feature in this country, and when railway men are well employed they are good buyers of our products. Then again railways are large purchasers of materials that in preparation give many laboring men active employment, these laboring men being also good buyers of meats and meat products. Furthermore, there is an immense country developing in the west that needs railway transportation. Without new railways vast sections of this country will not be settled very soon, for all the products of the semi-arid country cannot be consumed by its local population, and a part must find an outlet and market in more densely settled districts. It is this surplus that is shipped that makes the price of what is kept at home. Then again there are large sections of the western country in Wyoming, Montana, Texas, and elsewhere, awaiting the advent of new railway branches, and we cannot expect capital to be put into railway lines when it does not produce a fair return."

Railway Destroyed by the Turks.—According to advices from Athens, a section of the Smyrna-Kassambra Railway has been destroyed by the Turkish military authorities, rendering the operation of the railway from Smyrna impossible.

LUCIUS TUTTLE

Lucius Tuttle, for 17 years president of the Boston & Maine, and for three years, 1910-1913, chairman of the board of directors of that company, died at his home in Brookline (Mass.), November 30, at the age of 68. The cause of death was angina pectoris. Mr. Tuttle had been in poor health since the amputation of a leg about three years ago, but had continued active until within about a week of his death.

Mr. Tuttle was at the head of the Boston & Maine during the years when most of the important acquisitions of other roads were planned and carried out, and both the successes and the errors of those years were the subject of severe criticisms. Many of the criticisms voiced in the newspapers were based on the narrowest views, and acts which were for the best interest of the public were condemned, along with others really blameworthy; but the later troubles of the Boston & Maine were of a kind which could be cured only by those policies, bold financially and frank in their attitude toward the public, which in the "old school" where Mr. Tuttle learned his lessons, were never taught and seldom practiced. He was forceful and enterprising in many directions—as, for example, in adopting automatic block signals long in advance of his neighbors—but the public demanded a still more perfect railroad, and it became evident that the problem could not be solved except by a revolution—which came in 1910. In this revolution Mr. Mellen had a leading part. It must be remembered that the road serves a large summer-resort territory—which means bread-and-water rations for seven or eight months in the year—and there is also a large mileage of lines where this unpromising condition exists the year round; so that there were problems in plenty, aside from those connected with legislative and newspaper criticism. Some of the road's misfortunes, therefore, appear to have been almost inevitable.

Lucius Tuttle

Mr. Tuttle was born in Hartford, Conn., March 11, 1846. He was the son of a farmer, and his paternal ancestor, William Tuttle, who came from England in 1636, was one of the founders of New Haven. Young Tuttle's first work was as a clerk in the Hartford District court; but in August, 1865, he began his railroad service, as a ticket seller in the station of the Hartford, Providence & Fishkill, which subsequently became a part of the New York & New England, and is now included in the New Haven system. After only one year in the local office he was made general ticket agent of the road; and he held that office until 1878. Then, on the absorption of his road by the New York & New England, he was made assistant general passenger agent of that road, and went from Hartford to Boston.

But being dragged about from one city to another by consolidations of roads and changes of titles, a process so familiar in the railroad world in later years, seems not to have been to Tuttle's taste; and in less than six months he left the New York & New England and took the place of general passenger agent of the Eastern Railroad, now one of the principal divisions of the Boston & Maine. But in 1885, when the Eastern was absorbed by the Boston & Maine, and Tuttle was made assistant general manager under James T. Furber, he soon resigned and went to the Boston & Lowell as general passenger and ticket agent.

After two years on the Boston & Lowell his ability as a passenger traffic man seems to have become so well known that he was wanted on a number of larger roads, and in January, 1887, he went to the Canadian Pacific as passenger traffic manager, with headquarters at Montreal.

Two years later he returned to the United States, and from May, 1889, to May, 1891, he was commissioner of the Trunk Line association at New York City, acting as chairman of the passenger department. In the latter year he was called to the New York, New Haven & Hartford as general manager; and in 1892 was made vice-president of that road. But after only one year in this position he went to the Boston & Maine, as president, which position he held until October, 1910, when Mr. Mellen was made president and Mr. Tuttle chairman of the board of directors.

From the first it seems to have been Mr. Tuttle's policy on the Boston & Maine to take in all of the railroads which could be classed as either subsidiary or directly competitive. The Connecticut River road, from Springfield northward, had been acquired at an extravagant price to keep it away from the New Haven road before Mr. Tuttle became president; but this was followed in quick succession by the Boston & Lowell, the Boston, Concord & Montreal and numerous smaller roads. In 1899 control was secured of the Maine Central, though its organization was left separate. This, as everyone knows, had been one of the Boston & Maine's best investments.

In 1900 came the acquisition of the Fitchburg road, taking the Boston & Maine into New York state, and considerably beyond Albany. This road, including the Hoosac tunnel, which had been built by the state of Massachusetts at enormous cost, was controlled by the state; and the campaign in the legislature to secure the consent of the state to the leasing of the road by the Boston & Maine was a notable episode in Massachusetts politics. The Fitchburg has been a prominent element in the Boston & Maine system, and has carried great quantities of western grain and produce to Boston. The extensive docks established there by the Boston & Maine to accommodate this traffic constituted one of the most popular enterprises of the Boston & Maine, many millions being invested. But the interest charges on the Fitchburg securities have undoubtedly been one of the road's heavy burdens

Personally Mr. Tuttle was affable and always approachable, liked by all. He did much to promote the work of the Boston & Maine Young Men's Christian Association, and was a man of wide information. Besides being courteous he was con-

siderate, and the employees always relied on his sense of justice. "He gave everybody a fair chance," has been said of him by one man who holds an important position. In May, 1913, he was given the degree LL. D. by the New Hampshire State College. He was a director of several banks and railroad companies, and a member of various clubs, including the Algonquin, Commercial and Merchants' clubs of Boston, the Boston Chamber of Commerce and the New England Civic Federation.

THE PARCEL POST AND ITS EFFECTS ON RAILWAY REVENUES*

A study of the revenues of express companies for the last two years is not without profit, because impressions can be gained as to the drift of events, even though no certain conclusions can be reached. The express revenues of the fiscal year ended June 30, 1913, were affected by only six months' competition with the parcel post, but those of the next year suffered from this cause for a full year. And in five months of this last twelvemonth reduced express rates were in effect.

The gross revenues from operation of all express companies for the fiscal year ended June 30, 1913, as compared with the previous year, were as follows:

	1913	1912	Increase	Per cent
Mileage	301,064	283,303	17,761	6.27
Revenue	$168,880,923	$160,121,932	$8,758,991	5.47

This increase of $8,758,991 was in spite of the competition of the parcel post for the last six months of the year. It might be held that the additional revenue could be credited entirely to the new mileage, which increased in greater percentage than the revenue; but the mileage does not always have a harmonious relation to the revenue.

While there must have been some loss of business because of the parcel post, the amount evidently was not large enough to be positively disclosed in the gross revenues. We may also conclude, at least tentatively, that a large amount of the parcel post traffic from January 1 to June 30, 1913, was new business.

The only statistics yet available for the year ended June 30, 1914, are those of the Adams, the American and the Wells-Fargo companies. These, combined, represent nearly 70 per cent of the revenues, and 65 per cent of the mileage of all of the express companies. For comparison the figures are given since 1912.

Adams, American and Wells-Fargo Companies

Year	Revenue	Increase	Per cent
1912	$110,372,802	$10,666,994	10.69
1913	117,963,952	7,593,150	6.87
1914	110,579,322	*dec.* 7,386,630	*dec.* 6.26

If the revenues of these three companies for 1914 had shown the same growth as between 1912 and 1913, they would have been $125,000,000.

Part of the deficit is due to reduced rates. One prediction was that these would result in a reduction of 22 per cent. As the reduced rates were in effect only five months of the year, this would be equivalent to 9 per cent, or about $11,000,000, which, subtracted from $125,000,000, leaves $114,000,000. Comparing this with the actual earnings of about $110,000,000, leaves $4,000,000 to represent the maximum amount that could be due to parcel post competition. Another prediction was that the new rates would reduce revenues 17 per cent. On that basis the loss in 1914 was $8,750,000, leaving the maximum loss attributable to parcel post competition about $6,000,000.

[Mr. Bradley quotes the estimates made by the Interstate Commerce Commission in 1909 that the average weight of express packages was 32.80 lb.; that the average revenue per package was 50.49 cents, and the average per pound 1.54 cents; and then, comparing with other estimates concludes that in the year to June 30, 1914, the express companies lost 24,000,000 pieces. He then goes on.]

The active competition of the parcel post is from 1 to 11 lb., and from the first to the third zone. The 4-lb. package would be the typical average, for which the express rate to the third zone would be about 25 cents. The loss to the express companies was seemingly about 5 or 6 per cent in pieces and about 3 or 4 per cent in revenue. If express companies lost $6,000,000 in revenue, the railroads lost approximately $3,000,000.

In Great Britain, the parcel post is a distinct class of postal matter and pays the railroad companies 55 per cent of its revenues. In this country, Congress did not establish the parcel post as a class by itself, but merely extended the fourth-class of mail matter from a weight limit of four pounds to a weight limit of 11 lb., and rearranged the rates. This fourth-class in 1912, before the parcel post was established, already embraced about 240,000,000 pieces a year, weighing about 76,000,000 lb., with an average weight per piece of 5 oz., or 3.16 pieces per pound. The revenue from this class was about $12,500,000.

When statements are made regarding the volume of parcel post business, it is necessary to inquire whether the amount quoted includes or excludes the old fourth-class mail.

The postmaster general predicted at a Congressional Committee hearing December 3, 1913, that during the fiscal year 1914-1915 there would be transported 600,000,000 parcels that would yield a revenue of 10 cents a piece, or a total of $60,000,000. This estimate undoubtedly included the old, as well as the new, fourth-class matter and might be restated as approximately 300,000,000 parcels.

A representative in Congress, who has made some study of the subject, estimated the bona fide parcels at 150,000,000 in 1913, and 250,000,000 in 1914, thus showing a growth in one year of 66 per cent. If we calculate the weight of these parcels at 4 lb. each, we obtain a total weight in 1913 of 600,000,000 lb., and in 1914 of 1,000,000,000 lb. About 95 per cent of this weight is carried on the railroads. Therefore, we may say that the railroads carried in 1913 about 280,000 tons, and in 1914 about 475,000 tons of additional mail matter for an average distance of about 300 miles. The ton mileage of this mail in 1913 would, therefore, have been about 84,000,000. The Post Office Department reported to Congress as of April, 1913, a ton mileage for all mail of 510,000,000. The addition was, therefore, about 15 per cent in that year and even greater in 1914.

The only action by Congress towards compensation was an allowance of 5 per cent increased pay to the railroads until the mails were weighed in regular course, but this weighing is only made once in four years. The 5 per cent allowance amounted to $1,687,360, although the additional revenue received by the Post Office Department from the first year's new business was estimated at about $15,000,000. The railroads in the First Contract Section (the New England states, New York, Pennsylvania, New Jersey, Delaware, Maryland, Virginia and West Virginia) did not receive the 5 per cent allowance, because the mails were weighed on these roads from February to June, 1913, and they were supposed to receive the benefit of some of the increased business. Even if this were true, it cannot be considered an adequate provision for the increase of the following four years, especially as it appears that there is a growth of 66 per cent in the second year.

In conclusion it may be said:

1. That so far as the railroad revenues are reduced at the present time because of the reduction in the revenues of the express companies, this is more due to the new rates prescribed by the Interstate Commerce Commission than to the competition of the parcel post.

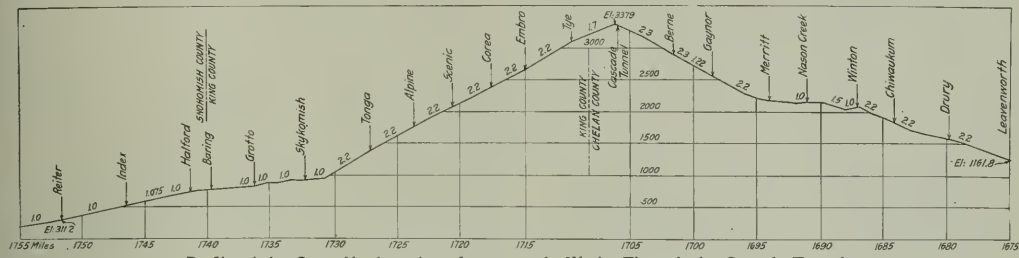
2. The parcel post, by the creation of a large amount of new business as well as by taking some business from the express companies, has greatly increased the tonnage of the mail transported without any adequate provision for payment to the railroads. It is of great importance that such remedial action be taken promptly, not only because justice to the railroads requires it, but also that the government may obtain information as to the full cost of performing the parcel post business. The knowledge of the full cost of transporting the parcel post business will save Congress from approving of parcel post rates which would result in a heavy increase in taxation.

*From a paper read before the New York Railroad Club on November 20 by V. J. Bradley, general supervisor of mail traffic, Pennsylvania Railroad.

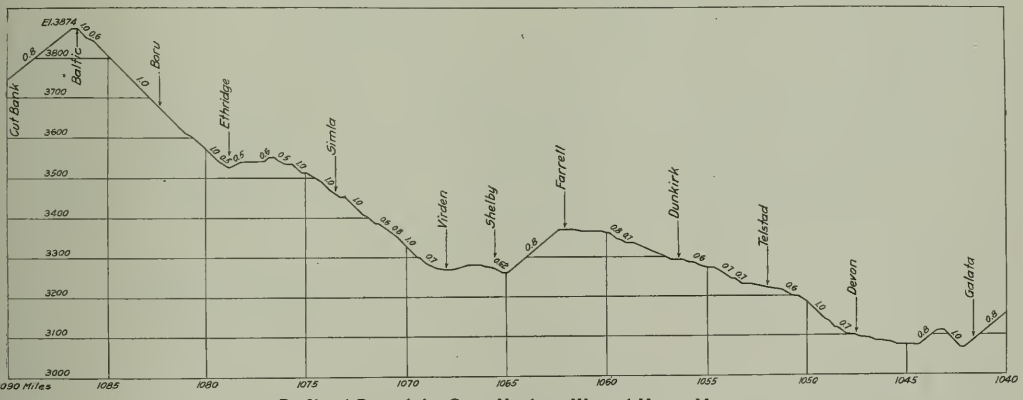
Passenger Locomotives for the Great Northern

Pacific and Mountain Types Used in Hauling Twelve-Car Transcontinental Trains Over the Heaviest Grades

The Great Northern has obtained very satisfactory service from 25 Pacific and 15 Northern or Mountain type locomotives delivered to that road about a year ago by the Lima Locomotive Corporation, Lima, Ohio. The Pacific type locomotives are used on the transcontinental trains between St. Paul, Minn., and Cut Bank, Mont., a distance of about 1,072 miles. The first locomotive district is one of 408 miles, from St. Paul to Devil's Lake, N. D., the crews being changed about 217 miles out of St. Paul. The next district is between Devil's Lake to Williston, N. D., a distance of 239 miles, the crews being changed 118 miles from Devil's Lake; the third is from Williston to Havre, Mont., a distance of 309 miles, the crews being changed at Glasgow, about half way. The fourth and last district on which the Pacific type locomotives are used is from Havre to Cut Bank, Mont., a distance of 129 miles. This portion of the road is in the foot hills of the Rocky mountains and considerable stretches of one per cent grade are encountered throughout, part of the profile



Profile of the Great Northern from Leavenworth, Wash., Through the Cascade Tunnel



Profile of Part of the Great Northern West of Havre, Mont.

Pacific Type Locomotive for the Great Northern

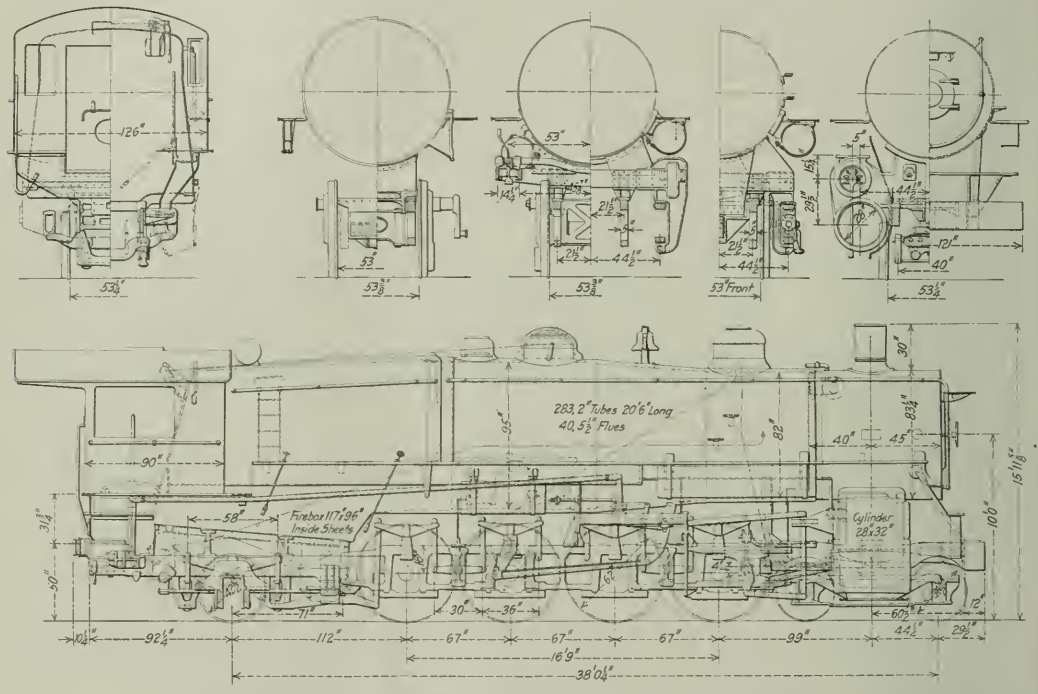
being shown in one of the illustrations. The accompanying table gives more detailed information concerning these runs:

Time Table for the Pacific Type Locomotives

Stations	Distances, miles	Schedule Stops	No. of cars	Max. grade, per cent	Time	Average speed, m. p. h.
St. Paul to Devil's Lake..	408	8	11 to 12	.72	11 hrs. 25 min.	35.7
Devil's Lake to Williston..	239	5	11 to 12	.72	6 hrs. 35 min.	34.3
Williston to Havre.....	309	5	11 to 12	...	8 hrs. 50 min.	34.8
Havre to Cut Bank.....	129	None	11 to 12	1.	4 hrs. 10 min.	30.

service has been entirely eliminated without a change being made in the time table, the Mountain type engines handling the trains at a speed of 17 to 20 m. p. h. on the 1.8 per cent grade.

The Mountain type engines have also been placed in service over the Cascade mountains, where the grade is 2.2 per cent, as shown in the accompanying profile. It will be noted that this grade is somewhat broken for a distance of 32 miles



General Arrangement of the Mountain Type Locomotive for the Great Northern

The Mountain type locomotives haul these same trains from Cut Bank to Whitefish, Mont., a distance of 129 miles. This division runs through the Rocky mountains in the vicinity of Glacier Park, and one per cent westbound and 1.8 per cent eastbound grades are encountered. Prior to putting on this type of engine in this service it was necessary to provide a helper on the eastbound run of this division for a distance of 18 miles between Essex and Summit. This helper going west, whereas it is almost continuous running eastbound for a distance of 25 miles. In this case, as before, the use of these engines has eliminated the helper service, and they maintain a speed of 15 m. p. h. up this grade with the transcontinental trains. These engines on this hill are burning oil for fuel. Both the Pacific and Mountain type engines are said to be very good steamers and are giving an economical fuel and water performance.

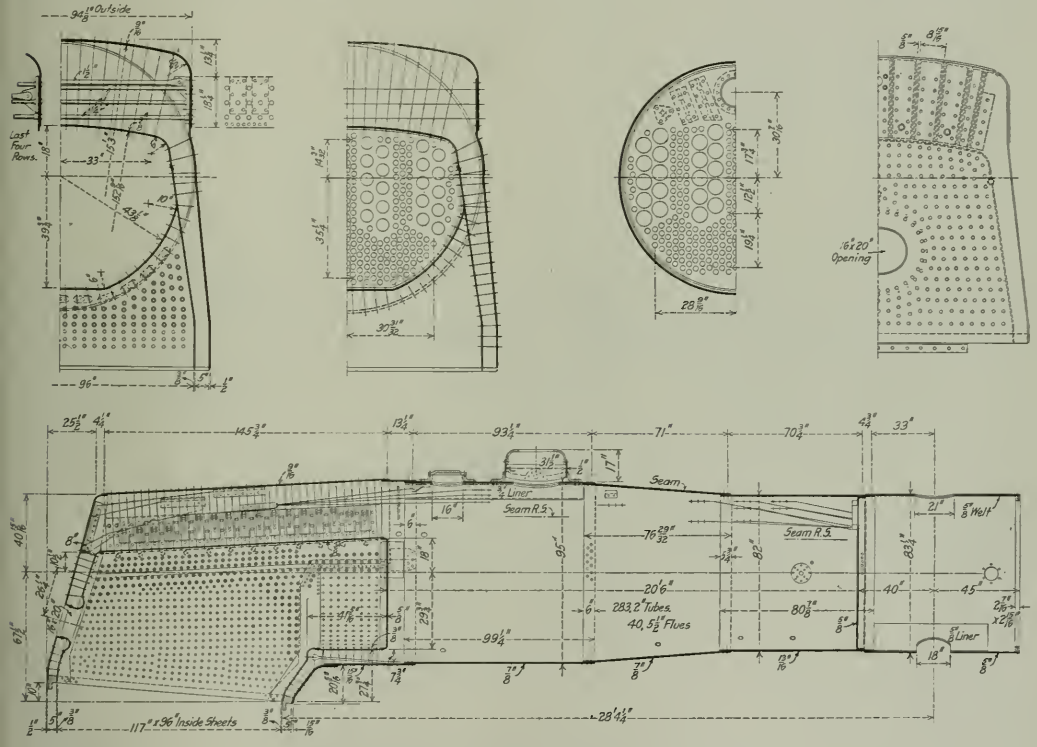
Mountain Type Locomotive for Passenger Service on the Great Northern

The Mountain type locomotives weigh 326,000 lb. in working order and have a tractive effort of 61,900 lb. They carry a boiler pressure of 180 lb., and have 28 in. by 30 in. cylinders and 62 in. driving wheels. They are equipped with Emerson superheaters, which provide a superheating surface of 1,075 sq. ft. The rigid wheel base of these engines is 16 ft. 9 in. The distance between the tires of the forward pair of drivers is 53 in., while the distance between the other drivers is 53⅜ in. The two leading pairs of drivers are equalized with the leading truck, while the two back pairs are equalized with the trailing truck. The forward spring hangers of the first set of driving springs support a transverse equalizer, from the middle of which is swung a longitudinal equalizer with its fulcrum on a casting attached to the guide yoke frame brace and to a waste sheet as shown in the elevation drawings. The other end of this equalizer is hung from a second longitudinal equalizer at a point just back of the cylinder casting. This second equalizer has its fulcrum on the leading truck center casting, and its forward end is attached to the front buffer casting. This construction gives the front part of the frame ample support and tends to reduce frame breakages back of the cylinder castings. The frame is made continuous from the splice in the rear of the fourth pair of drivers through to the buffer casting. It is 5 in. wide and is braced by three frame braces and three cross bearers. The main journals on these engines are 22 in. long.

The Pacific type engines weigh 251,200 lb. in working order, and have a tractive effort of 40,500 lb. They carry a boiler pressure of 210 lb. and have 23½ in. by 30 in. cylinders; the drivers are 73 in. in diameter. The distance between tires on the forward pair of drivers is 53 in., while that for the main drivers is 53⅜, and for the back drivers 53¼ in. All three pairs of drivers are equalized with the trailing truck, the cylinder casting resting directly on the center plate of the forward truck. The frames are 5 in. in width, the same as the Mountain type engines, and they are made in one piece from the front buffer to the splice in the rear of the back set of drivers. These locomotives are also equipped with the Emerson superheater, having a superheating surface of only 640 sq. ft.

Both types are equipped with the Walschaert valve gear, and the Chambers throttle valve. The leading trucks on both types of engines are the same and were designed by the railroad company. They have an 86 in. wheel base and support a load of 50,000 lb. in the case of the Mountain type locomotive and 55,000 lb. in the case of the Pacific type.

The trailing truck was designed by the Lima Locomotive Corporation and is known as the Austin truck. It is designed to simplify the removal and replacement of journal boxes and to provide a self-centering radial action of sufficient stiffness to prevent undesirable swinging of the rear end of the locomotive.



Boiler Used on the Great Northern Mountain Type Locomotive

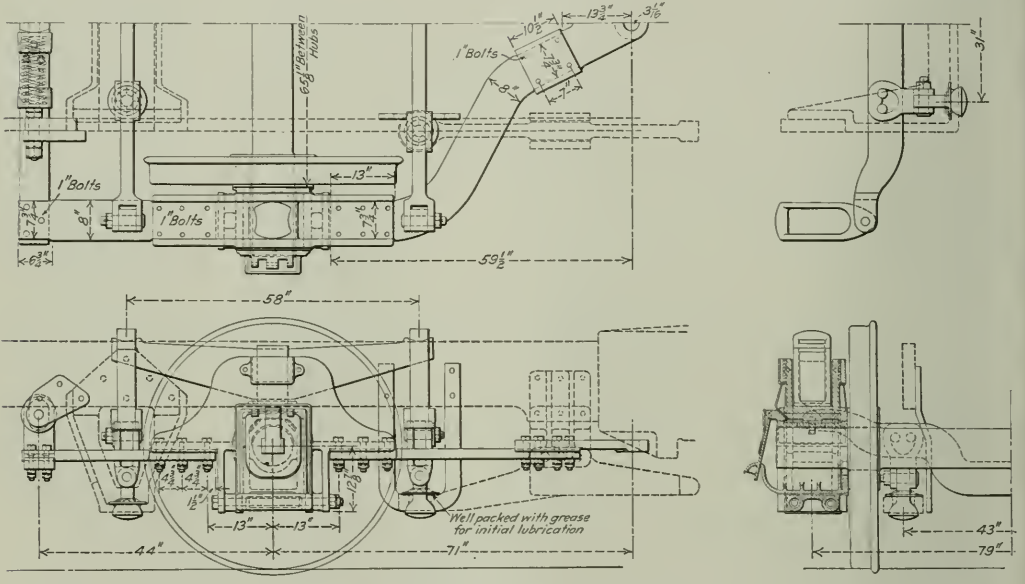
The boilers of both the Mountain type and Pacific type are of the Belpaire type and are partially equipped with Tate flexible stay bolts. The boiler of the Mountain type locomotive has a combustion chamber about 41 in. deep, which provides a tube length of 20 ft. 6 in. The Pacific locomotive, however, is not equipped with a combustion chamber and has a tube length of 21 ft. The outside diameter of the first ring of the Mountain type boiler is 82 in., while that for the Pacific type is 72 in. The cylinders of both engines are of similar design, the steam passages being

contained in the cylinder saddle. The valves are provided with 5⅛ in. bushings, those for the Mountain type being 16 in. inside diameter, and those for the Pacific type 12 in. inside diameter.

The following is a table of the principal dimensions and ratios:

General Data		
Type	4-8-2	4-6-2
Gage	4 ft. 8½ in.	4 ft. 8½ in.
Service	Pass.	Pass.
Fuel	.....	.....

Boiler		
Style	Conical Belpaire	Straight Belpaire
Working pressure	180 lb.	210 lb.
Outside diameter of first ring	82 in.	72 in.
Firebox, length and width	117 in. by 96 in.	116 in. by 66¼ in.
Firebox, water space	5 in.	5 in.
Tubes—number and outside diameter	283—2 in.	155—2¼ in.
Flues, number and outside diameter	40—5½ in.	32—5½ in.
Tubes, length	20 ft. 6 in.	21 ft.
Heating surface, tubes	4,200 sq. ft.	2,870 sq. ft.
Heating surface, firebox	340 sq. ft.	206 sq. ft.
Heating surface, total	4,540 sq. ft.	3,076 sq. ft.
Superheater heating surface	1,075 sq. ft.	640 sq. ft.
Total equivalent heating surface*	6,153 sq. ft.	4,036 sq. ft.
Grate area	78 sq. ft.	53.3 sq. ft.



Trailer Truck Used on the Great Northern Locomotives

Tractive effort	61,900 lb.	40,500 lb.
Weight in working order	326,000 lb.	251,200 lb.
Weight on drivers	218,000 lb.	150,700 lb.
Weight on leading truck	50,000 lb.	55,000 lb.
Weight on trailing truck	58,000 lb.	52,700 lb.
Weight of engine and tender in working order	487,000 lb.	420,000 lb.
Wheel base, driving	16 ft. 9 in.	13 ft.
Wheel base, total	38 ft.	33 ft. 9 in.
Wheel base, engine and tender	71 ft. 4 in.	66 ft. 9 in.
Ratios		
Weight on drivers ÷ tractive effort	3.52	3.51
Total weight ÷ tractive effort	5.27	6.17
Tractive effort × diam. drivers ÷ total equivalent heating surface*	623.	733.
Total equivalent heating surface* ÷ grate area	79.	75.7
Firebox heating surface ÷ total equivalent heating surface,* per cent	5.5	5.1
Weight on drivers ÷ total equivalent heating surface*	35.4	35.3
Total weight ÷ total equivalent heating surface*	53.	62.
Volume both cylinders	22.78	15.04
Total equivalent heating surface* ÷ vol. cylinders	270.	268.
Grate area ÷ vol. cylinders	3.43	3.54
Cylinders		
Kind	Simple	Simple
Diameter and stroke	28 in. by 32 in.	23½ in. by 30 in.
Valves		
Kind	Piston	Piston
Diameter	16 in.	12 in.
Outside lap	1⅛ in.	1 in.
Lead in full gear	¼ in.	¼ in.
Wheels		
Driving, diameter over tires	62 in.	73 in.
Driving, thickness of tires	3 in.	3½ in.
Driving journals, main, diameter and length	11 in. by 22 in.	10½ in. by 16 in.
Driving journals, others, diameter and length	10 in. by 12 in.	9½ in. by 12 in.
Engine truck wheels, diameter	36½ in.	36½ in.
Engine truck, journals	6 in. by 12 in.	6 in. by 12 in.
Trailing truck wheels, diameter	42½ in.	49 in.
Trailing truck, journals	8 in. by 14 in.	8 in. by 14 in.

Tender		
Tank	Wat. bot.	Wat. bot.
Wheels, diameter	36½ in.	36½ in.
Journals, diameter and length	5½ in. by 10 in.	5½ in. by 10 in.
Water capacity	8,000 gal.	8,000 gal.
Coal capacity	15 tons	15 tons

*Total equivalent heating surface = total evaporative heating surface + 1.5 times the superheating surface.

OPERATING THE MILWAUKEE (WIS.) TERMINALS OF THE ST. PAUL

By W. B. Hinrichs
Superintendent of Terminals, C. M. & St. P., Milwaukee, Wis.

The problems presented in the operation of large terminal yards are varied, intricate and exasperating. It is far more trying and difficult to operate successfully industrial terminals than large classification yards, where the make-up and break-up of trains is the only consideration. Let me briefly review the methods in vogue on the C. M. & St. P., at Milwaukee, Wis., where both flat and hump switching are extensively carried on.

We have over 300 miles of terminal yard and industrial trackage in this city. This mileage includes 17 yards, varying in capacity from 300 to 2,700 cars. Six of these are used exclusively for the receiving, classification and departure of trains; and the other 11 for assembling, storing and classifying cars for industries located in such yards, or in their immediate vicinity. Nearly every one of these 11 industrial yards has team track facilities, accommodating from 13 to 350 cars, the total capacity of these team tracks being 760 cars.

The industrial yards have been located where a large num-

ber of factories and industries had established their plants. Firms have also located at these yards when possible to obtain better switching service. For example, in the North Avenue district, 80 firms are served from one yard. The handling of a large amount of merchandise, beer, meat and other perishable freight, and the forwarding of these cars on eight or ten different time freights before midnight of the day they are loaded, is a task. As an illustration beer loading during the hot weather has reached over 250 cars a day. It must be remembered that the greater percentage of loading continues until 6 p. m. before which it is permissible to enter private industry tracks or to pull the cars from the freight houses where merchandise is loaded. After the completion of the loading, bills must be furnished, cars carded for switching purposes, then switched into transfers and taken to the proper train yards to be classified into trains, which must be moving toward their destination by midnight. A large number of the loads travel a distance of 15 miles on transfers from the loading point to reach the train yard.

After the day's loading has been gathered up and forwarded, it becomes necessary to place the cars for the next day's unloading, as well as the empties for loading, at the warehouse, industry and team tracks, elevators, wharfs, etc. This work is done after midnight and all cars are spotted by 7 a. m.

In addition to the handling of this local business, six divisions bring in and take out an average of about 5,000 road cars every 24 hours. During the busy season from 90 to 100 freight trains and 100 passenger trains arrive and depart daily. To handle the above described traffic successfully as well as economically requires a well drilled, organized and disciplined force.

At this writing it takes 82 switching crews, and 63 engines to do the work—a large percentage of the switch engines being double-crewed and working continuously. Our standard switch engines weigh 127,000 lb. on the drivers and have 28,000 lb. tractive effort and 180 lb. boiler pressure. They have 51 in. driving wheels and 19 by 26 in. cylinders. These engines, of which we have 36 in service, are utilized mostly in industrial switching, as they ride almost any curvature. Larger road engines are used for transfers and in the switching of trains in train yards. These engines vary from 189,200 lb. on drivers, with 43,000 lb. tractive effort, 200 lb. boiler pressure, 63 in. driving wheels and 23 in. by 30 in. cylinders, to the Mallet compound engines having 323,000 lb. on drivers, 76,000 lb. tractive effort, 200 lb. boiler pressure, 57 in. driving wheels, and 23½ in. by 37 in. by 30 in. cylinders. Of this latter type of engines we are using three. Of the 82 switching and transfer crews, 52 are working days and 30 nights. This number, of course, increases and decreases in accordance with the volume of business done, running as high as 92 crews for the last three months of the year. In connection with the work mentioned, eight of the 82 crews devote their entire time to switching in train yards, and seven crews work exclusively on the shop and repair tracks.

Briefly the organization to handle this large terminal is as follows: In addition to the principal freight agent, we have six sub-agents located at the main industrial centers, who have entire charge of their districts and maintain separate station accounts. The superintendent of terminals has charge of the entire terminal, including the agents, switching crews, tracks, the moving of traffic, and to a large extent all buildings except those located at the shops. He is assisted by a station master, who has charge of the passenger traffic, a day general yardmaster and general assistant, a night general yardmaster and general assistant, and 20 yardmasters, of which 12 work days and the balance nights.

Both day and night, general yardmasters exercise general supervision over the entire terminals, so far as the switching power and crews are concerned. They must keep the crews at the minimum at all times, but not sacrifice the service. They direct and outline the work, divert the power from one yard to another to help out when required, hire all yardmen and place them, make preliminary investigations of all misdoings and report direct to the superintendent.

The duties of the day and night assistant general yardmasters consist in directing all movements in the terminal by telephone from the centrally located general yardmaster's office. The prompt arrival and departure of trains into and from the different yards and tracks and the movement of transfers are entirely under their jurisdiction.

The 20 yardmasters are selected with great care, and as a rule are promoted from the ranks. As assistants to the yardmasters we have yard and train clerks, who can expedite the movement of cars by promptly handling the train lists, waybills, carding cars, etc. In these terminals we have 33 such clerks—23 days and 10 nights. The day force gets into action at 7:00 a. m., taking a track list of every car in the terminals. By 10:00 a. m. this information has been obtained and the lists are sent to the car record office, centrally located in the passenger depot, by special messengers.

In making the car records, a visible typewriter is used with a roll of tape one inch wide, perforated into inch squares, each having a hole at the upper end for the purpose of hanging on a pin. The number of the car and initials, time of arrival, number of train and name of division and date of arrival are put on the tag. The numbers of all cars shown on track lists, initials, number of track, where located and date of location are also put on the tags. Reports showing the movement of cars between districts in the terminal are also received and put on tags, so that it is possible to follow the movement of a car from one district to another and promptly locate it, while reports of cars loaded in the terminal during the day are made and put on tags showing the district in which car is loaded.

Different colored tags are used to designate the service the cars are in. White tags indicate a loaded car arriving; yellow, an empty car arriving. Similar colors are used for loaded or empty cars shown on track lists; red for delivery to connecting lines; blue for cars received from connecting lines; pink, for cars loaded in the terminal and brown for departure from the terminal.

All tags are taken from the typewriter as fast as made and sorted on aluminum pins in numerical order. These pins are about six in. long, and are provided with a washer on one end and inserted in a hole in a board divided into 1¼ in. squares. The boards have a capacity of 100 pins each. The tags are separated into thousands and then divided into hundreds by sorting on the pins.

After each day's business is completed the tags are ready for filing on the main records, consisting of nine boards having a capacity of 500 pins each, or a total of 4,500 pins. This provides sufficient room for the recording of every car arriving in the terminal and until it departs.

This method gives a complete record of the movement and location of all cars in Milwaukee and is available for reference at all times. An average of 12,000 cars movements is recorded daily. All reports for each day are recorded the same day. The office force consists of the manager, two assistants and 15 girl typists. It will be readily seen that by calling up this office after 12:00 o'clock noon, the location of any car in Milwaukee may be ascertained.

The cost of handling through cars which do not originate at Milwaukee varies from $0.125 to $0.145 per car. The cost of handling all cars passing through, including those originating at Milwaukee, varies from $0.69 to $0.80 per car. The average expense per ton for handling freight at Milwaukee in carload shipments amounts to 8.4 mills and for l. c. l. shipments $0.51 per ton.

No large terminals can be operated successfully and with economy unless co-operation and harmony exists among all of the employees doing the work. Get-together meetings are held a number of times each year and all of the different phases brought out by the employees are discussed. When any ideas with merit are advanced they are adopted and given a trial. In this way everybody becomes interested and is anxious to advance a proposition of his own.

THE DANGER OF FREIGHT CONGESTION*

By Arthur Hale
General Agent, American Railway Association

There is a larger surplus of cars now than there has ever been in the fall. Almost always October and November are periods of car shortage. Even in the three lean years, 1908, 1910 and 1911, the car shortage in October ran up to fifteen and twenty thousand cars. This year it has not reached 2,500 and the surplus is 154,000, nearly 40,000 higher than in the worst year—1908.

It is well known that in time of peace one should prepare for war. We ought to believe in the future of this country, and any one who believes in the future of this country knows that the time will come next year very likely when there will be a demand for transportation and when every freight car will be needed. When that time does come some kind of a car shortage is inevitable, but we should do everything we can to prevent it and to reduce it. Now there is one cause of car shortage which can almost always be eliminated if we take it in time. That is the congestion of loaded cars.

Car shortages are bad enough anyway, but they are most trying when they are accompanied by congestions of loaded cars. When all the cars in the country make a reasonable movement, and despite this a car shortage occurs, it can only be caused by such a sudden increase in business as could not be foreseen. When on the other hand car shortages are accompanied or caused by congestions of loaded cars it is another matter, and every one is to blame who has had it in his power to prevent the congestion and has failed to do so.

There were serious car shortages in the fall of 1906 and the fall of 1907, and these car shortages were accompanied by serious congestions of loaded freight cars. Since 1907 we have been more fortunate. Our freight cars did more work in every October between 1909 and 1913 than they did in the Octobers of 1906 and 1907. It was only in 1912 that the shortage exceeded 50,000 cars, and while there were some congestions they were by no means as serious as those of 1906 and 1907.

Why then, it may be asked, is there more danger of congestion in 1915 than in the preceding years? The answer is easy. Since 1907 the facilities of the railways have generally been ample to handle the increased freight business which was offered even in the record months of October, 1912, and October, 1913, and these months show a tremendous increase even over the prior maxima of 1909 and 1907.

Present conditions, however, are not favorable to the development or even the maintenance of railway facilities. If there is as much business in October, 1915, as there was in October, 1913, the railways will undoubtedly have the same facilities that they had in 1913, but I see no reason to think that they will have more facilities nor can I see how these same facilities can be maintained at quite the same point of efficiency as in 1913. If the business should show a decided increase there is danger of congestion.

But there are more ways than one to create a congestion. If a railway accepts for movement more loaded freight cars than it can handle it is wholly responsible for the resulting congestion, but if it accepts for movement cars which it can handle and its consignees cannot, the public shares the responsibility, and for this reason the matter is now brought before the National Association of Railway Commissioners in the hope that steps may be taken to entirely avoid in future all congestions for which the public is in anyway responsible.

There has never been a great freight car congestion when all freight has been properly covered by demurrage rules. Whenever any great car congestion has occurred there has been some imperfection in the demurrage rules, and a considerable proportion of the cars which composed the congestion were held without payment of demurrage.

*Paper presented at annual convention of the National Association of Railway Commissioners, Washington, D. C., November 17-20, 1914.

The most extensive freight car congestion in our memory was what was known as the "Arizona coke congestion" where thousands of cars of coke destined to points in Arizona were held for weeks and months on the lines between the Alleghanies and the Rocky mountains. This congestion accompanied and to some extent caused the car shortages of 1907, and yet the great majority of these cars were held for weeks and months without the payment of demurrage by the consignees, although the shipments were prematurely made in order to save those consignees from an increased freight rate.

The great congestions of coal and of cotton have practically ceased since demurrage has been applied at points of transshipment. The annual winter blockades of coal to and via certain cities of the central west have been greatly reduced since a charge has been made for the reconsigning privilege and the free time for reconsigning has been reduced.

Thus the old-fashioned congestions which we have had always with us have been largely mitigated by a more thorough enforcement of the National Code of Demurrage Rules originated by the National Association of Railway Commissioners, but we have confronting us a set of new conditions for which possibly our old measures are not calculated.

The business which is now increasing is the export business, and further increases in business will probably be in the same direction. Cars loaded with export freight may be expected at the seaboard in unprecedented numbers. Are our present demurrage and storage rules sufficient to prevent congestion? Is the national rule covering free time on reconsignments universally followed? Is the constructive placement rule universally followed, and are consignees paying demurrage on all freight cars which they cannot handle, when these cars cannot be placed for them?

It is to be feared that these questions must be answered in the negative. Much has been done locally to provide proper demurrage rules on freight to be trans-shipped by water, but excepting at one gulf port it must be confessed that the demurrage and storage rules covering export freight are such that many a loaded car can be held indefinitely at seaboard without any payment by the consignee. Progress has been made with the reconsignment rules, but there are too many exceptions to the rule and too many cases where cars which are not wanted at destination can be delayed by repeated reconsignment. The constructive placement rule is generally enforced to the letter, but at certain points there are minor congestions which recur so frequently as to almost prove that cars are being held free. The subject is thus presented to the National Association of Railway Commissioners in the hope that throughout the country, the commissions, the public and the railways will unite, for such a proper amplification and enforcement of the rules that no freight cars can be held free for any one and that the congestion of loaded freight cars will become an impossibility on every road whose facilities are ample.

It may be urged that we can handle an increased export trade without blockading our ports if we use the embargo. There was never a greater mistake. An embargo is the locking of the door after the horse is stolen. Railways cannot foresee shipments as shippers themselves can. Shipments should not be made to congested points or to points in danger of congestion, but the railroads should not be the one to impose the embargo. The shipments should be regulated by the shippers and consignees who alone can regulate them properly. Many shippers and consignees have enough public spirit and believe enough in fair play to properly regulate their shipments without any compulsion, but they should be protected as much as the railways against the shippers and consignees who will not properly regulate their shipments except under the spur of a personal advantage. It is for them and for them only that demurrage codes have been devised, and bitter experience has taught us that it is only by proper enforcement of proper demurrage rules that we can secure the help of all the public in keeping our freight movement free.

The Reasons for the Unpopularity of Railroads*

Opinion Expressed That the Public Is Beginning to See the Necessity for Fair Play Towards the Railroads

By A. M. Schoyer
Vice-President, Pennsylvania Lines West of Pittsburgh

People are saying that they are tired of hearing the continued calamity howl of the railroads. Do not they suppose the railroads are tired of howling? But what other remedy is left? State and interstate commissions were created for the purpose of correcting railroad evils and of acting for the people as against the railroads, thus making a convenient body before which the victims or opponents of the railroads can appear to urge their woes, but there is no body created to product the railroads against their opponents. Therefore, the railroads are always on the defensive, and, being before bodies which have been created to restrain them, those bodies are naturally not particularly favorable to them. The state railroad and utilities commissions and the Interstate Commerce Commission were created to prevent undue prosperity on the part of the railroads or, at any rate, to act as the protectors of the shippers and the public against them. The prosperity of the railroads, therefore, matters but little to these bodies, except when, incidentally (since these commissions are usually composed of fairminded men), they may be impressed in passing with the injustice which the existing situation so often creates. Yet it is seldom that a body or an individual or a business ever publicly favors the railroads' cause. Woe to the man who does so. If he is a banker, the question is at once raised, "What shall we do to cut the bond which unites the railroads and Wall Street?" If he is a business man, "What do you sell the railroads?" If he is a lawyer, "Who retains you?" If he is a public officer or legislator, "Corruption!" is the cry. Sometimes fair commercial bodies resolve in favor of the railroads in rate or other contentions, but this does not necessarily mean that the paid traffic representatives of such bodies will support the railroads' contention, and if the traffic representative afterwards publicly attacks the roads he retains his position, and often with added honor and authority.

I see in the newspapers that the Georgia Railroad Commission has decided not to order the railroads of Georgia to make any more improvements or expenditures until better times set in. This is an honorable, fair and sensible course, and it is greatly to be desired that similar organizations elsewhere should take the same advanced stand.

The unprejudiced, independent newspapers of the country have lately taken up the cudgels for better treatment of the railroads. Leading editorials are appearing with more and more frequency in the great, influential daily and weekly papers calling for justice. The more conservative of the magazines are making similar demands, and where, a few years ago, there were a number of magazines muck-raking the railroads, there are today but few following that course, and I do not believe that the few find any measure of popularity or success following their attacks. The rank and file of the public of this country is not today opposed to the railroads. There has been a complete revolution as compared with a few years ago. Nothing more clearly demonstrates the change in public sentiment than Missouri's vote on the extra crew question in the recent election. The bill was overwhelmingly defeated and the Missouri citizens, by a tremendous majority, voted that they would not have this extra burden placed upon the railroads of that state.

Notwithstanding the changed attitude of the public, the railroads are not yet popular. Not with the public bodies which regulate them; certainly not with Congress and the legislative bodies which legislate against them; not with a majority of the great leaders of the state and country; and probably not with the rank and file of the people.

The railroads are 100 per cent better than a few years ago, even though they are not perfect today. It is claimed that in olden times railroads gave passes, granted rebates, spent money in politics, were arrogant, did not provide facilities and were very independent in all directions; but they were popular then. If the people did not like them, they did not say so. There were but few laws passed to regulate them. Now, all this has changed. For a number of years none of these practices has been followed. There are no rebates, there are no passes, except those given to men who are legitimately entitled to them by reason of railroad employment and to the families of those men. The railroads are anxious to provide facilities to take care of the business of the country and, I believe, they are usually courteous in their treatment of the public. But now they are unpopular. No one hated them when they were said to be bad. Why do they hate them when they are so much better? The leaders who liked the railroads then often hound them now.

I have a tremendous faith in the sense of justice of the American people. I believe they have decided that the day has come to give the railroad its chance to live and to expand, and, sooner or later, their servants, these legislative and administrative bodies and executives I have been talking about, will learn the facts, and, when they do, how quickly they will change front!

The railroads must keep out of politics, but the railroad unions can go into politics and they do, and legislative bodies hasten to pass the laws they demand. Can it be because the legislator fears the power of the vote of the labor union men? No. It must be because the legislator knows what the experienced railroad officer does not know; that electric headlights are safer than less powerful lights, even though they blind the engineman, make danger signals look like safety signals and cost hundreds of thousands of dollars which are greatly needed for safe operation of railroads. Or because the experienced legislators know better than the railroad officers what effect another brakeman on the crew will have. To us, this extra brakeman appears to be an added source of danger; this man who is of no use, but who must be carried, and who is so often in the way. On one railroad in this country, this extra man is not allowed to do any work, but sits in solitary grandeur in the caboose or in the coach out of danger's way, riding over the road daily and drawing his ample pay on each succeeding pay day.

Why two pay days per month were required, our men can not tell us. Generally, they did not want it, but their leaders thought it would sound well and cracked the whip and some of the legislatures rushed to pass the law. The railroads spend hundreds of thousands of dollars yearly in the added expense of paying men who do not need their money twice a month and who would be better off with one monthly pay day.

On practically all railroads in this territory, every dollar spent for unnecessary things or for needless luxuries made obligatory by law, such as electric headlights, palatial cabooses, extra crew laws, unnecessary stations, double pay, hours of service laws, boiler inspection laws, changing the ladders on freight cars from one side to the other, self-cleaning ash pans, etc.—I say that every dollar spent for unnecessary things such as these is a dollar necessarily withheld from the necessities of railroad life, such as rails, cars, locomotives, ballast, more main and yard tracks, etc.

For years, the railroads have been unable properly to care for

*Abstract of an address before the Peoria Transportation Club, Jefferson Hotel, Peoria, Ill., November 13, 1914.

public needs of the day, let alone tomorrow. When this country finally awakes from its long industrial slumber, what an avalanche of reproach will fall upon the heads of the luckless railroads who have found it utterly impossible to beg, borrow or earn money for needed facilities.

The railroads, generally, are where they can go no further. They have stopped, but they are not standing still; they are retrograding. Receiverships are becoming more plentiful. As a rule, legislative and executive bodies, and men in power, are not favorable to railroad interests. The press of the country has changed front; the public is doing so. Even those who have changed front, however, are being governed by a stirring sense of justice and not because they like the railroads. There are two questions to be answered:

First, what can the country do to prevent the bankruptcy of the railroads?

(a) Stop passing anti-railroad laws and rulings at the demand of paid traffic managers, labor union leaders, and any one who can secure a post card and a fountain pen.

(b) Repeal the obnoxious and unnecessarily burdensome laws and rulings in effect. I have named some of them.

(c) Stop continually increasing railroad taxes.

(d) Permit the railroads to raise their rates sufficiently to give them a living income and to enable them to provide a modest surplus as a basis for credit.

(e) From time to time, consult leading railroad officers as to the needs of the railroads, generally, and as to the effect of proposed legislation. The railroads stand ready to co-operate in all needed and wise reforms.

(f) Cultivate a different sentiment. When praise is merited, try praising, instead of continual criticism, and endeavor to restore the railroads to a position of respect in the eyes of the general public. Then hold them strictly responsible for results.

Second, what can be done to remove existing antagonisms and make the railroads more popular?

(a) Let railroad men who come in contact with the public, treat it with consideration. The public may not know as much about railroading or railroad matters as we do, when they ask questions, but let us forget this and treat them courteously.

(b) Let the railroads refrain from arbitrary action in matters of rates and service. Because we are badly treated, there is no reason for passing it on.

(c) Let the owners of the railroads talk about the good qualities of the roads, advocate their cause, defend them and praise them.

(d) Let an effort be made by the better educated and more experienced railroad men of the country to enlighten the teachers of political economy and of railroad economics in the colleges and universities of the country, so that they may better understand today's railroad situation and develop in the minds of their students a comprehension of the changed conditions which have come to pass and a more cordial feeling toward the railroads. There is a necessity for a changed viewpoint by the young men pouring out of our universities and colleges everywhere if we intend greatly to increase railroad popularity.

(e) Let the railroads take the public, generally, and the interested public, especially, into their confidence as to what they are trying to do, why they are trying to do it and the difficulties in the way. There is nothing secret in railroad operations today. If the railroads wanted to have secrets, the laws would absolutely prevent it, since their books must be open to inspection at any time.

The railroad men brought up under the old regime are no longer in control. The men who are managing the railroads of this country today for the owners of the roads would never go back to the practices of ancient times, if they could, and the times have so changed and the public conscience and the general laws are such that no railroad manager could do so for a minute, even if he so desired. Then let these reformed railroads take their proper position. Let us stop "knocking" and try some other method.

I am not an opponent of wise railroad regulation, but, on the other hand, have always advocated it. But I am opposed to destructive regulation and I fear we have reached that stage. And we are today confronted with the possibility of new and more sweeping laws, rulings and orders, which will take from the railroad manager the application of the train and flagging rules which he feels are necessary for the success and safety of his railroad, and substitute rules which may be splendid in themselves and for some railroads, but not applicable to his own; or rules which will attempt to substitute specific instructions for more general ones, thus relieving the individual employee of his own responsibility. There is threatened the substitution of government regulation for the individual investigation of accidents and home discipline. There is threatened the enforced application of an automatic stop which will prevent collisions; and when we get this automatic stop and the engine and train crews no longer feel that eternal vigilance is the price of safety, what will result? Added safety or added danger? The automatic stop will be a machine and no matter how perfect, *but* a machine, and there will be times when it will fail—and then, God pity us!

If government regulation ever proceeds so far that it hampers the individuality of the general manager in handling his railroad and binds his hands in the matter of rules and discipline, and relieves the individual employee of his sense, of his responsibility, good-bye to safety and success.

I can not believe that destructive regulation will go further than it has. It must be that the force of public opinion will soon be felt and then let the railroads, having fully learned their lesson, pick up the fragments and build a new structure upon solid foundations of obedience to the law, reasonable financial results, and fairness and equity to public and employe.

TRAIN ACCIDENTS IN OCTOBER[1]

The following is a list of the most notable train accidents that occurred on the railways of the United States in the month of October, 1914:

Collisions.

Date.	Road.	Place.	Kind of Accident.	Kind of train.	Kil'd.	Inj'd.
13.	Georgia	Madison.	bc.	P. & F.	0	38
18.	New York Central	Indian Castle	rc.	F. & F.	2	1
22.	Pennsylvania	Kane.	rc.	F. & F.	1	4

Derailments.

Date.	Road.	Place.	Cause of Accident.	Kind of train.	Kil'd.	Inj'd.
3.	Hoosac T. & W.	Readsboro.	unx	P.	0	15
7.	Balt. & Ohio	Cove Run.	.....	P.	0	39
†17.	Del. L. & W.	Fulton, N. Y.	malice	P.	2	31
18.	Morgan's L. & T.	Broussard.	malice	P.	0	15
18.	Pennsylvania	Glen Union.	b. axle	P.	0	6
19.	Missouri K. & T.	Bartlett.	unx	P.	3	12
28.	Ches. & Ohio	Barboursville.	unx	P.	0	18
31.	Del. Lack. & W.	Alford.	b. rail	P.	0	33

Other Accidents.

Date.	Road.	Place.	Cause of Accident.	Kind of train.	Kil'd.	Inj'd.
†11.	Denver & R. G.	Grand Junc.	rock fall	P.	3	14

The trains in collision at Madison, Ga., on the 13th, were eastbound passenger No. 2 and a westbound freight. The passenger ran over a misplaced switch and into the head of the freight train, which was standing on a side track. Thirty-five passengers and three employees were injured. The responsibility for the collision is charged against the men in charge of the freight.

The trains in collision near Indian Castle, N. Y., on the 18th were eastbound through freights. The fireman and one brake-

[1]Abbreviations and marks used in Accident List:
rc, Rear collision——bc, butting collision——xc, Other collisions——h, Broken——d, Defective——unf, Unforeseen obstruction——unx, Unexplained——derail, Open derailing switch——ms, Misplaced switch——acc. obst., Accidental obstruction——malice, Malicious obstruction of track, etc.——boiler, Explosion of locomotive on road——fire, Cars burned while running——P. or Pass., Passenger train——F. or Ft., Freight train (including empty engines, work trains, etc.)——Asterisk, Wreck wholly or partly destroyed by fire——Dagger, One or more passengers killed

man were killed, and one other employee was injured. The collision was due to excessive speed in dense fog, under a caution card. Also the conductor and flagman of the leading train are held responsible for not affording proper protection by flag.

The trains in collision near Kane, Pa., on the 22nd, were eastbound through freights. The caboose of the leading train, which was moving slowly, was wrecked. An engineman was killed and four other trainmen were injured. There was a dense fog at the time of the collision.

In the passenger train derailed near Readsboro, Vt., on the 3rd, 15 passengers were injured. Three cars fell down a bank.

The train derailed at Cove Run, West Va., on the 7th, was northbound passenger No. 4, and 36 passengers and 3 employees were injured, most of the injuries being slight. The train was running about 25 miles an hour. The tender was the first vehicle to jump the track.

The train derailed near Fulton, N. Y., on the evening of the 17th was a northbound express, running at full speed. All of the cars in the train left the rails except the last one. The engineman and fireman were killed and 26 passengers and 5 trainmen were injured. One steel passenger car was turned completely around, but its occupants suffered only minor injuries. The derailment was due to the malicious misplacement of a switch. The light on the switch had been made to show green, all right.

The train derailed at Broussard, La., on the 18th, was westbound passenger No. 11. Every car in the train left the rails, but the number of persons injured is reported as only 15. The derailment was caused by loosening of spikes, presumably by persons who had intended to rob the train.

The train derailed at Glen Union, Pa., on the 18th was eastbound passenger No. 52. The baggage car fell down a bank. The engine and the entire train of seven cars left the rails. The passenger cars were of steel and only six passengers were injured, none seriously. The cause of the derailment was the breaking of one of the axles of the tender.

The train derailed near Bartlett, Tex., on the morning of the 19th, was northbound passenger No. 6, and the engine was overturned. The first three cars of the train were turned crosswise of the track, but the cars behind these were little damaged, and most of the passengers felt no serious shock. Three men on the engine were killed and six passengers and six employees were injured.

The train derailed at Barboursville, W. Va., on the 28th, was westbound passenger No. 1. Three cars were ditched. Eighteen passengers were injured.

The train derailed near Alford, Pa., on the 31st, was eastbound passenger No. 32, consisting of five cars. Three cars fell down a bank and 30 passengers and 3 employees were injured. The derailment was due to a broken rail.

The train which was wrecked near Grand Junction, Col., on the 11th, was westbound passenger No. 3, and the cause of the disaster was the fall of a mass of rock from the second ledge about 200 ft. above and from the track. The train was running at ordinary speed when a rock weighing 10 tons fell on the rear end of the smoking car, which was the third car from the engine, and broke the couplings. This applied the air brakes and the train was soon stopped; but at almost the same instant a boulder weighing perhaps five tons fell on the day coach and the roofs of the two cars were wrecked. Three passengers were killed and 14 injured.

Electric Car Accidents.—Of the half dozen serious collisions or derailments on electric roads reported in the newspapers as occurring in the United States during the month of October, three appear to have been attended by fatal results; one at Denison, Tex., on the third, two persons killed; one at Syracuse, N. Y., on the 9th, four persons killed; and one at South Glastonbury, Conn., on the 23rd, one person killed.

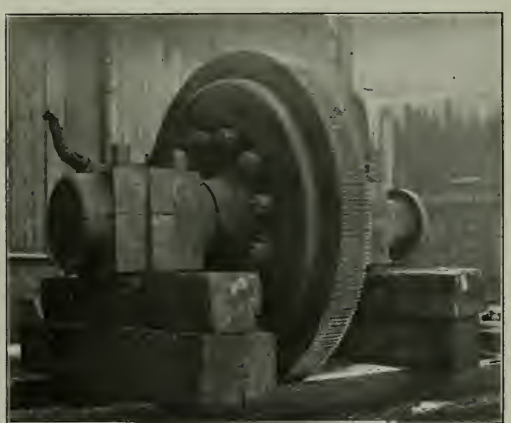
Railway Construction in India.—Sanction has been accorded for a survey by the Bengal-Nagpur Railway for a line 66 miles long between Gopalpur and Russelkonda.

THE MECHANICAL ELIMINATION OF SEAMS IN STEEL RAILS*

By Robert W. Hunt
President, Robert W. Hunt & Co., Chicago, Ill.

The increased weight of rolling stock and speed of traffic have necessitated increasing the size of the rail sections, and hence their weight; as many of the details of rail manufacture have been changed with such alterations, it is not surprising that new and unexpected physical weaknesses have developed in the heavier rails. One of the most notable has been the failure through crescent-shaped pieces breaking out of the rail flanges, followed by at least one, and in many cases several, ruptures across the whole section of the rail. Investigation has showed that in practically every instance of such failure there was a more or less pronounced seam running longitudinally in the bottom of the rail near its center, and thus immediately under its web. This seam occurs at the top of the curve of the crescent-shaped break and is undoubtedly the point at which the fracture starts.

Those familiar with steel rail making have known that it was practically impossible to make rails entirely free from seams, and that as the seamy conditions of the steel forming the head of the rail increased, its wearing quality would decrease, but I think it was not until the disastrous experiences with the "moon-shaped" failures that the danger from seams in the base of the rails was fully realized. It is true that rails with actual flaws in their flanges have been rejected as first-quality ones and that a very pronounced seamy condition of the bottom of the rail would also cause its rejection. Such rejections were the cause of frequent disputes between the mill operatives and the inspectors, the point being as to how far the inspectors were warranted in carrying their condemnation; but, as already said, it was not felt that a single seam would be dangerous unless very pronounced.



Tool Used on Milling Machine

The crescent-shaped breaks were of such frequent occurrence that they indicated a very serious condition and led rail makers to experiment with the design of their rolling passes, with a view to obviating the formation of the bottom seams. It was found that fewer seams were produced by such changes, but they were not entirely eliminated. While more or less successful in preventing the formation of seams through lapping on the bottom of the rails, the formation of seams in other parts of the section was not particularly affected.

T. H. Mathias, assistant general superintendent of the Lacka-

*Abstract of a paper read at the annual meeting of the American Society of Mechanical Engineers, New York, December 3, 1914.

wanna Steel Company, determined that the most certain way of getting rid of seams was to remove that portion of the metal which contained them, and, as applied to steel rails, thus to eliminate them from both the base and head of the rail. Mr. Mathias reasoned that the primary causes of seams existed previous to any rolling of the steel, in fact, were incident to the casting of the molten metal into ingots. He knew that disk-like apertures were formed on the sides of ingots while the molten metal was being cast and were probably caused from air being entrapped against the sides of the ingot molds by the hot steel as it raised in the molds, a condition which was not controlled in regular manufacturing routine. It will be appreciated that, as the section of the ingot is reduced and elongated in the rolling process, so, of course, will the apertures be stretched longitudinally and thus be formed into seams.

Mr. Mathias demonstrated that there is another constant condition present in the rolling of large steel ingots, in the formation of a decarburized surface, about 5/16 in. deep on all four faces, and containing from eight to ten points lower carbon than the metal immediately under it, the decarburized envelope undoubtedly being produced through the oxidizing conditions to which ingots are subjected in the soaking pits where they are heated preparatory to rolling. A thick oxide scale is always formed on the surface of ingots in the pits, so that conditions are invariably present for the production of such a layer of lower carbon metal on their outside faces.

Mr. Mathias was convinced that during the process of rolling ingots into rails it was practical to remove mechanically the parts of the enveloping steel which would form the top of the head and bottom of the flange of the rail, and experimented

Hot Sawing or Milling Machine in Operation

accordingly. He designed and his company installed as an addition to their rail train, a milling, or hot-sawing machine, to cut off that metal without retarding the regular operation and thus interfering with the production of the mill.

The ingot is reduced in the blooming rolls to an 8-in. by 8-in. cross-section, and after cropping the ends the bloom is further reduced in the roughing or shaping stand of rolls by five passes. When it leaves these rolls, it is approximately 75 per cent finished and at this period it is carried to the right and entered between two pinch rolls with its base or flange side up. A bar which will make four 33-ft. rails is about 60 ft. in length at this point in the rolling operation; therefore, the area of metal to be cut off or removed in the milling machine is approximately ⅛ in. deep, 7 in. wide and 60 ft. long. It is driven through the pinch rolls at a rate of 60 ft. in 30 seconds. The pinch rolls have a draft of about ⅜ in. and thus force the bar between the two milling saws, which are so arranged in the housing that they may be raised or lowered as desired. From 1/32 in. to 3/64 in. of metal is milled from the head and base of the bar, the front end of which, immediately on passing from between the rolls, is caught by a second set of pinch rolls which have a draft of about 1/16 in. These pinch rolls force the bar between the tools, pull it from between them, and also hold it in practically perfect line for the milling operation. The milling apparatus is driven electrically and requires about 600 hp. for its operation.

As the milled dust or particles of steel are thrown out, they are hit by water under pressure which forces them into a chute and also prevents the material from adhering together. They are carried below the mill, through this chute, and are caught

Cross-Section of Bar Preparatory to Entering Milling Machine

in boxes or receptacles suitable for charging as scrap into the open-hearth furnaces.

The milling tool is 5 ft. in diameter with an 8-in. face and revolves at a peripheral speed of 2,500 ft. per minute, thus causing an engagement of about 400 000 teeth per minute on the hot rail bar. The teeth are of 0.80 carbon steel, and it has been demonstrated that they will mill at least 30,000 tons of material without requiring dressing.

The milling on the flange does not reach the extreme edges of the bar, and on the head side does not affect the corners. Either by a modification of the shape of the piece as presented for treatment in the milling machine or, what will probably be more practical, changing the face of the tool, the milling can be extended to the extreme edge of the flange portion of the bar and somewhat around the corners of the top or head side. This will undoubtedly be perfectly practical and thereby eliminate the seams which may be located in those parts of the bar. The primary object has been to eliminate the seams from the central portion of the bottom of the rail which had been the starting point of the moon-shaped failures, and to remove them from the top or bearing surface of the head of the rail. Personally I think it will be desirable to extend the milling by the use of convex-faced tools.

The work of rolling which the steel receives after the removal of the more or less laminated metal, must produce a better product than if such elimination had not taken place, and it should not only make them less liable to breakage on account of seams in their flanges, but also enable them better to resist the abrasive effects of traffic.

During the many years of my connection with rail making

I have examined a great many etched specimens of rails, not only directly in connection with the process under consideration, but for various other reasons. From such experience I can fully appreciate what Mr. Mathias has accomplished. The surfaces of practically all rails, when etched, will show some seams on both the base and head, and very frequently the extent of such defects will not be appreciable if the scale has not been removed. Even then, it is not always an easy or certain matter to estimate the depth of the seams. When the rails have been subjected to the Mathias milling operation and still show pronounced seams, it has been found that breaking tests will practically always develop the fact that the suspicious marking is an actual seam.

As the original defects on the sides of the ingots vary in extent, so will the character of the resulting seams vary, and it can be readily appreciated that some of them may have been too deep to have been completely eliminated by the milling.

While I have confined myself to the matter of steel rails, it is patent that the process will be of great value in the preparation of blooms for axles and all other kinds of forgings. As is well known, it is practically the universal custom to endeavor to remove the seams developed in rolling axle billets by chipping them out through the use of pneumatic hammers, and for some of the higher characters of forgings, notably for automobile parts, the endeavor to eliminate the seams is carried to the extent of turning off the whole surface of the billets. I am confident that by the Mathias plan the greater part, if not all, of such work can be superseded, and I regard the invention and its practical installation as a notable achievement in the art.

GETTING CITY PEOPLE BACK TO THE COUNTRY*

By F. H. La Baume

Agricultural and Industrial Agent of the Norfolk & Western

One of the most urgent needs at this time is for the division of large areas into small farms, and the establishment of thousands of American families on these little farms under proper instruction that will enable them to tide over the first few years of struggle and adversity until they can acquire a competence along with the experience that will insure their continued livelihood and prosperity.

Heretofore many of the methods suggested for getting the landless man back to the manless land have been more or less socialistic or confiscatory, but this need not be so. To illustrate, I will, with your indulgence, explain what we are endeavoring to do in Virginia along these lines.

We have secured in one of the most attractive sections of the Shenandoah Valley a body of some eight hundred acres of good land adjoining a town and station within a night's ride of Philadelphia and New York. This land has been divided into small farms of five and ten acres each. In the center of the tract we have erected a club house, surrounded by wide porches and furnished with the equipment that goes to make a social gathering place of this kind attractive. It includes rugs and tables, chairs, settees, books, magazines, games, a grafanola, large fireplace and attractive grounds surrounding it.

One of the small farms has been turned over to a practical poultry, garden truck and fruit raiser, and this little farm is being equipped for use as a demonstration and guide for those who come down and purchase the little farms, which are sold on easy terms, with small cash payment and balance on long time at low rate of interest. Blue prints and plans of half a dozen cottages, bungalows and small houses are on file, by the aid of which a settler can erect a comfortable home for his family at a cost ranging from $100 to $1,000. The instructor on the small farm, set aside as a guide farm, is available at all times, and where his advice and counsel are followed explicitly settlers should have no difficulty in getting results.

*Abstract of a paper presented before the Railway Development Association, Chicago, November, 1914.

Our plan of helping others to help themselves is simply applying business methods to selling lands with the risks eliminated and uncertainty dispelled so far as possible. I believe that there is a large and growing class of American business men who recognize the necessity of taking a hand in the national economic and social problems. They only need to be convinced that practical plans can be evolved, and when they are so convinced they will be willing to put their money into it.

While the development that I have outlined above has been in the nature of a personal investment, supervised by those I have appointed to represent me on the ground, there is no reason why this line of business should not be handled successfully by an organization. Holding syndicates could be organized to take over large areas of land, handle the subdivision, purchase equipment, furnish competent instruction and then sell small farms on long time and easy payments to people who give reasonable assurance of their ability to succeed. Profit on the deal should be limited to a reasonable rate of interest on the investment. If this is done and the work is handled efficiently, economically and practically by representatives well equipped through experience to judge land and people, there need be no large element of chance in the undertaking.

INJUSTICE TO RAILROADS

[From the Jackson (Miss.) Daily News]

The fallacy of "expert medical testimony" and the injustice often wrought thereby is strikingly illustrated by the case of W. C. Haynie, a former locomotive engineer employed by the Illinois Central. In January, 1911, nearly four years ago, a jury in the Lincoln county circuit court awarded Haynie damages in the sum of $20,350 for alleged personal injuries. The verdict was based chiefly on the testimony of a distinguished oculist that Haynie would be blind within one year as a result of his injuries. The supreme court affirmed the verdict, and the Illinois Central had to pay the judgment, with interest.

Today, according to the most reliable information obtainable, Haynie is very far from being blind. His eyesight is said to be as good as it was on the day he obtained the verdict. At the trial three noted eye specialists testified that there was nothing wrong with Haynie's eyes, and that he was in no more danger of going blind than any other man. However, the jury preferred to believe the "distinguished oculist" who testified for the plaintiff. Perhaps they thought it wouldn't hurt the railroad company to pay out $20,350, and if there was any question of doubt in the case they were willing to resolve it in favor of the plaintiff.

After obtaining his money Haynie purchased himself a fine home and an automobile, and proceeded to enjoy a life of luxury and ease. He spent money freely while it lasted, and on account of the prominence gained by the conduct of his own case, became popular as an expert witness against railways in personal injury damage suits. Testifying was his diversion. To this day, down at McComb, Miss., where Haynie, lives, he is pointed out as the man who obtained $20,350 from a railroad company, upon testimony that he was going blind, and squandered it within a period of approximately two years. Where Haynie is known his testimony is not so effective as it once was, but that does not help the position of the railroad company, which is still out its $20,350, plus the interest and the costs of defending the suit, which were large.

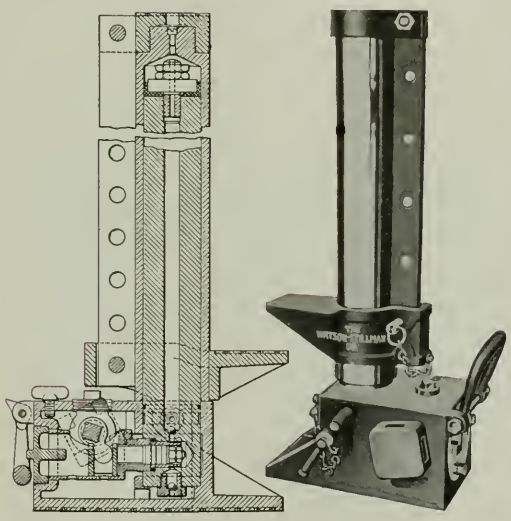
Railway Construction in India.—It is reported that work in connection with the Indo-Burma connection railway survey is to begin shortly. There are three possible routes to be surveyed, the coast route, the Manipur route, and the Yukon Valley route; and the next season will be devoted to the survey of the first of these three. One of the principal reasons for beginning work at this time is the outcry which was raised when Burma was so completely cut off from the rest of the Indian Empire by the doings of the German cruiser Emden.

EMERGENCY JACK

A hydraulic jack, the design of which embodies a number of unusual features, has recently been developed by the Watson-Stillman Company, New York. This jack was designed primarily to meet the demands of an emergency jack for street railway use, but its flexibility of adjustment is such as to make it of value for a variety of purposes wherever lifting work is performed.

The construction of the jack is shown in the sectional elevations, from which it will be seen that the cylinder is the moving part instead of the ram as in the usual type of jack. This allows the pump mechanism to stay in a fixed vertical position and permits the working parts of the jack to be made simpler and more compact than is usually the case. The piston is packed with leather rings and the valves are of the ball type with all passages amply proportioned. The pressure is relieved by means of a key operating a small needle valve. The jack is operated with a special oil, which not only acts as a lubricant, but prevents rust on the working parts and the possibility of freezing. It has no detrimental effect on the packings.

One of the most notable features of this jack is the arrangement of the claw which can be moved vertically upon the cylinder and adjusted to the most convenient height. The claw and the cylinder can be swung through a complete circle without changing the position of the jack or the location of the pump. The operating lever is but 18 in. long, but one man weighing 125 lb. can obtain the maximum pressure with but slight effort. The lever is curved and the socket has a hole in each of its four sides to allow for convenience in operation from practically any position. The jacks are now built in five and ten ton sizes with a ram stroke of 10 in., and are guaranteed by the manufacturer to stand a 50 per cent overload without detriment to any of the parts.

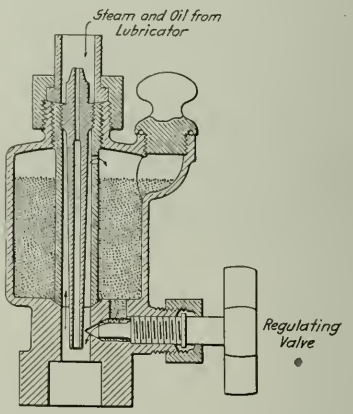


Exterior and Sectional Views of Emergency Jack

Timber Consumption of an Hawaiian Railway.—The Hilo Railroad, operating about 72 miles of line on the island of Hawaii and the only standard gage railway in the territory of Hawaii uses about 1,000,000 feet of lumber yearly. The company has car shops and a foundry, and builds and repairs its own cars at Hilo. Redwood ties are used in the roadbed. Douglas fir is chiefly used in the shops, though ohia has been found well adapted for car roofs.

GRAPHITE LUBRICATOR

The Graphite Lubricator Company, Detroit, Mich., has placed on the market a graphite lubricator for lubricating with flake graphite the valves and cylinders of locomotives. This graphite is suspended in common engine oil for the purpose of more easily filling the lubricator. The device is used in connection with the oil lubricator as now in use on locomotives. The present oil lubricator acts as the cleaner, while the graphite lubricator delivers graphite to the cylinders and valves as the lubricant. The accompanying illustration clearly shows its construction. The oil line from the steam or gravity-feed lubricator in the cab is connected to the top of the graphite lubricator, and the oil and steam pass to the cylinder and valves through the nozzle shown on the inside. The graphite is contained in the annular space surrounding this nozzle, and the feed is controlled by means of the regulating valve, as shown. The pulsating pressure of the steam will cause the feeding of the graphite through the passage controlled by the regulating valve, and there it becomes mixed with the oil from the gravity-feed lubricator. It is then distributed to the various parts of the valves and cylinders. This lubricator is adapted for use on superheater and compound locomotives (either piston or slide valve type) and especially those engines which experience trouble in obtaining the proper lubrication of the valves and cylinders. It is claimed that the priming of locomotives will not in any way interfere with the proper lubrication of the cylinders and valves where this lubricator is used. It is also claimed that 50 per cent less cylinder oil will be required for lubrication in the cylinders and valves, and that at the same time a better lubrication will be obtained by the use of the flake graphite.



Cylinder Lubricator for Flake Graphite

The lubricator shown, which will hold three ounces of the graphite lubricating mixture, is filled through the plug shown at the top and to the right of the lubricator. It may be attached to any standard steam chest choke-plug fitting, and thus eliminates the use of the choke plugs. One filling of the model A three-ounce lubricator is sufficient for the operation of a locomotive for approximately 250 miles without further attention on the part of the crew. At present the lubricators are made in two sizes—model A, which holds three ounces of lubricant, and model B, which holds six ounces.

German Locomotives Dismantled for Copper.—Unconfirmed press despatches from Amsterdam report that the scarcity of copper is such throughout Germany that orders have been given to dismantle as many locomotives on the state railways as possible, in order to use the copper and brass for making ammunition.

General News Department

The safety supervisor of the El Paso & Southwestern announces that the number of employees injured during the month of October was less than half the number reported in October, 1913.

The Baltimore & Ohio Chicago terminal repair shop at East Chicago, Ind., was severely damaged by fire on November 23. Some damage was also done to the cars in the shop, but the amount of loss has not yet been estimated.

The Chicago & North Western, during the fiscal year ending June 30, 1914, carried a total of 33,389,428 passengers, an increase of 2.92 per cent over the previous year, without a fatality to a passenger from any cause.

At a meeting of the American Railway Safety Association, held at Chicago on November 30, it was decided to disband the organization. Some of the roads are considering joining a railroad section of the National Council for Industrial Safety.

According to press reports members of shop craft unions, who struck on the Illinois Central and the Harriman lines on September 30, 1911, because the roads refused to recognize their system federation, have taken a vote on the question of calling off the strike; but there is not as yet any report of the result.

The New York, Philadelphia & Norfolk on January 1 will establish a pension department. The rules will be the same as those of the Pennsylvania Railroad pension system, the New York, Philadelphia & Norfolk being controlled by the Pennsylvania.

The discontinuance of trains on the Buffalo & Susquehanna, which was ordered for December 1, has again been postponed, the Supreme Court at Buffalo having extended the time limit to December 16. There is a bondholders' committee which hopes to find some way in which to keep the road running.

The safety and efficiency bureau of the San Pedro, Los Angeles & Salt Lake reports a reduction of 33.9 per cent in the number of injuries to employees for the year ending October 31, as compared with the preceding year. Three employees were killed, the lowest record in the history of the road, except that for 1909, when 3 were killed.

Michael McCarty, a crossing watchman on the Pennsylvania Railroad at Swarthmore, Pa., has been presented with a loving cup by the Swarthmore Home & School association, in recognition of his faithful service at his crossing for 16 years during which time no person has been injured on the crossing. With the gift were some verses making special mention of McCarty's interest in and care for children.

At the Wednesday evening session of the annual meeting of the American Society of Mechanical Engineers in New York, this week, the John Fritz Medal was awarded to Prof. John E. Sweet, honorary member and past president of the society, "for his achievements in machine design and for his pioneer work in applying sound engineering principles to the construction of the high speed steam engine." This medal is awarded by the four national engineering societies.

Thirty or more passengers in the smoking car of a suburban train on the Chicago, Burlington & Quincy in Chicago were injured on the night of November 24, when the car was set on fire by an explosion of a moving picture film which was being carried, wrapped in a paper package, by one of the passengers, and which presumably caught fire from a lighted match or cigar stub thrown on the floor. The Illinois Public Utilities Commission is making an investigation of the accident.

Work was resumed on December 1 at the shops of the Wheeling & Lake Erie at Brewster, Ohio, and Ironville, in compliance with an order by Judge John H. Clarke, of Cleveland, to the receiver of the railroad. The shops had been practically idle for two months and repairs to cars had been reduced for reasons of economy in order to meet certain interest payments. This policy the court criticized, as neither wise from an economical standpoint nor just from a social point of view.

On the Cincinnati, Hamilton & Dayton, which is owned mainly by the Baltimore & Ohio, but is now in the hands of receivers, discipline without suspension is to be the rule among the employees of the engine and train service. General Manager J. M. Davis has issued a circular announcing that the new system will be put in effect on January 1. This system is the same as that in use on the Baltimore & Ohio, which was the subject of a descriptive article in the *Railway Age Gazette*, January 16, 1914.

The Brotherhood of Railroad Trainmen has filed a statement with the Missouri recorder showing that a total of $16,056 was expended in the campaign for the passage of the full crew bill, which was defeated by referendum vote at the election on November 3. The Missouri legislative committee of the brotherhood, according to the statement, collected $15,880, leaving a deficit of $176. It is stated that the members of the Brotherhood of Railroad Trainmen contributed $14,680 and that $1,200 was contributed by the Order of Railway Conductors.

The Baltimore & Ohio has sent four superintendents on a trip of inspection to the Pacific coast, to be gone ten days; and on the return of the party, four other superintendents will be sent on a similar journey but by a different route. The men going on the first trip are H. B. Voorhees, G. D. Brooke, J. C. Hagerty and E. W. Scheer; and those on the second trip, R. N. Begien, F. B. Mitchell, E. T. White and M. V. Hynes. It is expected that all the general and division superintendents of the company will make trips of this kind, occasion being taken to send them now while business is below normal.

Mr. Love, chairman of the Oklahoma Corporation Commission, is reported as proposing to ask each high school and higher educational institution of the state to offer, as a part of their courses of study, instruction in the making and adjustment of freight rates. He wants to give the next generation in Oklahoma a general knowledge of railroad rates, their application and adjustment, which, he says, are all Greek to the average citizen. Mr. Love must be of an optimistic temperament. If he really wishes for success he should begin by giving the boys a couple of years of real Greek, as a preliminary training.

In the United States District Court at East St. Louis, Ill., November 30, four railroads pleaded guilty to violations of different laws. The Illinois Central pleaded guilty to 12 charges of violating the cattle quarantine law and was fined $100 on each count; three charges of violating the 28-hour law, $100 on each count; two charges of violating laws relating to telegraph operators' working hours, $25 on each count. The Southern was fined $100 on each of two counts for violating the 28-hour law; the Baltimore & Ohio Southwestern $25 on each of six counts for violation of the 16-hour law governing train crews, and the Louisville & Nashville $100 for violation of the safety-appliance law.

International Railway Congress Postponed by War

Word has been received from Berlin that because of the war all preparations have been broken off for the ninth session of the International Railway Congress, which was to have been held there next June. The congress, whose membership consists of governments and companies operating more than half of the earth's railway mileage, is perhaps the most important railroad association in the world. Its sessions are held every five years, the last having occurred at Berne, Switzerland, in 1910. They are devoted to the discussion and interchange of ideas on questions of railway maintenance, equipment and operation. The German government was to have acted as host, and

it was understood that Kaiser Wilhelm would have opened the convention. Some of the American "reporters" have already prepared their papers for the congress.

Russian "Bath Train" for the Front

It is stated that the Russian ministry of ways and communications is sending to the front a "bath train" of over 20 cars, providing 2,000 baths daily. There is a tank car in case water is unobtainable at any stopping place. Soldiers can be given clean underclothes from the stores carried. There is also a car for drying and disinfecting outer garments and a restaurant car.

An Unusual Train Accident

The Pennsylvania Railroad, in one of its circulars giving "information for employees and the public," tells of an incident near Pittsburgh on the night of November 6 in which the derailment of a passenger train was prevented by means of the electropneumatic automatic signal system, a rupture of the main air-pipe, lying between the tracks, having set a signal at stop just in time to keep an eastbound passenger train from running into a car, which had been pushed over on to the eastbound track from a derailed westbound freight train. The passenger train had received a clear distant signal; but the home signal suddenly changed from the proceed to the stop position just before the train reached it. The engineman at once applied the brakes, in emergency, and stopped only about forty yards from the obstruction. The freight car had broken the air-pipe, which, of course, set at stop the signals dependent on the pressure in that pipe. The engineman of the passenger train was Edward F. McKenzie, known to readers of the *Railway Age Gazette* by his prize article on "Keeping a Good Lookout" printed a year ago.

Good Work Well Done

S. C. Long, general manager of the Pennsylvania Railroad, has sent to 800 employees of the company a personal letter commending their efficiency during the strike of trainmen on the Monongahela division in March, April and May of this year, when in spite of adverse conditions, the road was able to operate trains uninterruptedly. The letter says in part:

" . . . practically the entire force of road and yard freight trainmen on the Monongahela division, by their refusal to report for duty, when called, severed their relations with the company. A force of new men had to be organized and the inexperienced instructed; and food, sleeping quarters and police protection had to be provided. The regular division operating force had to be supplemented by temporarily transferring to the Monongahela division, officers and employees from other divisions. . . . The success with which the business was handled was most gratifying to the management.

"The general superintendent of the Western Pennsylvania division has called our attention to the commendable manner in which you participated in furthering this accomplishment; and it is a pleasure for me to join with the president and executive officers of our company in expressing to you sincere appreciation of this practical display by you of that sense of responsibility to the public which every railroad man must share, as well as of your fidelity to the interest of this company."

The Stamp Taxes

The war revenue act approved October 22 provides for the imposition of certain stamp taxes beginning December 1, and the Pennsylvania Railroad has issued a seven-page circular of instructions to agents concerning the administration of the law. A number of other roads have also issued circulars. On the Pennsylvania, east of Pittsburgh, about 50,000 bills of lading are issued daily. On each such receipt the shipper must affix a one-cent stamp. Agents are instructed not to deliver bills of lading until the stamp is affixed and cancelled; and the shipment must not be accepted or forwarded until the receipt is passed.

When carload freight is weighed before the receipt is filled out, a copy of the scale report is to be stamped, to take the place of a receipt. Where a car is switched from one track to another within the same station limit, and a charge is made for the service, the switching order is to be stamped. On goods that are carried in baggage cars on passenger trains, except personal effects properly classed as baggage, there must be a stamp for each shipment, provided the transportation charge is more than five cents; and if no bill of lading is given, the stamp is to be affixed to the goods.

Shippers are expected to buy their stamps at post offices, but the agents and conductors of the railroad will have supplies on hand, and may sell to shippers.

A notice has been issued by the Internal Revenue department, Washington, instructing freight conductors how to attend to the stamp tax requirements in cases where freight is received by them at stations where there is no agent.

New Haven Men Commended

The very heavy passenger movement carried out by the New York, New Haven & Hartford, on the occasion of the Yale-Harvard football game of November 21, when the road carried to and from New Haven in one day over 33,000 passengers, was noticed last week, page 1023. Chairman Howard Elliott, himself formerly a division superintendent, has sent to the operating and traffic vice-presidents a congratulatory letter summarizing the work done and expressing the pleasure of the directors at the results. After giving the facts he says:

"A well equipped, well organized, well managed, and well manned railroad should be able to perform this task satisfactorily. . . . But to do this work required most careful planning and detailed inspection by many officers; the greatest care by officers and thousands of employees; the most accurate and painstaking work by hundreds of men on engines and trains; on stations, in yards and round houses, and a nearly perfect condition of track, signals, and equipment. . . . That the large number of trains was handled substantially on the running time, speaks well for the condition of the property and for the team work of the officers and employees. There was one delay of about thirty minutes, due, it is believed, to unintentional interference with the air-brake valve by a passenger. There was only one casualty; a partly intoxicated man jumped from a moving train.

"On the New Haven [city] division of the Connecticut Trolleys there were, on Saturday, 180,140 fares rung up. This large number of passengers was transported without accident of any kind and with reasonable promptness over streets almost blocked by automobiles and pedestrians. . . .

"I am requested by the directors to express to you, to Mr. Bardo, general manager, to Mr. Smith, general passenger agent, . . . and to the men without whose careful work the day would have been a failure, the appreciative thanks of the directors, representing the owners of the property, and, to a certain extent, the public, for the good result obtained. . . . Personally, I wish to express my own hearty appreciation of the team work done and the esprit de corps shown. . . ."

Report on A. G. S. Derailment

The Interstate Commerce Commission has issued a report on the derailment on the Alabama Great Southern, near Livingston, Ala., September 18, in which 10 persons were killed and 40 injured; and the cause is found to be as given in the earlier report, which was printed in the *Railway Age Gazette*, October 30, page 794—malicious misplacement of a switch. Running at about 50 miles an hour, at three o'clock in the morning, northbound passenger train No. 2 encountered a facing point switch set for a siding, and the engine and the first four cars of the train were wrecked. The engineman saw the switch light change from clear to red only a short distance before reaching it. A freight train had used the switch only a short time previous, and there is no question that the switch was purposely misplaced, but the report says nothing on the question whether there is any clue to the perpetrator of the crime. The men on the freight train, waiting a few miles south of the switch, saw an automatic signal change two or three times from one position to the other, which changes were caused undoubtedly by movements of the switch. In the wooden passenger car in the train, three out of the seven passengers occupying the car were killed; and in a steel underframe car five out of fifteen were killed; and the inspector questions whether the steel underframe type, in a case like this, affords materially greater safety to passengers than does a wooden coach.

American Society of Mechanical Engineers

At the annual meeting of the American Society of Mechanical Engineers, held in New York, December 1-4, John A. Brashear, Pittsburgh, Pa., was elected president, and Henry Hess, of Philadelphia, Pa., George W. Dickie, New York Shipbuilding Company, Camden, N. J., and James E. Sague, Poughkeepsie, N. Y., were elected vice-presidents. Charles T. Main, Winchester, Mass., Spencer Miller, The Lidgerwood Manufacturing Company, New York, and Max Toltz, St. Paul, Minn., were elected managers. Morris L. Cooke, Philadelphia, was elected manager to fill an unexpired term, and William H. Wiley was elected treasurer.

MEETINGS AND CONVENTIONS

The following list gives the names of secretaries, dates of next or regular meetings, and places of meeting of those associations which will meet during the next three months. Hereafter the full list of meetings and conventions will be published only in the first issue of the Railway Age Gazette for each month.

American Society of Civil Engineers.—Chas. W. Hunt, 220 W. 57th St., New York. Regular meetings, 1st and 3d Wednesday in month, except June, July and August, 220 W. 57th St., New York.

American Society of Engineering Contractors.—J. R. Wemlinger, 11 Broadway, New York. Regular meetings, 2d Thursday in month, at 2 P. M., 11 Broadway, New York.

American Wood Preservers' Association.—F. J. Angier, B. & O., Mt. Royal Sta., Baltimore, Md. Next convention, January 19-21, 1915, Chicago.

Association of Transportation and Car Accounting Officers.—G. P. Conard, 75 Church St., New York. Next meeting, December 8-9, Richmond, Va.

Canadian Railway Club.—James Powell, Grand Trunk, P. O. Box 7, St. Lambert (near Montreal), Que. Regular meetings, 2d Tuesday in month, except June, July and August, Windsor Hotel, Montreal Que.

Canadian Society of Civil Engineers.—Clement H. McLeod, 176 Mansfield St., Montreal, Que. Regular meetings, 1st Thursday in October, November, December, February, March and April. Annual meeting, January, Montreal.

Car Foremen's Association of Chicago.—Aaron Kline, 841 Lawler Ave., Chicago. Regular meetings, 2d Monday in month, except July and August, Lytton Bldg., Chicago.

Central Railway Club.—H. D. Vought, 95 Liberty St., New York. Regular meetings, 2d Friday in January, May, September and November. Annual meetings, 2d Thursday in March, Hotel Statler, Buffalo, N. Y.

Engineers' Society of Western Pennsylvania.—Elmer K. Hiles, 2511 Oliver Bldg., Pittsburgh, Pa. Regular meetings, 1st and 3d Tuesday, Pittsburgh.

General Superintendents' Association of Chicago.—A. M. Hunter, 321 Grand Central Station, Chicago. Regular meetings, Wednesday, preceding 3d Thursday in month, Room 1856, Transportation Bldg., Chicago.

New England Railroad Club.—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass. Regular meetings, 2d Tuesday in month, except June, July, August and September, Boston.

New York Railroad Club.—Harry D. Vought, 95 Liberty St., New York. Regular meetings, 3d Friday in month, except June, July and August, 29 W. 39th St., New York.

Niagara Frontier Car Men's Association.—E. Frankenberger, 623 Brisbane Bldg., Buffalo, N. Y. Meetings monthly.

Peoria Association of Railroad Officers.—M. W. Rotchford, Union Station, Peoria, Ill. Regular meetings, 2d Thursday in month, Jefferson Hotel, Peoria.

Railroad Club of Kansas City.—C. Manlove, 1008 Walnut St., Kansas City, Mo. Regular meetings, 3d Friday in month, Kansas City.

Railway Business Association.—Frank W. Noxon, 30 Church St., New York. Annual meeting, December 10, 1914, Waldorf-Astoria Hotel, New York.

Railway Club of Pittsburgh.—J. B. Anderson, Room 207, P. R. R. Sta., Pittsburgh, Pa. Regular meetings, 4th Friday in month, except June, July and August, Monongahela House, Pittsburgh.

Richmond Railroad Club.—F. O. Robinson, C. & O., Richmond, Va. Regular meetings, 2d Monday in month, except June, July and August.

St. Louis Railway Club.—B. W. Frauenthal, Union Station, St. Louis, Mo. Regular meetings, 2d Friday in month, except June, July and August, St. Louis.

Salt Lake Transportation Club.—R. E. Rowland, Hotel Utah Bldg., Salt Lake City, Utah. Regular meetings, 1st Saturday of each month, Salt Lake City.

Southern Association of Car Service Officers.—E. W. Sandwich, A. & W. P. R. R., Atlanta, Ga. Next regular meeting, January 21, 1915, Atlanta, Ga.

Southern & Southwestern Railway Club.—A. J. Merrill, Grant Bldg., Atlanta, Ga. Regular meetings, 3d Thursday, January, March, May, July, September, November, 10 A. M., Candler Bldg., Atlanta.

Toledo Transportation Club.—Harry S. Fox, Toledo, Ohio. Regular meetings, 1st Saturday in month, Boody House, Toledo.

Traffic Club of Chicago.—W. H Wharton, La Salle Hotel, Chicago.

Traffic Club of New York.—C. A. Swope, 291 Broadway, New York. Regular meetings last Tuesday in month, except June, July and August, Waldorf-Astoria, New York.

Traffic Club of Pittsburgh.—D. L. Wells, Erie R. R., Pittsburgh, Pa. Meetings bimonthly, Pittsburgh. Annual meeting, 2d Monday in June.

Traffic Club of St. Louis.—A. F. Versen, Mercantile Library Bldg., St. Louis, Mo. Annual meeting in November. Noonday meetings October to May.

Western Canada Railway Club.—W. H. Rosevear, P. O. Box 1707, Winnipeg, Man. Regular meetings, 2d Monday, except June, July and August, Winnipeg.

Western Railway Club.—J. W. Taylor, 1112 Karpen Bldg., Chicago. Regular meetings, 3d Tuesday in month, except June, July and August, Karpen Bldg., Chicago.

Western Society of Engineers.—J. H. Warder. 1735 Monadnock Block, Chicago. Regular meetings, 1st Monday in month, except January, July and August, Chicago. Extra meetings, except in July and August, generally on other Monday evenings.

REVENUES AND EXPENSES OF RAILWAYS

Three Months of Fiscal Year Ending June 30, 1915—Continued

Name of road.	Average mileage operated during period.	Operating revenues — Freight.	Passenger.	Total. inc. misc.	Operating expenses — Maintenance — Way and structures.	Of equipment.	Traffic.	Trans-portation.	Miscel-laneous.	General.	Total.	Net operating revenue (or deficit).	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
Spokane, Portland & Seattle	556	784,605	498,826	1,412,278	154,223	105,054	26,483	284,456	11,678	40,218	622,114	790,165	160,200	629,857	48,649
Tennessee Central	294	281,998	118,125	424,829	92,018	52,746	16,606	156,805	....	20,054	338,229	86,600	13,405	73,154	—48,185
Terminal R. R. Ass'n of St. Louis	35	....	538	697,864	51,223	30,962	2,678	228,778	....	16,364	330,005	367,859	83,510	284,350	113,596
Texas & New Orleans	469	647,805	307,220	1,056,586	191,335	270,919	22,333	455,104	44,335	31,639	1,015,244	41,343	47,379	—6,766	—105,229
Texas & Pacific	1,887	2,838,111	1,165,249	4,356,049	505,956	751,555	110,340	1,787,708	44,956	115,366	3,313,887	1,042,161	206,100	835,369	63,673
Toledo & Ohio Central	446	1,201,713	187,440	1,479,232	182,739	239,698	21,103	498,152	5,477	30,236	977,405	501,827	64,060	437,314	36,330
Toledo, Peoria & Western	248	193,790	128,804	340,065	53,800	77,030	6,844	133,259	....	10,796	281,730	58,335	18,300	40,035	20,794
Toledo, St. Louis & Western	451	1,006,481	107,977	1,196,742	144,294	184,544	47,237	424,184	....	23,810	824,069	372,673	63,000	309,673	—74,593
Trinity & Brazos Valley	315	183,493	75,123	280,258	59,699	21,332	12,185	135,966	....	25,240	254,422	25,836	14,700	11,103	35,628
Ulster & Delaware	129	150,535	175,116	375,247	54,761	39,286	6,584	153,155	149	9,229	263,165	112,082	9,900	102,182	—21,735
Union Pacific	3,615	10,603,905	2,874,247	14,871,407	2,007,547	1,857,923	265,629	3,368,719	228,190	352,429	8,074,939	6,796,468	549,357	6,245,925	260,055
Union R. R. of Baltimore	9	351,490	70,191	426,956	40,080	....	....	13,794	....	6,871	60,746	366,211	18,591	347,620	—17,027
Union R. R. of Pennsylvania	31	....	....	1,205,881	149,530	310,788	300	423,709	....	8,869	893,194	312,687	12,159	300,528	—135,768
Vandalia	910	2,009,803	677,430	2,992,073	440,536	562,538	66,443	1,075,471	36,698	63,213	2,244,899	747,174	96,873	650,301	—67,571
Vicksburg, Shreveport & Pacific	171	209,991	143,172	391,674	66,678	87,048	10,388	143,080	7,748	15,110	330,052	61,622	21,600	40,022	—33,466
Virginia & Southwestern	240	450,051	49,916	515,649	74,966	113,716	7,446	141,523	....	11,385	349,035	166,614	18,750	147,864	1,637
Virginian	503	1,366,973	122,478	1,582,946	199,179	271,867	17,029	348,418	31,476	29,911	881,339	701,608	67,500	634,098	—38,745
Wabash	2,518	5,463,122	1,944,558	8,089,816	969,022	1,333,630	261,691	2,937,365	51,507	183,162	5,729,998	2,359,818	250,695	2,108,700	13,379
Washington Southern	36	115,938	111,526	307,050	40,794	48,190	4,028	123,107	1,544	8,968	226,631	80,418	9,960	70,454	1,575
West Jersey & Seashore	356	511,491	1,803,947	2,506,281	302,622	285,227	36,839	804,407	9,548	39,409	1,478,054	1,028,227	82,078	946,063	95,397
Western Maryland	661	1,777,063	325,230	2,200,248	315,908	355,774	63,774	804,311	5,876	56,888	1,598,226	602,022	73,500	528,522	109,919
Western Pacific	943	1,233,761	381,329	1,712,031	418,233	196,579	74,164	507,063	38,704	65,924	1,300,667	411,364	90,053	320,528	—158,055
Western Ry. of Alabama	133	168,442	122,248	319,986	60,558	80,751	17,252	96,991	4,396	13,370	273,318	46,668	15,832	30,761	—28,329
Wheeling & Lake Erie	459	1,298,316	184,747	1,617,362	210,321	297,738	27,455	550,828	4,557	47,417	1,138,315	479,047	97,643	381,404	—200,586
Yazoo & Mississippi Valley	1,372	1,839,926	647,565	2,656,850	470,032	457,284	51,501	1,038,971	2,482	68,049	2,084,729	572,121	150,000	421,862	35,429

Traffic News

The Chicago & North Western and the Chicago, Milwaukee & St. Paul have recently advanced the charge for table d'hote meals in dining cars between Chicago and St. Paul from $1 to $1.25.

A special train composed of 34 carloads of tea was run over the Chicago & North Western last week en route from Los Angeles to the East. The run from Omaha, Neb., to Peoria, Ill., 464 miles, was made in about 24 hours. The tea weighed 1,221,477 lb. and was valued at approximately $300,000.

A meeting of the Official Classification Committee will be held in New York on December 8, for consideration of many subjects enumerated in docket No. 21, including recommendations of the Committee on Uniform Classification. A preliminary hearing was held in the rooms of the Central Freight Association in Chicago on December 3.

Quarantines against foot-and-mouth disease have been relaxed but little. In some states, including New Hampshire, new quarantines have been ordered because of the discovery of the disease in new places. The state of Delaware has issued a quarantine order against the bringing of dogs into the state, in baggage cars or by express.

The agricultural instruction car of the University of Tennessee is making a tour of the eastern part of that state which is planned to extend over four months. The car carries prize horses, sheep and other animals. It is in charge of Professor C. A. Keffer. Each county, to have the advantage of the presence of the car within its borders, must make an appropriation of $100.

At the annual meeting and election of officers of the Traffic Club of New York on November 24, W. C. Hope, general passenger agent of the Central of New Jersey, was elected president. Other officers elected were: Vice-presidents, T. A. Gantt, W. C. Connor, Jr., T. T. Harkrader, R. S. Stubbs, W. N. Agnew; treasurer, Frank C. Earle; secretary, C. A. Swope; governors, W. C. Bates, W. S. Cowie, W. A. Schumacher.

More than a million tons of freight have been carried through the Panama Canal during the first three months of its operation. Thus far the eastbound traffic has been in excess of westbound traffic, westbound being 621,080 tons as compared with 457,991 tons eastbound. More than 95 per cent of this traffic was on the four great routes which developed soon after the canal was opened; the United States coastwise trade, the traffic between the Pacific Coast of the United States and Europe, the trade of the west coast of South America with the Atlantic seaboard of the United States and with Europe and traffic between the Atlantic coast of the United States and the Far East.

Beginning on November 29 the Chicago, Burlington & Quincy's Denver Limited train will leave Chicago at 10:05 a. m., instead of in the evening, and will arrive at Omaha at 12:01 a. m. and Denver at 2:30 p. m. the next day, taking the place of the Colorado Limited, which formerly left at 9:45 a. m., and which will not be run during the winter months. On the same date the Chicago & North Western will put on a new morning train to Omaha, Denver, Colorado Springs and Pueblo, leaving Chicago at 10:30 and arriving at Denver the following afternoon at 2:45. The train now leaving Chicago at 6:05 p. m., known as the Denver Special, will be called the Omaha-Chicago Special, and will be run between Chicago, Omaha and Sioux City, being discontinued beyond. Corresponding changes will be made in the eastbound service.

The directors of the Chamber of Commerce of Norfolk, Va., have petitioned the Interstate Commerce Commission to permit the railroads terminating in that city to continue their ownership of the steamboat lines now operated or controlled by them running to Baltimore, New York and other northern ports. There is a feeling in Norfolk that if the railroads should be compelled to divest themselves of ownership in the steamer lines the control of the vessels would go to other cities, and would work against the interest of Norfolk. The petition asked for the continuance of the present ownership "to such reasonable time as may be necessary for a demonstration of the efficiency of the act" which allows this continuance of railroad ownership. The Interstate Commerce Commission, when it gives such permission, must assume authority to regulate rates over the water lines.

The Department of Agriculture has issued a statement to the effect that there is no quarantine against shipment of dressed poultry except from actually infected farms. An entirely erroneous impression has gained currency and has prevented the shipment of dressed poultry, damaging seriously the turkey industry. In New York, Boston and Philadelphia turkeys were somewhat scarce at Thanksgiving and prices ruled high. The Department of Agriculture, wishing to save farmers in the important turkey growing states of Tennessee, Kentucky, Missouri, Texas, Indiana and Illinois, reiterates its previous announcement that there is no federal quarantine or restriction on shipping dressed turkeys or other poultry from uninfected farms in quarantine states, and absolutely no federal restriction as to shipment of dressed poultry into quarantined states. There is at present no state quarantine in New York against the shipment of dressed poultry into that state. Kentucky has quarantined against the shipment of dressed poultry from the infected counties in that state, but this is purely a state measure.

Increased Fares in New England

The Boston & Maine, the Boston & Albany and the New York, New Haven & Hartford have announced new passenger tariffs, to go into effect January 1. In all of these tariffs the regular rate for single tickets is based on 2½ cents a mile; and in substantially all cases, except a few on the Boston & Maine, this will mean an advance. The B. & M. has some fares based on a rate of three cents a mile, and some on 2¾ cents. In the suburban district around Boston—distances less than 15 miles—there is no advance.

On most of the important lines of these companies the local rate at present is 2¼ cents; but this has now been made the rate for thousand-mile tickets. Under the new tariffs the difference between single tickets and mileage tickets will be 2½ mills a mile, as formerly.

Advances in Freight Rates Suspended

The Interstate Commerce Commission this week suspended for four months practically all of the new freight tariffs, making advances in rates, which have been filed recently by the roads in Central Freight Association and Eastern Territory, and also in the territory west of Chicago. The commodities affected by these suspensions are very numerous, coal, livestock, fresh meats, hay, grain, cotton goods, etc., and changes in elevator charges and allowances and other local charges are included. The roads had proposed to increase grain rates about 1 cent per 100 lb., from St. Paul, St. Louis, Chicago and other points to Gulf ports.

A larger number of other freight tariffs, which are of interest in more limited territory, have also been suspended.

The proposed increases in the rates on livestock and meats from Chicago eastward were complained of by the American Meat Packers' Association. The new tariffs showed an advance of five cents—from 45 cents to 50 cents, per 100 lb., in the rates on fresh meats from Chicago to New York; on cattle from Chicago to New York five cents—28 to 33; on hogs, sheep, etc., in double deck cars, from 28 to 33; in single deck cars, from 35 to 38. Other kinds of goods in these same general classes were advanced in proportion.

Railway Construction in Uruguay.—Application has been made to the Uruguayan ministry for public works for authority to make a survey for a railway starting from Pan de Azucar, crossing the valley of that name and proceeding in the direction of Minas. It is stated that this line would permit the exploitation of a number of marble and mine stone quarries in the district, as well as rich slate and copper deposits. The projected line will connect with another ten miles long connecting Pan de Azucar with the port of Piriapolis.

Commission and Court News

INTERSTATE COMMERCE COMMISSION

A hearing was held at Chicago on November 30 before Examiners Carmalt, Sanford and Hewett, on allowances paid by trunk line railroads to industrial lines, of which cancellations have been filed by the railroads and suspended by the commission. The first case heard was that of the Algoma Central & Hudson Bay, which is connected with the Algoma Steel Company, of Sault Ste. Marie, Ont. Next was taken up the case of the Chicago & Calumet River, connected with the Western Steel Car & Foundry Company, and testimony was presented as to a number of other industrial roads, most of them in the Chicago district.

The Corporation Commission of Oklahoma, the Oklahoma Grain Dealers' Association and the Oklahoma Millers' Association have filed with the Interstate Commerce Commission a joint complaint asking that the Atchison, Topeka & Santa Fe and the Gulf, Colorado & Santa Fe be ordered to establish through routes and joint rates for the transportation of grain and grain products from Oklahoma points to Louisiana points for export, and to re-establish joint rates to Texas ports. According to the complaint Galveston, Tex., and Texas City, and points in their immediate vicinity are the only ports on the gulf to which through routes have been maintained by the Santa Fe lines, and, since October 31, these roads have maintained an embargo on grain shipments for export to these ports, making it necessary for shippers to pay higher combinations of local rates on shipments to Louisiana points.

Rates on Blackstrap Molasses to Kansas City and Other Points

Opinion by Commissioner McChord:

The commission finds that the carriers are justified in restoring to the regular molasses rate basis, the present rate on blackstrap molasses in carloads from points in Louisiana to Kansas City, St. Joseph and other points in Missouri, Nebraska, Kansas and Iowa. (32 I. C. C., 176.)

Penalty Charges on Sulphuric Acid

International Agricultural Corporation v. Atlanta & West Point et al. Opinion by Commissioner McChord:

The commission finds that the tariffs of the defendants allowing only 24 hours' free time on sulphuric acid and doubling the charge after 48 hours are unreasonable, and believes that a reasonable rule would be to allow 48 hours' free time after the first 7 a. m., following notice to the consignee of arrival, and that the charge should not exceed $2 per day after such free time. Reparation is awarded on this basis. (32 I. C. C., 199.)

Rates from Houston, Tex., to Points in Arkansas

Chamber of Commerce of Houston, Tex., v. Houston East & West Texas et al. Opinion by Commissioner Clements:

The commission finds that the present adjustment of rates from Houston, Tex., St. Louis and Kansas City, Mo., and New Orleans, La., to stations in Arkansas, is not prejudicial to the first-named point or preferential to the last three points. Complaint dismissed. (32 I. C. C. 203.)

Class Rates from Terre Haute, Ind.

In re Class Rates from Terre Haute, Ind., and Other Points to Kansas City, Mo., and Other Destinations. Opinion by Commissioner Hall:

The commission finds that the carriers are justified in cancelling the joint through class rates applicable on traffic from Terre Haute, Ind., and other points to points on the Missouri River. The proposed cancellations will leave in effect combinations of intermediate rates, but it is held that these combinations do not result in unreasonable rates. (32 I. C. C., 206.)

STATE COMMISSIONS

The Texas Railroad Commission has again changed the date from January 14 to January 11, 1915, for the proposed hearing on the application of the Texas railroads for a general advance in freight rates.

Investigators for the Illinois Public Utilities Commission have reported to the commission that sufficient protection against accidents and inconveniences to patrons during rush hours are not provided at the Union passenger station in Chicago. As a result of the report the commission has notified officers of the roads that steps must be taken at once to improve the situation.

It is estimated that the cost of the newly created Public Utilities commission of the State of Maine will be $58,000 a year. Among the principal items in the budget are: Salaries of commissioners, $14,000; salaries of clerk and assistant clerk, $5,000; salary, help and office expenses of the engineer in charge of the water storage department, $5,000; chief of the railroad department, $2,500; chief of the department of rates and schedules, $1,500; office stenographers, $2,000; traveling expenses of commissioners and employees, $4,000; office expenses and equipment, $3,500; witness fees and expenses for hearings, $3,000; investigations, inspections, incidental matters involving informal complaints and actions on the initiative of the commission, $5,000; expert accountant and auditor, $2,500; printing annual report, $3,000. An additional estimate of $5,000 is presented for the year 1915 for printing blanks, rules, orders and instructions for uniform bookkeeping, returns, rates, schedules, etc., and $5,000 for the year 1916 for securing data and beginning the work of the physical valuation of the utilities in the state.

PERSONNEL OF COMMISSIONS

E. J. Bean, general counsel of the Missouri Public Service Commission, has been appointed a member of the commission, succeeding William F. Woerner, resigned. William G. Busby, of Carrollton, has been appointed general counsel of the commission to succeed Mr. Bean.

Richard Sachse has been appointed chief engineer of the California Railroad Commission, with office at San Francisco. He entered the service of the commission in 1911 as assistant engineer; was promoted to the position of principal assistant engineer in 1913; and was made acting chief engineer about a year ago. Prior to his service with the commission he had been with the Western Pacific and the Southern Pacific railroads and the United States Reclamation Service.

COURT NEWS

John W. Keogh, a manufacturer of excelsior, has filed suit in the United States district court at Chicago against eight railroads entering Chicago for $125,000 damages for alleged depreciation in the value of his plant at St. Paul, caused by an advance in freight rates.

In the United States District Court at Newark, N. J., November 27, the Central Railroad of New Jersey was indicted for paying illegal rebates on freight. The charges are based on allowances made to the Lehigh Coal & Navigation Company in connection with terminal operations.

The New Orleans, Texas & Mexico has petitioned the federal court at New Orleans to enjoin the Interstate Commerce Commission from enforcing its second supplemental order in the tap line cases, charging that the order does not permit tap lines to earn a reasonable return on the investment, and asking that the order be nullified also as it affects the Louisiana & Pacific. The court has set the petition for a hearing on December 10.

The Ohio Valley Tie Company has recovered $56,971 from the Louisville & Nashville Railroad in a suit claiming damages because the railroad refused accommodations for shipments of ties, and made an unreasonable advance in the rates for transportation. After recovering a considerable sum in a former suit for overcharges caused by an unexpected increase in the rates, the tie company secured a mandatory injunction requiring the

railroad to give it suitable accommodations. Then, it is alleged, the road failed to furnish cars; and cars offered by the Pennsylvania and the Cleveland, Cincinnati, Chicago & St. Louis, customers of the tie company, were refused. It was also charged that the Louisville & Nashville would accept carloads of ties to be delivered on team tracks at Louisville, but would not accept the same for delivery to connecting roads.

Judge Sullivan at Chicago, on November 28, rendered a decision setting aside the award made by E. C. Field as arbitrator of the claims of the Chicago & Western Indiana against John C. Fetzer, a real estate broker, Benjamin Thomas, former president of the road, and C. R. Kappes, former real estate agent of the road, which ordered the restoration by the three men of $525,000 alleged to have been misappropriated from the company in real estate transactions for the road. After the railroad had filed a civil suit against the three men an agreement was reached to settle the case out of court by arbitration, and Thomas and Kappes paid in approximately $70,000 as their share of the award. Fetzer, however, filed suit to have the award set aside on the ground that this money was charged to real estate transactions and then turned back by him to officers of the road to be expended in bribing the legislature of Illinois and the city council of Cook county. Judge Sullivan set the award aside on the ground that the arbitrator had violated some of the provisions of the agreement under which the case was left to arbitration.

Oklahoma Separate-Car Law

The Supreme Court of the United States on Monday last delivered an opinion that the Oklahoma "Jim Crow" law proviso permitting railroads to furnish sleeping, dining and chair car accommodations only to the white race—the "luxury" clause—was unconstitutional, but because of imperfections in the petition on which the case reached the courts, no decree to that effect was entered.

Five negroes, contending that the entire law was unconstitutional, sought an injunction to restrain five railroads in Oklahoma from enforcing it. The Oklahoma Federal Court dismissed the petition, holding the law constitutional. The court affirmed the dismissal because the negroes had not shown that they had applied to the railroads for accommodation under the law or that the railroads had notified them that accommodations would be refused to them.

The opinion, by Justice Hughes, stated, however, that the court could not agree with the lower court that the proviso as to sleeping, dining and chair cars was constitutional. A minority, consisting of Chief Justice White and Justices Holmes, Lamar and McReynolds, concurred merely in the order of affirmance, but expressed no views on the constitutional question.

In the opinion by the majority, Justice Hughes said that previous decisions that laws for separate coaches for the two races were constitutional were not questioned, adding that "substantial equality of treatment of persons traveling under like conditions cannot be denied."

Justice Hughes set forth the reasons for the opinion that the lower court was wrong in holding the proviso constitutional. "The reasoning is," said he, "that there may not be enough persons of African descent seeking these accommodations to warrant the outlay in providing them. This argument with respect to the value of the traffic seems to be without merit. It makes the constitutional right depend upon the number of persons who may be discriminated against, whereas the essence of the constitutional right is that it is a personal one. Whether or not special facilities shall be provided may doubtless be conditioned upon there being a reasonable demand therefor; but if facilities are provided, substantial equality of treatment of persons traveling under like conditions cannot be denied. It is the individual who is entitled to the equal protection of the laws, and if he is denied by a common carrier, acting in the matter under the authority of the state, facilities or conveniences in the course of his journey under substantially the same conditions as furnished to another traveler, he may properly complain that his constitutional privileges have been invaded."

The court gave no intimation as to whether in a proper case it would merely hold the "luxury" car section unconstitutional, or whether it would decide that this section being unconstitutional, the entire law must fall. The five railroads in the case had asked the court to hold the entire law unconstitutional if the "luxury" proviso was annulled.

Railway Officers

Executive, Financial, Legal and Accounting

F. C. Elliott, general counsel of the White Pass & Yukon at Chicago, has been elected president, with office at Chicago, succeeding O. L. Dickeson, resigned, effective January 1.

A. S. Dutton has been appointed auditor of freight accounts, and J. M. Eedson has been appointed freight claim agent of the Toronto, Hamilton & Buffalo, with offices at Detroit, Mich., succeeding Thomas Eedson, deceased.

J. E. Dalrymple, vice-president of the Grand Trunk, the Grand Trunk Pacific and the Central Vermont at Montreal, Que., has been appointed also vice-president in charge of traffic of the Montreal & Southern Counties.

Lyman Delano, assistant to president and assistant secretary of the Atlantic Coast Line at Wilmington, N. C., has been elected third vice-president, in charge of operation. He was born on January 16, 1883, at Newburgh, N. Y., and was educated at Harvard College. On April 1, 1909, he began railway work in the office of the chief roadway accountant of the Atlantic Coast Line. He subsequently served as assistant to chief engineer, and then as assistant to the general superintendent of transportation. On January 1, 1912, he was appointed assistant to president, and now becomes third vice-president in charge of operation of the same road. Mr. Delano's entire service has been with the Atlantic Coast Line.

Operating

J. J. Blair, trainmaster of the Northern Pacific at Spokane, Wash., has been assigned to other duties, the office having been discontinued.

E. T. Sudduth has been appointed general superintendent of the Liberty-White, with office at McComb, Miss., succeeding J. B. Paul, resigned.

R. C. Hobbs, traffic manager of the Kansas City & Memphis, has been appointed general manager, with headquarters at Rogers, Ark., succeeding O. C. Lisman.

W. W. Varney has been appointed trainmaster of the Zanesville division of the Pennsylvania Lines at Zanesville, Ohio, in place of V. B. McCarty, assigned to other duties.

Charles Hurdleston, formerly division superintendent of the Missouri, Kansas & Texas, has been appointed manager of the Texas State Railroad, with headquarters at Rusk, Tex.

G. S. Waid, assistant general manager of the Sunset-Central Lines at Houston, Tex., has been appointed general manager, with headquarters at Houston, succeeding W. G. Van Vleck, deceased.

W. E. Smith has been appointed superintendent of the Henderson and St. Louis divisions of the Louisville & Nashville, with office at Evansville, Ind., succeeding Jno. W. Logsdon, assigned to other duties.

S. L. Racey, trainmaster of the Denver & Rio Grande at Salt Lake City, Utah, has been appointed assistant superintendent of the First division, with headquarters at Pueblo, Colo., succeeding E. E. Gray, transferred.

D. M. Stevens, fuel inspector of the Baltimore & Ohio, has been appointed trainmaster at Garrett, Ind. J. K. Yohe, Jr., has been appointed assistant trainmaster at Connellsville, Pa. J. J. Smith, assistant trainmaster of the New Castle division, has been transferred to the Chicago division at Chicago Junction, Ohio, in a similar capacity. C. E. McDougal, assistant trainmaster of the Pittsburgh division, has been transferred to the New Castle division in a similar capacity, with office at Chicago Junction. C. W. VanHorn, trainmaster of the eastern district, Chicago division, has been appointed superintendent of terminals at Chicago Junction. J. S. Gilmore, assistant trainmaster of the Chicago division, has been transferred to the Connellsville division.

Traffic

The office of C. D. Brown, commercial agent of the Southern Railway, has been removed from Greenwood, S. C., to Abbeville.

William Gourlay, assistant to vice-president of the American Express Company, at Chicago, has been appointed general traffic agent.

F. G. Hamblin has been appointed traffic manager of the Kansas City & Memphis, with office at Rogers, Ark., succeeding R. C. Hobbs, promoted.

Charles S. Lee, whose appointment as passenger traffic manager of the Lehigh Valley, with headquarters at New York, has already been announced in these columns, was born at Washington, D. C., and began railway work in 1871, with the Lake Shore & Tuscarawas Valley, now a part of the Baltimore & Ohio at Cleveland, Ohio. From August, 1879, to July, 1883, he was rate and advertising clerk in the passenger department of the Cleveland, Columbus, Cincinnati & Indianapolis, now a part of the Cleveland, Cincinnati, Chicago & St. Louis, and then became secretary of the American Railway Publishing Company at New York. In February, 1884, he was appointed chief clerk in the general passenger department of the Denver & Rio Grande, at Denver, Colo. From May, 1887, to September, 1893, he was general passenger agent of the Colorado Midland, part of which time he had charge of both passenger and freight departments. On September 1, 1893, he entered the service of the Lehigh Valley as general passenger agent at New York, which position he held at the time of his recent appointment as passenger traffic manager of the same road as above noted.

C. S. Lee

George W. Hay, who has been appointed general passenger agent of the Lehigh Valley, with headquarters at New York, as has already been announced in these columns, was born at Woodstock, Ontario, in 1869, and began railway work, in 1888, as a billing clerk on the Grand Trunk at Detroit, Mich. He subsequently entered train service as a baggage man, and was steadily promoted, until his appointment in 1906 as assistant general baggage agent of the entire system of the Grand Trunk. In 1907 he entered the service of the Lehigh Valley as general baggage agent, with headquarters at South Bethlehem, Pa., and was also assigned duties as a district passenger agent for that section of the Lehigh Valley's territory, which position he held at the time of his recent appointment as general passenger agent of the same road, as above noted.

G. W. Hay

A. H. Proudfoot, assistant general freight and passenger agent of the Liberty-White at McComb, Miss., has been appointed general freight and passenger agent, and his former position has been abolished.

The duties of C. A. Searle, general baggage agent of the Rock Island Lines, with headquarters at Chicago, are extended to include supervision of express traffic.

Eugene J. Henry, general western freight agent of the Lehigh Valley at Chicago, has been appointed western traffic manager, a new position, with headquarters at Chicago. A. B. Hill, general agent of the passenger department, at Chicago, has been appointed an assistant general passenger agent, with headquarters at Philadelphia, Pa., and D. F. Lindsley, city passenger agent at Chicago, has been appointed western passenger agent, with headquarters at Chicago.

Paul S. Millspaugh, whose appointment as assistant general passenger agent of the Lehigh Valley, with headquarters at Buffalo, N. Y., has already been announced in these columns, was born at Waverly, N. Y., in 1874, and began railway work as a joint representative of the Lehigh Valley and the Erie at Waverly, as accountant and auditor. In 1892, when the Lehigh Valley was opened through to Buffalo, he was appointed an assistant in the ticket office at Ithaca, and then was consecutively city ticket agent, traveling passenger agent and district passenger agent until about a year ago, when he was appointed general agent of the passenger department, with headquarters at Ithaca, which position he held at the time of his recent appointment as assistant general passenger agent of the same road, with headquarters at Buffalo, as above noted.

P. S. Millspaugh

Engineering and Rolling Stock

Charles B. Teller has been appointed roadmaster of the Chicago, Rock Island & Gulf at Ft. Worth, Tex., to succeed B. F. Harrison, resigned.

E. Wanamaker has been appointed electrical engineer of the Rock Island Lines, with headquarters at Chicago, succeeding F. J. Glover, resigned, effective December 1.

E. J. Langhurst, assistant road foreman of engines of the New Castle division of the Baltimore & Ohio, has been appointed road foreman of engines at Parkersburg, W. Va.

F. K. Moses, foreman at the Garrett (Ind.) shops of the Baltimore & Ohio, has been appointed master mechanic of the Baltimore & Ohio Chicago Terminal shops, at East Chicago, succeeding J. W. Fogg.

H. C. Oviatt, until recently superintendent of the Old Colony division of the New York, New Haven & Hartford at Taunton, Mass., has been appointed assistant mechanical superintendent in charge of a new bureau just established to be known as the bureau of fuel economy, with office at New Haven, Conn.

W. Gillespie, master car builder of the Central Vermont at St. Albans, Vt., has been appointed mechanical superintendent in charge of motive power and car departments, and T. A. Summerskill, superintendent of motive power, and J. E. Fitzsimons, master mechanic, have been assigned to other duties. The offices of master car builder, superintendent of motive power and master mechanic are abolished.

OBITUARY

Henry Fonde, general agent of the Southern Railway at Knoxville, Tenn., died at his home in that city on November 28.

Henry D. Mirick, who was general freight agent of the Missouri, Kansas & Texas in 1871, died in Washington, D. C., November 26, aged 79 years.

J. H. Waters, president and general manager of the Florence & Cripple Creek, died in Colorado Springs, Colo., on November 27 from injuries received in a collision between a railroad motor car and a locomotive at Cripple Creek on November 25.

C. C. Mallard, superintendent of the Arizona Eastern, with headquarters at Globe, Ariz., died at New Orleans, La., on November 24, aged 54 years. He had been in railway service since 1879, when he commenced as rodman on Morgan's Louisiana & Texas Railroad. Subsequently he was assistant engineer on the Sabine & East Texas and the Houston & Texas Central; engineer for the contractors on the Chicago, Texas & Mexican; roadmaster and assistant engineer of Morgan's Louisiana & Texas, and assistant superintendent bridges and buildings of the Atlantic system of the Southern Pacific, until July, 1898. He was then until August, 1905, successively division engineer of the latter company, and assistant superintendent of the Louisiana lines. From September, 1905, to January, 1906, he was assistant engineer and roadmaster of the Gila Valley, Globe & Northern, and since the latter date Mr. Mallard had been superintendent of that road and its successor, the Arizona Eastern.

Owen J. Travis, formerly superintendent of bridges of the Colorado & Southern and the Ft. Worth & Denver City, died at Everett, Wash., on November 14, aged 66 years. Mr. Travis entered the service of the Keystone Bridge Company in 1868 as bridge builder at Kansas City, Mo., and from 1877 to 1881, was superintendent of traffic of the St. Louis Bridge Company. He was then for three years superintendent of bridges and buildings of the Middle division of the Wabash, St. Louis & Pacific, and from 1884 to 1889, was general foreman of the Chicago and St. Louis division of that road. The succeeding four years he was with the Iowa Central as superintendent of bridges and buildings, going to the Elgin, Joliet & Eastern in 1893 in a similar capacity. He was superintendent of bridges of the Illinois Central from 1897 to 1903, when he became superintendent of bridges and buildings of the Colorado & Southern and the Ft. Worth & Denver City at Fort Worth, Tex. Mr. Travis held the latter position until his retirement from active railway service in 1910.

A. C. Bird, formerly vice-president in charge of traffic of the Gould Lines, died on November 28, at Pasadena, Cal. Mr. Bird was born at Pittsfield, Ill., on March 4, 1843, and began railway work in 1865 with the St. Louis, Alton & Terre Haute. He held various minor positions until 1872, when he went to the St. Louis, Kansas City & Northern as chief clerk in the general freight office. In July, 1874, he was appointed general freight agent of that road, and in November, 1879, he accepted a similar position with the Wabash, St. Louis & Pacific, being promoted to superintendent of freight traffic in January, 1880. He resigned the latter position on January 1, 1883, to become general freight agent of the Chicago, Milwaukee & St. Paul, of which road he was freight traffic manager from February, 1889, to December, 1895; general traffic manager the following four years, and third vice-president from December, 1899, to March, 1903. Mr. Bird then went to the Gould Lines as vice-president in charge of traffic, with headquarters at Chicago, resigning in November, 1907, since which time he had not been engaged in active railway work.

Australian Railway War Council.—Section 64 of the Australian local defence act of 1903 provides that "The government may, in time of war, authorize any officer to assume control of any railway for transport for naval or military purposes." Following Lord Kitchener's visit to Australia in 1910, he recommended the formation of a war railway council, similar to that in the United Kingdom. In conformance with that advice a council was formed, which met for the first time in February, 1911. The council is similar to the British council, the commissioners of each state, together with the heads of a few branches, constituting its members.

Equipment and Supplies

LOCOMOTIVE BUILDING

The California Western Railroad & Navigation Company is in the market for one locomotive.

The Maine Central, as reported in the *Railway Age Gazette* of last week, has ordered 7 Mikado type locomotives from the American Locomotive Company. These locomotives will have 26½ by 30 in. cylinders and a total weight in working order of 275,000 lb. They will be equipped with superheaters and will be used in freight service.

CAR BUILDING

The Union Tank Line is in the market for 500 6,500-gal. tank cars.

The Westmoreland Coal Company is in the market for 100 50-ton gondola cars.

The Illinois Southern has ordered 300 box cars from the Haskell & Barker Car Company.

IRON AND STEEL

The Minneapolis, St. Paul & Sault Ste. Marie has ordered plate girder spans amounting to 107 tons from the Chicago Bridge & Iron Works.

The Atchison, Topeka & Santa Fe has ordered 63,450 tons of 90-lb. rail from the Colorado Fuel & Iron Company. Of this allotment 23,000 tons are for the eastern lines, 25,900 tons for the western lines, 7,600 tons for the coast lines and 6,950 tons for the gulf lines.

SIGNALING

The Nashville, Chattanooga & St. Louis is putting up a telephone line from Nashville to Chattanooga, and telephones will be used for train despatching throughout this division. The contracts for the poles, wires, instruments, etc., will amount to $60,000, or about $400 a mile.

The Federal Signal Company has taken the contract for the installation of a mechanical interlocking at Tivoli, N. Y., on the Hudson Division of the New York Central & Hudson River. This consists of a 56 lever style "A" machine operating 17 signals, 8 switches, 1 derail and 9 facing point locks. Twenty-one spare levers are provided for future extensions to complete a standard four track interlocking layout on the completion of the track work.

The signaling on the Centre street loop of the Brooklyn Rapid Transit System, New York City, is being installed by the Federal Signal Company, and the first section was placed in service on Sunday, November 15. During the rush hours, morning and evening, trains pass over this section less than one minute apart. Since installation, however, there has not been a failure or any interruption of traffic due to the signal system. This line, extending underground from the Brooklyn bridge to the Williamsburgh bridge, Manhattan, about one mile, is a part of the extensions now being added to New York's subway system.

Trans-Siberian Mail Route Again Open.—The trans-Siberian mail route from the Philippines to the United States and most parts of Europe, which was closed at the outbreak of the war in Europe, has been reopened, the first mail arriving in Manila on September 22. The postage now charged is 8 cents for each 20 grams or fraction thereof for letters and 3 cents for single post cards. Westbound mail will go direct to Petrograd and be forwarded thence to Russia, Sweden, Norway, Denmark, Great Britain, the United States, Belgium, France, Italy, Spain and Portugal, leaving Russia via Sweden and Norway.

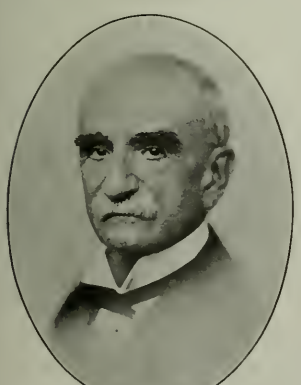
Supply Trade News

The Union Switch & Signal Company has made the following changes and appointments: Central District, Chicago office: V. K. Spicer, special representative; W. H. Talbert, resident manager; George Marloff, office manager; S. E. Gillespie and J. L. Lucks, engineers: Eastern District, New York office: A. Dean, resident manager; H. McCready, office manager; H. W. Griffin, R. P. Tuttle, J. W. White and H. H. Hamilton, engineers, and T. H. Patenall, resident manager, Montreal, Que.

William E. Magraw, president of the Railway List Company, the Railway Master Mechanic and Railway Engineering and Maintenance of Way, and for many years advertising manager of the Railway Review, died in Chicago on November 24, following an operation for a second attack of appendicitis. Mr. Magraw was born at St. Peter, Minn., in 1858, and his business life was spent in St. Paul and Chicago. He had been president of the Railway List Company for many years and has had charge of the Railway Master Mechanic and Railway Engineering and Maintenance of Way since 1909. He leaves a widow and two daughters.

William F. Bauer, assistant manager of the railway department of the Edison Storage Battery Company, Orange, N. J., has been appointed manager of the Chicago office of that company, succeeding Charles B. Frayer, who retired on November 30 to devote himself to private interests. Mr. Bauer has been engaged in storage battery work for many years. In 1889 he was the electrician in charge of the original train lighting equipment of the Pennsylvania's Chicago Limited, a lighting system designed by his father, then chief electrician of the Pullman Company. He later had experience with the Electric Accumulator Company, the Westinghouse Electric & Manufacturing Company, the Pullman Company and the Wagner Palace Car Company. In 1901 he entered the employ of the Consolidated Railway Electric Lighting & Equipment Company and two years later was appointed chief electrician of the Missouri Pacific, in charge of car lighting. In 1906 Mr. Bauer became sales engineer of the Electric Storage Battery Company. He has been with the Edison Storage Battery Company for about a year and is president of the Railway Electrical Supply Manufacturers' Association.

Eli Stillson Hart, chairman of the board of the Rodger Ballast Car Company, Chicago, and one of Chicago's oldest residents, died at his home, 2922 Prairie avenue, on November 23, after an illness of several weeks, as briefly noted last week. Mr. Hart was born in Rochester, N. Y., in 1832. In 1855 he was graduated from Hamilton College in the law school. He began the practice of law in Clinton, Ia., and came to Chicago in 1856, where he continued his law practice as a member of a leading firm of that period. In 1874, owing to ill health, Mr. Hart gave up his legal work to engage in business. He was one of the founders of the Rodger Ballast Car Company, the success of which was due to his ability, and until his death he was chairman of board of directors. Mr. Hart's integrity of character, sound judgment and kindly humor made him many friends. He is survived by three children: Miss Gertrude W. Hart, H. Stillson Hart and Mrs. Evan A. Evans.



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Eli S. Hart

Railway Construction

Alberta & Great Waterways.—See Edmonton, Dunvegan & British Columbia.

Chicago & North Western.—An officer writes that track laying has just been started on the branch building from Koepenick, Wis., along Wolf river for about 7.2 miles. Contract for building this line was given to Peppard & Burrill, Minneapolis, Minn. (July 31, p. 227.)

Work has just been started on the line from Kingston, Wis., westwardly for a distance of five miles. Clery, White & Duffy are the contractors. (September 18, p. 549.)

Edmonton, Dunvegan & British Columbia.—An officer writes that work is now under way on the section from Smoky river, Alta., to Spirit river, 65 miles, and surveys are being made for a further extension from Spirit river to the British Columbia boundary, 64 miles. The Alberta & Great Waterways is now under construction on the section from Lac La Biche, Alta., to Fort McMurray, 160 miles. The J. D. McArthur Company, Edmonton, Alta., is carrying out the work. (September 11, p. 493.)

Moncton & Buctouche.—An officer of this company, which operates a line from Moncton, N. B., north to Buctouche, 32 miles, writes that surveys are being made for an extension from Buctouche northwest to Loggieville, about 65 miles.

New York, Pittsburgh & Chicago Air Line.—The rights and property of this company, which started surveys early in 1909, for a line from Pittsburgh, Pa., east to Allentown, 298 miles, were recently sold to E. T. Noble, of Evans, Noble & Evans, Pittsburgh, who represented the reorganizers of the company. It is reported that the Harriman estate is interested in the property. The projected route is from Pittsburgh, Pa., east via Indiana, Cherry Tree, Irvona, Sandy Ridge, Loveville, Tusseyville, New Berlin, Sunbury, Mahanoy City and Tamaqua to Allentown. Proceedings have been taken before the Pennsylvania Public Service Commission at Harrisburg to perpetuate the road's franchise under the new organization.

Norfolk & Western.—An officer writes that the company plans to carry out work during 1915 on an extension of the Alma branch, 2.56 miles in West Virginia and the construction of a branch up Jacobs Fork and Cucumber creek, 5.30 miles.

Pacific Electric.—An officer writes that this company during 1914 finished work on a total of 32.35 miles of new lines in California as follows: from Santa Ana to Orange, 1.64 miles; Lordsburg, to North Pomona, 1.54 miles; Upland to San Bernardino, 21.73 miles; Hawthorne to El Segundo, 4.42 miles; at Torrance, 0.58 miles, and at Riverside, 2.44 miles. The company also laid a total of 9.62 miles of second track. Work is now under way building an extension from Arlington to Corona on 7.75 miles.

Pacific, Peace River & Athabasca.—We are told that this company, which was given a charter last February by the Canadian government, has completed reconnoissance surveys for about 1,500 miles from a point in British Columbia on the Pacific coast east to Prince Albert, Sask. Charles F. Law, P. O. Box 116, Vancouver, B. C., may be addressed. (November 20, p. 991.)

Portland Railway, Light & Power Company.—An officer writes that this company during 1914 built 1.74 miles of second track in Portland, Ore., to the city lines, and the Willamette Valley Southern, formerly the Clackamas Southern, which is building from Oregon City, south to Mt. Angel, 32 miles, has track laid from Beavercreek to Mt. Angel, 25.09 miles.

Salt Lake & Utah (Electric).—An officer writes that track laying has been finished on the line from Salt Lake City, Utah, to Provo, 48.5 miles, and it has not yet been decided when construction work will be started on the second section, from Provo via Spanish Fork and Springville to Payson, between 18 and 20 miles. W. R. Armstrong, assistant general manager and chief engineer, Salt Lake City.

Slate Belt Electric.—This company, which operates an electric line connecting Bangor, Pa., Pen Argyl, Wind Gap and

Nazareth, is planning to build a 9-mile branch, it is said, from Wind Gap to Saylorsburg and Saylors lake.

Texas Roads.—A proposition has been submitted to residents of San Antonio, Texas, and Bexar county, asking for a bonus of $87,500 in aid of a line to be built from San Antonio. The proposed route from San Antonio is north to Johnson City, thence northwest to Robert Lee in Coke county and eventually to a point in New Mexico. James L. Himrod, Austin, Texas, is back of the project.

Visalia Electric.—An officer writes that this company, during 1914, completed work on 2.03 miles, from Rose Street Station to Elderwood, Cal.

Watauga & Yadkin River.—We are told that this company is building with its own forces an extension from Dennys, N. C., northwest to Rogers Mill, 12 miles, and surveys have been completed for a further extension from Rogers Mill northwest to Boone, 14 miles. The company does not contemplate building the extension during 1915, which was projected sometime ago from Grandin southwest to Lenoir, 16 miles. (March 27, p. 767.)

Willamette Valley Southern.—See Portland Railway, Light & Power Company.

RAILWAY STRUCTURES

Chicago, Ill.—An ordinance was introduced in the city council last week on behalf of the Baltimore & Ohio Chicago Terminal to provide for a new freight yard to be located south of Fourteenth street, between South Western avenue and South Paulina street, to take the place of the yards now located at Twelfth street, the site of which is to be used for the approach to the new Union station.

Dewey, B. C.—The Railway Commission of Canada has directed that new stations be built by the Grand Trunk Pacific on locations approved by the commission at Dewey, B. C.; Newlands, Longworth, Giscome, Lindup and Shelley, and has approved locations of new stations at Rose Lake, Forestdale, Decker Lake, Walcott, Quick, Priestly and Palling.

Johnstown, Pa.—The Pennsylvania Railroad is having plans made for a new station to be built at Johnstown. The company does not expect to let contracts for carrying out the work until 1915.

Oelwein, Iowa.—See Randolph, Minn.

Parnell, Mo.—See Randolph, Minn.

Randolph, Minn.—The Chicago Great Western has just awarded contracts for the erection of three water tanks to the Chicago Bridge & Iron Company, as follows: A 100,000-gallon steel tank at Randolph, Minn., and a similar one at Oelwein, Iowa, and an 80,000-gallon steel tank at Parnell, Mo. The foundations will be built by company forces. The Great Western has also let a contract for a 1,500-ton ice house, to be located on the company's shop ground at Oelwein, Iowa. The work on the new depot at Randolph, Minn., reported in the *Railway Age Gazette* of October 16, is nearing completion.

Spokane, Wash.—The Oregon-Washington Railroad & Navigation Company has begun work on its division terminal buildings at Spokane, which consist of an 11-stall roundhouse, a machine shop, 80 ft. by 120 ft., a power house, 40 ft. by 50 ft., a coaling plant, cinder pit and coach cleaning facilities. The power house will be of concrete construction, and the other buildings will have brick walls and mill constructed frames. Work is being done by company forces and the approximate cost will be $150,000.

The Dalles, Ore.—The improvement of the Oregon-Washington Railroad & Navigation Company at The Dalles is said to consist of a roundhouse for 30 locomotives, and additional freight handling facilities, including switch tracks, etc. The estimated cost is $140,000.

Toledo, Ohio.—The Cincinnati, Hamilton & Dayton has awarded contracts for the construction of a coal handling plant at Toledo, which was mentioned in the *Railway Age Gazette* of November 6, 1914, to Wellman-Seaver-Morgan Company, Cleveland, Ohio. The foundation will be built by the Smith-McCormick Company, Easton, Pa. The capacity of the new plant will be 40 cars an hour.

Railway Financial News

Chicago, Rock Island & Pacific.—The United States circuit court of appeals has reversed the order of the lower court which fixed November 24 as the date for the sale of the Chicago, Rock Island & Pacific Railway stock, which is collateral for the Chicago, Rock Island & Pacific Railroad 4 per cent bonds.

Gilmore & Pittsburgh.—See Northern Pacific.

Lake Shore & Michigan Southern.—J. P. Morgan & Co., New York, have bought $15,000,000 5 per cent notes of this company, of which about half will mature September 1, 1915, and the remainder on December 1, 1915. The notes are being offered at private sale at par.

Mobile & Ohio.—Although the gross operating revenues of this road in the fiscal year ended June 30, 1914, were the greatest in the history of the company, the net income after the payment of expenses, rentals, taxes and interest was but $85,109 as compared with $641,870 in the previous year. The increase in gross operating revenues was $597,781, but the increase in total operating expenses was $1,005,630, the latter said to be due to the accident near Buckatunna, Miss., on October 19, 1913, in which 17 persons were killed and 171 were injured; to the difficulties in operation caused by the work, since completed, of raising the tracks in and about Cairo, Ill., to provide against floods; to greater maintenance of equipment expenses and an increase of 35 per cent in empty car mileage.

The Mobile & Ohio operates 1,122 miles. The main line extends from Mobile to St. Louis with a branch to Montgomery, Ala., and the road also has trackage rights over the Illinois Central, the Northern Alabama and the Southern from Corinth to Birmingham.

In 1914 the road earned gross revenues per mile of road of $11,250 as compared with $10,783 in 1913. The freight revenue per mile of road was $9,540 in 1914, and $9,120 in 1913. The ton-mile rate in 1914 was 6.70 mills, and in the previous year 6.56 mills, the total revenue ton mileage carried being 1,598,623,994 in 1914 and 1,555,296,849 in 1913. The average trainload of revenue freight decreased as between the two years from 373 to 365 tons. The total number of passengers carried in 1914 was 2,202,092, an increase of 1.16 per cent over 1913; and the average passenger receipts per passenger mile were 2.205 cents in 1914 and 2.248 cents in the previous year.

The company paid 4 per cent dividends in 1914. The bonded debt on June 30, 1914, was $4,100,000 greater than on June 30, 1913, there having been assumed $4,000,000 of bonds of the St. Louis & Cairo, the entire lines of which (159 miles) were purchased on July 28, 1913. At the end of the year the company had on hand cash to the amount of $968,737, as compared with $754,835 on June 30, 1913. On June 30, 1914, there were loans and bills payable of $426,808.

National Railways of Mexico.—This company announces that its offer to pay coupons due April 1 last on its guaranteed general mortgage 4 per cent gold bonds and the National Railroad Company of Mexico first consolidated mortgage 4 per cent gold bonds in 6 per cent secured gold notes Series B, due January 1, 1917, has become effective. The notes have been delivered to the Guaranty Trust Company of New York who will exchange them for coupons. The offer to pay coupons due June 1 last on the 6 per cent gold notes has also become effective.

New York Central & Hudson River.—J. P. Morgan & Co., New York, who, with two banks, bought the recent issue of $40,000,000 5 per cent notes, half maturing April 1, 1915 and half October 1, 1915, are offering notes now at 99.80 and interest to yield about 5½ per cent for the notes due April 1, and at 99.15 and interest, to yield about 6 per cent for the notes due October 1.

Northern Pacific.—A press despatch from Butte, Mont., says that the Northern Pacific has bought the Gilmore & Pittsburgh, which runs from Armstead, Mont., to Gilmore, 110 miles.

ANNUAL REPORT

THE COLORADO & SOUTHERN RAILWAY COMPANY—FIFTEENTH ANNUAL REPORT

To the Stockholders of the Colorado & Southern Railway Company:

Herewith is submitted the Fifteenth Annual Report of this Company, for the year ended June 30, 1914.

There are included the reports of A. D. Parker, Vice-President, and J. H. Bradbury, General Auditor.

By order of the Board of Directors,

HALE HOLDEN,
President.

MR. HALE HOLDEN,
President,
Chicago, Ill.

DEAR SIR:—I herewith submit the report for the fiscal year ended June 30, 1914, which report combines the operations and affairs of the lines operated by the companies named, and which are herein designated as the "COLORADO & SOUTHERN LINES."

Per Cent.	1914.	OPERATING REVENUES.	1913.	Per Cent.
68.47	$ 9,053,885.00	Freight Revenue	$10,836,134.18	71.87
25.30	3,345,489.44	Passenger Revenue	3,394,073.63	22.51
1.72	226,844.16	Mail Revenue	218,848.38	1.45
1.97	260,598.66	Express Revenue	264,279.94	1.76
1.91	252,452.15	Miscellaneous Transportation Revenue	271,113.16	1.80
.58	76,933.03	Revenue from Operations other than Transportation	89,542.64	.59
.05	6,534.92	Joint Facilities	3,685.00	.02
100.00	$13,222,737.36	Total Operating Revenues	$15,077,676.93	100.00
		OPERATING EXPENSES.		
13.75	$ 1,818,146.33	Maintenance of Way and Structures	$ 1,905,988.15	12.64
16.52	2,184,784.04	Maintenance of Equipment	3,111,512.80	20.64
1.64	216,445.43	Traffic Expenses	230,406.63	1.53
38.23	5,055,015.62	Transportation Expenses	4,901,494.00	32.50
3.57	471,611.16	General Expenses	473,560.09	3.14
73.71	$ 9,746,002.58	Total Operating Expenses	$10,622,961.67	70.45
26.29	$ 3,476,734.78	Net Operating Revenue	$ 4,454,715.26	29.55
.....	16,956.19	Net Deficit from Outside Operations	24,804.07	.....
.....	$ 3,459,778.59	Total Net Revenue	$ 4,429,911.19	.....
.....	638,450.24	Taxes Accrued	520,546.72	.....
.....	$ 2,821,328.35	Operating Income	$ 3,909,364.47	.....
		OTHER INCOME.		
.....	$ 262,487.79	Rents	$ 256,106.51	.....
.....	627,915.08	Miscellaneous Interest	588,170.54	.....
.....	$ 890,402.87	Total Other Income	$ 844,277.05	.....
.....	$ 3,711,731.22	Gross Corporate Income	$ 4,753,641.52	.....
		DEDUCTIONS FROM GROSS CORPORATE INCOME.		
.....	$ 177,662.85	Rents	$ 141,919.53	.....
.....	817.01	Miscellaneous Interest	1,203.44	.....
.....	2,853,001.18	Interest Accrued on Funded Debt	2,874,279.94	.....
.....	10,300.80	Extinguishment of Discount on Securities Sold	10,099.20	.....
.....	61,029.76	Sinking Funds	60,826.48	.....
.....	202,768.49	Miscellaneous Deductions	.....	.....
.....	$ 3,305,580.09	Total Deductions	$ 3,088,328.59	.....
.....	$ 406,151.13	Net Corporate Income	$ 1,665,312.93	.....
.....	340,265.84	Dividends	990,236.92	.....
.....	$ 65,885.29	Surplus	$ 675,076.01	.....

The total operating revenues show a decrease under the preceding year of $1,854,939.57 or 12.30%. This decrease is principally in Freight Revenue and is the consequence of a coal miners' strike in the Colorado coal fields, called on September 23rd, 1913. The first eighty-three days of the Fiscal year, which preceded the strike, showed an increase in Freight Revenue over the same period of the previous year.

Subsequent to the calling of the strike referred to however, not only revenues from coal transportation but those derived from other classes of freight, partly dependent thereon, showed a constant decrease under those of the previous year. This is more fully set forth in the "Statement of Classified Freight Tonnage and Revenue," appearing on pages 26 and 27 of this report and on pages 20 and 21 of the report for the Fiscal year ended June 30, 1913.

The total operating expenses were decreased under those of the preceding year by $876,959.09 or 8.25% and would have been still further reduced had your company not been compelled to purchase coal from mines not on the lines of your Company, at a cost more than double that of the previous year and had not the heavy snows of last winter made operation of trains and the keeping of terminal yards open for operation singularly difficult and expensive.

Taxes increased $117,903.52 over the preceding year or 22.65%. This was due to legislative action in Colorado, increasing the assessed valuation, without a corresponding reduction in the state levy; and in Texas to increase in the state rate, due to accumulated deficiency extending over several past years and a new tax of 5 cents per $100.00 valuation for the creation of pension funds.

During the fiscal year, Mortgage, Bonded and Secured Debt was decreased as follows:

First Mortgage Bonds of C. S. & C. C. D. Ry. Co. were retired through Sinking Fund	$ 58,000.00
Equipment Trust Obligations were discharged	349,226.18
Making the decrease in Mortgage, Bonded and Secured Debt	$407,226.18

The outstanding Capital Stock was reduced by the acquisition of 39.84 shares, par value $3,984.00, "Stamped Stock" of Fort Worth & Denver City Railway Company.

There were charges aggregating $165,589.26 to Property Investment for additions and betterments. Of this amount there was expended for:

Structures and Machinery	$22,897.29
Substituting Permanent Bridges for Wooden Ones	33,350.16
Additional Spur and Industry Tracks	37,668.81
Relaying Heavier Rail—Main Line	15,615.61
Laying Tie Plates—Main Line	52,942.13
Various Other Additions and Betterments	3,115.26

The property of The Trinity & Brazos Valley Railway Company was placed in the hands of a Receiver on June 16, 1914, by the Federal Court of the Northern District of Texas upon proceedings instituted by Old Colony Trust Company, Trustee, in the First Mortgage of that Company. This Company and The Chicago, Rock Island & Pacific Railway Company are joint owners in equal shares of The Trinity & Brazos Valley Railway Company in accordance with the provisions of the contract entered into in 1906 between the owning Companies, and with the beginning of operations of The Trinity & Brazos Valley Railway Company in 1907 it had been anticipated that within a reasonable time the revenues of the Company would have been sufficient to meet the operating expenses and fixed charges. At that time agreements had been made for interchange of traffic with lines other than, and in addition to, the owning Companies, which would have provided The Trinity & Brazos Valley Railway Company with an increasing business, but later the traffic of these other lines was diverted, and this fact, together with the general depression in business and increases in operating expenses, due to increased wage schedules, increased cost of material and increases in taxes, rendered it impossible for The Trinity & Brazos Valley Railway Company to meet its charges and the receivership proceedings followed.

The following statistical tables have been compiled in the form required for the Annual Report of Carriers to the Interstate Commerce Commission:

INCOME STATEMENT.

RAIL OPERATIONS—			
Operating Revenues:			
Revenue from Transportation:			
Freight	$9,053,885.00		
Passenger	3,345,489.44		
Excess Baggage	30,925.36		
Mail	226,844.16		
Express	260,598.66		
Other Passenger Train	3,408.04		
Switching	208,350.92		
Special Service Train	6,200.78		
Miscellaneous Transportation	3,567.05	$13,139,269.41	
Revenue from Operations Other than Transportation:			
Station and Train Privileges	$ 20,146.19		
Parcel Room Receipts	881.10		
Storage Freight	3,272.33		
Storage Baggage	2,424.11		
Car Service	38,405.52		
Rent of Buildings and Other Property	6,664.57		
Miscellaneous	5,139.21	$ 76,933.03	
Joint Facilities Cr.		6,534.92	
Total Operating Revenues		$13,222,737.36	
Operating Expenses:			
Maintenance of Way and Structures	$1,818,146.33		
Maintenance of Equipment	2,184,784.04		
Traffic Expenses	216,445.43		
Transportation Expenses	5,055,015.62		
General Expenses	471,611.16	$9,746,002.58	
Net Operating Revenue			$3,476,734.78
OUTSIDE OPERATIONS—			
Revenues		$ 105,987.29	
Expenses		122,943.48	
Net Deficit from Outside Operations			$ 16,956.19
Total Net Revenue			$3,459,778.59
Railway Tax Accruals			638,450.24
Railway Operating Income			$2,821,328.35

OTHER INCOME.		
Income from Lease of Road	$ 214,208.82	
Joint Facility Rent Income	22,732.54	
Miscellaneous Rent Income	25,546.43	
Separately Operated Properties—Profit	1,443.41	
Dividend Income	27,000.00	
Income from Funded Securities	492,153.93	
Income from Other Securities and Accounts	25,023.94	
Miscellaneous Income	82,293.80	$ 890,402.87
Gross Income		$3,711,731.22
DEDUCTIONS FROM GROSS INCOME.		
Hire of Equipment—Balance	$ 96,200.72	
Joint Facility Rent Deductions	41,019.16	
Miscellaneous Rent Deductions	40,442.97	
Interest Deductions for Funded Debt	2,853,001.18	
Other Interest Deductions	817.01	
Amortization of Discount on Funded Debt	10,300.80	
Miscellaneous Deductions	202,768.49	$3,244,550.33
Net Income		$ 467,180.89
DISPOSITION OF NET INCOME.		
Appropriations of Income to Sinking Funds	$ 61,029.76	
Dividend Appropriations of Income:		
First Preferred Stock—2 per cent., payable Oct. 1, 1913	170,000.00	
Second Preferred Stock—2 per cent., payable Oct. 1, 1913	170,000.00	
Other Dividends	265.84	$ 401,295.60
Income Balance Transferred to Credit of Profit and Loss		$ 65,885.29

PROFIT AND LOSS STATEMENT.

Credit:		
Balance June 30, 1913	$ 5,542,665.55	
Balance for Year brought forward from Income Account	65,885.29	
Additions for Year:		
Miscellaneous Credits	85,342.94	$5,693,893.78
Debit:		
Appropriations of Surplus	$ 235,842.80	
Deductions for Year:		
Book Value of Securities Written down	$2,633,994.56	
Miscellaneous Debits	168,604.77	2,802,599.33 $3,038,442.13
Balance Credit, June 30, 1914.		$2,655,451.65

GENERAL BALANCE SHEET.

JUNE 30, 1914.

ASSETS.

Property Investment—Road and Equipment:		
Road	$94,372,289.71	
Equipment	15,463,273.26	$109,835,562.97
Reserve for Accrued Depreciation—Credit		3,196,105.89
Total		$106,639,457.08
Securities:		
Securities of Proprietary, Affiliated and Controlled Companies—Pledged—		
Stocks	$ 413,308.21	
Funded Debt	8,760,000.00	9,173,308.21
Securities of Proprietary, Affiliated and Controlled Companies—Unpledged—		
Stocks	$ 112,120.00	
Funded Debt	1,440,498.05	1,552,618.05
Total		$ 10,725,926.26
Other Investments:		
Advances to Proprietary, Affiliated and Controlled Companies for Construction, Equipment and Betterments.		$ 301,452.27
Miscellaneous Investments—		
Physical Property	$ 4,710.00	
Securities Pledged	1,021,557.30	
Securities Unpledged	48,457.40	1,074,724.70
Total		$ 1,376,176.97
Working Assets:		
Cash		$ 662,852.20
Securities Issued or Assumed, Held in Treasuries—Funded Debt		4,058,276.55
Loans and Bills Receivable		124,061.00
Traffic and Car Service Balances Due from Other Companies		228,932.45
Net Balance Due from Agents and Conductors		188,316.58
Miscellaneous Accounts Receivable		387,525.90
Materials and Supplies		1,271,695.43
Other Working Assets		6,334.38
Total		$ 6,927,994.49
Accrued Income Not Due:		
Unmatured Interest Dividends and Rents Receivable		$ 149,469.46
Deferred Debit Items:		
Advances—		
Working Funds	$ 984.18	
Other Advances	156,071.17	$ 157,055.35
Rents and Insurance Paid in Advance		23,322.92
Unextinguished Discount on Funded Debt		214,277.84
Special Deposits		121,621.71
Cash and Securities in Sinking Funds		14.01
Other Deferred Debit Items		64,664.06
Total		$ 579,955.89
Grand Total		$126,398,980.15

GENERAL BALANCE SHEET.

JUNE 30, 1914.

LIABILITIES.

Capital Stock:		
Common Stock		$ 31,021,484.00
Preferred Stock		17,000,000.00
Total		$ 48,021,484.00
Mortgage, Bonded and Secured Debt:		
Funded Debt—		
Mortgage Bonds—		
Held by Companies	$ 4,058,276.55	
Not Held by Companies	61,548,900.00	65,607,176.55
Equipment Trust Obligations		557,226.18
Total		$ 66,164,402.73
Working Liabilities:		
Loans and Bills Payable		$ 116,211.00
Traffic and Car Service Balances Due to Other Companies		347,849.51
Audited Vouchers and Wages Unpaid		1,150,289.64
Matured Interest, Dividends and Rents Unpaid		78,418.01
Other Working Liabilities		29,064.82
Total		$ 1,721,832.98
Accrued Liabilities Not Due:		
Unmatured Interest, Dividends and Rents Payable		$ 625,688.18
Taxes Accrued		427,981.67
Total		$ 1,053,669.85
Deferred Credit Items:		
Other Deferred Credit Items		$ 47,461.71
Appropriated Surplus:		
Additions to Property since June 30, 1907, through Income		$ 4,571,933.41
Reserves from Income or Surplus—		
Invested in Sinking Funds	$ 30,322.74	
Invested in Road and Equipment	1,589,251.76	
Not Specifically Invested	543,169.32	2,162,743.82
Total		$ 6,734,677.23
Profit and Loss:		
Balance		$ 2,655,451.65
Grand Total		$126,398,980.15

Railway Age Gazette

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WE GUARANTEE, that of this issue 8,750 copies were printed; that of these 8,750 copies 7,403 were mailed to regular paid subscribers to the weekly edition, 250 were provided for counter and news companies' sales, 1,055 were mailed to advertisers, exchanges and correspondents, and 42 were provided for samples and office use; that the total copies printed this year to date were 466,850, an average of 9,337 copies a week.

The RAILWAY AGE GAZETTE and all other Simmons-Boardman publications are members of the Audit Bureau of Circulations.

VOLUME 57 DECEMBER 11, 1914 NUMBER 24

Contents

*Illustrated.

A Word of Appreciation

Within the past few years there has been a remarkable reversal of feeling on the part of the public toward the railways. This is largely because of a campaign of education which has helped the public better to appreciate the problems of the railways and has shown both the railways and the public that they had a common interest. An important factor in this quiet, but none the less effective, work has been the Railway Business Association. It was among the first actively and aggressively to take up the work and undoubtedly did much to encourage other organizations throughout the country to lend their efforts to its promotion. The value of the remarkable addresses which have been so characteristic of its annual dinners is well known and they have exerted a strong influence on the public in its policy toward the railways. No one, however, can know or understand the full import of the work which is done by this and other associations of this sort unless they are familiar with the thorough and painstaking methods which are necessary for the conduct of a comprehensive educational campaign. An indication of the place which the Railway Business Association has so well earned for itself is evident from a recent editorial in The Wall Street Journal, which characterized it, with President Rea, of the Pennsylvania Railroad, as one of "two undoubted authorities which deal with what is perhaps the most vital obstacle to really effective regulation of railroads in justice to all interests."

C. Colson on Cost of Service

The classic work of the French economist, C. Colson, "Transports et Tariffs," has often been mentioned in these columns. There now appears an English translation of part of this work edited by Charles Travis and published by G. Bell & Sons, London. The translation comes at a particularly opportune time in that it includes Mr. Colson's analysis of what is meant by cost of service. At this time when Commissioner Meyer, in charge of the Interstate Commerce Commission's accounting activities, is earnestly looking for guidance in developing a system of cost accounting which will be something more than an arbitrary fiction, Mr. Colson's final pronouncement on the subject is worthy of rereading. Mr. Colson divides a rate into the charge covering the cost of performing that particular service, in addition to other services, and the toll, which includes that particular service's portion of all overhead charges, including cost of maintenance, return on capital, etc., his point being, of course, that the greatest total amount of service can be given when the toll portion of each charge is so apportioned as between all services as to induce the greatest use of the transportation plant. This suggests a way in which real cost accounting as distinguished from theoretical cost accounting may be arrived at. It is strictly analogous to what C. B. Seger, vice-president of the Union Pacific, attempted to explain to Commissioner Meyer during one of the hearings on the division of freight and passenger expenses. It is possible to determine with a fair degree of accuracy, Mr. Seger pointed out, the cost at any particular time of any particular service; but this is very different from trying to determine the cost of one general class of service. A general division of freight and passenger expenses would obscure rather than help the actual determination of cost, Mr. Seger believes. Commissioner Meyer believes just the opposite. A rereading, however, of Mr. Colson's discussion of this subject of what constitutes a freight rate or passenger rate is strongly recommended to all of those who are now interested in a division of freight and passenger expenses.

Log Book of a General Superintendent

There is much complaint from railway officers that, under present conditions, they have to give far too large a part of their time to hearings before courts and commissions and conferences with grievance committees representing organized labor. If railway officers are to do their work efficiently, and thereby the efficiency of railway operation is to be maintained and increased, the officers must be able to devote the great majority of their time to investigations, to conferences with and supervision of their subordinate officers, to conferences with the communities along their lines and with their patrons, and to hard, downright, uninterrupted thinking. The last-named is the most important of all. Railway officers must neglect some of these things if too much of their time is taken by regulation and labor disputes; and this is what is occurring. The general superintendent in charge of a large district of an important railway kept a diary for twelve months, show-

ing all of his movements during that time. The following summarizes what his diary showed:

Time Taken by Grievance Committees and Regulations

Locomotive engineers (B. of L. E.)	15 days
Locomotive firemen (B. of L. F. & E.)	12 days
Conductors and trainmen (O. R. C. and B. of R. T.)	33 days
Telegraph operators (O. R. T.)	43 days
Bay and river steamers and labor organizations	12 days
Before courts and commissions	18 days
Total	133 days

Time Spent on Road

December	4 days	July	13 days
January	18 days	August	7 days
February	20 days	September	11 days
March	9 days	October	21 days
April	16 days	November	17 days
May	21 days		
June	15 days	Total	172 days

The case of this general superintendent is doubtless typical, and investigations would show that still larger parts of the time of the higher operating and executive officers are being taken by duties unconnected with the development and application of ways and means for increasing the efficiency of service and operating and especially by duties growing out of regulation. Whatever thus interferes with the most important work of railway officers tends to cause railway service to be poorer and more expensive to the public than it otherwise would be. How many of the labor leaders and regulating authorities, who draw such heavy drafts against time of railway officers, ever think of this point?

ABSENTEE LANDLORDISM AND THE COMMISSION

WITHOUT intending to, the Interstate Commerce Commission is permitting a grave abuse of its power of suspension in minor cases, of advanced rates. There were two distinct extensions of authority given to the commission in the 1910 amendment of the Commerce Act. One placed the burden of proof of the reasonableness of advanced rates on the railroads; the other gave the commission power to suspend an advance in rates pending an investigation. The second of these provisions should be and probably was intended to be used only in emergencies or where injustice might result from arbitrary action on the part of a railroad. This power is comparable to that of injunction and should be used by the commission as sparingly as is the power of injunction by the courts.

The commission, in its pursuit of more and more power, has obtained authorities and responsibilities so broad that it is physically impossible for seven human beings to personally fulfill these responsibilities. The result has been, especially in regard to the suspension of unimportant—that is, unimportant as affecting shippers or public interest—rate advances, that these questions have been left to be settled wholly by young employees of the commission. An advance in rates on certain commodities may have been decided on after careful deliberations and for good and sound reasons by the traffic department of a railroad. The question is considered and passed upon by the vice-president and quite possibly by the president. Thirty days' notice is given the commission. No commissioner personally even knows of the matter, but a law clerk receives a letter from some shipper, whose responsibility he knows nothing of, protesting against the advance. To be on the safe side he suspends the advanced rate, and in the due course of time an examiner is appointed to make an investigation, and at the expiration of a year or a year and a half it is found that the advanced rate is entirely reasonable and that the railroad company is fully capable of bearing the burden of justifying it and it is permitted to go into effect. During the year and a half the railroad company has not been earning the additional revenue which the commission eventually finds that it was fairly entitled to; but there is no reparation for the railroad. The railroad never had a chance to justify the rate before it was suspended, never even had a hearing. Some commissioner may theoretically have passed on the case, but if he did it was in a purely cursory way.

The evils of railroad management by absentee landlordism have been pointed out many times in the *Railway Age Gazette;* but even if it is reprehensible for two or three influential members of the board of directors to attempt to manage three or four thousand miles of railroad from the deck of an Atlantic liner, it is just as bad for all the business interests affected for the Interstate Commerce Commission to try to exercise so much authority that it has to leave innumerable important decisions to $1,500 a year clerks.

One of the reasons which undoubtedly influenced Congress in giving the commission power to suspend rate advances was that a manufacturer's business might be seriously injured through an arbitrary or unjust rate advance to an extent that reparation could not indemnify. The manufacturer might lose contracts because of the inability to quote as low a rate as a competitor, unless he ran the risk of gambling on the chance that the commission would eventually award him reparation. In cases such as this the power to suspend rates pending investigation is an equitable one, but it should be exercised only upon such a presentation of the facts as would be required by a court before granting an injunction. Judgment, good sense and knowledge, as well as a judicial attitude of mind, are required even more in deciding a question such as this before a full hearing has been had than would be required in deciding the case after a full investigation and public hearing. It is, therefore, a palpable injustice for the commission to permit its clerks automatically to suspend any advanced rates if there seems to be the remotest possibility of a protest from shippers. This sort of playing safe by subordinates is just the sort of thing that railroads in the past have been most severely criticized for, and rightly so. The commission ought to revise its practice in this respect.

LOCOMOTIVE BOILER DESIGN

UNTIL recent years the term horsepower has conveyed but little meaning to the designer of locomotives. The advent of the testing plant, which makes possible accurate determination of the actual horsepower developed by a locomotive under any conditions of cut-off, speed and load, has probably done more than anything else to bring out the meaning of this expression as applied to locomotives. F. J. Cole, consulting engineer of the American Locomotive Company, has recently developed a method of adapting horsepower requirements to the proportioning of locomotive boilers; briefly this method consists of determining the steam requirement for a specified horsepower and piston speed and designing a boiler capable of generating this amount of steam, the evaporative values of firebox and tube heating surface being known and tabulated. This method should prove of great interest to all locomotive designers, and besides the advantages claimed for it in proportioning the boiler itself, Mr. Cole, in a discussion of this subject given elsewhere in this issue outlines a number of other advantages obtainable by its use in the designing of locomotives. Another point of interest in this discussion is that of the relative value of short and long tubes in boiler construction. While Mr. Cole does not make a specific argument in favor of the use of long tubes, he brings out their value in the reduction of smokebox temperatures or, in other words, absorbing a greater amount of heat from the gases which pass through them, the only increase of energy required being the slightly greater draft in the smokebox. That there may be differences of opinion in this matter is indicated by the discussion on the same subject by C. D. Young, engineer of tests of the Pennsylvania Railroad. Mr. Young takes a firm stand against the excessively long tube, charging that beyond a certain length there is too great a sacrifice of boiler capacity in the interest of economy in coal and that the long tube offers a serious resistance to the flow of the gases toward the smokebox. Evidently the experience of the Pennsylvania Railroad has indicated that the increase in draft necessary with long tubes is appreciable, particularly when we consider Mr. Young's statement that the locomotive with the long tube is a slow steamer.

IS CRITICISM OF PRESENT RAILWAY REGULATION JUSTIFIABLE?

THE attitude of railway managers toward regulation has received severe criticism recently from two widely different sources. H. G. Wilson, president of the National Industrial League, attacked it in an address to the League, and Professor John H. Gray, of the University of Minnesota, assailed it in a paper before the Western Economic Society, both addresses being delivered in Chicago recently. The speakers asserted that the managers and spokesmen of the railways are trying, by denouncing regulation, to destroy it. Professor Gray seemed to think that a disposition to oppose all regulation in order that they may be made free to speculate in the stocks of their companies, to indulge in unfair discriminations, and to run the politics of the country, is characteristic of practically all railway managers. Mr. Wilson said he did not assert that all of the men operating railways desire to undermine and vitiate the present system of regulation, but that some of them do.

If Mr. Wilson and Professor Gray expressed their real views they do not know the actual attitude of a large majority of railway executive officers at all. Doubtless until ten years ago most railway managers were opposed to almost every kind of regulation; but owing to numerous changes in the personnel of railway managers and to changes of heart by many of the older officers, it is incorrect and misleading to say that they are now generally opposed to regulation. President Ripley, of the Santa Fe, followed Professor Gray as a speaker before the Western Economic Society, and with the authority of his position as one of the oldest and most prominent railway managers, he expressly denied that they are now opposed to regulation. They recognize, he said, that regulation is needed and has come to stay; and what they oppose is merely unfair and harmful regulation.

The question arises, Is there any ground for the complaints and criticisms of railway officers who say that they favor regulation, but oppose such regulation as now prevails? No well-informed and fair man can answer that question in the negative. Even Mr. Wilson's own organization recognized at its convention the need for reform in regulation of railways by adopting a committee report recommending standardization of state laws relating to railways and codification of interstate laws relating to them. What are some of the shortcomings of the present system of regulation?

1. The railways are subjected to the annoyance and expenses of regulation by the nation and all the states. Regulation, in consequence, is often duplicated, and when not duplicated is often inconsistent and conflicting.

2. Restrictions and burdens are often imposed on the operations of railways, and reductions are often made in their rates, especially by the states, without any previous investigation as to their fairness or expediency, and chiefly for political reasons. These things are often done by the legislatures in spite of the fact that in most of the states commissions have been appointed which are supposed to be composed of experts, and therefore to be more competent than the legislatures to deal with such matters.

3. As a matter of fact the commissions never are composed of experts, and are often composed of anti-railway partisans, in spite of the universally conceded principle that they should be expert, fair and judicial. Witness, for example, the fact that the chairman of the Iowa Railroad Commission has been appearing as an attorney in the rate advance cases before the Interstate Commerce Commission.

4. Turning to federal regulation, we find the railways subjected by the national government to the Sherman anti-trust law, which prohibits them from making agreements regarding rates and operation, and requires them to compete, and at the same time subjects them to regulation by the Interstate Commerce Commission, which constantly, in effect, orders them to enter into agreements in regard to operations and rates, and denounces them in its opinions because they sometimes commit unfair discriminations and permit economic wastes which are a direct and inevitable result of the competition required by the Sherman law.

5. A large part of the increase in expenses from which the railways are suffering is due to awards made in arbitration proceedings carried on under a federal law. There have also been enormous increases in their taxes for which the state and national governments, and especially the state governments, are entirely responsible. The Interstate Commerce Commission, in its decision in the five per cent rate case, admitted that as a result of these and other developments the net income of the railways in Official Classification territory had become inadequate. But instead of allowing the advance in rates which the railways asked for, it made numerous recommendations, among them being one that the railways should impose special charges for certain special services at terminals. But when the railways, in obedience to this recommendation, filed the tariffs carrying special charges of the kind recommended, the state and interstate commissions immediately suspended them. In other words, they were told that they could not get their increase in income in the way they asked for it, but in another way, and when they tried to get it in that other way they were not permitted to do so.

6. The theory of the law is that the railways will be regulated by the Interstate Commerce Commission, but the Commission has been so burdened by work that it has become impossible for the commissioners to hear and write the opinions in most of the cases coming before it, and in consequence, to a large extent, the railways are being regulated, not by the Commission, but by subordinates by whom the law never contemplated that they should be regulated.

7. It has been intimated by the Interstate Commerce Commission, conceded by Mr. Brandeis, special counsel for the Commission, and held in a report by a Joint Congressional Committee, that the compensation received by the railways for carrying the mails is inadequate; and yet since the parcels post was established the roads have been granted only a 5 per cent increase in their total mail compensation, and Congress has thus far refused to give them the increase recommended by the Joint Congressional Committee.

8. It is probable that the railways would not oppose the granting to the Interstate Commerce Commission of authority to regulate operation comprehensively if this would relieve them of the unfair, and sometimes almost idiotic, regulation of operation to which they are subjected by the states. But, nevertheless, the railways resent the fact that in its present regulation of operation the Commission employs inspectors who in many cases are not experts, who in practically all cases are members of railway brotherhoods, and who are therefore believed to be strongly biased against the railways.

9. More and more the regulating authorities are tending to limit the profits which railways may earn, but they do not limit the risk incurred in railway investments. In other words the regulating authorities are fixing maximum profits and maximum rates, but they are not fixing either minimum risks, minimum profits or minimum rates.

These are but a few of the features of the present regulation of railways against which railway men protest. Are they not justified in doing so? Is not a system of regulation which contains these and numerous other defects one which not only railway men, but every fair man, ought to denounce? Is it not very questionable whether such a system is better from the standpoint of the public than none at all?

The two papers which were consolidated to form the *Railway Age Gazette* advocated the Hepburn act. We have advocated legislation for the regulation of the issuance of railway securities of such a character as was recommended by the Hadley commission. We have advocated legislation such as the Stevens bill now pending in Congress, which would give the Interstate

Commerce Commission extensive authority to regulate operation. But we believe that the crying need of the present is not for more legislation, but for the repeal of a great deal of the legislation now in effect, such as train crew laws, headlight laws, the Sherman anti-trust law as it applies to railways, and other laws which increase railway expenses without conferring any benefits on the public. We are in favor of giving the Interstate Commerce Commission increased power along certain lines; but we believe that a much more pressing need is legislation for such reorganization of the Commission as will fit and enable it to carry its present burdens and perform its present duties. The present system of regulation is so unfair in many respects, and so defective in most respects, that before it can be made clearly to do more good than harm it must be thoroughly overhauled and reformed.

Men who have the intelligence to see this, and the courage to say it, should not be made a target for the attacks of those who are so enamored of regulation per se that they do not take the pains to find out whether the system of regulation actually in effect is good or bad, or whether it might not be so changed that it would cause less evil and confer more benefits. Regulation, in itself, is neither desirable nor undesirable. Intelligent and fair regulation is desirable. Unintelligent and unfair regulation is wholly undesirable.

DEVELOPMENTS IN TUNNEL CONSTRUCTION

THE St. Paul is now completing a 2½-mile tunnel through the Cascade mountains about 60 miles east of Seattle, driving it from a bottom heading and trapping the material above into cars in the lower drift. The Canadian Pacific is driving a tunnel five miles long through Mt. McDonald, in the Selkirk mountains, from a separate parallel or pioneer tunnel with cross cuts to the main tunnel at frequent intervals. By each of these methods it is possible to drive the tunnel from several faces at the same time and to materially hasten its completion. These two projects are the most recent examples of railroad tunnel construction in America and may therefore be considered to represent the latst practice.

The adoption of a line involving the construction of a tunnel has been subject to two serious objections, the first cost of construction and the difficulty in operation resulting from smoke. This latter objection has been alleviated by the development of electric traction and by the installation of artificial ventilating systems. However, progress has not been as great in the reduction of the cost of construction by the development of improved methods and equipment.

In this respect tunnel construction has not kept pace with the many important improvements in other lines, notably grading equipment, where the large steam shovels, drag lines, high-capacity dump cars, unloading plows, etc., have all assisted in reducing the cost of ordinary grading operations. An incident in the construction of a second track on a western line during the past summer reveals this condition in a striking manner. When the line was first built about 20 years ago, a short tunnel was driven through a projecting point. Here the second track is located about 100 ft. distant on the up-hill side and in making estimates it was found to be cheaper to build it as an open cut even though the depth was considerably greater than at the point where the tunnel was constructed previously. This change was due to the relative reduction in the cost of excavation as compared with tunnel construction in recent years.

The continual increase in traffic is making more urgent the reduction of grades on the heavy mountain divisions. In many cases the construction of tunnels of considerable length offers the ultimate solution, but with present methods the cost of such construction is prohibitive. For several years the Moffat Line has been endeavoring to finance the construction of a six-mile tunnel through the Rocky mountains in Colorado, while another western road has located a tunnel 10 miles long which will effect a very important improvement in its grade line. Any improvement of the methods of tunnel construction enabling a reduction in cost to be made would give impetus to the construction of other tunnels which are now necessarily held in abeyance.

NEW BOOKS

Statistics of Railways in the United States; Twenty-fifth Annual Report. Prepared by the Division of Statistics, Interstate Commerce Commission, Wm. J. Meyers, statistician. 719 pages, 9 in. by 12 in. Bound in cloth. Copies may be had from the Superintendent of Documents, Government Printing Office, Washington, D. C., at $1 each.

This is the final statistical report for the year ending June 30, 1912. The first part of the report, 65 pages, not including the figures for individual roads, was issued in pamphlet form last July. The preliminary totals, which were printed in the *Railway Age Gazette,* August 1, 1913, page 180, included the returns only of the larger roads, "class 1" and "class 2."

The present report comes out in considerably less than 12 months after the similar report for the preceding year, indicating that the statistician's office and the government printing office are improving their service in the matter of promptness.

Statistics of Railways in the United States; Twenty-sixth Annual Report. 62 pages, 9 in. by 12 in. Pamphlet. Superintendent of Documents, Government Printing Office, Washington. Ten cents a copy.

This report, for the fiscal year 1913, corresponds to that for the year before, mentioned in the preceding notice, except that this contains only the summaries and introductory matter. This reaches us about seven months earlier in the year than the similar pamphlet for 1912. The commission, in its annual report to Congress, sent in this week, expresses the expectation that the whole of this report—the dollar-a-copy issue—will be published next month. The "preliminary abstract" for 1913, corresponding to this report, which is a pamphlet of 179 pages, giving totals for individual roads of class 1 only, was issued in April, 1914.

Railway Rolling Stock Appliances and Equipment. Compiled and arranged by Parker Cook, Victor Building, Washington, D. C. 16 pages, 3¼ in. by 6 in. Bound in paper. Copies free.

Patent attorneys receive numerous inquiries from clients as to the number of patents in the different sub-classes, and so far as is known there has been, up to the present, no publication that gives this information. This book gives the number of patents in each class and sub-class, and was compiled after considerable research work. It is so arranged that an inventor or any one desiring such information can at once determine how many patents there are in any sub-class. It should prove of particular value to inventors as they can determine at once from it how many patents there are in the different sub-classes.

The Science and Practice of Management. By A. Hamilton Church. 535 pages, 4¾ in. by 7¼ in. Illustrated with charts. Bound in cloth. Published by the Engineering Magazine Company, 140 Nassau street, New York. Price $2.

This book constitutes one of the most recent additions to the Works Management Library of the Engineering Magazine. The author's treatment of the subject seems to be scientific, not in the sense that he sets forth any system of so-called scientific management, but that he attempts in a scientific way to get at the fundamental elements and principles, so that existing forms of management can be scientifically analyzed and classified. It has been endeavored to ascertain the fundamental facts of production, not from the viewpoint of cost but from the viewpoint of management. Instead of trying to throw light on the nature of expense the author has endeavored to throw light on the nature of organization. The theory of the book is to formulate such fundamental facts and regulative principles as may be later developed into a true science of management, and it is not one from which the "rule of thumb" practitioner can obtain a ready-made system.

The Railway Problem a Statesman's Opportunity*

Developed on Wrong Basis, Railways, Now Football of Politics, Must be Saved by Broad Statesmanship

By Fairfax Harrison
President, Southern Railway Company

The time is well within the memory of men still in active life when railroads, both in regard to their ownership and in regard to their use, were considered not only by their owners, but by the public, as private property. This was when railroad building, as a means of developing and making available vast stretches of territory, was the prime necessity of the people, and when the thing of first importance was to encourage the use of private capital in these pioneer enterprises. As a means of giving this encouragement, private investors were invited to build railroads, with no suggestion that a system of public regulation would supersede the right of private use and management. Under this conception of the nature of these properties, it inevitably happened that, as the railroads were to be used for private ends, their managers felt at liberty to make bargains solely from the standpoint of the private gain of the company. They sold transportation to those of the public who took it by wholesale at prices and on terms different from those on which they sold to the individual who took little of it. They gave rebates to those of sufficient commercial importance to demand them, while denying these concessions to others. They did things which they deemed would increase their business and their profits, such as many engaged in other forms of industry still do, without recognizing that their form of industry differed from most other forms of industry, in that there inhered in it a peculiar public, as distinguished from private, interest in the character of their services and in the terms on which they were performed.

TRANSPORTATION BUSINESS STARTED ON WRONG BASIS.

This conception of the business of transportation, entertained at once by the authority which granted the original charters and by those who had ventured their means in making them a success, was at the same time conceded and encouraged by the public, but we now deem that it was fundamentally unsound. It was based upon a principle of the relation of the state to industry, which, like some others, has gone down in a revolution of public opinion. It ignored the controlling influence which transportation, as distinguished from most other forms of industry, was in time to exert upon the public welfare. It failed to take into account the fact that the fate and the fortunes of industries, of individuals and of communities could be made or marred by a few men controlling, for the gain of private owners, the transportation facilities of the country. It failed to recognize that a power harmless enough when it was granted might in time become with exercise so great as to be a political menace.

Whatever was its original quality, an economic conception which differed fundamentally from a political tendency could not be suffered permanently to survive in a democracy. As the economic necessity, considered from the standpoint of the prime interest of the people, for the building and extension of railroads began somewhat to decline, the public mind commenced to busy itself with other related questions chiefly economic in their character which were then pushing to the front—with the question of how competition or the opportunities for competition created by the railroads, was affecting rival markets, or rival producing centers, or rival commodities and industries, or aspiring and rival communities. It was perceived that the conception of private ownership, accompanied by the unqualified and unregulated right of private use for private gain, gave to the private owners in the last analysis the power of commercial life or of commercial death over individuals and over industries and communities, and could not in the general interest be tolerated.

A NEW CONCEPTION

This resulted in the recognition of a new conception—that a right exists in the public to regulate the use of these privately owned and privately managed properties, and immediately efforts began to be made, with more or less definiteness of purpose and with more or less moderation, to regulate by governmental authority the use by their owners of privately owned transportation properties.

The appearance of this new conception marked the beginning of a bitter controversy between the owners of these properties, on the one hand, who had invested their money believing that they were not surrendering the right of private and unregulated management, and, on the other hand, representatives of the public, who asserted the right and the duty of the government to control the power of private management and to subject the use of these properties to complete and effective regulation—to go far beyond the regulation of the original economic questions and to interfere even with the smallest details of physical operation. This controversy was fiercely waged for many years. Its virulence was intense, but not without precedent. In all history the conflict of creeds, of ideas and of systems has been bitter and has been merciless.

REGULATION WITHOUT RESPONSIBILITY

In this conflict the public has come out victorious, and in its victory has been illustrated the cycle theory of the philosophy of history. In the bitterness which the conflict engendered, the conception of a public right of regulation has gone as far in the direction of error on the one side as the conception of private ownership and private management had previously gone in the other. It has come about that the public denies not only the right of unregulated use, but also the right of unqualified private ownership. It has resulted in the assertion of a power of public regulation without the assumption of any corresponding duty or responsibility. In these days of revolution of opinion the views of the extremists have for a time prevailed, and the power of regulation has been pushed to an extent not anticipated when the right of reasonable regulation was first actively asserted. The pendulum has now swung to an extreme on the side of irresponsible public power, as it had previously swung to an extreme on the side of irresponsible private ownership.

In the clash of this controversy and in the flush of the victory of the conception of irresponsible power in the public, many forces have been developed and have found encouragement which are now difficult to control, and the real interest, as well as the real right, of the public in the system of transportation has been given a false perspective.

A FOOTBALL OF POLITICS

One of the most significant, as well as one of the most embarrassing and important developments has been that this great business question has been injected into politics and has come to be regarded as a valuable political asset by men aspiring to public office. It has been found easy to interest and to agitate the public mind on the subject. Possessing many technical sides difficult of comprehension by those uninstructed by practical experience, requiring a large and comprehensive view adequate to take in and properly to balance the rights and interests of all commerce and of all communities, no matter how differently

*An address before the Railway Business Association, New York, December 10, 1914.

circumstanced or how widely separated, the economic, as distinguished from the physical, problem of the railroad manager possesses little which will appeal to the popular imagination, but much that can be used by the skillful agitator to produce misunderstandings of motives, misconceptions of purposes and policies, and so to arouse local and neighborhood prejudice.

The only appeal the railroad manager can make is to the spirit of thoughtful consideration, of wisdom and moderation of the people. Here is his handicap. To be successful such an appeal takes time, for the history of popular government shows that it takes time for the public to reach its final conclusion on any important question, especially on one of an economic nature. On the other hand, the appeal of the agitator is to the immediate selfish interest, to prejudice and impulsive judgment and to the spirit of quick and active resentment of the people. Such an appeal does not take time, and the result in respect of these properties is that many impulsive and inconsiderate conclusions find their way into statutory or commission-made law which the sober judgment of the people will not subsequently approve. Meanwhile, however, a business of the highest public importance, one which to be successful must be subject to a wise, stable, consistent and constructive policy, has been made the victim of a judgment which is impulsive and ill-considered, a judgment founded upon an inadequate comprehension of the problem in all its reach and consequence.

A natural corollary to the view which would make the transportation question a football of politics, which would consider it merely from the standpoint of its advantage to the political fortunes of the aspirant for public place, is that common carriers, in respect of their regulation, may be considered of public concern when it is advantageous to do so and of private concern when that course constitutes the chief political advantage. This means that, if considerations of important political advantage are dominant, these carriers are considered as public when it comes to the imposition of burdens and to limiting charges or regulating operations, but private when it comes to creation of credit or improvement of conditions. In other words, there seems to be in many minds the false conception that, in the matter of imposition of burdens, railroad companies are public concerns and subject to the public regulating power, but, in the matter of relief, are private property and not entitled to be considered from the standpoint of their public service.

This has been strikingly illustrated by some of the contentions recently made in the advance rate hearing before the Interstate Commerce Commission. There the question was asked why it is that railroads should be permitted to increase their charges at a time of general business depression and when all other industries are suffering from decreased revenues. In the last analysis, the basis of this suggestion is that railroads, in respect of this matter, stand as private enterprises and represent only a private interest. It is an assertion of the proposition that their private owners alone are concerned with the question of sustaining their operations. It ignores the principle, so often relied on in other connections, that railroads are engaged in a governmental function and are doing a thing essential to the public welfare. It loses sight of the fact that the maintenance of transportation facilities is a condition precedent to the success of every private enterprise and to the return of prosperity to all the people. It takes no note of the public nature and of the public obligations of the transportation business.

If, however, the question comes of a reduction of transportation charges, or of the imposition of public burdens, the teachers of this doctrine insist loudly on the public right and the public power of regulation and control. This inconsistency of attitude on the part of those often influential in public affairs, produces, in respect of matters involving the continued efficiency of the carriers, a situation of instability and uncertainty which is of vital consequence to the public.

One of the outgrowths, full of menace, of this situation is the appearance in our public affairs of men who assert successfully an influence in directing the regulating power of government, but who are without any responsibility, official or otherwise, for the consequences. The conscientious railroad manager, responsible alike to those who invest their private means in the establishment of these properties and to the entire public for the success of the transportation system, is confronted by men who criticize and oppose, but on whom will fall none of the responsibilities or burdens of failure. The intrusion of these irresponsible influences into the settlement of transportation problems comes from the necessity of giving their solution a political rather than a business, aspect and is the outgrowth of the political conditions which menace the stability and usefulness of these great transportation properties.

Transportation is a business, and, if it is to be efficiently and successfully conducted, must be managed on business principles. In no other way can it survive or be supported as a business.

As the manager of transportation properties have, in the public interest, been largely deprived of the power of business management, any successful system of public regulation must apply to the regulation of these properties sound and just business principles and not merely the force of repression. A manifest danger of a system of regulation controlled by politics is that it will be administered on the principle of always reducing the cost of service to the public as a means of appeal to popular approval, and thus doing to the railroads all that can be done in the direction of curtailing their business prosperity short of bringing destruction upon them. No business enterprise, dependent for its usefulness upon its growth, can live if always kept down near the point of starvation.

UNITY OF REGULATION NECESSARY

There is another complication in the theory of regulation as it is practised today which also has its origin in a political condition. We have seen the unifying forces of steam and electricity change the map of the commercial world. They have introduced conditions which can not be ignored by those who would give to the public adequate service in transportation. A transportation system to be efficient must be co-extensive with the transportation needs of the people whom it serves. If their business needs ignore state lines, the railroads which would give them adequate service must adapt themselves to that condition. The business of a people that seeks all markets without regard to political subdivisions of territory can not be successfully carried on if their means of transportation are halted at state lines, either by physical interruption or by unwise, inconsistent or exaggerated local regulation.

The same interest of the people which demands that these transportation facilities extend in physical continuity across state lines likewise requires unity of management and control. This, of course, is impossible without unity of governmental regulation. While the preservation of the states in their complete constitutional integrity is a fundamental necessity of our system of government, it is equally essential that their power should not be extended beyond their constitutional limitations.

At a time and under conditions when the existing development of our continental commerce was inconceivable, the fathers of our government had a vision which was a miracle, and it resulted that the states, in the constitution, confided to the federal government the power to regulate interstate and foreign commerce. This of necessity involves the power to regulate the instruments of interstate and foreign commerce. And yet, in response to the exigencies of political warfare, it is easy to raise a controversy between the power of the states and the power of the federal government as to the line of demarcation between their respective powers as related to this question. In fact, the controversy as to the rights of the states has been the great historic controversy between differing schools of political thought among our people. The growth of commerce has injected the question of the regulation of commerce into this states' rights controversy as a factor of prime importance. The question of what will promote and what will retard the efficiency and usefulness of a transportation system often becomes obscured and is lost sight of while the ad-

vocates of these differing schools of constitutional philosophy fight out their wars. And yet a business enterprise, if it is to succeed, can not be subject to these political uncertainties: nor can a business enterprise, dependent for its efficiency and usefulness on its unity of regulation and management, be wisely left subject to many masters with differing views of public policy and with widely varying conceptions of its problems.

Even without any wide divergence of view, the mere existence of a power of management in many masters which may be exercised with different degrees of promptness, or which, if not actually exercised at all, is constantly made the basis of proposal and agitation, constitutes an obstacle in the way of effective and successful railroad management which can not be overstated. It may be claimed that our experience has demonstrated that a multi-form system of regulation is as economically unsound as the lack of any regulation, for the railroad problem can no longer be considered as of merely local concern any more than it can be considered of merely private concern. One of the greatest evils of the present system in this respect is that the capacity for efficient management is weakened. An undue proportion of the time of the responsible railroad manager and his responsible assistants is diverted from the useful duties of management to the calls for explanations and arguments before many different state authorities when all that is necessary might be accomplished before one central regulating body.

An efficient management is admitted by all to be a large factor in securing for, or continuing to, the public a low basis of transportation charges under existing conditions. It follows that there is an obligation of efficiency in regulation as great as the obligation of efficiency in management.

IMPORTANCE OF PROMPT DECISIONS

In suggesting that consideration it becomes one's duty to call attention to one of the most dangerous weaknesses which has developed in the system we have experienced, namely: its inability to give prompt decision to the business questions which must be determined. No man of business experience needs to have pointed out how essential is promptness, or the capacity for promptness, in dealing successfully with a business situation. That business in which there is no capacity for promptness is fatally hampered. If there is a legitimate and pressing need for more revenue, the power to authorize or to produce it must be capable of being brought into action at once. If economies must be introduced, the power of management must be capable of responding promptly to the need. If a change of policy is demanded in the public interest, the power to pass upon the question must be capable of convenient and prompt exercise. It may be justly said that the consensus of opinion of thoughtful men everywhere is that the existing system of regulation is fatally defective in respect of its capacity for prompt action.

WHAT IS NEEDED

To sum up what has been here suggested: no system of governmental treatment of this subject can be permanently successful which fails to conserve the things that are essential to railroad growth and efficiency. Prominent, and in fact first, among these essentials is adequate railroad credit. To secure this a system of successful regulation must be a system of protection as well as of correction. Even a conquering army feeds its prisoners. Our existing system has well served the purpose of correction, but we have seen it hesitate when called upon to protect. We need a system of regulation which will recognize the whole duty of government, which can as readily build where things are sound as cut away all fungus and unhealthy growths: a system which will bring stability of service and of credit as well as equality and fairness of treatment. None of this can be if the system of regulation is founded on the shifting sands of politics.

It must possess a capacity and be controlled by a purpose, of promptness in affording required relief and in meeting business conditions as well as in the removal of recognized abuses. This is also inconsistent with a mere political conception of the duties and responsibilities of regulation.

It must be possessed of an authority co-extensive with the subject to be regulated. Its powers must not be divided and scattered among a number of independent regulating bodies, many of them responsible to a part only of the public whose welfare is involved, all of varying outlook and influenced in their conclusions by differing policies and often by clashing and conflicting interests. This is inevitable, if regulation by the states and regulation by the federal power are both to be preserved.

PRESENT METHODS CANNOT ENDURE

Like the previous stage of irresponsible private control, the existing system of irresponsible, rigid and divided regulation can not permanently endure. So long as the chief need was of a public prosecutor, it served its function, but, when the demand was for statesmanship, it failed by reason of a constitutional incapacity which relates back to its origin, to its political progenitors. This is no criticism of individuals but the indictment of a social tendency. No more does it mean that we must abandon the principle of reasonable and efficient regulation: that we must turn from Scylla of irresponsible regulation to the Charybdis of government ownership. It is an argument that a system of reasonable, balanced and non-political regulation has not failed because it has not yet been generally tried.

Whatever may be the individual view, no one will deny that these considerations present a problem, and that a problem still unsolved. Its subject matter is of transcendent public interest and consequence. It is, as was recently suggested by President Wilson, "the one common interest of our whole industrial life." My present purpose is not to venture to suggest the solution but the source from which an acceptable solution must come. As it is a big problem, it must be solved in a big way.

A STATESMAN'S OPPORTUNITY

A solution is not likely to be accepted if the suggestion comes from the railroad manager, because he is still supposed to look at only one side of the question and to be controlled by a selfish interest.

It can not come from the mere politician, because of his narrow vision and his temptation to keep the question unsolved as a means of easy political agitation and as a valuable asset for temporary political advantage.

"Who then will be sufficient for these things?"

The problem is a statesman's opportunity. It is as great a problem as has confronted the statesmen of any age. He who solves it must be trusted by all the people. He must be above the suspicion of selfish motive. All the lessons of history must be at his command. He must be a profound student of human action and of human government. He must have power to impress his views upon his fellowmen. He must be able, with just and equal hand, to divide unto capital and unto labor its living. He must be able to assure the public of the correction of abuses, the establishment of justice and the maintenance of facilities adequate for their needs, and he must be able to assure the private owner of protection of his just interests and of fairness to his just rights. He must be able to reconcile the people to his philosophy of regulation and the politician to the loss of a highly valued political asset.

Is there a man among us who is capable of this?

I venture to suggest that the present President of the United States is equal to this great achievement. The time seems ripe for him to undertake it. His administration came into existence pledged to the correction of abuses in business life and to a constructive work which would build healthily and mightily to a greater and sounder prosperity. Doubtless the specific things embraced in his program of correction have been largely accomplished. Some parts of his constructive program—notably the creation of a new banking system—have also been carried out. But, of course, his comprehensive appreciation of commercial conditions brings to him the realization that much which is constructive remains to be done.

Having arrived at the constructive period of his administration, he can perform no higher or more useful public service than by

proposing and carrying through a solution of the transportation problem.

He has recently, in an impressive way, shown publicly a sympathetic appreciation of the railroad situation. In his response to the appeal of the railroads last September, he called the attention of the country to "the imperative need that railway credits be sustained and the railroads helped in every possible way," and disclaiming any "deep anxiety" that this would not be done, he gave as his reason "that the interest of the producer, the shipper, the merchant, the investor, the financier and the whole public in the proper maintenance and complete efficiency of the railways is too manifest." "They are," as he expressed it, "indispensable to our whole economic life, and railway securities are at the very heart of most investments, large and small, public and private, by individuals and by institutions."

The fact, thus made evident, that he has grasped the point of view from which a solution of this problem must be approached, has aroused in the minds of many the hope that before laying down the reins of government he will propose and work out some constructive plan that will give stability to railroad investment and growth. May we not ask that he will undertake the work? The people of the United States have called him to the leadership of this nation. They have entrusted him with their power. He has responded by notable public service. Is it too much to ask that he undertake this problem also and bring to its solution the wisdom and power which he has already used so effectively in the public interest?

No ambition could be more worthy than to establish a "Constitution of Peace" among the variant views and interests which menace the success of the system of transportation so essential to the public welfare. No service to his fellowmen could be a loftier or finer service than to place this high interest of the people upon a sound, a stable and a permanent foundation.

I think I properly interpret the men now charged with the responsibility of railroad management when I say that they will welcome a solution of the problem, however it may differ from any preconceived views, and will meet any suggestion that may be made in a co-operative and a helpful, and not in a carping or obstructive, spirit. They are as anxious as the most public-spirited statesman for a just and final settlement of transportation controversies. When it comes to the consideration of any proposal, they may be relied on to put aside prejudice and pride of opinion, for they, of all others, are best aware of the imperative need of the railroads for an adjustment of all differences and for public approval, sympathy and support. Opposition must come from outside the railroad ranks. The problem is, then, how shall the transportation system of the United States be put upon an assured foundation of efficiency, usefulness and success? Here is "a statesman's opportunity."

COMPARATIVE SERVICE TESTS OF 100-POUND SECTIONS, P. S. AND A. R. A.—A RAILS ON THE PENNSYLVANIA LINES*

By W. C. Cushing

Chief Engineer Maintenance of Way, Southwest System, Pennsylvania Lines.

In 1909 the Pennsylvania purchased 1,535 tons of A. R. A. type "A" rail, for service comparison with the standard P. S. type. Both types of rail were of Bessemer steel, weighing 100 lb. per yard, manufactured by the Carnegie Steel Company at the Edgar Thomson mill, in February, 1909, and were laid at various places on the Pittsburgh division in November, 1909. A record of failures is being kept. A portion of each kind of rail was singled out to be laid on a very sharp curve to test the relative abrasive resistance to the car wheels passing over it. It is this test which is the particular subject of this discussion.

There is a great deal of curved track on the Pennsylvania system, and a somewhat heavy-headed rail has been adopted as standard, because of the belief that it would last longer on such alinement than a comparatively thin-headed rail. As the two lots purchased represented the two different designs, it was hoped and expected that differences, if any existed, would be clearly indicated. It must be borne in mind that this was only one test, and that usually many are necessary before a definite and precise rule can be prescribed.

For the abrasive test, a 7-deg. 45-min. curve at the west end of the Dinsmore tunnel, about 30 miles west of Pittsburgh, was selected near the summit of a 1 per cent grade in each direction. The rail was laid on the eastbound track, which is elevated for a speed of from 30 to 40 miles per hour. The west half of the curve was laid with the P. S. rail and the east half with A. R. A. —A rail.

Twelve rails were selected for periodical measurements with a section lining machine, the lengths of the periods being six months, one-half of them on each kind of rail and one-half of each kind being on the low or inside and the others on the high or outside. After removal the 12 rails were sent to the Pennsylvania laboratory at Altoona for chemical and physical survey.

The material in the rails was fairly uniform and none of it segregated, except in two instances, with the P. S. section. With the exception of these two rails the chemical and physical characteristics seem to point to fairly uniform and good material for Bessemer carbon steel. The carbon of the A. R. A. rails may be considered a trifle higher, as is also the manganese and the sulphur. The hardness indicated by the Brinell and scleroscope tests was very much the same in each case, there being but ordinary differences. In only two rails was the upper limit of carbon exceeded, while all of them were quite well above the lower limit. The phosphorus in all kept pretty close to the specification limit. The manganese in all but two was close to the desired quantity of 1 per cent. The tensile strength of all was fairly good, with the exception of the two segregated rails.

The rail which was removed in order to allow the test rails to be laid was 100-lb. Bessemer steel of A. S. C. E. section, rolled by the Carnegie Steel Company, at the Edgar Thomson mill in April, 1907, but as no chemical and physical survey was made of the actual rail, the average mill figures of the month of May, 1907, during which this rail was rolled, were used.

On the whole it would seem that if there is any advantage to be derived by one section over the other on account of quality of material, it rested with the A. R. A. type "A" section in this particular test, although the differences were extremely slight. The rail was laid in November, 1909, and removed in August, 1911, after one year and nine months' service, on account of the A. R. A. type "A" rail being considered too badly flange worn for further service. The P. S. section was not considered to have reached its limit of abrasion at the same time, but owing to being laid on the same curve it was necessary to remove both kinds at the same time. It took the P. S. section one year and nine months to have the same average amount, 0.62 sq. in., abraded from the heads of the six test rails, as was abraded in one year and five months from the six test rails of the A. R. A. type "A" section. These two rail sections are compared under the same conditions, the abrasion per 10,000,000 tons of traffic being 0.27 in the case of the P. S. section and 0.36 in the case of the A. R. A. type "A" section. The abrasion of the A. S. C. E. section was but 0.22 per 10,000,000 tons of traffic, but one cannot feel quite as sure about the accuracy of the amount of tonnage passing over it as in the other cases, because the information was acquired by searching over back records after the A. S. C. E. rail was removed and not in keeping the record during the time the test was in progress, which was done in the case of the other two sections.

In the total quantity, 1,535 tons of A. R. A.—A rail laid in service in 1909, there have been 157 failures, or 1,023 per 10,000 tons of rail laid. Of the 157 failures 108 were on tangent and 49 on curve.

Three were broken rails, two on tangent and one on curve, and 10 were classified as "split web," while all the others, 144, were head failures, principally split heads.

*Abstracted from Bulletin No. 169 of the American Railway Engineering Association, just issued.

Boiler Design in Respect to Heating Surface

Calculations Based on Cylinder Horsepower Requirements; Effect of the Length of Tubes on Boiler Capacity

The paper on Steam Locomotives of Today, which was published in the *Railway Age Gazette,* November 20, 1914, page 947, was presented as the report of the sub-committee of the Railroad Committee of the American Society of Mechanical Engineers at the annual meeting in New York, December 2, and was thoroughly discussed from a number of standpoints. Below are given parts of the discussion by F. J. Cole, consulting engineer of the American Locomotive Company, and C. D. Young, engineer of tests of the Pennsylvania Railroad, on the subject of boiler design in respect to the factors making up heating surface.

DISCUSSION BY F. J. COLE

In recent years, locomotives have increased so much in dimensions, weight and power that methods employed in the past are no longer adequate in proportioning the grate, heating surface, length and diameter of tubes, etc., or to predetermine how best a locomotive boiler may be designed to suit certain requirements, the type, tractive effort and limitations of weight being known.

The size of cylinders is usually fixed by the permissible axle load allowed upon the track or bridges, in connection with the type, the diameter of the driving wheels, the boiler pressure and the factor of adhesion. After these fundamental features are decided upon, the boiler proportions must be outlined to see whether the required amount of heating surface can be obtained without exceeding the limits of weight.

There are two general questions involved in the consideration of this subject, namely, how many pounds of steam per hour are required to supply the cylinders in order to develop the maximum horsepower; and what proportion of grate, firebox and tube heating surface will best produce this amount of steam.

The locomotive, unlike most steam plants, varies in the speed and power developed. It must be able to run at any intermediate speed between starting and its full velocity and at the same time develop all degrees of tractive effort within its capacity. At slow speeds the maximum pull must be exerted in order to start the trains easily, and for this reason the live steam is admitted to the cylinders during 80 to 87 per cent of the stroke. As the speed increases it is necessary to reduce the admission period, thereby increasing the expansion of the steam; therefore for any speed there is some point for the valves to cut off the live steam, at which the engine will develop its maximum power. There is also some minimum velocity at which the full horsepower of the locomotive is attained; after this velocity is reached the horsepower remains constant or slowly decreases. This critical point may be taken at 700 ft. to 1,000 ft. per minute piston speed.

It has been customary to use certain ratios, based on cylinder volume, for locomotive proportions. These ratios left to individual preference such matters as rate of combustion per square foot of grate, length of flues, evaporative value of firebox heating surface or value of tube or flue heating surface in relation to the length, making it desirable to proportion boilers upon more uniform methods in which these variable factors are given due consideration.

Four or five years ago the writer collected a considerable amount of data on this subject and drew up a report with the object of reducing this matter to a more uniform basis, substituting for the ratios hitherto employed, cylinder horsepower requirements. Suitable values were assigned to grate surface, firebox heating surface, tube heating surface, etc., with corresponding evaporative values, so that the balance between the amount of steam required by the cylinders and the amount of steam which the boiler was capable of generating could be expressed in percentage of cylinder horsepower. The tests made on sectional boilers on the Northern Railway and the Paris, Lyons & Mediterranean Railway of France, those of Dr. Goss on a Jacobs-Shupert boiler, and tests by the Pennsylvania Railroad on the Altoona testing plant were examined in order to obtain data on which to base the evaporative values of different points of the boiler. It is obvious that the evaporative value of a boiler tube of given diameter varies greatly with its length. The temperature of the firebox is fairly constant under similar conditions of draft and rate of combustion, therefore the temperature of the smokebox will be reduced with an increase in the tube length. While some additional draft will be required to draw the gases through the tubes, yet the net result is a greater heat absorption between the firebox and smokebox. The thermal efficiency of the engine is increased within certain limitations by the use of long tubes. Of course there is a certain economical length of tube which is determined mostly by the number and arrangement of wheels or the type of the engine which the service requires and only partly by thermal conditions.

About 1899 the wide firebox Atlantic (4-4-2) type locomotive was introduced. Because the firebox was placed behind the driving wheels the grate area could be made to suit the power of the locomotive; therefore it was no longer necessary to force the rate of combustion to 180 lb. and 200 lb. of coal per square foot of grate area per hour. Very poor results were obtained when high rates of combustion were necessary, because much unburned coal was drawn through the tubes into the smokebox and thrown out through the stack by the violent draft. With the Atlantic type locomotive, tubes 15 ft. and 16 ft. long, and sometimes longer, were necessary. While at first there was some apprehension as to leakage with tubes of these lengths, it was soon found that no more difficulty was experienced in maintenance than with short tubes. With the introduction of the Pacific (4-6-2) type and Mikado (2-8-2) type, and other locomotives using trailing trucks, still longer tubes were required. Tests made on long tube engines, compared with older locomotives with shorter tubes, showed a noticeable reduction in smokebox temperatures.

Instead of the old arbitrary method of designing locomotive heating surface by cylinder ratios, the idea of using the cylinder horsepower suggested itself as forming a very desirable basis for the heating surface, grate area and tube area. Curves were prepared from the most recent available data showing speed factors or drop in M. E. P. in relation to velocity. With saturated steam the average maximum horsepower is reached at about 700 ft. piston speed per minute, speed factor .412; constant horsepower is obtained at 700 to 1,000 ft. piston speed, and the horsepower decreases slightly at higher velocities for average conditions when engines are especially constructed for the highest speeds. For superheated steam the average maximum horsepower is reached at 1,000 ft. piston speed, speed factor .445, and constant horsepower at higher speeds. Because the horsepower is based on piston speeds, the stroke and diameter of wheels is omitted in the following figures, the calculation becoming by cancellation:

$$\frac{.85\ P \times .412 \times 1{,}000 \times 2\ A}{33{,}000} = \frac{1.7\ P \times .412 \times A}{33} = .0212 \times P \times A$$

$$HP. = .0212 \times P \times A$$

in which A = area of one cylinder in square inches.
P = the boiler pressure.
.412 = speed factor.

In a similar manner the horsepower calculation for superheated steam becomes:

$$HP. = .0229 \times P \times A$$

using .445 as the speed factor.

The maximum horsepower can sometimes be increased when the locomotive is operated under the most favorable conditions. It is considered safer and better practice, however, to take figures which represent average conditions rather than the abnormal and unusual figures obtained when all conditions are most favorable.

The horsepower basis affords many additional advantages in designing locomotives. For instance, in determining the maximum amount of water and coal required per hour, the size of the grate is found to be proportional to the amount of coal that can be burned to the best advantage, to be varied according to the quality. Knowing the amount of coal required per hour directs attention to the question of hand firing or the use of a mechanical stoker. Knowing the amount of water evaporated per hour determines the location of water stations, size of tender tank, the size of injectors and safety valve capacity, also the size of steam pipes and other features of the boiler. Through the stack a mixture of gas and exhaust steam is ejected at substantially the same velocity for all locomotives in similar service, and proportional to the amount of coal burned. For this reason the area of the stack may be taken as proportional to the maximum amount of coal burned per hour in the firebox.

From the reports of the Pennsylvania Railroad testing plant at St. Louis and Altoona, and from road tests, the conclusion is reached that with saturated steam a horsepower can be obtained from 25 to 29 lb., of saturated steam in simple cylinders with piston speeds of 700 to 1,000 ft. per minute; 27 lb. has been taken as a fair average value, and in a corresponding way 23½ lb. for compound engines, 20.8 lb. for steam superheated 200 deg. and over, and 19.7 lb. for superheated steam used in compound cylinders. These figures provide for steam for auxiliaries. While careful tests show that the evaporation can be increased under the most advantageous conditions, such as best quality of picked coal, clean fire, high degrees of smokebox vacuum, etc., it is considered better practice to take the lower figure in order to provide a margin for average conditions.

The great increase in the length of tubes which took place with the building of trailing truck locomotives, naturally directed attention to the values of the heating surface of different lengths of tubes and emphasized the fact that a square foot of heating surface in tubes 10 ft. or 11 ft. long had a much greater evaporative value than in tubes 18 ft., 20 ft. or 22 ft. long. In the absence of definite temperature tests of different parts of a tube, it was thought that the evaporative value varies inversely as the square root of its length. Pyrometer tests recently made by the Pennsylvania Railroad at Altoona with various locomotives on the testing plant showed that the temperature curve of tubes of various lengths and diameters follows somewhat different laws. From the many observations of pyrometer readings taken at various portions of the boiler tube, curves have been drawn which show the decrease in temperature from the firebox to the smokebox. From these curves the increase or decrease of tube evaporation may be calculated.

Short tubes have much greater evaporative value per square foot of heating surface than long tubes, but they discharge the gases into the smokebox at much higher temperatures. Therefore, while the heat absorbed per foot of length is much greater for short than long tubes, it is not so economical. The short tube boiler, other things being equal, requires more coal for a given evaporation than a boiler having long tubes. Where tube lengths of 12 or 14 ft. were common 14 or 15 years ago, lengths of 20, 22 and even 24 ft. are used in the modern locomotive. The result is that the smokebox temperatures have decreased from between 750 and 800 deg. to 550 or 600 deg., the only increase of energy required being the slightly greater draft in the smokebox to pull the gases through the long tubes. This is not intended as a defense of the long tube in modern engines, especially of the 4-6-2, 2-8-2, Mallet and other types, because in most cases their construction requires long boilers. Tests show that economy results from the better utilization of heat in the modern engine than in older types because the range of temperatures between the furnace and the stack is greater with the long tube locomotive.

As a result of the investigations previously outlined, conclusions have been arrived at as follows:

Firebox Evaporation.—An evaporation of 55 lb. per square foot of firebox heating surface, combustion chamber and arch tubes has been adopted. The greater absorption of heat by the firebox than by the rear portion of tubes per unit of area is largely due to radiant heat. This varies as the square of the distance from the surface of the fire to the sheets separating the gases from the water. Again, it is probable that within certain limitations the amount of heat absorbed is independent of the heating surface and is a function of the grate area or the area of the bed of live coals. Assuming that there is sufficient heating surface to absorb the radiant heat, it is probable that very little additional heat will be absorbed by increasing the firebox heating surface. It therefore follows that the relatively greater area of the fire in proportion to the absorbing surface in wide firebox locomotives is more efficient than in the old narrow firebox.

Diameter, Length and Spacing of Tubes.—The evaporative value in pounds of water per square foot of outside heating surface has been approximately calculated for 2 in. and 2¼ in. tubes, and for superheater flues 5⅜ in. and 5½ in. The range of length is 10 to 25 ft., and the spacing 9/16 in. to 1 in. The best data available shows that the evaporative value of a tube or flue varies considerably with differences in length, diameter and spacing. The curves of temperature compared with length have been used as a basis for determining the evaporation for different lengths of tubes and flues. The rate of evaporation on this basis will vary directly as the difference of temperature of the tube or flue gases and that of the steam contained in the boiler.

Tubes and flues from 10 to 24 ft. long, spaced 9/16 in. and 1 in. apart, outside diameter 2 in, 2¼ in. and 5¼ in. will evaporate from 7.50 to 14 lb. of water per square foot per hour.

Grate Area.—The grate area required for bituminous coal is based on the assumption that 120 lb. of coal per square foot of grate per hour is a maximum figure for economical evaporation. While 200 and 225 lb. have at times been burnt in small, deep fireboxes and the engines made to produce sufficient steam, it is wasteful of fuel and it has been found after numerous and careful tests that the evaporation per pound of coal under these conditions is very low. If, on the other hand, the rate of combustion is too slow, economical results will not be produced owing to the fact that at least 20 per cent of the coal burned produces no useful work in hauling trains, but is consumed in firing up, waiting at roundhouses or terminals, on sidetracks, or to the fact that the greater portion of the time locomotives are used at considerably less than their maximum power.

For hard coal the grates should be proportioned for a range of from 55 to 70 lb. of coal per square foot per hour, according to the grade of the fuel.

Complete tables of horsepower for saturated and superheated steam, evaporation of tubes and flues of various lengths, diameters and spacing, as well as diagrams of temperature for different flue lengths, have all been prepared to facilitate the calculations in determining the proportions of grate, firebox, tube and flue heating surface.

It must be remembered, however, that the boiler capacity for a locomotive when other things are in proportion cannot usually be made too large within the permissible limits of weight, and it can be shown by numerous tests that such in-

crease in boiler capacity makes for considerable economy in the use of fuel and steam. For passenger service the boilers may often be made with advantage over 100 per cent.

In a general way, a boiler will have ample steam making capacity if proportioned by this method for 100 per cent, provided the grate is sufficiently large and deep so that the rate of combustion at maximum horsepower does not exceed 120 lb. of coal per square foot of grate per hour for bituminous coal of average quality. For gas coal a smaller grate may be used, but it is better practice to use the larger grate and brick off a portion at the front end in order to obtain sufficient volume of firebox for proper combustion, because nearly all modern locomotives are deficient in firebox volume.

C. D. YOUNG'S DISCUSSION

On the Pennsylvania Railroad it is believed that the tendency at the present time should be to increase the firebox heating surface, as it should be realized that it is of comparatively greater effectiveness at mean and low rates of working than the remaining surface of the boiler. Some few years ago when large boilers were designed the tendency was to make the ratio of the firebox to the total heating surface less than 6 per cent. This resulted in locomotives which, although efficient in evaporation, were not free steaming, as they lacked capacity unless very heavily drafted. It is my opinion that the firebox heating surface should be at least 7 per cent of the total heating surface of the boiler, in order to provide a free steaming locomotive, and that when this ratio is satisfied, good results will follow, provided the tube heating surface has been properly proportioned. When working the boiler at high rates of evaporation, however, the tube surface is fully as effective as firebox surface, and for large capacity a large tube heating surface is necessary.

We do not agree with the recent tendency toward excessively long tubes, as beyond a certain length of tube there is too great a sacrifice of boiler capacity in the interest of economy in coal. The long tube presents a very serious obstruction or resistance to the flow of the gases, and beyond a length which appears to be about 100 internal diameters, this obstruction increases without a corresponding increase in evaporation. The locomotive with a long tube is a slow steamer and a higher draft must be furnished in order to create an active fire. This rule that the length of tube should be 100 times the internal diameter has been applied to three new classes of our locomotives with exceedingly gratifying results, and confirms the earlier experiments which were made by us upon this subject, as well as those made by M. A. Henry, of the Paris, Lyons & Mediterranean Railway of France.

ACCIDENT BULLETIN NO. 51

The Interstate Commerce Commission has issued Accident Bulletin No. 51, containing the record of railway accidents in the United States during January, February, and March, 1914. The number of persons killed in train accidents was 120, and of injured, 2,371.

The total number of casualties of all classes reported, including industrial accidents, was 2,108 killed and 42,414 injured. The accidents are summarized as follows:

TABLE NO. 1.—*Casualties to persons—Steam railways*

Causes	Passengers		Employees (including employees not on duty)		Other persons (trespassers and non-trespassers)		Total persons	
Train accidents.	Killed	Inj'd	Killed	Inj'd	Killed	Inj'd	Killed	Inj'd
Collisions	6	553	55	602	2	54	63	1,209
Derailments	6	494	37	427	6	35	49	956
Miscellaneous, including boiler explosions	1	30	7	176	...	...	8	206
Total	13	1,077	99	1,205	8	89	120	2,371
Other than train accidents.								
Accidents (293) to roadway or bridges not causing derailment	...	...	...	2	...	...	...	2
Other accidents (classes C3 to C12, inclusive)	39	1,616	574	11,429	1,296	2,317	1,909	15,362
Total	52	2,693	673	12,636	1,304	2,406	2,029	17,735
Industrial accidents to employees.								
While working on tracks or bridges	...	...	29	5,217	...	...	29	5,217
At stations, freight houses, enginehouses, etc.	...	...	17	6,238	...	...	17	6,238
In and around shops	...	...	25	11,588	...	...	25	11,588
On boats and wharves	...	...	1	390	...	...	1	390
At other places	...	...	7	1,246	...	...	7	1,246
Total	...	...	79	24,679	...	...	79	24,679
Grand total	52	2,693	752	37,315	1,304	2,406	2,108	42,414

Table No. 1A, following, presents comparisons with the bulletin next preceding and the bulletin covering the corresponding quarter of the previous year.*

TABLE NO. 1A.—*Condensed summary of fatalities.*

	Item	Bulletin No. 51	Bulletin No. 50	Bulletin No. 47
1	Passengers killed in train accidents	13	34	15
2	Passengers killed, all causes	52	85	68
3	Employees (on duty) killed in train accidents	99	137	132
4	Employees (on duty) killed in coupling	44	49	62
5	Employees (on duty) killed, total	608	730	734
6	Total passengers and employees (items 2 and 5, above)	660	815	802
7	Other persons killed (including trespassers, nontrespassers, and employees not on duty), all causes	1,369	1,860	1,442
8	Employees killed in industrial accidents	79	117	97
	Grand total (items 6, 7 and 8)	2,108	2,792	2,341

*Preceding bulletins have been noticed in the *Railway Age Gazette* as follows: No. 50, July 24, 1914, page 170; No. 49, May 15, 1914, page 1072; No. 48, March 6, 1914, page 468; No. 47, October 24, 1913, page 759.

The total number of collisions and derailments reported was 3,185 (1,223 collisions and 1,962 derailments), of which 137 collisions and 156 derailments affected passenger trains. These are classified as follows:

TABLE NO. 2.—*Collisions and derailments*

No.	Classes	Number	Killed	Inj'd	Damage to road and equipment
	Collisions:				
1	Rear	191	14	321	$172,504
2	Butting	112	18	328	168,962
3	Trains separating	97	3	21	48,450
4	Miscellaneous	823	28	539	398,821
	Total	1,223	63	1,209	$788,737
	Derailments due to—				
5	Defects of roadway	480	10	389	$429,032
6	Defects of equipment	967	7	113	733,127
7	Negligence	86	6	88	63,563
8	Unforeseen obstruction	92	10	108	76,412
9	Malicious obstruction	12	5	36	15,453
10	Miscellaneous	325	11	222	237,633
	Total	1,962	49	956	$1,555,220
	Total collisions and derailments	3,185	112	2,165	$2,343,957
	Total for same quarter of—				
	1913	3,982	143	3,338	$3,019,409
	1912	3,903	217	4,251	3,368,125
	1911	2,801	128	2,806	2,124,090

The usual tables are given, classifying certain kinds of accidents in detail.

Fifteen accidents were investigated by the inspectors of the commission and the reports of these investigations fill 30 pages of the bulletin. The accidents occurred as follows:

N. Y. N. H. & H.	Westerly, R. I.	Oct. 31, Derailment
Lehigh & Hudson R.	Hamburg, N. J.	Jan. 5, Rear collision
Southern	Davidson, N. C.	Jan. 18, Derailment
Michigan Central	Air Line Crossing	Jan. 25, Butting collision
Pennsylvania	Conemaugh, Pa.	Jan. 29, Rear collision
Grand Trunk	Fosters, Mich.	Feb. 6, Butting collision
St. Louis & S. F.	Nichols Jn., Mo.	Feb. 16, Side collision
C. C. Chic. & St. L.	Cincinnati, Ohio	Feb. 18, Butting collision
Missouri, Kan. & Tex.	Hillsboro, Tex.	Feb. 24, Rear collision
Grand Trunk West.	Chicago, Ill.	Mar. 3, Rear collision
Chic. St. P. Minn. & O.	Mendota, Minn.	Mar. 14, Derailment
Minn. & St. Louis	Olds, Iowa	Mar. 21, Butting collision
C. C. Chic. & St. L.	Irdianapolis, Ind.	Mar. 22, Derailment
Great Northern	Thama, Idaho	Mar. 25, Butting collision
Chic. Burl. & Quincy	Hawthorne, Ill.	Mar. 30, Derailment

Electric railways reporting to the commission (not included in the foregoing statistics) had 114 persons killed during the quarter and 1,148 injured; and there were 24 collisions and 8 derailments. Train accidents are charged with 3 fatalities. The total number of passengers killed from all causes was 5, and of employees 13 (3 in industrial accidents). The trespassers struck or run over by cars were 65; 40 killed and 25 injured.

Driving a Five-Mile Tunnel Through the Selkirks

The Canadian Pacific to Hasten Completion Is Constructing This Bore From a Second or Pioneer Tunnel

The Canadian Pacific is now engaged in the construction of a double-track tunnel five miles long through the Selkirk mountains at Rogers Pass, B. C.; this will be the longest railroad tunnel in America, exceeding in length the Hoosac tunnel of the Boston & Maine by about 1,400 ft. In addition to its unusual length, it is of special interest because of the fact that it is being driven from a pioneer tunnel parallel to and entirely outside of the limits of the final tunnel section. The tunnel is a part of a line change of 18.6 miles.

While the elevations reached at its crossings of the Rocky and Selkirk mountains are over 5,000 ft. below those of some

Location of Old and New Lines at Rogers Pass

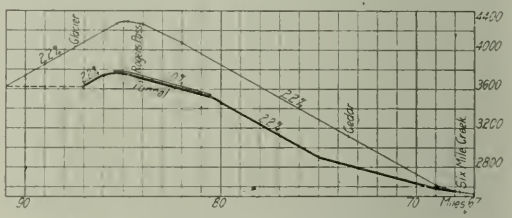
of the railroads further south, the Canadian Pacific is recognized as one of the most scenic of the transcontinental lines because of the ruggedness of the country through which it passes. This feature which gives it its scenic attraction, also adds materially to the operating difficulties. Its crossing of the Rocky mountains with a 4.5 per cent grade on the west slope was particularly difficult until the construction of a new line between Field and Hector on a 2.2 per cent grade in 1909, which work included the two famous spiral tunnels. The crossing of the Selkirk mountains at Rogers Pass is 96 miles west of the Rocky mountain divide and 425 miles east of Vancouver. The present summit at Rogers Pass is at an elevation of 4,300 ft., and is reached by 21 miles of continuous 2.2 per cent grade westbound from Beavermouth and by 25 miles of 2.2 per cent grade eastbound from Albert Canyon.

Following the completion of the work between Field and Hector, the portion of the line at Rogers Pass has presented the greatest difficulties in the operation of the four to eight transcontinental passenger trains and an average of about 12 freight trains daily. The engine district including this portion of the line extends from Field to Revelstoke, 130 miles. With normal business, about 11 helper engines are located at Rogers Pass station at the summit and are sent from here each way down to the foot of the grade to meet approaching trains. Oil burning engines are used exclusively on all lines west of Field. A small roundhouse and storage yard are located at the summit, and as the prevailing tonnage is usually eastbound, turn-around trains are run from Revelstoke to Rogers Pass, where the cars are set out and then added to other eastbound trains descending the mountain.

THE NEW LINE

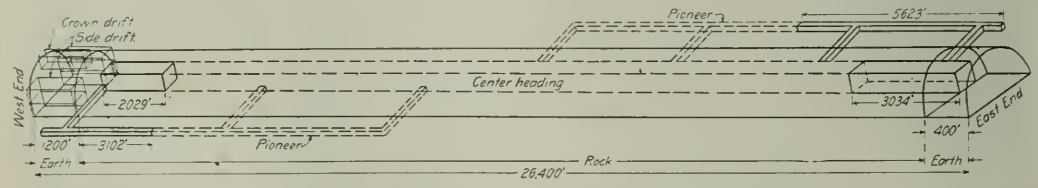
The new line leaves the old at Six Mile creek, 18 miles east of Rogers Pass, and, turning slightly to the left, follows generally parallel to the old line but lower down in the canyon of Beaver river for 10.5 miles. It then plunges directly into a tunnel 26,400 ft. long passing about 6,000 ft. below the summit of Mt. MacDonald. A short distance in from the west portal it crosses about 400 ft. below the old line and emerges at the west portal a short distance to the right of the old line and about one mile west of Glacier station. The new line then continues westerly 1.5 miles to a connection with the old line at Cambie. All the new work is being built for double track, including the tunnel. A short distance west of the tunnel a six-track storage yard will be built to replace the yard now located at Rogers Pass and to be used for the same purpose.

The new line is 18.6 miles long and saves 4.4 miles of distance. While it does not reduce the ruling grade of 2.2 per cent it



Profiles of New and Old Lines

decreases the length of this grade from 21 to 12 miles on the east approach and from 25 to 17 miles at the west end. It also eliminates 552 ft. of rise and fall. While the maximum curvature remains 10 deg. there are only three such curves on the new line, as compared with a large number on the old, and 2,600 deg. of central angle is eliminated. There are over four miles of snow sheds on the old line, as compared with only one short shed on the new line. The old line also required a number of bridge structures of considerable size, including a 338-ft. steel arch span 310 ft. high and a steel viaduct 586 ft. long and 140 ft. high. The only structures larger than culverts on the new line are two 70-ft. and one 60-ft. deck girder spans, and one steel viaduct 500 ft. long and 125 ft. high.



Sketch Showing Relation of Pioneer to Main Tunnel, and Progress of Headings on December 1

West of the tunnel the new line is located in the center of the valley, instead of on a bench at one side, to avoid danger from snow slides and the necessity for protection therefrom, although this lower location required changing the location of Illecillewaet river for a mile before work could be undertaken on the grading of the line itself. The roadway embankment

west of the tunnel will require 300,000 cu. yd. of material, all of which will be secured from the west approach cut to the tunnel and from the tunnel itself. The only structures on this portion of the line are a 60-ft. girder span and a 20-ft. arch culvert.

On the 10.5 miles of new line east of the tunnel about 1,500,000 cu. yd. of material will be moved, over 70 per cent of which is rock. This is largely side hill work, fairly evenly distributed over the line and suitable for handling by steam shovel. This grading east of the tunnel will be handled by contract, and it is expected that the work will be let next spring.

THE TUNNEL

The tunnel is 26,400 ft. or exactly five miles long and is located on tangent for the entire distance. The 2.2 per cent grade

View of West Portal Showing Center and Side Drifts Through Earth. Mouth of Pioneer Tunnel in Background

up the east approach breaks at the east portal to a 1 per cent grade which continues to the summit a short distance in from the west portal. As shown on one of the drawings, the tunnel is being built for double track with the tracks spaced 13 ft. between centers, with a horizontal clearance of 8 ft. from the center of the track and with a vertical clearance of 20 ft. from the base of rail measured over the center of the track. For distances of 1,200 ft. at the east end and 400 ft. at the west end the tunnel passes through loose debris. Beyond these points it is expected that solid rock will be encountered for the entire distance. The material found in the rock section at the west end up to the present time has been a soft slate which breaks well. At the east end mica schist, blue schist and quartzite have been encountered. It is planned to line the tunnel only through the earth sections as the character of the rock encountered so far in the rock sections indicates that no lining will be required. An 18-in. pipe will be placed in the ballast between tracks for drainage.

In driving the earth sections a drift 8 ft. 6 in. wide by 10 ft. high was first driven at grade on each side and timbered. A second drift 8 ft. high and 8 ft. wide was then driven directly above and the material trapped into cars below. In this way the side walls were opened to a point 15 in. above the tops of the plumb posts. A crown drift 9 ft. wide and 10 ft. high was also driven with the top 33 in. above the top of the timber segments. The intervening section was then broken through and the arch timbering placed, after which the remaining material was removed by air-operated shovels loading into 12-yd. Western Steel air-operated dump cars.

The most interesting and unusual feature of this entire project

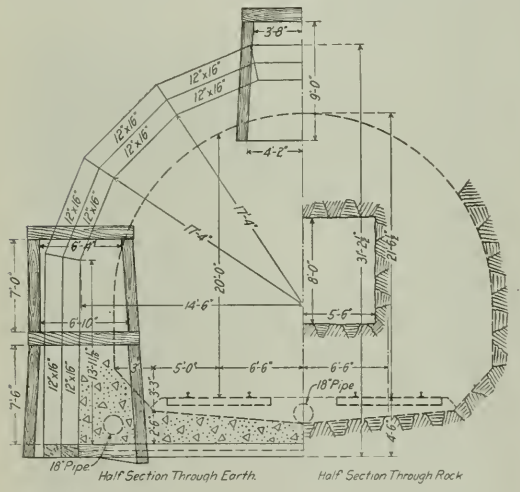
Looking Over Approach Cut from West Portal

is the driving of an auxiliary or pioneer tunnel at one side of the main tunnel. Because of the great length of the main tunnel it was estimated that it would require at least four years to complete it by the ordinary methods. The contractor therefore decided to drive this pioneer tunnel to enable him to prosecute the work more rapidly, thereby increasing his bonus, and also to reduce to the minimum the interference of the different operations in the tunnel proper. This pioneer tunnel is 6½ ft. by 9 ft. in cross section, and is driven 50 ft. to the right of the main tunnel, with its floor 7 ft. above the final grade. After reaching rock, cross cuts are being driven to the center of the main tunnel at intervals of about ¾ mile and center drifts 11 ft. by 8 ft. are then driven up grade on the center line of the main tunnel with the bottom of these drifts also 7 ft. above grade. The rock is then being drilled and broken on all sides of the drift, and after shooting, the material is loaded by air-operated shovels into small cars, and removed through the pioneer tunnel. These operations are identical at each end.

By this method work can be pushed from several faces at

once without interference. It is also possible to do all blasting ahead of the shovels so that they can be operated continuously. Air lines are carried through the pioneer tunnel where there is only slight danger of their being broken; all drainage is removed through the same outlet, that at the west or up-grade end being handled by "booster" pumps with a portable pump on wheels at the face of the heading. Through these various advantages, the contractor estimated that this plan, which is original, will hasten the date of completion of the tunnel at least a year. The pioneer tunnel is solely a construction expedient with no intention of using it for ventilation or any other purpose after the completion of the work. To shorten the length through the earth sections, the pioneer tunnel at the west end was started 128 ft. above its proper grade, and sloped downward on a 50 per cent grade until it reached the proper elevation. All cars are hauled up this grade by cables. At the east end the pioneer tunnel was started 43 ft. above grade.

Complete duplicate power plants have been installed at each end of the tunnel. At the west end ventilation is provided by a Connersville ventilating fan with a capacity of 3,000 cu. ft. of free air per minute. This air is delivered through the pioneer tunnel to the various faces in the main bore and to the pioneer heading. A second fan located near the portal of the pioneer



Methods of Driving Tunnel Through Earth and Rock

heading assists in drawing the free air out from the faces. Two Ingersoll-Rand air compressors with capacities of 2,200 and 1,100 cu. ft. of free air per minute, respectively, provide the power for operating drills and other tools, working at 110-lb. pressure. A third air compressor with a capacity of 750 cu. ft. of free air per minute compresses air to 1,000 lb. pressure for the operation of the 16-ton air locomotive used in the hauling of the muck. A similar locomotive, but weighing only 10 tons, is employed at the east or down grade end of the tunnel. All of these various units are driven by five 150-h.p. coal-fired boilers.

Contrary to usual practice in work of this character, no electric illumination is provided and Wolf safety carbide lights are used exclusively. Individual lights are given each workman except at the air shovels, where large carbide lights are installed.

No permanent ventilating plant will be installed at this tunnel, as upon its completion it is planned to operate it with electric locomotives. Under the system tentatively adopted an electric locomotive will be attached to the rear of the train at the foot of the 2.2 per cent grade on the east slope, assisting the steam locomotive up to the east portal. At this point, where the grade breaks from 2.2 per cent to 1 per cent the steam locomotive will shut off and the electric locomotive will push the entire train through, cutting off at the summit at the west portal. Westbound trains will be brought to the summit with oil burning helper engines as at present. Up to the present no work has been done in the development of electrification other than preliminary investigations of power sites.

The construction of this tunnel has now been under way since September, 1913. On December 1, 1914, the pioneer tunnel had been driven 3,102 ft. at the west end and 5,623 ft. at the east heading. The heading in the rock section had been driven 2,029 ft. at the west end, and 3,034 ft. at the east end. At the east end the timbered section through earth will be completed about December 20, while the shovel has just started work at the west end. From this it may be seen that unusual progress is being made in this work. In July, 715 ft. of pioneer heading was driven at the east end alone, an average of 23 ft. per day, while in November the pioneer heading at the west end was advanced 817 ft., moving 37 ft. one day and 35 ft. another. During this same month the pioneer heading at the east end was advanced 529 ft., while the center heading at the west end was driven 654 ft. Working in this material, the face is shot down about every 6 hours, advancing the heading about 6 ft. per shot. It is expected that the tunnel will be completed by September 1, 1916. This work is being carried out under the direction of J. G. Sullivan, chief engineer, and W. A. James, engineer of grade revision. J. W. Shepperd is assistant engineer in direct charge of the work. Foley Brothers, Welch & Stewart, of Vancouver, are the contractors, employing about 680 men on three eight-hour shifts.

ARBITRATION OF WESTERN ENGINEMEN'S DEMANDS

Hearings before the board of arbitration on the demands of the engineers and firemen of the western roads for increased wages and changes in working conditions, the opening proceedings of which were reported in last week's issue, were continued throughout last week and this week.

James M. Sheean, attorney for the railways, explaining their position, said that there was an adjustment with both organizations in 1910, one by mediation and the other by arbitration, and that since 1910 there has been no such change, either in operating conditions or in the duties and responsibilities of the men, as would justify an increase at this time above the increases which were granted three or four years ago. "Instead of making for standardization," he said, "or uniformity as among the different schedules, the request as presented is in fact a pyramiding and a wider separation by reason of the variety of differentials in different schedules, and the imposition upon the varying base of a uniform standard, which, of course, would cause a departure from uniformity rather than work for uniformity. Although there might be an absolute uniformity of rates, when they are spread over 98 different roads and applied to different bases—some having arbitrary allowances and some not—the uniform rates would produce different sums of money under the different schedules."

M. W. Cadle, assistant grand chief of the Brotherhood of Locomotive Engineers, whose testimony had been interrupted by illness, resumed the stand on December 2, and continued his discussion of the 16 articles submitted to arbitration, giving the present schedule provisions of the various roads to sustain the contention that all of the proposed rules are in effect on some roads. He was questioned by Warren S. Stone, grand chief of the engineers. In connection with Article II, "that the practice of conducting surprise tests by turning switch lights and placing red lights or flags, unaccompanied by torpedoes. beside track, or wiring down auto-

matic signals to proceed position, be eliminated," Mr. Stone made a statement that the brotherhoods do not object to surprise tests when made under fair working conditions, but that some officials have got away from the original intent of the test—to see that the men were living up to the rules—and go out with the idea of setting a trap for a man and catching him; that they do not give him time to get the signals. The objection is to such unfair tests.

Under cross-examination by James M. Sheean, attorney for the railroads, Mr. Cadle said that no railroad has in effect all of the rules requested, but he thought that as many as five of the requests were in effect on some roads, and he admitted that on the roads he had mentioned as having in effect certain of the proposed rules other rules and conditions were in effect to such an extent that practically none of the rules proposed were in effect in the form submitted in the demands. He said at first that the proposed rule for a 5-hour day in passenger service was not intended to apply to suburban service, but later said the board was expected to arbitrate that question.

Mr. Sheean also brought out that the engineer who runs a fast mail train from Chicago to Burlington, 207 miles, in four hours, draws a little over two days pay, and under the proposed rules would be paid for 30 minutes additional preparatory time, and then if he took his engine at the roundhouse, an additional allowance for the time from the roundhouse to the station and at the end of his run for the time from the station to the roundhouse. Also if at the beginning of his run his train were held for 45 minutes after leaving time, but arrived on time at the other end of the run, he would receive pay for that 45 minutes initial terminal delay, when he was only on duty altogether six hours from the time he reported until the time he was relieved.

He also showed that under the automatic release and continuous time rules it would frequently be possible for men to earn several days' pay in one day and to collect pay under various rules for the same time under conditions which were not excepted in the rules. The man on the 207-mile run, if a washout held him away from his home terminal for two days, would receive overtime after the expiration of 15 hours at the rate per hour for the last service he had performed, or the rate for about 50 miles an hour, and if his trip was made in overtime he would be paid at the overtime rate for the time held up. In the case of a road that has a rule permitting men, when necessary, to tie up for rest after 12 hours on duty, the entire crew would continue to draw continuous time during all the time they were resting or sleeping, and on resuming duty would go on overtime rates. Mr. Cadle also admitted that under a proposed rule if a man were called to deadhead to a certain place on a passenger, and the train were late in starting so that he had to wait for it, he would be paid for initial terminal delay, plus the rate of the crew of the passenger train, although the train made up the initial delay. If he were to deadhead on a freight train, and went to sleep in the caboose at the time for the train to leave, and if the train were delayed while he slept, but made up the time, he would receive more pay than if the train were running while he slept. Mr. Cadle said the rule was intended to keep men "from lying around cabooses without earning any money," and that "he could never sleep in a caboose anyway." Mr. Sheean also pointed out that in the case of an inspection train out 10 hours, but covering only 40 miles around terminals, the engineer and fireman would receive two days' pay under the 5-hour day rule.

W. S. Carter, president of the Brotherhood of Locomotive Firemen and Enginemen, presented testimony in support of the contention that wages of enginemen should be based on the weight on drivers. He said that engineers and firemen should be paid in proportion to their labor and responsibility and according to their productive efficiency, that when the labor cost of a product decreases the employer should be more able to pay the wages that are incidental to the cost of that product, and that weight on drivers is the simplest and most accurate index of the effective tractive power of a locomotive, and therefore of the increased labor, responsibility and productive efficiency of the man. He said that on eastern roads the pay of firemen is governed by weight on drivers. He said that there are some rates in effect on some roads higher than those asked, but the arbitration agreement provides that any higher rates shall be maintained. He said it was not claimed that wages should be increased in the same ratio as the increase in the efficiency of the engine. In the case of a Mallet, on which the tractive power is six times greater than the smallest engine in use, the proposed rate of wages is between 60 and 70 per cent greater.

Mr. Sheean on cross-examination tried to show that the rates mentioned by Mr. Carter for different engines were not a proper index to the amount of money paid out, without a consideration of the other rules applying to them. Mr. Carter said that generally the roads that had the most liberal rates also had the most liberal rules. He admitted, however, that in order to bring about uniformity in what the man receives there must be a uniform basis to which the uniform rate applies. Asked whether there has been any increase in work, responsibility or productive efficiency since 1910 on small engines, he said the general tendency has been to require more of the engineer and fireman since the safety first movement was started and that they are required to observe more stringent rules. He said the installation of automatic signals has added greatly to the responsibility of engine crews, but he would not say that the crew should receive greater pay on a road with automatic signals or on a road that "specializes on safety first."

Mr. Sheean asked why in the classification of weights and rates the first step was from 80,000 to 100,000 lb., the next from 100,000 to 140,000 lb. and the next from 140,000 to 170,000 lb., whether there was any change in the labor, responsibility or efficiency at the breaking points mentioned that would not apply at other points. Mr. Carter could give no reason for the selection of the particular weights. He would make no distinction in the pay of a fireman on an automatically-stoked engine and on a hand-fired engine, nor in the rates for coal-burning or oil-burning engines. A man should not have his wages decreased because of any improvement in the engine, he said. "If some inventive genius finds that more tons of freight can be transported over the same division with the same engine crew," he said, "we dissent from the school of economy that would permit the railroads to reduce the wages of the engineer and fireman."

Samuel T. Steinberger, a clerk in the grand lodge of the Brotherhood of Locomotive Firemen and Enginemen, testified regarding an exhibit showing the rates on wages requested compared with the wages in effect for various classes of engines and service for both engineers and firemen. He said there are 36 roads that pay in some class of service a rate that is as high or higher than the rates requested.

Mr. Carter resumed the witness stand on Monday and introduced an exhibit comparing the wage scales in 46 industries with those of the engineers and firemen. In this list the engineers stood sixteenth and the firemen thirty-eighth in rate of pay. He said that one-third of the organized laborers in the building trades receive more pay than engineers and 80 per cent receive more than firemen.

He also characterized the seniority rule as "not so very good," but said it was necessary to prevent nepotism and favoritism. "It is common knowledge," he said, "that petty officers make more money selling jobs than they do from their salaries." In this he referred especially to section foremen.

RAILWAY ELECTRIFICATION IN AUSTRALIA.—It is reported that notwithstanding the war, steady progress is being made with the electrification of the Melbourne suburban railways.

Annual Report of Interstate Commerce Commission

Annual Review of the Work Done by the Commission and Its Nine Hundred Clerks, Lawyers and Helpers

The Interstate Commerce Commission sent its 28th annual report to Congress on Thursday of this week. It consists mainly of a review of the details of the work of the past year, with few and brief expressions of opinion on important matters. The statistics and comparisons, except as otherwise noted, are for eleven months, ending November 1. An abstract of the report follows:

The work of the commission continues to increase in volume, but a board of "examiner-attorneys" has been organized, and this with increases in the strength of other bureaus, is expected to enable the commission to keep well abreast of its work.

On the "informal docket" the number of complaints received has been 7,600, an increase of 455 over the corresponding months of the preceding year. Orders for refund of overcharges have numbered 5,604, an increase of 1,243; orders under the fourth section docket have numbered 1,086, a decrease of 246; the number of tariffs suspended and disallowed was 42; 146 other tariffs complained of were suspended and disposed of in other ways, including 44 cases in which the proposed changes were allowed as filed; and in 205 instances the commission refused requests for the suspension of tariffs. These refusals numbered 20 more than in the same months of the preceding year.

The number of formal complaints filed in the eleven months was 1,081, an increase of 131; 643 cases were decided, and 179 were dismissed, making a total of 822 cases disposed of, about the same as in the preceding year. The number of hearings during the eleven months was 1,461, which is 234 less than the year before.

The report tells of the special investigations which have been made by the commission, at the order of Congress, such as those into the affairs of the St. Louis & San Francisco and the New York, New Haven & Hartford. Five investigations of "a continuing nature" are mentioned, such as that concerned with railroads which carry coal and oil owned by themselves, and the investigation into the practices of the express companies. Then there is a list of 25 investigations, still pending, as to some of which the work is near completion. This includes the inquiries into the condition of the Pere Marquette and the Rock Island, the use of private cars, and the practices of the roads in the matter of embargoes, etc. Two of these investigations have to do with telegraph and telephone companies.

The number of tariffs and supplements filed during the eleven months was 149,031, an increase of 35,800 over the corresponding previous period. The work of the tariff bureau is increasing; it renders useful aid to state commissions, shippers and carriers. The "Division of Inquiry" which deals with matters litigated by the commission in the courts furnishes the material for a dozen pages in the report. During the eleven months 80 prosecutions have been concluded and the commission was almost uniformly successful. These cases were distributed over 22 states.

The report summarizes the opinions of the federal courts in a half dozen cases in which the Interstate Commerce law has has been construed. Among these are the Hocking Valley case, the Grand Rapids & Indiana case, giving a broad construction to the word "knowingly," the Keystone elevator case and others. Indictments have been secured for the crime of filing fraudulent claims for loss or damage on freight, and for failure on the part of carriers to adjust over-charge claims; for false description of shipments; for acts in connection with the relations between the New York Central and the O'Gara Coal Company, and for unlawful use of passes (for which one man in Alabama has been sentenced to be imprisoned for 13 months). The Pennsylvania Railroad has been indicted for 25 offenses against the commodities clause of the law, and will soon be tried. A shipper has been punished for inducing an agent to discriminate in his favor; he paid money to have bills of lading issued before the freight was delivered to the road.

This summary takes account only of the more significant investigations. Four-fifths of the matters investigated never result in prosecution, but in a great number of cases the commission gives useful advice where no action is taken in the courts. The action, under the fourth section, in connection with transcontinental freight rates and freight rates in the southeastern states, is reported at considerable length.

Uniform classification of freight is again discussed, as in many previous annual reports; but the commission has now appointed a "classification agent" who consults with the classification committees and who evidently takes a conservative and sound view of this difficult question. The work of the railroads' classification committees is commended. The greater part of the recommendations of the permanent committee of the railroads has been adopted in the classifications published by the roads. The report says that the commission, if authorized in accordance with the bills which have been before Congress, could hasten the adoption of uniformity in those features as to which uniformity is most desired, and as to which uniformity is conceded to be desirable "and in such a way as would not injure the interests of shippers or carriers."

The work of the commission in connection with express companies is regarded as very successful. The classification, rates, etc., prescribed by the commission have been adopted by the state authorities in 40 states, and the states and the express companies have worked in harmony with the commission. The several express companies have greatly improved their claim departments.

The report reviews the decisions of the Supreme Court in the Shreveport, the inter-mountain, the pipe line, and other important suits, in which the commission's action was sustained; also three cases in which the Supreme Court decided against the commission. In the lower court the commission has won 7 suits and has lost 4; and 23 cases are now pending.

The "Division of Carriers' Accounts" has made a general revision of the accounting classifications for steam railways, electric railways and express companies, and the new codes went into effect July 1, 1914. The bulletin of decisions relative to the accounting regulations is to be revised and will be issued, with additional cases. The carriers have co-operated helpfully with the commission, but there are still many unsatisfactory features of railroad accounting to be corrected. The matter of depreciation is not properly treated by the carriers. During the past year the examiners of accounts have had other work to do and have not attended to the field examination of carriers' accounting practices as well as they should have done.

This division now has branch offices in New York, Philadelphia, Pittsburgh, St. Paul, Chicago, St. Louis and San Francisco, and an office is to be opened at New Orleans. At each office there is a force of resident examiners, and the plan is expected to save expense.

The commission has investigated the practice of the railroads in the adjustment of freight claims. During six months ending June 30, 1914, the total number of claims presented to the railroads of the country was 2,424,996, of which 1,739,781 were for loss or damage and 685,215 were for over-charge. At the end of the six months 22 per cent of these claims remained unadjusted, many of them, of course, having been received during the last preceding month or two. Of the 78 per cent adjusted, 1,680,041 were paid, 186,290 were declined, and 29,101 were withdrawn. Fifty-five per cent of the claims adjusted were settled within 15 days after receipt, 74 per cent within 30 days, and 90 per cent within 60 days. Claims are now being adjusted with

commendable promptness. In the three years ending with 1910 the amount paid out by the steam railroads for loss and damage decreased, year by year; but since then there has been an increase; the payments in 1913 amounting to $30,885,454, which is 41 per cent more than the sum paid in 1910. Freight revenue increased during that period only 14.2 per cent. The payments in 1913 amounted to more than three times as much as in 1900, while the increase in freight revenue during those 13 years was only 109 per cent.

The Division of Statistics has begun the preparation of the annual preliminary abstract of statistics for the year ending June 30 last, but none of this work appears; some of it, apparently, is to be issued in an appendix. This division is working, together with committees of the American Railway Association and the Association of Accounting Offices to formulate a code of rules for separating operating expenses as between freight and passenger services.

The Division of Safety administers the safety appliance acts and kindred laws. During the year ending June 30, prosecutions were begun in 257 cases, involving 1,020 violations of the safety appliance acts. In court decisions during the year under this head the government lost on 26 counts and won on 17; but the 26 are all to be appealed to the Supreme Court. Carriers confessed judgment during the year as to 483 counts. The railroads still fail to provide adequate means for repairing cars at a sufficient number of convenient points. The government standards of safety appliances are pretty well complied with, except as to freight cars, the number of which properly equipped is disproportionately small. Only by the exercise of the greatest diligence can the carriers standardize their freight cars within the time required by the law.

A half dozen pages are given to judicial interpretations of the safety appliance and hours-of-service laws. Prosecutions have been begun for 2,871 violations of the hours-of-service law, and during the year ended June 30, 1914, the railroads have confessed judgment as to 1,785 violations. Of 592 counts which went to trial, 395 were decided in favor of the government and 164 against it. The number of cases during the year in which individual employees worked more than the statutory number of hours was 163,192, which is a very large reduction from the number reported in the preceding year. The numbers are regarded as still unduly large, particularly the cases due to hot boxes, defective couplers, etc., causes which ought to be done away with by more rigid inspection of cars. The commission again recommends that Congress define more exactly what causes shall excuse the retention of train men on duty beyond the prescribed hours.

Sixty-three train accidents were investigated during the year ending June 30, of which 40 were collisions and 23 were derailments. Thirteen collisions occurred under the block system. The flagging rule is still very imperfectly enforced, and inexperienced flagmen are employed. Speaking generally, some improvement has been noted in the matter of supervision of trainmen, and stricter obedience to rules is being insisted on. The "safety-first" committees are credited with a large part of this improvement. The commission again calls for legislation to standardize operating rules, and repeats its demand for investigations to determine the stresses to which rails and wheels are subjected. It also repeats the recommendation for a statutory requirement that steel cars be used, and would have the use of wooden cars in front of or between steel cars in high speed trains prohibited.

The Division of Safety has investigated proposed safety appliances, in accordance with the wish of Congress, and a separate report by this department will tell in detail what has been done.

The chief inspector of locomotive boilers reports that during the fiscal year the number of locomotives inspected was 92,716, a considerable increase over the preceding year; but the number found defective, 49,137, is about 5,000 less than in 1913. The percentage of engines found defective, 52.9, compares with 60.3 in the preceding year. The number of engines ordered out of service, 3,365, was 1,311 less than in 1913. The number of persons killed in boiler accidents in 1914 was 23, as compared with 36 in 1913 and 91 in 1912.

No prosecutions for violations of the boiler inspection law have been sought during the year; but on two or three of the larger roads and on several smaller ones it is believed that it will be necessary to resort to the courts.

Under the Panama Canal act, the commission has received 58 applications for release from the requirements of clause forbidding the ownership of water lines by railroads, and investigations of these cases are well under way.

The Division of Valuation expects in the near future to make up its conclusions in regard to the five roads on which the work was first undertaken, namely the Norfolk Southern; the Atlanta, Birmingham & Atlantic; the New Orleans, Texas & Mexico; the Texas Midland, and the San Pedro, Los Angeles & Salt Lake. Eight parties of engineers are now at work in each of the five districts and in each district they cover from 1,500 to 1,700 miles of road a month. The preparation of inventories of telegraph and telephone lines has been begun. The accounting officers of the division of valuation have done a good deal of work on selected roads, and final reports of two roads have been received. So far as can be judged at the present time the attempt to report in detail as to the cost of each piece of property, as required by law, "has involved an expenditure out of all proportion to the value of the results." The supervisor of land appraisals has a land attorney in each of the five districts, and much work has been done.

Recommendations. The commission again recommends that the government furnish it a suitable building. Outside quarters have to be rented, and expense could be saved by furnishing one large building. Recommendations are renewed that three years be set as a time limit for beginning actions relating to transportation charges; that the federal government take control over railway capitalization; that the commission be more explicitly authorized to examine all correspondence, etc., of carriers subject to the act; that the penalty for violations of the hours-of-service act be made a fixed sum, and that the use of steel cars in passenger trains be required by law.

The expenditures on behalf of the commission during the fiscal year amounted to $2,094,583, of which the sum spent on valuation was $456,565. The boiler inspection law cost $202,326, and the safety appliance regulations $134,275.

VENEERED STEEL INTERIOR FINISH FOR COACHES

The development of a suitable material for the interior finish of passenger cars has been one of the problems which railways and car builders have been endeavoring to solve for some time, particularly since the advent of the steel car. Such a finish should possess lightness, strength and durability, be pleasing to the eye, a poor conductor of heat, occupy a minimum of space and be fire-resisting.

An all-wood interior finish is bulky and does not seem to be in harmony with modern car construction. While it is possible to make an imitation of wood by using steel interior finish, the mere fact that wood is imitated would seem to indicate that it is the desirable finish, but with the use of steel there are many disadvantages that do not seem to be much nearer solution than when steel was first used. The steel surface is often wavy, even when new, and particularly on flat surfaces; it is easily dented and the dents or buckles cannot be easily removed; it is cold, noisy and corrodes on the unexposed side.

The question of a suitable interior finish has been solved by the Canadian Pacific by the use of veneered steel. The veneer is of varying thickness, from 1/8 in. up, depending on the severity of service for which it is intended, which is governed by the location in the car, and the class of the car. It con-

sists of a steel plate with a layer of canton flannel glued to both sides; the wood veneer is then glued to this flannel.

This veneered steel is used in the construction of doors, panels, wainscot, bulkheads, sleeping car berths, sleeping car seat ends, etc., and is of approximately the same cost as steel or wood. It has the insulating effect of wood, is not subject to corrosion the same as steel alone, does not splinter in wrecks, is fire-resisting and can be made attractive in appearance. In other words, it seems to combine all the good points of wood and steel without the disadvantages of either. It is not an experiment, as it has been used sufficiently long to know that it does not deteriorate. It is now in service on about 60 cars and its use has been arranged for on diners, sleepers, coaches and all passenger carrying cars.

In the construction of doors, bulkheads, panels, etc., the veneer is used on each side of the steel and in this way oak can be used on one side and mahogany on the other. In the

Veneered Steel Bulkhead in Canadian Pacific Steel Coach

illustration, all of the wood in sight in the bulkheads, smoking room partition, etc., is of thin veneer, except the casings for the door frame and the moulding.

This veneered steel finish is the invention of R. W. Burnett, general master car builder, Canadian Pacific, Montreal, Que.

The First Railway Mail Car.—A bronze reproduction of the queerest, clumsiest, funniest little old railroad car in the world was hung in the train concourse of the new Chicago & North Western terminal yesterday. The original was built in 1864, and was the first railway postal car in the country. George B. Armstrong's name appears below the reproduction of the car, because it was his idea that brought the railway mail service into existence. The Chicago & North Western Railroad had the reproduction made because it was the first source of encouragement to the persistent inventor. The railroad furnished the financial backing, and on August 28, 1864, the first mail was carried between Chicago and Clinton, Iowa. It was the knell of the stage coach. By 1867 two more mail cars had been built and put into service between Chicago and Fort Howard, Wis., and between Boone and Council Bluffs, Iowa.—*Chicago Tribune.*

OBEDIENCE TO ORDERS; ABSTENTION FROM LIQUORS*

By H. W. Williams
Cleveland, Cincinnati, Chicago & St. Louis, Springfield, Ohio

When I was sixteen years old, I enlisted in the 51st Regiment, Canadian militia, and served two years. Those English officers taught me the great importance of obeying orders under any and all circumstances; and this lesson I have remembered to this day. There was another lesson which they taught me, and that was to keep my eyes and ears alert all the time; and not to talk while on duty!

I fired about three years for one man, and after I had been with him about three months, he was nick-named the kid-glove engineer; and all the time I fired for him, he never put his hand on a wrench, or an oil can. There was perfect harmony between us. Without harmony on an engine, there is not much efficiency.

There is no secret about the successful running of a locomotive. I have always followed certain rules under all circumstances. First, remember you are holding a man's job. Second, while running or standing on main track, talking must not be indulged in. I have known a whole crew to forget their orders on account of talking and joking. Third, keep an incessant lookout on the track and slow down for all signals that cannot be clearly seen. Fourth . . . more damage is done and more men are dismissed from the service on account of strong drink than from any other cause. I believe that more than 70 per cent of the failures of railroad men can be traced to drinking spirituous liquors. It surely does reduce efficiency. Best leave it alone entirely. Fifth, always take the needed rest as soon after arriving at the terminal as possible; never let the call boy surprise you. Sixth, if there is any leisure time, study your business. There are three books I will mention, two of them are books of rules; the first is the Bible, and I commend it to railroad men. The second is the railroad company's book of rules. The third is a bank book; the engineer who does not begin early in life to build up a bank account, is neglecting part of his duty. . . .

One hears much about "surprise tests," and some object to them. I have never had occasion to complain about them. If some officer has extinguished a lamp and made me lose a little time, that was the company's business, not mine; all I had to do was to report time lost at that place and no questions were asked.

In my 41 years I have had many firemen; and they were all good runners but one; he was a complete failure, and whiskey caused his downfall.

Up to about 1898, we had regular engines and somehow I almost always had a good engine, but I did most of the repairs on her myself. Since our engines have been pooled, my practice has been to go to the engine house early enough to thoroughly inspect the engine I had to take out. By doing so I have had very few engine failures.

I have had but few engine failures and never had an accident worthy of note, and I have never received a reprimand from any officer; but instead, have received several complimentary letters; and my record is still clear. Now, I claim my freedom from accident and injury to myself and others (for I have never injured a passenger on my train or any other train) is due to strict adherence to the rules and attending to the business I was paid for. . . .

London Post-office Tubes.—A contract has recently been let for the construction of a post-office tube line in London six and one-half miles long, extending between the eastern district post-office in Whitechapel and the Paddington district post-office, and making connections with a number of other post-offices.

*This is the fourth of a series of articles, made up of useful hints to locomotive runners, which were written in connection with the prize competition of several months ago. The previous articles of this series were printed in the issues of September 25, October 2 and November 27.—Editor.

The Railway Problem and Its Solution*

The Necessity Is Emphasized for Having a Constructive Policy in the Practice of Public Regulation

By Samuel Rea
President, Pennsylvania Railroad Company

It is no difficult task to sum up the present railroad situation. We can all see that something is wrong, but no useful purpose will be served unless we can suggest some constructive methods of improving conditions.

Examine, for instance, the eastern railroads, which reach the centers of the largest population and heaviest traffic of the country, and you will find greatly diminished gross revenues and the still greater proportionate reduction in net revenues; their purchasing powers are stringently curtailed, and their credit has been greatly weakened. This condition arises from causes largely beyond their own control, so that the return earned during the past year upon the money invested in the road and equipment of these roads amounted to less than 4 per cent. This serious conditon is not new, but it is now acute. We have been living on hope at least since 1910, when the downward trend was clearly indicated; how much longer we can exist on that precarious asset, I will not venture to say, except to suggest that it takes more than hope, advice, or enthusiasm, or all combined, to pay wages and taxes, provide satisfactory service, pay dividends, and retain a proper credit basis to obtain capital for improvements and extensions.

Increased traffic will not cure the railroad malady, for up to the present all the economies and efficiency, obtained by increased trainloads, etc., have been offset by increased costs, wages and taxes. These companies therefore need not merely the very moderate increase in rates for which they petitioned the Interstate Commerce Commission, but also all the revenue that can be secured by working out in practice the various other means suggested by the commission for increasing revenue.

A full consideration of the railroad position and the effects of public regulation must not, however, stop there. Irrespective of any decision in the rate case now pending, whether it be finally favorable (as we trust it will be) or unfavorable, it is evident that the time is ripe for suggestions concerning constructive railroad legislation and policy.

INVESTORS MUST HAVE REASONABLE RETURNS

I need not remind you that after agriculture—and what would agriculture be without railroads?—the railroads are not merely the most important industry in the country, but they are also in their essence public institutions performing functions which are by their very nature of a public character. They are owned in part by an army of individuals, actually holding their stocks and bonds, and in part by institutions such as savings banks, insurance companies, universities, hospitals and other philanthropic enterprises, in the welfare of which many more millions of individuals are vitally concerned. These are largely dependent upon income derived from the money they have invested in the service of the public, and rightfully they hold railroad managers responsible for this income. It should be the business of government regulation not merely to see that the public is properly served by these railroad managers, but also to see that the owners of the properties are fairly compensated, and that their revenues are sufficient to discharge properly their duties to the public. Otherwise the managements of these companies will be prevented from efficiently discharging their obligations to the public and their owners. The railroads must give the public good service and their operations must be continuous in good times and in bad. Moreover, the railroads of the country pay over $140,000,000 in taxes every year, a sum equal to 5 per cent on nearly three billions of dollars, requiring over 16 per cent of their net operating revenues. They pay good wages to their own employees and furnish profitable employment for the industries which furnish railroad materials and supplies.

But apparently the interests of everyone have been safeguarded under public regulation except the interests of those who furnish the money for the public service; and we must protect these investors upon whom we must rely for future capital. Failure in the last decade to protect the railroads and railroad investors has at last produced a lack of confidence in public regulation, and we now know that through the weakness of the railroads, the whole country is suffering. Upon this great industry, through the operation of too many hastily enacted federal and state laws, and by failure to provide and adjust the machinery necessary to enforce these laws by reasonable and practical methods, a mistaken policy of repression has been imposed, which has not permitted railroad charges to increase with the enforced increase in the cost of their operations. This has caused loss to existing railroads, and has precluded the building of new lines, and the making of needed improvements and betterments on the present roads.

The inherent weakness of the present situation is that we as a people seem to have assumed that the present railroads and their equipment and facilities are complete, and are sufficient for present and future needs, and that the chief function of public regulation is to curtail their revenues, increase their expenses and lessen the margin of return. In this growing country the present railroads are far from adequate, and therefore the policy of repression is bound to bring, if it has not brought already, a day of reckoning. Let us not forget that if we expect people to continue supplying their savings for our railroads, present and future, their earnings must continue to be what these investors regard as reasonable and sufficient, and they are not likely to be governed by the opinions of legislators, or commissions in this respect. The present policy of repression must be modified and lack of confidence must be removed, or these millions of investors will seek other avenues to utilize their capital.

There are some particular features of the railroad situation, incidental to public regulation, to which I would direct attention.

PRESENT CONDITIONS UNENDURABLE

The railroads are existing under conditions that breed business depressions, because of arbitrary, heavy and frequently unjustifiable burdens imposed upon them, by legislatures, state and national, and there are still many wasteful legislative experiments forthcoming unless the authors discover that the public will not willingly pay their cost. Public opinion is now convinced, I feel, that the railroads are entitled to more equitable treatment under public regulation.

The present situation is not the result of premediated action or of a clearly defined punitive public policy; it is the result of our failure to adjust fairly our national conception of the rights and duties of these common carriers, and to adapt our new laws for public regulation to rapidly changing commercial and financial conditions. It is not, therefore, a case for mere sterile criticism, but for mutual study and cooperation to the end that the evils now existing may be clearly recognized and corrected. The public, the railroads and the

*An address before the Chamber of Commerce meeting, New York, December 3, 1914.

commissions, state and federal, should unite in an effort to ascertain and finally establish the principles upon which wise regulation should hereafter proceed, so as to retain for the people at large the advantage of our American system of private ownership and operation under public regulation, and avoid being forced into another system far less desirable in a country such as this.

I. C. C. OVER-BURDENED WITH WORK

Can it reasonably be contended that any large and important business enterprise, whether individual or corporate, could be successfully conducted if, notwithstanding radically changed conditions and substantially increased costs of production, it could only increase prices subject to the power of an administrative body which on its own initiative and without a hearing might suspend the increased prices for an extended period? Under the existing federal law, increases in railroad rates, no matter how reasonable or justifiable, may be suspended without any hearing, for at least four months after they would have become operative. In practice, this means five months after the rate schedules are filed with the commission, and the suspension may be extended by the commission for a further period of six months. It is, therefore, possible even if the new rates are justifiable, for the railroads to lose nearly a year of benefit from them while the commission is determining their reasonableness. Is the public welfare promoted thereby? From practical experience and in a spirit of fairness and justice, I should say it is not, and the period of such suspension, and the determination of the question at issue, ought to be restricted to sixty days after the date of filing new rate schedules with the commission.

Another trouble in the present situation is that the Interstate Commerce Commission has been over-burdened with work and with responsibilities, many of which must be deputed to a large corps of subordinates, so that in many instances direct consideration by the entire commission is impossible. The work of the Interstate Commerce Commission, as originally designed in 1887, was to prevent unjust discrimination in rates or service, to see that rates were reasonable, to secure publicity of railroad rates and practices, prescribe uniform railroad reports, and primarily act as a referee betwen the public and the railroads. The commission was given limited, but well defined, powers within reasonable scope. Now, however, as the result of new laws, the scope of its control of railroad operations and development has been largely extended. It could materially assist railroad development, but so far it has proven impossible for seven men in one center to act not merely as regulators but as administrators of the railroads, leaving the financial results and responsibility of that administration to be borne by the companies and their owners.

STATE AND FEDERAL REQUIREMENTS CONFLICT

There is also a certain amount of disagreement between the federal and state laws and orders of commissions, and of failure to recognize the inroads on railroad revenues of new laws, orders and governmental awards.

Let me use just one example of the commercial chaos resulting from such conflict. The recent difference in the views of the Interstate Commerce Commission, on the one hand, and the Public Service Commission of New York, on the other, in connection with the allowances to industrial railroads, has, during the last eight months, resulted in freight rates, via the lines of the New York Central (whose route is intrastate) from one of the large industries at Buffalo to New York City, and to other places on its line, lower than via any of the other trunk lines, as their routes between Buffalo and New York are interstate, and there is nothing that the other railroads could do to meet this situation, injurious as it was, not only to themselves, but also to industries local to their lines. The same situation, arising from the same cause, existed in the State of Pennsylvania, as between the Pennsylvania Railroad and other trunk lines. These differences must be reconciled for the welfare of the public and the railroads.

CONSTRUCTIVE SUGGESTIONS

In the practice of public regulation, from the constructive side, I would at this time suggest:

First.—That the Interstate Commerce Commission should be materially increased, and so organized as to be able to deal promptly with the very important railroad questions affecting all parts of this large country, and thus conserve the time and energy of railroad officers, the public and the commission. The additional members of the commission should be selected from men having experience in railroad management, operation, traffic and finance, and if men of broad business experience were also added, it would be very helpful.

Second.—That the position should be placed beyond political influence, by a long tenure of office, and with compensation sufficient to attract and retain men of the widest experience and greatest ability. We recognize the necessity for men of this character and technical experience in dealing with banking and other broad business enterprises, and we must recognize that equally wide experience is essential to deal intelligently and wisely with the railroad problems.

Third.—That the regulatory power of the Interstate Commerce Commission should be clearly extended to the supervision and control of all rates and practices which directly, or remotely, affect interstate transportation or commerce.

Fourth.—That the Interstate Commerce Commission should be given the power to interfere, by appropriate action, whenever necessary to maintain a rate structure approved by, or satisfactory to, it, even though, to accomplish this, it should be necessary for the commission to prevent reductions of rates which would have a contrary effect, or to compel advances of rates found by the commission to be unreasonably low. An unreasonably low rate may be beneficial to some one or more shippers, but the rates of some other shippers are sure to be disadvantageously affected thereby.

Fifth.—That for the existing repressive policy of public legislation, a constructive policy should be submitted, and existing legislation should be so modified as to permit the railroad companies to do their full share in the development of the country's resources. It will naturally follow that the commission should be enabled, and indeed required, in the determination of questions involving railroad rates and practices, to deal with the questions before it, not merely from the standpoint of the shipper and the carrier, but from the larger standpoint of the entire country, and on such economic and business lines that due and controlling weight may be given to these larger interests essential to the public welfare. Such a change in public policy and legislation is requisite to encourage the investment of private capital for railroad extensions and additional facilities.

For instance, I seriously question the practical utility of railroad valuation, for I believe that very few railroads are over-capitalized, and I know the public is not required to pay higher rates on weak roads than on the more conservatively capitalized railroad lines. Therefore, while the railroads are cordially and fully co-operating in the work of federal valuation, yet under present conditions and when economies are being enforced everywhere, I look to the commission, under such an equitable public policy as I have in mind, not to commit the country and the railroads to so vast an expenditure until one system, or the lines in one section of the country shall first be valued and the results demonstrated to the country.

Sixth.—That, as another necessary result of a constructive and equitable policy towards railroads, and with a commission amply strengthened to deal with railroad questions, Congress would no doubt refer to the commission for investigation and report, such legislation as affected wages, em-

ployees' working hours and conditions, increased taxes, boiler inspections, extra and unnecessary men on trains, non-compensatory mail and parcel post service, railroad valuation, improved stations, grade crossing elimination, and other matters which seriously affect railway revenues and expenses. Due weight to these heavy expenditures would thus be given in approving rate schedules, and a tangible basis would be thereby provided on which to continue the regulation of these matters (if essential to the public welfare) without injustice to the railroads. The inability of the railroads to protect themselves in respect to increased wages fixed by governmental action could not be more forcibly presented than in the November, 1913, report of the Board of Arbitrators under the Newlands Act, relating to conductors' and trainmen's wages on which your president served as chairman.

Seventh.—That the extraordinary power to suspend rates without a hearing should be limited to a period not exceeding sixty days after being filed with the commission, or some such reasonable period. If after such hearing as could readily be had within this period, coupled with the information and data already possessed by the commission, from the current and special reports made by the railroads, under its uniform accounting regulations, the commission could not be satisfied that the increase proposed ought not to be made, the rate should rightfully become effective, and the present confusion and delay would end. The railroads as an act of self-preservation will always endeavor to make their service and facilities satisfactory, and rates reasonable, because only in this way can they make friends, encourage business and earn profits.

AN ENLIGHTENED POLICY WILL PREVENT CONFISCATION

Considerable emphasis has been laid upon the fact that the railroad companies, and their owners, are deprived of an appeal to the courts for the protection of what they conceive to be their just rights as against the orders of the commission. I am willing, however, to continue relying upon public regulation and public opinion to protect the railroads, although I cannot overlook the fact that the eastern railroads are earning a return of less than 4 per cent on their property investment. If this is not approaching confiscation, how much less must we earn before reaching that point? Surely the country does not want impoverished railroads unduly restricted in the conduct of their business. What it does want is strong, aggressive lines, built and improved with private capital, efficiently managed and operated, subject to equitable public regulation.

What I have suggested may not meet all the difficulties in the public regulation of railroads. Other helpful suggestions will doubtless be forthcoming from railroad and business men and commercial bodies, etc., and, I trust, from some statesmen. There can be no difference of opinion that public regulation must be equitable so far as the railroads are concerned, and must be adjusted to respond promptly to business conditions. Such a change will encourage initiative and enterprise in railroad manageemnt and will insure investors, here and abroad, that their money has the full protection of our laws and that they will be equitably dealt with.

I believe in regulation by commission, and I urge, therefore, that we do not encourage destruction of such regulation, but rather its conservation, by adapting it, as we have banking regulation and other laws, to suit the needs of the country as they change from time to time. We must look beyond the present obstacles and view the whole subject from the statesman's standpoint. Under an enlightened policy of public regulation, but not repression, the railroads will be placed and kept in a strong position to meet increased traffic demands, as well as to live healthfully in time of depression. If we now by equitable dealing ensure their strength, one of the greatest obstacles to the recovery of financial confidence and business enterprise can be removed.

SOME DIFFICULT PHASES OF TERMINAL OPERATION*

By C. A. Pennington

Superintendent of Terminals, Cleveland, Cincinnati, Chicago & St. Louis, and Chesapeake & Ohio, Louisville, Ky.

The problem of terminal operation is steadily becoming more complex, due to the natural expansion of business without a corresponding increase in facilities—an increase that at some points can only be secured by the expenditure of enormous sums of money—and to the improper uses to which terminal tracks are subjected. Outlying classification or auxiliary yards in less congested districts afford some relief but do not entirely remove the difficulties of the terminal situation in all its phases and they in turn tend to increase unit costs. While many yards have been entirely reconstructed to meet modern needs, most systems have a few points where conditions are such as to exert a detrimental influence on the greater part of the line.

So serious has the problem become that there has been a revolution of methods and even ideas. Where formerly a terminal was considered one factor in the general scheme of transportation, where the yard served the railroad, necessity has demanded a reversal of positions. During certain periods, transportation loses its primacy in the minds of operating officers in that it is subordinated to the paramount object of keeping some terminal open to the end that congestion on the line may be avoided. Road conditions may be responsible for sluggish work within a terminal, the greatest trouble usually being lack of or irregular supplies of motive power. When the traffic is not moved currently, congested conditions are bound to reflect on the terminal work. It is much easier and cheaper to prevent a blockade than to clear one. While only reasonable sums of money are needed, unfortunately such funds are not always available to improve easily remediable conditions, such as shortage of power, an insufficient number of sidings, sidings of insufficient length, etc.

Without depreciating the importance of the question of facilities in the broader sense, it is well to consider other conditions which tend to minimize the improvements effected by the extension of terminal facilities. It is no uncommon thing for an ordinary terminal to hold several hundred cars of grain and coal awaiting reconsignment to local elevators, industries or connecting lines. The entire yard must be switched at least once every day and often no more than 15 or 20 per cent of the "hold" cars are disposed of.

The handling of team track business is made most difficult during certain seasons, because of insufficient storage space at the command of consignees. In many cases freight is bought on speculation with no definite market in sight and the railroad is expected to take care of it. It is a serious problem when costly equipment is allowed to stand on valuable team track space while the freight is being peddled in one-horse wagons. The team track storage charge should remedy the trouble somewhat, but something more drastic and broader in its scope is necessary to help general terminal conditions. A railroad yard is no place to store or to retail freight; it is not a coal yard, neither is it designed for grain storage, and its uses as such should be discouraged.

To get the best out of a terminal it is, of course, necessary to handle cars quickly and definitely, avoiding unnecessary moves. The marking or listing of inbound trains is an important feature. A consignee may be located on both home and connecting line tracks and will handle certain commodities at his different warehouses; another will handle all his hay and oats, for instance, from the team tracks but will reconsign corn from the hold yard; a third may be located entirely off the home rails on the tracks of two connecting lines. To dispose of a considerable part of the inbound train promptly on arrival it

*A paper submitted in the recent contest on the operation of large terminal yards.

is necessary for the yard clerks to know how freight for various consignees is handled.

At Louisville we are constantly after consignees for standing orders in whole or in part. These disposition orders are worked into a complete alphabetical list and a copy is furnished each yard clerk interested in the inbound work. The clerks chalk mark the trains, showing disposition, name of consignee and commodity, on all but through connecting line business. Inspectors follow the clerks, observing their marks, and in turn mark on the corner of the cars the train number and date. This mark not only shows that the inspectors have examined the car but indicates the age of any car in the yard. By walking through the hold or team track yards at any time the yardmaster can readily spot any old car or one apparently out of line. Yard checks and lists of billing with the locations of cars shown are also used. Cars for the freight house are given a distinguishing mark in accordance with the class of freight, preference in switching being given special traffic. As a double check against delay to perishable or other important merchandise cars, the warehouse foreman has a list each day of his billing, and if such cars fail to show up in the house the matter is promptly called to the attention of the yardmaster. Any such delays are followed up and responsibility located as between the yard clerk and switch foreman. The campaign for heavier loading of merchandise cars has helped terminals by reducing the number of house cars. This is merely a statement of the fact with respect to yard conditions and not an argument in favor of the extremely heavy loading of cars without regard to delay, extra handling and increased chance of O S & D claims

In handling industry work, a system can be applied to the firms doing a large steady business, but the work of small irregular receivers and shippers requires close supervision. We bill all of our industry cars and check the bills regularly, filing them when cars have been reported placed. When bills are carried over from one day to the next the cars are located and the cause of delay ascertained. The bills for all cars loaded on sidings have shown on the top of the bill the name of the firm or siding. If any such cars fail to show up promptly for outbound movement, the bill shows the yardmaster at a glance where the car was loaded.

Conditions governing the interchange of traffic are so varied that any plan must be formulated entirely to suit local requirements. The success of any scheme depends largely on close supervision and the ability of officers to get together on the ground and "iron out" minor irregularities. Permanent inability of a connection to handle its business indicates a situation beyond the power of local officers to regulate. One thing in common that has brought about trouble in terminals and between connections this past summer and at other periods is the flooding of connection points with empty bad-order cars. Homeward movement of foreign cars is, of course, directly responsible, but it would further appear that in handling such cars through shop tracks the general practice on a great many roads has been to repair cars only sufficiently to get them over to "the other fellow." There may be good reasons for such handling, but it has not worked to the advantage of terminal points. It is apparent that it costs less to switch a car through one shop track and repair it than it does to switch it through three or four and make partial repairs. In the latter case, who stands the additional expense?

Considerable attention is being given at present to damage to freight. It is hardly practicable to slow up switching. In fact conditions are such as to make it imperative to keep crews speeded up, although it does not necessarily follow that more care cannot be used. There is one place, however, where more time could be given with good results, and that is on the night manifest runs. In some cases the time is too short between the closing of freight houses and the departure of trains. Under pressure to run trains on time, house switching is done with speed as the main, if not only, object. However, where trains depart from terminal yards, it is well to get them out of the way as early as consistent. So far as yard work is concerned, there are always more opportunities for damage at night. In some cases consignees leave partly unloaded cars on team tracks in such shape that an ordinary coupling will displace the contents. Attention to this feature has been productive of good results. Warehouse foremen must give attention to partly loaded or unloaded merchandise cars.

Close co-operation among the various terminal departments is of great value in handling the business, particularly the small miscellaneous jobs or "short" work. Foremen of transfer gangs, coaling stations, shop tracks, bulking yards, etc., should anticipate their needs sufficiently to allow the yardmasters and conductors to map out the work. When several people wait until the last minute to call for engine service there is bound to be some disappointment. Wide-awake car inspectors contribute to successful operation. Not only should trains be handled promptly, but during intervals the inspectors should look over shop tracks and other available sources of empty cars and tag all cars in line with their general condition and the purpose for which they are required. Car inspectors, yard clerks and conductors must realize the importance of promptly and properly filling orders for empty equipment. This means much to a railroad's customers. Road engines ready on time, close figures on trains, overhauling of the best yard power during dull seasons, close attention to yard tracks and conditions by the maintenance of way department—all these things exert an influence.

The local freight office can render valuable assistance by prompt handling of billing, by securing advance disposition orders and by urging consignees to dispose of carload freight promptly. In busy seasons one man's time can be spent profitably in checking lists of "hold" and team tracks, telephoning consignees on all old cars and straightening out any irregularities. Through interline billing is an aid to yard operations as well as a time saver in the office. Freight auditors should extend this system of billing to cover a greater proportion of through business.

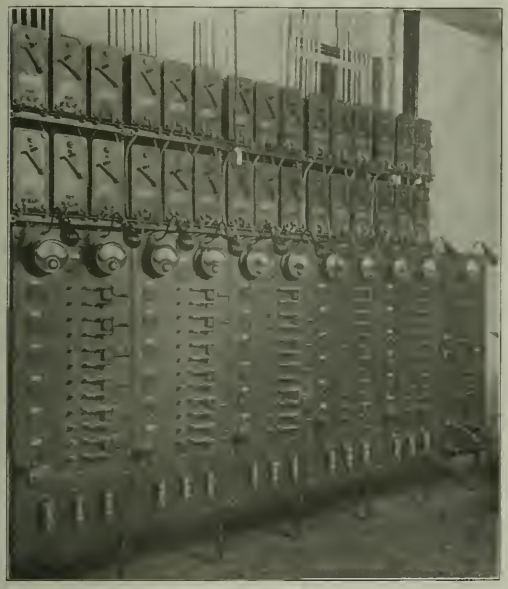
Co-operation between the operating and traffic departments is highly important. In attempting to secure business freight solicitors should not make unreasonable promises which usually have a boomerang effect. These men should spend some time around the yard at intervals, in order to know something of conditions and at least roughly understand the time required to make certain moves. On the other hand, when a yardmaster promises something he should make good even at a sacrifice. It is also well to remember that the manner of stating inability to grant some request is often resented more than the failure to secure what is wanted. It is impossible to prevent all complaints or to satisfy every one. A few shippers constantly play one railroad against another, endeavoring to secure questionable concessions and are ready to complain on the slightest pretext, principally in order to keep traffic officers "on edge." The public as a whole asks only for reasonable, dependable service, but cannot stand misrepresentation or being "double-crossed." It should be impressed on terminal employees that the shipping public makes their jobs possible. Operating and traffic employees must forget that there are such things as "departments" and work together.

Too much thought cannot be devoted to organization and supervision—not superficial direction, but the supervision that means careful teaching, training and development of latent ability, a supervision that not only corrects errors but strikes at the cause. This may well apply beyond the terminal. The title of master of trains is better written train (ing) master and that officer within or without a terminal should have his title imprinted on his mind as an everlasting admonition to—trainmaster.

Above all things, with a force of terminal clerks, create interest in the work, let each man feel some responsibility, understand the reason for performing his duties and the result of failure to properly handle his work—not the result so far as the employee is concerned but the effect on the company he represents. It is not possible to perfect an error-proof organization but we may aim high, and by patient, well directed effort produce results of a satisfactory nature, bearing in mind the fact that a well regulated smooth-working terminal is one of the railroad's best advertisements.

HANDLING FREIGHT WITH STORAGE BATTERY TRUCKS

Electric trucks for handling express and baggage have been in use for some time past at a number of passenger terminals. Their application is gradually being extended to the handling of freight and to the handling of materials around shops. One of the most extensive installations of this kind for handling freight is that of the Fall River Line, Piers 14 and 15, North River, New York, where twenty electric storage battery trucks together with complete facilities for battery recharging have been installed by the Sprague Electric Works.



Battery Recharging Switch Board for Storage Battery Trucks, Fier No. 14, Fall River Line

These trucks have a heavily bound oak platform located 22½ in. from the ground. The platform rests upon a frame of channel side members and steel end castings which are joined by rivets. Power is furnished by a lead storage battery having flexible rubber jars assembled in a creosoted wooden tray and suspended below the platform in a cradle attached to the side channels. The truck is driven by two series wound automobile motors enclosed in dust and damp proof frames, which are electrically connected in multiple and work independently of each other. This arrangement greatly simplifies the transmission by eliminating the countershaft, chains and differential, the pinion on each motor meshing directly with a gear bolted to one of the driving wheels. The maximum speed of the truck, light, on a level floor, is nine miles per hour. With a one-ton load the maximum speed on the level is seven miles per hour, and it will operate successfully up a 25 per cent grade under full load.

Truck Ascending Steep Grade to the Deck of the Ship

The truck is operated from a platform at one end on which the operator stands with one foot on the brake pedal, the controller lever in one hand and the steering lever in the other.

Receiving Platform, Fall River Line, Piers 14 and 15, North River

The brake is so arranged that it is set at all times until released by pressure on the brake pedal. An automatic switch is connected with the brake lever so that when the brake is applied the switch is open. It can only be closed by releasing the brakes and prevents running the truck with the brake applied or the possibility of accident from movement of the controller handle while loading or unloading the truck. The controller is arranged to give three speeds forward and three speeds reverse. To stop the truck the operator simply takes his hand from the controller lever which automatically returns to the neutral position, and lifts his foot from the brake pedal.

While the conditions under which the storage battery trucks are operating on the piers of the Fall River Line are in some respects different from those to be found in railway freight stations handling the same amount of business, the methods of classifying and stowing freight in the boats are such as to make a brief study of the operation of these trucks of interest from a railway standpoint. The Fall River Line boat arrives at New York in the morning, is unloaded during the forenoon and reloaded with outbound freight, leaving New York late in the afternoon. All classifying of both inbound and outbound freight is done at the piers in New York. A large part of the inbound freight is shipped from Boston and other New England points to Fall River by rail and transferred directly from the trains to the boat, while freight from New York is transferred directly from the boat to trains for rail delivery.

Before the storage battery trucks were installed it was customary for a large proportion of the shippers' wagons to drive directly onto the dock both to receive and to deliver freight. Those receiving freight loaded directly from the piles where the consignments were stored. When the dock became congested, as often happened, in order to avoid delay it was necessary to truck many consignments to the bulkhead by hand for delivery to the waiting trucks. This materially increased the cost of handling. Trucks delivering outbound freight drove to the gangway of the ship, where the freight was unloaded, weighed, checked and trucked by hand direct to the deck of the ship. The number of shippers' trucks which could be unloaded at one time was limited by the space directly in front of the gangway, and at times during the day, to avoid congestion, it was necessary to assist the drivers in unloading. A large number of men were required to truck the freight to the ships, as there was no room for temporary storage on the dock. One man could handle but a small load when the conditions were best, and at high tide the grades up the gangplank were such that he required assistance.

After the installation of the electric trucks a careful study was made and changes in the methods of receiving and delivering freight have been put into effect which have resulted in materially improving conditions on the piers as well as greatly reducing the cost of handling. Congestion has been greatly reduced if not entirely eliminated by keeping trucks delivering outbound freight off the docks entirely. To accomplish this a receiving platform, one inch lower than the loaded electric truck, has been built at the bulkhead to receive all outbound freight. This platform is built in sections; the outer section, or that nearest the doors, is permanent and contains two scales at each door; the inner section is subdivided into five parts, each of which may be lifted out of the way when not in use. In the morning the portable platforms are lowered and are used for storage. As freight is received it is weighed, checked and sorted according to railway routing at the other end of the line. Before all of the portable platforms are filled a sufficient amount of space is available on the ship to make room for the stowing of outbound freight, and a few electric trucks are assigned to transferring the freight from the receiving platforms as fast as it is received. No effort is made to transfer the freight accumulated on the platform until the ship is unloaded. When not in use the portable platforms are hoisted out of the way, thus facilitating the loading of the electric trucks directly from the receiving platform.

Beyond either end of the platform is a receiving door through which the electric trucks may be run to be loaded directly from the shippers' trucks. This makes unnecessary the handling of freight across the platform which does not require weighing. Since all freight has been received at the bulkhead it is possible, by the use of all the receiving doors, to unload from as many as 20 trucks at one time; the electric trucks, because of their speed and load capacity, are able to take care of the transfer to the ship without congestion and at a greatly reduced labor cost.

In unloading the ship the electric trucks are loaded with freight regardless of marks, which is sorted as it is unloaded, the trucks going to the various piles and distributing their loads in the proper places on the dock.

There are times when grades on the gangplank are as high as 25 per cent, owing to the tides. These are negotiated by the loaded electric trucks without difficulty, while with the hand trucks it is impossible for one man to take a load up such grades. In all classes of freight the electric truck will carry several times the amount that one man can carry with a hand truck, and will travel three or four times as fast. While the reduction in the amount of labor effected by the use of the electric trucks varies somewhat, depending upon a number of changeable conditions, it is stated that approximately 100 less men are required during the rush hours than were required when using the hand trucks exclusively, this being equivalent to a reduction of about one-third of the entire force.

THE MAGNOLIA CUT-OFF OF THE B. & O. PLACED IN SERVICE

The first track on the 12-mile cut-off between Orleans Road, W. Va., and Little Cacapon, which has been built by the Baltimore & Ohio at a cost of $6,000,000 (*Railway Age Gazette*, July 17, 1914), was opened for traffic last Sunday. This portion of the road has a freight density of 15,000,000 tons per mile of road, this unusually heavy traffic being occasioned by the fact that the two main lines from Chicago and St. Louis, respectively, converge at Cumberland, Md., just west of the new cut-off. The new line, which has two tracks, will be used for eastbound freight traffic only, all passenger service being maintained on the old two-track line along the Potomac river in order to avoid tunnels. The new line reduces the curvature 887 deg., the distance six miles, and the maximum grade eastbound from 0.5 per cent to 0.1 per cent, eliminating a helper grade 2.8 miles long. The construction of the new line involved the excavation of 3,500,000 cu. yd. of rock and earth, the driving of four tunnels with a combined length of 7,100 ft., the placing of 25,000 cu. yd. of concrete in bridges, and 50,000 cu. yd. in retaining walls, and the erection of 3,000 tons of steel bridges. The new line will be equipped with automatic signals and trains will be operated by telephone despatching. This improvement was completed in 18 months under the direction of F. L. Stuart, chief engineer, and John T. Wilson, district engineer.

Railway Construction in China.—A recent British consular report states that the projected line from Kochiu to Pishihchai on the French railway continues to be the subject of negotiations; but neither the officials nor the people are in favor of it, as the traffic is not considered sufficient to justify its construction. An agreement has recently been made with the Banque Industrielle of Tientsin, a Franco-Chinese institution, for a loan to build a railway from Ch'in Chou, west of Pakhoi in Kuangtung, to Yunnanfu; and, according to the Chinese press, the line will pass through Nanning, Poseh, Singyi and Lo Ping. At Singyi it will presumably link up with the line from Shashih, the contract for which has been awarded to a British firm. The construction of these two lines, which will place Yunnanfu in railway communication with the Yangtze on the north and the ocean on the south, will be of great benefit to the trade of this province as well as that of Kweichow.

General News Department

Conductors on the Northern Pacific are negotiating with the management for a new schedule of wages and working conditions.

The shops of the St. Louis, Iron Mountain & Southern at Argenta, Ark., which were closed recently were reopened on December 1, putting 600 men back at work.

The railroads of Louisiana, at a recent meeting in New Orleans, decided to adopt for use throughout that state the National demurrage rules, as promulgated by the American Railway Association.

At Marietta, Ga., December 2, John Nolan, who robbed passengers on a train of the Louisville & Nashville, near Atlanta, about a year ago, was, on second trial, found guilty, and sentenced to imprisonment for 20 years.

President Kenly, of the Atlantic Coast Line, announces that reductions of from 6 per cent to 10 per cent have been made in the salaries of all persons in the employ of the company receiving $200 or more a month.

At Allentown, Pa., this week, J. H. Freyer, a car inspector of the Philadelphia & Reading, 27 years old, was sentenced to 45 years' imprisonment for numerous robberies in railroad stations, post offices and dwellings.

The "health exhibit" cars of the Louisiana State Board of Health are being taken around the country by the railways of the southern states without charge; and the cars have recently visited New Orleans, Richmond, Jacksonville, Atlanta, Macon and a dozen other cities.

On November 26, the 10-stall frame engine house of the Southern Pacific at Horace, Kan., was destroyed by fire. The estimated loss of the building is $12,000; six locomotives which were in the roundhouse at the time of the fire were damaged to the extent of $30,000.

Through the enlargement of its shops at Nashville, Tenn., and the addition of several new machines, the Nashville, Chattanooga & St. Louis contemplates giving employment to between 400 and 500 additional men in the work of building its own freight cars. It is estimated that 1,000 cars will be built annually by the company.

The new car shops for the Chicago & Eastern Illinois at Oak Lawn, near Danville, Ill., adjoining the locomotive repair shops, were completed on December 1, and the new building was put into use at once. At the same time the old shops, which had been closed for some time, resumed operations with a full force working 40 hours a week.

A freight train of the Grand Trunk, stopped near Valparaiso, Ind., on the night of December 6, because of some trouble with the running gear, was robbed, while standing, of 36 tubs of butter. Two masked men intimidated the engineman and conductor with revolvers, and they had three accomplices, with an automobile, to carry away the butter. Just how or why the train had been stopped is not explained.

R. A. McCranie, receiver of the Florida Central, advises us that the track of this road from Thomasville, Ga., south to a point in Florida just beyond Roddenbery, Ga., a distance of 15 miles, is to be abandoned and taken up. This point is 1½ miles south of the Georgia-Florida boundary. From here southward the line has been sold to the Atlantic Coast Line. This section runs through Stringer, Wadesboro and Capitola to Fanlew, 32 miles.

The cuts and tunnels for the Lexington avenue subway, New York City, the new north-and-south line now under construction on the east side of Manhattan, have been opened through from Fifty-third street to the Harlem river, something over three miles; that is to say, there is an opening big enough for a man to walk through, on foot, all of the way. Many months must elapse before this or any part of the Lexington avenue line will be ready for operation.

The Bureau of Mines, of the Interior Department, has eight mine-rescue cars traveling through the different mining districts, giving instructions to miners in rescue, first aid and safety methods. The bureau also has five mine-rescue stations in different coal fields from which it is carrying on similar work. Legislation now pending in Congress will, if enacted, provide for continuous operation of cars throughout the year. Most of the railroads haul the cars free.

The Cincinnati, Hamilton & Dayton announces that it expects henceforth to buy ties from the farmers along the line instead of from jobbers.

The New York, New Haven & Hartford, having been accused of contemplating a change in its policy of buying ties largely from New England producers, has assured President C. M. Ely of the Lumber Manufacturers' Association of Southern New England, that a very large proportion of the company's ties will still be bought in the territory adjacent to its lines; probably 1,600,000 during the coming year. In the fiscal year ending June 30, 1914, 2,060,485 ties were laid, compared with 1,814,190 in 1913, and 1,493,786 in 1912. Of those laid last year about 1,800,000 were bought in New England. The company has been prompted by motives of economy to experiment with outside ties on certain portions of its line where the expense of renewing ties is naturally very high. The cost of replacing ties in stone ballast is about 50 per cent greater than for gravel and about 75 per cent higher than in dirt or cinders. For the inside tracks on a four-track, stone-ballasted line the expense is even higher. The life of a tie has become therefore a most important factor. Experience has shown that the oak ties produced in New England last about four years in rock ballast, and the chestnut ties from five to seven years. The company has decided to buy this year 100,000 long leaf yellow pine ties for use on its main lines so as to see if they will last any longer than ties now used.

Summary of Revenues and Expenses of Steam Roads in September

The Bureau of Railway Economics' summary of revenues and expenses and comments thereon for September, 1914, are as follows:

Railways operating 228,041 miles of line are covered by this summary, or about 90 per cent of all steam railway mileage in the United States. Their operating revenues for the month of September, 1914, amounted to $269,581,592. This amount includes revenues from freight and passenger traffic, from carrying mail and express, and from miscellaneous sources connected with rail and auxiliary operations. Compared with September, 1913, these operating revenues show a decrease of $13,792,318. Total operating revenues per mile averaged $1,182 in September, 1914, and $1,257 in September, 1913, a decrease of $75, or 6.0 per cent.

Operating expenses, which include the cost of maintaining track and equipment, operating trains, securing traffic, and of administration, amounted to $178,086,808. This was $14,380,302 less than for September, 1913. These operating expenses per mile of line averaged $781 in September, 1914, and $854 in September, 1913, a decrease of $73 per mile, or 8.5 per cent.

Net operating revenue, that is, total operating revenues of rail and auxiliary operations less operating expenses, amounted to $91,494,784, which was $587,984 more than for September, 1913, but this increase is due to increase in operated mileage, as is shown by the fact that net operating revenue per mile decreased. Net operating revenue per mile of line averaged $401 in September, 1914, and $403 in September, 1913, a decrease of $2 per mile, or 0.5 per cent.

Taxes for the month of September amounted to $11,454,768, or $50 per mile, an increase of 2.0 per cent over September, 1913.

Operating income, which is net revenue from rail and auxil-

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF OCTOBER, 1914

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses						Net operating revenue (or deficit).	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
					Maintenance									
		Freight.	Passenger.	Total. inc. misc.	Way and structures.	Of equipment.	Traffic.	Trans-portation.	Miscel-laneous.	General.	Total.				
Alabama & Vicksburg	143	$87,083	$37,489	$138,145	$21,464	$34,272	$3,985	$50,443	$3,132	$5,527	$118,823	$19,322	$7,240	$12,082	—$30,468
Alabama Great Southern	309	267,024	85,366	388,222	35,112	109,158	15,152	139,275	3,110	11,141	312,949	75,273	15,493	59,757	—62,766
Ann Arbor	292	171,982	43,468	228,830	26,090	32,974	5,125	85,228	345	7,681	157,494	71,337	13,880	57,366	—9,363
Arizona Eastern	367	122,034	24,182	158,157	27,038	18,441	1,922	42,977	1,166	10,154	101,718	57,438	13,100	44,300	—46,787
Atchison, Topeka & Santa Fe	8,514	6,340,089	1,904,201	8,987,678	1,347,666	1,443,398	160,793	2,386,775	.....	162,055	5,498,571	3,489,106	421,682	3,066,936	213,427
Atlanta & West Point	93	55,859	34,885	104,285	17,692	23,594	5,353	32,184	1,447	4,784	85,054	19,231	7,125	11,965	—24,377
Atlanta, Birmingham & Atlantic	646	157,980	38,613	214,727	33,368	44,998	12,063	94,087	.....	9,694	194,209	20,518	14,337	6,147	—73,997
Atlantic & St. Lawrence	167	85,426	32,584	128,561	19,553	17,249	4,105	50,501	.....	2,944	94,353	34,208	10,800	23,408	29,852
Atlantic Coast Line	4,680	1,680,175	575,798	2,453,687	366,691	506,596	59,778	927,097	6,573	75,882	1,938,743	514,944	138,000	376,711	—449,239
Baltimore & Ohio System	4,516	6,064,387	1,300,803	7,955,694	939,304	1,504,652	152,070	3,174,490	48,837	178,558	5,997,664	1,958,030	267,588	1,687,962	—396,626
Baltimore & Ohio Chicago Terminal	79	.....	622	153,083	14,867	20,213	906	60,924	1,448	4,432	102,790	50,292	19,021	31,271	2,302
Bangor & Aroostook	631	266,276	64,903	349,954	50,769	50,790	2,881	101,893	1,091	9,921	217,345	132,609	8,750	123,823	—52,019
Belt Ry. Co. of Chicago	24	.....	.....	288,601	13,696	27,079	825	88,240	.....	6,354	136,194	152,407	10,525	141,882	67,407
Bessemer & Lake Erie	204	879,979	27,447	922,582	65,573	175,071	15,076	192,082	2,462	11,099	458,523	464,059	20,000	444,052	21,186
Bingham & Garfield	27	75,868	3,386	79,401	8,349	9,674	838	17,328	64	1,602	37,856	41,545	1,286	40,259	—60,837
Birmingham Southern	43	39,020	1,191	71,194	19,960	12,880	430	28,865	.....	3,322	65,457	5,737	3,150	2,587	—31,373
Buffalo & Susquehanna R. R. Corp	253	124,406	6,560	134,610	26,390	36,721	1,338	38,453	.....	5,453	108,355	26,255	2,600	23,655	.....
Buffalo & Susquehanna Railway	91	18,623	6,389	27,576	3,793	9,131	573	12,460	7	2,371	28,335	—760	1,600	—2,360	18,261
Buffalo, Rochester & Pittsburgh	586	717,353	92,814	842,546	95,691	204,315	12,502	274,119	1,324	17,242	605,194	237,352	20,000	217,303	—119,326
Canadian Pacific Lines in Maine	233	52,084	16,566	75,177	25,786	11,566	5,381	34,874	.....	3,020	80,628	—5,451	12,000	—17,451	13,908
Carolina, Clinchfield & Ohio	248	170,908	15,257	190,719	15,498	23,565	6,877	34,054	.....	9,370	88,553	102,167	14,250	87,917	—41,190
Carolina, Clinchfield & Ohio of S. C.	18	10,059	1,639	12,005	817	77	1,754	2,449	.....	557	5,653	6,352	750	5,602	—2,862
Central of Georgia	1,924	707,129	236,797	1,055,587	150,550	191,066	33,740	356,348	1,122	35,699	768,153	287,434	44,486	242,213	—330,703
Central of New Jersey	678	1,991,948	458,550	2,580,423	246,978	477,906	29,999	862,421	10,613	47,779	1,675,651	904,772	117,157	787,615	—83,253
Central New England	304	299,518	40,852	355,643	96,004	38,657	1,274	115,907	.....	4,036	255,721	99,923	11,000	88,923	—53,387
Central Vermont	411	233,367	83,251	343,875	55,310	57,482	8,558	150,167	2,769	6,679	280,966	62,909	15,760	47,149	—36,519
Charleston & Western Carolina	341	129,584	25,859	164,969	30,661	30,839	3,879	54,537	.....	4,591	124,507	40,462	5,000	35,454	—33,501
Chesapeake & Ohio Lines	2,367	2,684,299	516,357	3,404,946	420,923	765,726	52,514	1,082,393	22,318	80,529	2,424,403	980,543	109,922	870,544	—89,293
Chicago & Alton	1,033	851,727	332,092	1,284,815	144,431	273,687	39,269	444,899	10,448	30,648	943,383	341,432	44,850	296,497	240,251
Chicago & Eastern Illinois	1,282	909,915	232,334	1,242,885	152,083	289,441	23,086	461,872	7,637	37,142	969,475	273,409	56,900	216,439	44,434
Chicago & Erie	270	409,129	50,773	503,015	85,494	63,617	17,647	223,218	2,334	15,129	391,456	111,559	23,479	88,080	148,119
Chicago & North Western	8,108	5,213,543	1,736,165	7,713,475	1,011,315	1,212,256	114,005	2,697,736	52,006	148,574	5,235,892	2,477,583	375,000	2,102,280	—497,925
Chicago, Burlington & Quincy	9,314	6,393,058	1,827,954	8,978,521	964,238	1,371,269	137,576	2,607,254	66,413	172,595	5,319,344	3,659,177	332,563	3,326,614	—206,634
Chicago, Detroit & Can. Gd. Trunk Jctn.	60	79,827	14,690	104,785	16,133	10,764	2,057	46,100	.....	1,237	76,291	28,494	2,870	25,624	6,381
Chicago Great Western	1,427	929,510	272,835	1,306,727	213,997	215,115	45,791	456,343	6,634	36,352	972,870	333,858	48,668	284,929	39,549
Chicago, Indiana & Southern	359	349,872	25,919	388,417	52,445	105,960	8,883	123,038	1,865	10,352	302,543	85,874	20,085	65,766	4,540
Chicago, Indianapolis & Louisville	618	392,629	154,065	596,178	60,032	116,119	30,311	210,815	126	16,253	433,391	162,787	26,685	136,089	—47,120
Chicago Junction	12	.....	.....	179,003	25,910	17,127	848	92,903	.....	4,078	140,865	38,138	2,182	35,951	—15,353
Chicago, Milwaukee & St. Paul	10,067	6,446,492	1,595,296	8,873,521	1,173,792	1,213,792	155,719	3,166,285	62,560	151,092	5,789,659	3,083,862	400,152	2,682,279	—596,218
Chicago, Peoria & St. Louis	255	110,121	23,569	142,543	24,592	25,078	6,670	60,414	.....	5,082	121,837	20,706	5,700	15,006	5,387
Chicago, Rock Island & Gulf	477	216,418	51,875	288,185	26,166	37,950	9,288	103,245	1,864	8,542	187,056	101,129	6,318	94,748	292
Chicago, Rock Island & Pacific	7,852	4,426,952	1,526,024	6,389,470	974,044	1,004,564	142,371	2,376,402	40,066	133,596	4,668,229	1,721,241	293,010	1,427,857	—276,693
Chicago, St. Paul, Minneapolis & Omaha	1,753	1,159,294	431,135	1,709,030	189,573	226,014	26,312	609,370	15,616	37,922	1,104,807	604,223	92,801	511,391	—34,822
Chicago, Terre Haute & Southeastern	374	174,915	17,217	198,589	32,083	61,407	5,953	58,603	969	8,903	167,918	30,670	11,500	19,170	—11,176
Cincinnati, Hamilton & Dayton	1,015	666,377	127,139	887,210	133,974	165,252	28,247	383,804	.....	18,021	729,299	157,911	40,042	117,436	—46,147
Cincinnati, New Orleans & Texas Pacific	337	627,895	148,315	820,637	89,267	247,989	25,568	243,538	7,038	22,163	635,562	185,074	31,000	154,074	—108,799
Cincinnati Northern	246	127,922	15,868	149,734	23,046	25,737	2,709	45,257	.....	3,851	100,600	49,135	5,000	44,134	37,674
Cleveland, Cincinnati, Chic. & St. Louis	2,361	2,229,621	710,139	3,238,046	295,968	524,955	81,317	1,173,627	25,149	58,307	2,155,402	1,082,643	130,000	948,334	439,754
Colorado Midland	338	172,734	19,330	209,228	23,768	39,867	7,601	80,805	1,094	5,768	158,903	50,325	8,530	41,795	30,981
Colorado & Southern	1,111	607,707	106,487	768,951	84,312	150,140	10,166	223,891	4,111	18,609	491,228	277,723	31,366	246,321	102,657
Cumberland Valley	164	197,294	59,034	271,965	42,644	36,229	5,381	89,351	749	7,241	181,570	90,368	5,910	84,458	—3,522
Delaware, Lackawanna & Western	960	2,947,148	711,891	4,023,331	410,051	613,588	65,389	1,192,281	32,053	75,658	2,366,694	1,656,637	185,000	1,471,624	10,330
Denver & Rio Grande	2,562	1,772,381	415,765	2,309,007	269,647	375,820	37,064	634,872	28,702	47,736	1,390,598	918,409	90,000	828,210	27,155
Denver & Salt Lake	255	128,450	23,039	160,665	23,921	28,657	2,267	53,207	.....	5,003	112,766	47,899	6,000	41,899	18,984
Detroit & Mackinac	400	67,946	26,012	101,145	11,871	16,828	2,752	34,342	29	2,767	68,590	32,555	9,100	23,455	—8,083
Detroit & Toledo Shore Line	79	135,845	.....	136,021	15,890	9,430	1,649	33,566	.....	2,799	63,313	72,707	5,900	66,807	—3,847
Detroit, Grand Haven & Milwaukee	191	159,000	61,000	255,118	40,807	34,024	7,384	113,198	903	4,463	200,779	54,339	3,360	50,448	—16,578
Duluth & Iron Range	292	460,209	18,914	495,643	90,932	68,101	906	99,117	2,201	8,996	270,253	225,390	26,427	198,962	—257,648
Duluth, Missabe & Northern	364	525,795	28,242	561,965	66,284	65,706	2,117	106,796	1,858	10,041	252,803	309,162	31,526	277,636	—329,161
Duluth, South Shore & Atlantic	628	144,014	73,918	239,150	51,825	33,781	7,610	96,620	3,913	10,057	203,807	35,353	19,000	16,332	—52,928
Duluth, Winnipeg & Pacific	185	90,137	22,333	115,900	13,400	17,667	3,076	40,376	1,430	5,550	81,498	34,402	5,795	28,607	8,839
El Paso & Southwestern Co	1,028	438,422	93,808	576,690	71,528	86,806	19,666	155,954	4,875	23,916	353,995	222,695	38,211	169,613	71,812
Elgin, Joliet & Eastern	778	691,328	3	738,098	70,197	138,175	7,465	212,728	.....	20,276	448,782	289,316	32,833	256,483	—80,930
Erie	1,988	3,868,198	749,307	5,035,519	587,060	1,030,019	87,893	1,740,427	31,921	99,726	3,570,602	1,464,917	171,370	1,288,004	89,437
Florence & Cripple Creek	87	95,562	12,560	110,271	11,496	10,195	1,673	29,733	.....	4,253	57,351	52,920	5,658	47,262	3,606
Florida East Coast	696	222,664	111,636	387,343	57,951	49,947	6,664	124,549	2,907	10,467	250,492	136,851	20,000	116,850	101,604
Fort Worth & Denver City	454	348,196	142,952	517,184	46,527	66,767	6,556	202,987	3,456	14,742	341,035	176,148	10,758	165,391	52,768
Galveston, Harrisburg & San Antonio	1,338	709,066	237,033	1,048,368	126,993	183,826	27,837	429,148	9,101	39,501	815,396	232,972	39,425	193,347	—43,000
Georgia	307	192,459	56,850	271,413	28,770	50,162	11,504	108,979	297	8,257	207,969	63,444	3,439	59,822	—76,888

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF OCTOBER, 1914 CONTINUED

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses							Net operating revenue (or deficit).	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
					Maintenance										
		Freight.	Passenger.	Total. inc. misc.	Way and structures.	Of equipment.	Traffic.	Trans-portation.	Miscel-laneous.	General.	-Total.				
Georgia, Southern & Florida	395	$116,419	$54,337	$197,940	$27,734	$42,259	$7,575	$75,957	.....	$11,667	$165,192	$32,748	$10,943	$20,971	—$31,116
Grand Rapids & Indiana	575	285,456	139,740	464,730	50,313	75,887	16,560	118,114	$1,888	15,058	347,821	116,909	24,270	92,639	3,703
Grand Trunk Western	347	416,000	174,000	639,931	97,005	126,818	23,560	258,824	7,174	14,520	527,901	112,030	35,920	76,090	—57,976
Great Northern	8,043	5,905,471	1,275,079	7,789,500	581,250	622,309	94,174	1,786,323	77,042	105,168	3,262,646	4,526,854	455,122	4,071,237	100,590
Gulf & Ship Island	308	111,767	23,899	144,281	17,151	30,831	2,130	36,490	298	6,761	93,661	50,620	7,325	43,296	—13,908
Gulf, Colorado & Santa Fe	1,937	1,128,605	279,466	1,487,406	197,251	207,116	25,893	494,668	.....	34,920	959,849	527,558	45,231	481,700	181,469
Hocking Valley	351	561,096	78,492	684,311	82,702	132,497	8,512	197,986	.....	17,606	439,303	245,008	38,800	206,208	—52,524
Houston & Texas Central	857	489,121	133,072	658,390	98,220	83,398	15,422	241,119	1,744	17,971	457,534	200,856	24,047	176,637	19,098
Houston, East & West Texas	191	90,799	23,687	121,635	18,076	17,861	1,686	46,091	.....	3,114	86,790	34,845	4,249	30,582	25,623
Illinois Central	4,769	3,992,602	1,117,717	5,520,343	796,829	1,204,346	112,491	1,940,165	29,965	125,684	4,165,514	1,354,828	275,000	1,078,468	—117,525
Indiana Harbor Belt	105	.....	.....	304,062	34,861	24,564	3,064	113,611	.....	7,708	183,808	120,254	7,785	112,404	40,185
International & Great Northern	1,160	674,633	174,925	908,572	141,167	121,800	24,319	348,931	2,482	27,490	666,190	242,383	30,000	212,347	—128,706
Kanawha & Michigan	177	220,019	31,810	259,810	42,732	66,526	2,466	79,111	.....	6,739	197,574	62,235	11,514	50,721	—38,883
Kansas City Southern	827	669,640	115,493	880,044	109,919	108,265	42,080	283,462	.....	46,866	587,524	292,520	48,176	243,831	—61,025
Lake Erie & Western	906	397,386	61,920	466,514	79,746	96,730	11,912	198,387	.....	12,559	399,334	87,179	24,513	62,660	—21,000
Lake Shore & Michigan Southern	1,852	2,925,129	993,437	4,517,769	438,961	954,244	92,007	1,492,308	47,922	167,833	3,193,275	1,324,494	205,000	1,117,176	167,315
Lehigh & Hudson River	97	156,904	9,633	169,154	26,955	22,046	1,367	59,202	.....	3,692	113,262	55,892	4,150	51,742	21,105
Lehigh & New England	294	259,466	1,221	270,126	33,190	33,296	1,739	61,142	.....	5,772	135,140	134,986	5,670	129,317	46,156
Lehigh Valley	1,444	3,563,928	326,810	4,110,503	430,366	799,764	72,917	1,334,984	12,259	66,978	2,717,267	1,393,236	140,000	1,253,084	73,763
Long Island	398	368,996	553,548	1,074,952	122,280	124,695	12,035	471,777	7,879	27,554	766,221	308,731	65,237	243,493	110,967
Louisiana & Arkansas	279	104,830	17,546	126,385	22,771	23,753	2,481	35,836	.....	4,767	89,340	37,045	6,250	30,795	—14,032
Louisiana Western	208	116,359	55,101	184,982	20,396	36,169	5,583	72,261	2,962	6,397	143,752	41,230	8,735	32,493	12,836
Louisville & Nashville	5,034	3,304,441	923,119	4,546,327	716,208	950,211	108,274	1,556,278	16,852	100,316	3,441,446	1,104,881	184,275	920,193	—810,998
Maine Central	1,209	681,087	293,409	1,041,514	148,969	159,241	9,109	368,153	2,944	25,600	714,016	327,498	49,788	277,573	66,241
Michigan Central	1,800	1,966,796	670,970	3,019,611	343,690	450,305	63,980	1,218,725	46,648	55,642	2,178,989	840,621	134,000	704,935	149,901
Midland Valley	380	96,320	35,363	139,586	23,724	19,098	2,119	40,972	.....	5,785	91,698	47,888	6,582	41,271	—3,671
Minneapolis & St. Louis	1,646	697,722	173,385	921,109	111,536	138,328	19,534	343,889	74	23,103	636,464	284,645	41,265	243,379	—16,099
Minn., St. Paul & Sault Ste. Marie	4,102	2,369,718	548,125	3,120,069	354,685	353,711	51,633	845,037	14,229	53,601	1,666,224	1,453,845	141,569	1,312,276	56,821
Missouri & North Arkansas	365	70,185	31,560	109,756	28,422	21,563	3,297	54,204	.....	5,430	112,916	—3,160	6,000	—9,168	—24,533
Missouri, Kansas & Texas System	3,865	2,132,283	771,740	3,129,330	373,518	406,827	52,096	1,012,062	27,417	95,868	1,947,103	1,182,227	119,358	1,062,207	256,028
Missouri, Oklahoma & Gulf	332	82,108	19,802	107,323	22,826	23,808	4,556	51,632	110	5,633	108,565	—1,241	6,500	—7,903	—23,939
Missouri, Oklahoma & Gulf of Texas	19	12,205	342	12,675	672	190	194	3,967	.....	418	5,441	7,234	197	7,038	4,390
Missouri Pacific	3,920	2,098,831	432,763	2,749,209	341,225	532,473	70,387	1,008,030	8,422	65,255	2,025,791	723,419	98,590	622,454	260,450
Mobile & Ohio	1,122	724,388	105,962	894,710	89,314	160,097	41,888	351,092	3,161	32,175	677,726	216,984	26,595	190,268	—101,443
Monongahela	67	81,531	2,127	85,562	17,924	6,594	358	21,793	.....	2,044	48,713	36,848	1,140	35,708	—45,886
Morgan's L. & Tex. R. R. & S. S. Co	405	250,452	89,141	371,886	49,272	68,151	11,316	133,617	2,546	11,863	276,680	95,206	20,392	74,567	36,718
Nashville, Chattanooga & St. Louis	1,231	666,732	211,579	958,689	119,575	193,072	42,699	375,603	8,911	30,585	770,447	188,241	27,213	161,002	—105,370
Nevada Northern	165	61,901	6,840	72,392	14,370	12,476	451	20,063	82	3,603	51,046	21,146	5,600	15,546	—48,187
New Orleans & North Eastern	204	212,245	44,822	281,388	31,078	59,716	10,315	97,489	5,856	11,928	216,383	65,005	15,700	49,305	—24,244
New Orleans Great Northern	283	107,284	24,166	142,928	17,447	23,015	3,163	44,806	125	6,336	94,892	48,037	4,167	43,860	—26,950
New Orleans, Texas & Mexico	286	109,237	18,470	134,091	30,986	19,432	3,245	59,599	.....	10,714	123,976	10,115	1,621	8,494	11,799
New York Central & Hudson River	3,692	6,005,939	2,615,882	10,083,111	1,115,608	1,857,236	152,297	3,359,312	173,239	193,697	6,851,390	3,231,721	520,889	2,710,573	693,303
New York, Chicago & St. Louis	568	854,841	120,250	1,022,837	144,336	126,912	50,261	439,556	4,736	19,192	784,993	237,844	42,000	195,843	—33,921
New York, New Haven & Hartford	2,003	2,697,075	2,306,958	5,639,521	674,737	837,140	37,047	2,128,242	49,583	137,655	3,862,115	1,777,406	235,000	1,541,864	—74,224
New York, Ontario & Western	568	562,530	86,856	756,315	117,026	151,197	7,714	298,482	.....	16,378	590,797	165,518	19,583	145,935	—9,879
New York, Philadelphia & Norfolk	112	226,558	39,371	294,218	32,249	57,642	3,943	129,230	4,716	10,495	238,276	55,942	8,700	47,234	6,498
New York, Susquehanna & Western	140	195,328	42,609	263,920	29,765	29,010	1,844	113,019	.....	5,019	178,614	85,306	14,750	70,553	348
Norfolk Southern	900	219,861	88,034	333,295	38,819	54,444	8,718	119,141	.....	20,914	242,035	91,259	12,000	79,259	—32,739
Norfolk & Western	2,044	2,951,187	421,926	3,519,806	490,936	758,754	63,937	1,053,718	11,493	68,977	2,378,790	1,141,016	140,000	1,001,016	—201,079
Northern Pacific	6,423	4,918,490	1,221,947	6,649,518	985,880	875,351	95,172	1,760,836	83,403	88,670	3,648,601	3,000,916	419,767	2,580,984	—383,292
Northwestern Pacific	401	158,353	146,373	341,920	68,559	45,671	4,145	124,128	.....	8,889	245,224	96,696	15,985	80,711	9,085
Oregon Short Line	2,163	1,523,001	407,537	2,106,527	318,523	251,125	30,467	460,506	27,115	53,972	1,132,879	973,648	112,014	861,286	—390,886
Oregon-Washington R. R. & Nav. Co	2,023	1,030,529	375,956	1,543,937	196,606	162,309	39,775	484,274	12,397	55,570	938,551	605,386	97,077	508,187	—23,984
Panhandle & Santa Fe	668	309,515	54,417	383,531	63,736	78,167	3,485	117,399	.....	8,696	271,483	112,048	8,598	103,450	59,313
Pennsylvania Company	1,750	3,600,291	795,344	4,862,090	722,032	873,813	76,458	1,808,195	36,515	113,533	3,630,547	1,231,543	261,519	970,016	—410,730
Pennsylvania Railroad	4,519	11,670,040	3,351,479	16,482,466	2,060,824	3,150,746	185,662	6,028,604	230,768	397,689	12,054,293	4,428,174	665,322	3,759,396	88,186
Pere Marquette	2,319	1,240,371	323,117	1,697,190	150,863	299,665	34,961	609,162	5,055	44,677	1,143,709	553,481	52,962	500,514	250,808
Philadelphia, Baltimore & Washington	717	855,731	712,522	1,743,155	263,926	297,578	23,667	721,701	12	45,998	1,352,881	390,274	57,623	332,579	70,513
Pittsburgh & Lake Erie	224	1,088,202	140,711	1,281,928	180,342	166,010	15,673	359,358	3,268	27,146	751,797	530,131	52,250	477,881	—242,720
Pittsburgh, Cincinnati, Chic. & St. Louis	1,472	2,380,742	676,825	3,461,475	447,940	685,741	66,578	1,280,119	24,290	78,453	2,583,120	878,356	173,411	704,944	—89,430
Pittsburgh, Shawmut & Northern	294	147,843	9,901	159,541	34,404	40,922	1,530	55,188	.....	4,573	136,616	22,925	1,649	21,276	493
Richmond, Fredericksburg & Potomac	88	106,724	79,213	218,239	16,644	32,507	3,400	87,546	8,619	7,328	156,043	62,195	7,637	54,544	10,480
Rutland	468	181,816	114,601	334,291	39,785	52,985	8,308	122,940	1,302	5,464	230,783	103,509	17,096	86,413	7,355
St. Joseph & Grand Island	258	103,334	25,558	137,238	24,043	24,272	4,633	46,161	.....	4,900	104,009	33,229	7,034	26,177	12,852
St. Louis & San Francisco	4,746	2,612,101	895,225	3,754,028	599,091	519,750	60,559	1,203,090	.....	89,077	2,471,566	1,282,462	83,706	1,197,634	—79,753
St. Louis, Brownsville & Mexico	548	110,392	56,046	183,822	36,455	20,954	5,189	71,170	.....	10,454	143,572	40,250	6,750	33,500	28,486
St. Louis, Iron Mountain & Southern	3,365	2,023,205	440,344	2,714,785	379,093	467,012	56,910	797,289	9,037	59,176	1,768,518	946,267	113,032	832,220	—196,350
St. Louis Merchants' Bridge Terminal	9	.....	104	165,477	22,994	8,987	776	80,033	.....	6,071	118,862	46,615	8,330	38,285	2,316
St. Louis, San Francisco & Texas	235	75,190	30,298	112,662	40,507	16,468	2,104	47,738	.....	4,619	111,436	1,226	1,327	—113	—38,758

REVENUES AND EXPENSES OF RAILWAYS

Month of October, 1914—Continued

Name of road.	Average mileage operated during period.	Operating revenues: Freight.	Passenger.	Total. inc. misc.	Operating expenses: Maintenance: Way and structures.	Of equipment.	Traffic.	Transportation.	Miscellaneous.	General.	Total.	Net operating revenue (or deficit).	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
St. Louis Southwestern	943	$515,282	$101,838	$654,765	$72,305	$114,543	$25,246	$173,207	$3,206	$27,908	$416,119	$238,646	$29,626	$209,010	—$29,598
St. Louis Southwestern of Texas	811	252,973	84,349	363,741	75,807	90,405	10,884	150,525	1,000	21,534	349,444	14,297	13,500	658	—43,435
San Antonio & Aransas Pass	724	264,247	93,542	381,011	67,023	78,993	6,552	172,570	.....	12,511	337,650	43,361	12,000	31,361	—59,800
San Pedro, Los Angeles & Salt Lake	1,132	534,154	210,323	815,440	90,273	122,264	32,901	255,351	13,046	18,344	532,181	283,259	40,700	242,549	—29,432
Seaboard	3,101	1,187,110	343,476	1,712,208	208,862	255,684	59,585	629,969	7,073	50,534	1,211,706	500,502	91,000	408,435	—269,464
Southern	7,036	3,692,323	1,343,823	5,531,969	732,534	1,000,034	189,100	1,991,565	36,931	174,295	4,115,395	1,416,575	215,195	1,200,309	—947,390
Southern in Mississippi	281	64,907	27,289	100,937	21,202	10,481	2,523	42,689	.....	3,799	80,694	20,243	6,193	14,050	—16,137
Southern Pacific	6,522	5,969,330	2,329,892	9,032,205	731,488	1,175,172	163,508	2,681,010	135,201	234,715	5,105,465	3,926,740	425,541	3,498,294	—841,959
Spokane International	163	53,695	15,185	72,053	12,936	4,892	2,324	22,291	.....	3,659	46,102	25,951	3,993	21,921	—24,549
Spokane, Portland & Seattle	556	271,096	112,624	420,471	50,737	36,508	6,940	89,891	3,346	13,656	201,079	219,392	53,400	165,941	—59,553
Tennessee Central	294	78,550	33,780	121,460	31,122	19,537	5,872	50,784	.....	6,807	114,112	7,349	4,480	2,866	—36,210
Terminal R. R. Ass'n of St. Louis	35	.....	204	243,659	27,097	16,680	904	81,124	.....	3,412	129,217	114,441	30,017	84,424	13,132
Texas & New Orleans	469	218,603	89,375	335,534	59,681	75,829	7,692	135,511	12,683	10,816	302,034	33,500	15,793	17,320	—8,647
Texas & Pacific	1,887	1,202,840	399,977	1,738,853	143,310	240,396	39,694	667,829	15,833	38,278	1,144,042	598,810	68,700	525,315	165,157
Toledo & Ohio Central	446	482,756	52,267	578,382	98,186	89,516	6,528	194,584	1,813	9,485	400,112	178,270	21,348	156,720	75,589
Toledo, Peoria & Western	248	57,960	40,687	110,496	17,108	28,307	3,075	46,269	.....	3,524	98,282	12,214	6,100	6,114	—9,653
Toledo, St. Louis & Western	451	344,119	26,083	398,346	57,356	62,819	18,032	145,170	.....	10,755	294,132	104,214	56,660	47,554	—78,700
Trinity & Brazos Valley	315	89,511	16,855	116,790	22,718	16,439	2,535	40,158	.....	8,086	89,936	26,854	4,900	21,842	—799
Union Pacific	3,615	4,059,520	897,777	5,551,469	668,970	654,473	95,109	1,247,201	72,273	115,594	2,850,541	2,700,928	185,119	2,515,683	—348,284
Union R. R. of Baltimore	9	110,583	24,087	136,562	13,435	.....	.....	4,684	.....	1,833	19,952	116,610	6,230	110,380	—10,602
Union R. R. of Pennsylvania	31	.....	.....	354,782	34,227	102,999	109	135,921	.....	2,765	276,020	78,762	2,750	76,012	—37,825
Vandalia	910	674,001	222,926	1,004,612	162,229	192,199	24,814	380,251	11,561	21,496	792,551	212,061	32,219	179,770	—82,790
Vicksburg, Shreveport & Pacific	171	74,142	37,600	125,096	19,486	28,939	3,644	48,474	2,532	4,859	107,933	17,163	6,200	10,963	—21,965
Virginia & Southwestern	240	149,543	15,888	170,182	22,567	37,151	2,275	49,425	.....	4,078	115,496	54,685	6,250	48,435	—9,445
Virginian	503	442,344	31,634	505,399	61,716	98,721	5,500	116,200	10,810	11,767	302,216	203,182	22,500	180,682	—161,513
Wabash	2,518	1,809,590	536,786	2,578,539	287,374	470,072	80,261	993,101	13,636	58,858	1,894,915	683,624	79,057	604,124	—81,326
Washington Southern	36	33,111	37,836	97,193	12,960	15,169	1,319	40,804	3,646	2,908	76,807	20,386	3,320	17,065	—3,364
West Jersey & Seashore	356	165,580	251,143	472,386	80,701	83,574	17,470	234,261	2,441	13,271	431,718	40,668	29,565	11,057	32,330
Western Maryland	661	608,901	83,516	724,999	109,813	120,144	20,972	257,796	1,822	20,197	530,323	194,676	24,500	170,176	61,068
Western Pacific	943	415,195	106,369	554,177	145,300	72,596	25,194	179,762	12,122	20,935	455,909	98,269	30,009	68,031	—95,761
Western Ry. of Alabama	133	68,603	36,687	115,180	18,774	26,059	6,147	33,977	1,429	4,849	91,235	23,945	5,816	17,887	—30,524
Wheeling & Lake Erie	459	437,862	48,744	532,266	39,342	60,257	7,442	187,036	1,405	14,711	310,693	221,572	32,852	188,720	—102,898
Yazoo & Mississippi Valley	1,372	850,132	194,845	1,106,749	153,702	149,886	17,341	375,563	2,087	23,690	721,847	384,901	50,000	334,615	—53,313

Four Months of Fiscal Year Ending June 30, 1915

Alabama & Vicksburg	143	$327,741	$163,150	$541,394	$87,113	$132,390	$14,881	$197,002	$12,972	$22,135	$466,494	$74,900	$28,960	$45,940	—$72,994
Alabama Great Southern	309	1,120,149	411,385	1,674,656	195,281	446,530	55,901	567,039	13,230	39,126	1,317,156	357,499	61,972	295,467	—104,855
Ann Arbor	292	581,909	218,108	854,114	99,264	115,899	19,359	308,485	2,019	28,983	574,009	280,106	55,520	224,353	2,556
Arizona Eastern	367	563,637	115,577	732,632	108,987	105,372	8,616	198,959	3,594	39,528	465,034	267,598	53,038	214,274	—76,462
Atchison, Topeka & Santa Fe	8,448	23,298,322	8,250,378	34,268,217	5,039,097	5,693,554	654,331	9,190,238	.....	609,109	21,177,695	13,090,521	1,619,062	11,467,151	1,318,221
Atlanta & West Point	93	200,112	159,974	410,370	69,776	98,077	21,411	126,817	5,895	17,801	339,777	70,593	28,500	41,925	—41,789
Atlanta, Birmingham & Atlantic	646	633,488	216,651	928,627	147,204	174,325	51,898	397,302	.....	40,358	811,087	117,540	57,347	59,937	—112,086
Atlantic & St. Lawrence	167	299,926	139,266	479,942	89,046	65,641	16,193	204,711	.....	11,354	386,947	92,995	43,200	49,795	61,436
Atlantic Coast Line	4,672	6,074,069	2,562,400	9,392,150	1,706,139	1,981,331	224,593	3,727,098	26,520	311,162	7,950,935	1,441,215	552,000	885,759	—930,859
Baltimore & Ohio—System	4,516	25,442,392	5,739,484	33,585,090	3,534,870	6,536,126	637,727	12,504,663	190,748	729,705	23,953,592	9,631,499	1,065,694	8,561,912	—1,076,568
Baltimore & Ohio Chicago Terminal	79	.....	2,853	590,526	64,368	85,743	3,714	232,261	11,886	18,722	416,694	173,832	76,085	97,748	—5,747
Bangor & Aroostook	631	795,687	255,470	1,117,234	204,159	191,350	10,935	353,944	5,429	38,503	804,321	312,913	35,000	277,872	—80,175
Belt Ry. Co. of Chicago	24	.....	.....	1,126,159	75,510	96,483	3,911	349,733	.....	24,332	549,969	576,189	45,209	530,981	213,961
Bessemer & Lake Erie	204	4,134,440	175,725	4,371,557	296,299	629,075	43,092	809,543	9,796	45,363	1,873,218	2,498,339	74,000	2,424,324	494,844
Bingham & Garfield	27	414,679	16,921	434,389	48,178	61,957	3,712	77,046	352	7,496	198,741	235,648	7,024	228,624	—126,907
Birmingham Southern	43	177,081	4,774	323,415	83,709	58,173	1,826	118,877	.....	13,660	276,244	47,170	9,737	37,433	—117,400
Buffalo & Susquehanna R. R. Corp.	253	474,146	29,709	516,273	103,666	152,280	4,791	151,639	.....	21,729	434,105	82,169	10,400	71,769	.....
Buffalo & Susquehanna Railway	91	66,217	33,650	110,441	23,958	40,132	2,137	49,827	182	9,878	126,114	—15,673	6,400	—22,073	32,940
Buffalo, Rochester & Pittsburgh	586	3,055,032	442,703	3,632,625	541,130	850,560	46,611	1,089,140	5,507	70,068	2,603,015	1,029,609	80,000	949,547	—367,630
Canadian Pacific Lines in Maine	233	189,798	77,869	294,336	95,966	56,499	24,618	135,991	.....	13,952	327,026	—32,689	48,000	—80,689	47,328
Carolina, Clinchfield & Ohio	248	672,867	74,611	767,075	68,950	94,623	27,725	143,090	.....	35,377	364,183	402,892	57,000	345,857	—165,379
Carolina, Clinchfield & Ohio of S. C.	18	36,923	6,810	44,782	3,509	377	7,189	8,711	.....	2,254	22,040	22,742	3,000	19,742	—11,438
Central of Georgia	1,924	2,643,642	1,176,078	4,228,908	630,566	819,958	141,333	1,483,612	5,280	136,991	3,205,604	1,023,304	198,681	823,517	—290,336
Central of New Jersey	678	7,436,848	2,510,427	10,502,517	968,183	1,732,024	126,478	3,436,458	52,032	195,812	6,510,674	3,991,843	468,691	3,523,127	—197,996
Central New England	304	1,043,768	179,448	1,280,248	325,530	150,025	4,442	421,333	.....	15,909	916,945	363,303	44,000	319,270	—207,567
Central Vermont	411	915,444	368,541	1,393,228	226,893	223,217	32,159	600,488	11,778	26,225	1,120,760	272,467	63,040	209,427	86,067
Charleston & Western Carolina	341	431,700	126,377	590,203	126,534	120,763	16,782	221,266	.....	17,046	502,390	87,812	20,000	67,812	—69,548
Chesapeake & Ohio Lines	2,367	10,607,776	2,288,668	13,702,244	1,663,409	2,954,463	223,867	4,285,528	89,435	290,706	9,507,409	4,194,836	439,688	3,754,838	—1,516
Chicago & Alton	1,033	3,272,675	1,520,851	5,200,669	571,161	1,102,906	146,332	1,697,376	41,353	117,708	3,676,836	1,523,833	179,400	1,343,846	220,415
Chicago & Eastern Illinois	1,282	3,767,076	1,046,169	5,221,516	599,043	1,077,287	87,648	1,835,201	31,191	142,662	3,771,178	1,450,339	227,600	1,222,488	421,167
Chicago & Erie	270	1,595,710	229,038	1,994,180	343,481	Cr.—62,710	77,466	918,277	8,727	- 54,052	1,323,310	670,870	62,164	608,664	754,805
Chicago & North Western	8,108	19,561,679	8,217,572	30,822,898	4,844,776	4,632,376	453,340	10,187,142	220,979	571,994	20,910,607	9,912,291	1,500,000	8,410,641	—322,066
Chicago, Burlington & Quincy	9,276	23,223,672	8,090,849	34,161,784	3,929,069	5,516,551	563,441	9,884,147	272,998	682,687	20,848,892	13,312,889	1,330,147	11,982,742	—236,581

REVENUES AND EXPENSES OF RAILWAYS

FOUR MONTHS OF FISCAL YEAR ENDING JUNE 30, 1915—CONTINUED

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses						Net operating revenue (or deficit).	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
					Maintenance									
		Freight.	Passenger.	Total, inc. misc.	Way and structures.	Of equipment.	Traffic.	Trans-portation.	Miscel-laneous.	General.	Total.				
Chicago, Detroit & Can. Gd. Trunk Jctn.	60	$221,286	$75,493	$346,177	$50,103	$44,074	$7,513	$165,712	.....	$5,118	$272,520	$73,657	$11,480	$62,177	$3,833
Chicago Great Western	1,427	3,442,445	1,186,574	5,045,350	770,318	809,759	192,390	1,685,120	$27,248	140,528	3,628,305	1,417,045	194,674	1,220,845	—71,846
Chicago, Indiana & Southern	359	1,287,521	117,726	1,457,449	209,475	345,235	28,659	468,166	7,018	48,940	1,107,493	349,957	77,470	272,357	127,142
Chicago, Indianapolis & Louisville	618	1,599,770	638,950	2,437,353	302,857	452,554	84,470	841,076	622	70,268	1,749,930	687,423	106,663	580,691	—79,198
Chicago Junction	12	.....	.....	666,606	91,904	71,445	3,822	342,324	.....	18,604	528,099	138,507	8,796	129,656	—95,314
Chicago, Milwaukee & St. Paul	10,067	23,517,099	7,222,769	34,127,916	4,560,479	4,531,755	616,266	12,352,697	272,130	579,981	22,059,880	12,068,035	1,633,795	10,419,144	387,416
Chicago, Peoria & St. Louis	255	349,061	87,299	462,460	75,820	76,098	17,793	179,471	.....	15,677	364,859	97,600	17,100	80,500	84,659
Chicago, Rock Island & Gulf	477	729,422	215,777	1,020,244	132,549	143,294	38,766	390,660	7,344	30,711	743,324	276,920	32,762	243,979	—2,049
Chicago, Rock Island & Pacific	7,852	16,764,366	6,764,924	25,242,292	3,792,676	4,160,678	576,049	9,319,490	176,034	537,076	18,541,727	6,700,565	1,039,905	5,659,271	214,357
Chicago, St. Paul, Minneapolis & Omaha	1,753	4,151,497	2,022,880	6,643,796	928,659	857,481	114,746	2,241,038	64,955	144,356	4,351,236	2,292,561	366,661	1,925,122	295,152
Chicago, Terre Haute & Southeastern	375	696,346	73,735	793,967	124,200	190,088	14,754	222,548	3,528	36,825	591,944	202,024	46,000	156,024	47,189
Cincinnati, Hamilton & Dayton	1,015	2,757,182	599,854	3,743,306	523,451	631,352	84,293	1,562,580	.....	74,201	2,875,877	867,429	155,536	710,491	122,747
Cincinnati, New Orleans & Texas Pacific	337	2,482,807	593,064	3,256,081	353,066	949,560	100,140	998,218	20,159	85,860	2,507,002	749,079	124,000	625,079	—359,071
Cincinnati Northern	246	472,113	91,567	588,938	88,666	101,214	10,873	179,339	.....	13,712	393,804	195,134	23,000	171,875	168,975
Cleveland, Cincinnati, Chic. & St. Louis	2,361	8,734,106	3,235,244	13,121,473	1,416,859	2,417,378	306,308	4,743,032	103,189	242,401	9,212,645	3,908,828	514,500	3,388,878	1,742,919
Colorado Midland	338	565,996	117,319	751,406	128,086	155,838	32,119	290,710	6,238	22,721	635,711	115,694	34,120	81,574	65,748
Colorado & Southern	1,123	1,955,972	609,975	2,758,568	403,082	623,285	43,858	835,961	19,909	74,733	2,000,827	757,741	138,241	619,152	—163,126
Cumberland Valley	164	757,342	252,752	1,067,697	188,236	130,756	18,266	354,211	3,109	30,333	724,910	342,787	23,642	319,145	—30,508
Delaware, Lackawanna & Western	960	10,670,791	3,230,150	15,348,078	1,973,041	2,404,824	277,975	4,547,066	139,138	292,853	9,549,477	5,798,601	740,000	5,058,215	—31,889
Denver & Rio Grande	2,562	6,259,305	1,896,644	8,690,754	1,427,274	1,512,290	156,927	2,409,009	132,904	218,202	5,847,503	2,843,250	360,000	2,482,897	—75,513
Denver & Salt Lake	255	452,315	165,852	655,584	80,848	113,667	11,069	201,872	.....	21,863	426,344	229,239	20,000	209,239	8,700
Detroit & Mackinac	400	247,724	124,307	403,813	50,002	64,857	8,698	137,260	1,021	10,744	272,583	131,230	36,497	94,733	24,159
Detroit & Toledo Shore Line	79	471,539	.....	472,726	67,240	35,873	6,178	129,929	.....	10,522	249,743	222,982	23,600	199,382	—44,753
Detroit, Grand Haven & Milwaukee	191	545,000	262,000	929,234	165,815	133,775	29,687	438,749	4,359	18,738	791,324	137,910	13,440	123,830	—68,029
Duluth & Iron Range	292	2,412,450	77,715	2,577,228	382,221	295,684	4,810	475,768	13,564	34,358	1,206,404	1,370,824	137,220	1,233,604	—1,223,146
Duluth, Missabe & Northern	364	2,846,165	121,218	3,028,423	310,483	304,645	8,763	490,588	12,341	38,017	1,164,837	1,863,586	157,336	1,706,249	—1,333,430
Duluth, South Shore & Atlantic	628	622,113	372,504	1,105,169	231,757	146,549	32,108	395,708	16,939	47,251	870,312	234,857	76,000	158,804	—67,912
Duluth, Winnipeg & Pacific	185	359,801	79,852	451,755	109,272	83,432	9,902	164,222	3,596	24,421	394,845	56,910	22,588	34,322	—66,931
El Paso & Southwestern Co	1,028	1,957,259	428,267	2,595,861	324,457	368,422	73,284	695,357	22,725	90,550	1,566,044	1,029,818	152,843	861,772	59,653
Elgin, Joliet & Eastern	777	3,043,481	26	3,233,661	322,588	563,903	22,693	877,645	.....	72,634	1,859,152	1,374,509	131,332	1,243,177	—241,443
Erie	1,988	14,723,651	3,550,715	19,959,059	2,250,372	4,497,778	363,048	6,772,665	137,480	398,456	14,381,805	5,577,254	587,010	4,979,308	—237,510
Florence & Cripple Creek	87	329,572	78,436	415,493	53,665	38,997	8,283	124,187	.....	17,159	242,292	173,201	22,688	150,513	—60,339
Florida East Coast	696	680,769	435,253	1,292,907	247,996	199,420	25,001	490,210	11,321	75,975	1,035,304	257,603	80,000	177,557	238,055
Fort Worth & Denver City	454	1,143,598	578,612	1,824,293	178,221	259,083	33,262	698,621	14,805	56,230	1,240,221	584,072	47,354	536,718	146,856
Galveston, Harrisburg & San Antonio	1,338	2,810,273	1,083,317	4,187,785	525,630	694,951	110,539	1,662,902	36,655	143,332	3,170,746	1,017,039	157,702	858,829	—40,839
Georgia	307	651,203	287,648	1,019,147	118,155	203,366	48,527	445,794	297	31,262	847,400	171,747	13,756	157,760	—70,561
Georgia, Southern & Florida	395	454,965	244,364	800,589	108,152	173,135	30,585	315,202	23	40,230	667,327	133,262	43,770	88,297	—24,355
Grand Rapids & Indiana	575	1,038,694	820,884	2,035,765	223,289	276,251	46,033	779,740	13,318	55,307	1,393,938	641,827	96,982	544,845	90,323
Grand Trunk Western	347	1,635,000	744,000	2,543,628	383,351	481,686	85,801	1,002,310	37,495	58,679	2,049,322	494,306	143,680	350,448	—17,460
Great Northern	8,028	21,362,357	5,681,964	29,627,635	2,856,061	2,595,540	413,332	6,875,106	324,314	424,061	13,466,208	16,161,428	1,631,682	14,528,459	844,562
Gulf & Ship Island	308	427,334	117,751	580,413	72,397	117,717	9,817	150,513	1,072	28,958	380,473	199,941	29,279	170,616	93,843
Gulf, Colorado & Santa Fe	1,937	4,101,072	1,195,402	5,582,147	722,251	802,455	109,988	1,886,590	.....	134,799	3,656,083	1,926,064	198,397	1,726,018	697,611
Hocking Valley	353	2,078,397	334,498	2,597,706	340,992	476,941	33,420	755,232	.....	56,443	1,663,029	934,677	155,200	779,477	—246,551
Houston & Texas Central	854	1,620,933	598,984	2,369,462	426,216	345,871	61,523	916,514	6,700	69,245	1,824,657	544,806	96,187	448,184	—109,889
Houston, East & West Texas	191	314,060	125,226	464,267	100,288	79,428	7,647	178,059	.....	12,080	377,249	87,018	16,996	69,924	—26,363
Illinois Central	4,769	15,806,287	4,811,416	22,291,247	3,305,648	4,991,927	409,369	7,669,143	121,142	487,713	16,879,193	5,412,054	1,100,000	4,304,795	220,371
Indiana Harbor Belt	105	.....	.....	1,167,708	157,296	123,164	10,870	451,877	.....	30,846	774,053	393,655	31,140	362,230	121,263
International & Great Northern	1,160	2,174,404	736,561	3,136,112	578,958	507,258	97,828	1,414,849	11,474	120,112	2,730,479	405,633	110,000	295,340	766,681
Kanawha & Michigan	177	1,014,220	131,476	1,173,459	160,556	272,101	9,715	324,066	12	27,232	793,683	379,776	46,976	332,786	—40,625
Kansas City Southern	827	2,677,655	548,386	3,570,118	416,203	439,213	121,848	1,142,688	.....	170,732	2,284,637	1,285,481	190,020	1,094,319	86,080
Lake Erie & Western	906	1,688,174	307,086	2,098,906	289,321	327,325	50,859	777,813	.....	47,641	1,492,959	605,947	97,513	507,469	180,831
Lake Shore & Michigan Southern	1,852	11,407,882	4,776,384	18,604,477	2,044,583	3,644,158	309,726	6,059,908	214,248	445,380	12,718,002	5,886,475	794,500	5,087,700	—156,215
Lehigh & Hudson River	97	573,563	42,213	625,851	99,181	79,445	5,379	218,487	.....	14,236	416,723	209,129	16,600	192,529	79,315
Lehigh & New England	294	929,829	5,980	975,164	124,055	127,906	7,011	225,766	.....	23,587	508,325	466,839	22,679	444,160	188,394
Lehigh Valley	1,444	12,832,025	1,699,309	15,378,758	1,645,906	3,094,126	301,080	5,023,866	55,990	274,340	10,395,308	4,983,450	557,000	4,424,131	—27,995
Long Island	398	1,323,241	3,394,332	5,399,963	503,720	477,074	56,585	1,991,366	27,037	104,775	3,160,557	2,239,407	260,948	1,977,436	367,102
Louisiana & Arkansas	279	482,535	84,222	583,935	117,215	98,769	10,388	151,574	.....	17,845	395,399	188,536	25,000	163,536	—26,039
Louisiana Western	208	469,077	237,215	751,440	81,163	138,667	26,143	226,315	12,116	25,921	510,260	241,181	34,941	206,184	33,405
Louisville & Nashville	5,024	13,292,975	4,117,704	18,657,212	2,988,851	3,816,705	440,490	6,278,492	62,888	408,582	13,981,965	4,675,246	737,100	3,935,854	—1,061,753
Maine Central	1,209	2,372,454	1,506,113	4,179,383	592,286	590,595	51,150	1,493,405	30,449	105,379	2,863,264	1,316,118	206,176	1,109,804	171,509
Michigan Central	1,800	7,175,011	3,449,863	12,019,994	1,279,226	1,777,277	256,095	4,559,334	194,579	217,066	8,283,576	3,736,418	536,000	3,198,436	935,564
Midland Valley	380	324,530	152,798	507,328	106,544	100,028	8,221	164,889	.....	22,827	402,509	104,819	26,328	78,269	—27,854
Minneapolis & St. Louis	1,646	2,625,587	759,005	3,585,562	428,536	535,915	74,204	1,273,439	325	82,587	2,395,006	1,190,556	154,569	1,035,987	63,173
Minn., St. Paul & Sault Ste. Marie	4,102	7,738,684	2,459,693	10,995,727	1,435,801	1,482,790	195,057	3,178,400	65,453	203,741	6,533,153	4,462,575	491,807	3,970,768	85,612
Missouri & North Arkansas	365	260,316	150,165	441,263	117,028	83,157	14,905	204,032	.....	23,511	442,634	—1,371	24,000	—25,559	87,997
Missouri, Kansas & Texas System	3,865	7,328,081	3,088,258	11,238,104	1,499,264	1,726,491	226,529	3,929,717	113,394	369,077	7,777,295	3,460,810	456,422	3,002,545	17,495
Missouri, Oklahoma & Gulf	332	306,252	87,340	414,332	83,510	71,129	17,080	179,592	402	21,728	373,441	40,891	25,892	14,660	—13,350
Missouri, Oklahoma & Gulf of Texas	19	37,985	1,662	40,533	4,288	7,678	841	17,259	.....	2,033	32,100	8,433	787	7,646	6,611
Missouri Pacific	3,920	8,066,422	1,830,851	10,742,876	1,332,879	1,940,496	253,163	3,763,299	35,630	254,409	7,579,876	3,162,999	394,360	2,765,106	1,006,380

REVENUES AND EXPENSES OF RAILWAYS

FOUR MONTHS OF FISCAL YEAR ENDING JUNE 30, 1915—CONTINUED

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses							Net operating revenue (or deficit).	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
					Maintenance										
		Freight.	Passenger.	Total, inc. misc.	Way and structures.	Of equipment.	Traffic.	Transportation.	Miscellaneous.	General.	Total.				
Mobile & Ohio	1,122	$3,282,541	$492,789	$3,951,662	$466,807	$846,004	$167,040	$1,522,110	$11,843	$118,706	$3,132,511	$819,152	$126,331	$692,674	—$272,463
Monongahela	67	350,274	9,080	366,905	71,546	26,550	2,404	88,200	.....	8,027	196,727	170,178	7,440	162,738	—150,183
Morgan's La. & Tex. R. R. & S. S. Co...	405	982,692	370,588	1,462,947	192,538	309,084	44,960	566,282	10,534	47,710	1,170,908	292,039	81,569	209,142	28,038
Nashville, Chattanooga & St. Louis.....	1,231	2,627,249	975,556	3,925,396	530,228	810,695	174,693	1,528,922	39,802	118,303	3,202,643	723,753	108,852	613,661	—160,210
Nevada Northern	165	336,464	40,341	392,289	73,887	57,055	1,827	92,631	261	15,506	241,167	151,122	22,525	128,597	—136,775
New Orleans & North Eastern.....	204	903,185	196,464	1,205,013	131,250	262,792	39,225	423,062	23,290	46,577	926,197	278,816	60,400	218,416	—66,803
New Orleans Great Northern.....	283	409,177	112,576	572,051	68,675	85,166	10,855	171,676	708	25,523	362,604	209,446	13,667	195,770	—65,799
New Orleans, Texas & Mexico.....	286	432,135	82,635	541,332	118,062	67,745	16,814	211,494	.....	34,121	448,237	93,095	6,484	86,612	25,799
New York Central & Hudson River.....	3,692	21,634,884	12,544,510	40,054,126	4,681,976	7,136,582	616,291	13,396,337	739,220	888,748	27,459,154	12,594,972	2,056,337	10,537,517	1,259,568
New York, Chicago & St. Louis.....	568	3,080,692	571,360	3,839,438	547,392	436,497	179,661	1,661,857	22,762	76,903	2,916,072	923,365	168,000	755,072	3,322
New York, New Haven & Hartford.....	2,003	10,535,731	10,005,159	22,954,442	3,017,186	3,234,484	151,643	8,364,122	188,531	520,077	15,467,488	7,486,954	970,000	6,515,337	141,008
New York, Ontario & Western.....	568	2,231,131	856,852	3,571,575	504,865	593,869	33,003	1,241,906	.....	61,696	2,435,340	1,136,235	78,332	1,057,873	—24,637
New York, Philadelphia & Norfolk.....	112	1,080,339	197,165	1,400,921	140,013	260,622	17,757	565,493	18,951	38,974	1,041,811	359,110	34,800	324,302	27,426
New York, Susquehanna & Western.....	140	720,847	192,168	1,010,769	109,576	114,017	8,108	431,387	.....	22,257	685,250	325,519	52,500	261,619	45,711
Norfolk Southern	900	806,977	429,723	1,334,416	193,348	213,496	31,035	480,026	.....	79,962	997,866	336,550	49,000	287,550	—85,896
Norfolk & Western	2,039	12,971,657	1,807,940	15,350,825	2,370,871	2,991,172	241,974	4,357,047	39,673	268,813	10,060,694	5,290,131	560,000	4,730,130	—27,105
Northern Pacific	6,413	17,349,630	5,722,174	25,251,358	3,959,149	3,640,119	392,134	6,957,331	364,541	353,270	15,126,106	10,125,252	1,653,568	8,471,684	—905,159
Northwestern Pacific	401	611,857	779,224	1,544,620	251,845	166,051	18,642	497,324	.....	36,908	949,437	595,183	63,940	531,243	—48,722
Oregon Short Line	2,160	5,511,624	1,764,759	7,985,295	1,174,828	946,496	117,895	1,833,205	118,788	217,823	4,354,832	3,530,463	461,514	3,068,074	—620,134
Oregon-Washington R. R. & Nav. Co....	2,023	3,863,988	1,743,168	6,084,026	665,155	653,596	151,883	1,885,147	55,852	223,696	3,585,655	2,498,371	388,286	2,109,605	153,832
Panhandle & Santa Fe.....	668	1,038,034	237,130	1,341,168	233,177	265,354	14,738	413,376	.....	35,307	961,953	379,216	36,299	342,558	205,373
Pennsylvania Company	1,750	15,159,226	3,656,262	20,828,158	2,903,588	3,497,273	298,938	7,108,610	152,599	443,035	14,404,043	6,424,115	1,080,027	5,343,770	—1,205,268
Pennsylvania Railroad	4,519	46,126,454	14,348,851	66,320,664	8,371,836	12,167,342	754,588	23,566,198	954,692	1,610,239	47,434,895	18,885,769	2,635,744	16,251,622	593,110
Pere Marquette	2,321	4,246,121	1,650,363	6,444,587	603,323	1,191,372	130,422	2,279,285	23,068	197,500	4,422,237	2,022,350	212,512	1,809,317	1,082,338
Philadelphia, Baltimore & Washington...	717	3,727,094	2,879,647	7,313,188	1,104,835	1,286,508	100,827	2,992,171	52	176,882	5,661,275	1,651,913	228,093	1,423,576	311,734
Pittsburgh & Lake Erie	224	4,797,385	635,215	5,662,915	716,749	1,147,176	55,572	1,411,024	14,380	110,045	3,454,946	2,207,969	207,600	2,000,369	—906,699
Pittsburgh, Cincinnati, Chic. & St. Louis.	1,472	9,684,326	3,008,043	14,242,032	1,847,838	2,567,332	257,155	4,908,972	101,534	309,813	9,992,643	4,249,389	673,172	3,575,833	297,513
Pittsburgh, Shawmut & Northern.....	294	560,821	47,821	617,504	174,177	195,158	6,073	204,733	.....	16,953	597,094	20,410	6,602	13,808	—48,945
Richmond, Fredericksburg & Potomac....	88	480,297	305,123	902,281	78,810	122,997	14,365	342,815	12,730	28,227	599,945	302,336	30,547	271,744	11,311
Rutland	468	691,878	454,171	1,302,518	164,235	221,365	34,867	487,584	5,282	21,771	935,104	367,413	68,652	298,761	—61,136
St. Joseph & Grand Island.....	258	458,639	114,473	614,636	124,042	83,733	19,279	206,116	.....	21,992	455,163	159,474	28,165	131,282	56,493
St. Louis & San Francisco.....	4,746	9,667,964	3,940,107	14,527,279	2,021,397	2,225,583	262,510	4,765,938	.....	344,906	9,620,334	4,906,946	434,824	4,468,247	—365,611
St. Louis, Brownsville & Mexico.....	548	473,180	276,714	820,216	150,859	83,255	20,909	309,264	.....	42,155	598,847	221,369	27,000	194,369	—22,986
St. Louis, Iron Mountain & Southern....	5,365	7,936,736	1,994,388	10,755,505	1,515,850	1,928,634	218,483	3,283,361	38,040	238,447	7,322,815	3,532,690	452,128	3,077,458	—361,856
St. Louis Merchants' Bridge Terminal...	9	.....	850	643,869	85,949	26,256	3,023	309,580	.....	27,543	452,351	191,519	30,570	160,949	82,832
St. Louis, San Francisco & Texas.....	235	303,696	121,279	454,334	118,524	69,116	9,463	198,405	.....	19,553	416,061	38,272	5,309	32,949	—136,257
St. Louis Southwestern	943	1,880,551	457,279	2,481,332	295,752	424,504	101,906	660,176	14,242	102,203	1,598,040	883,292	118,504	764,580	—228,545
St. Louis Southwestern of Texas.....	811	820,696	374,278	1,298,644	318,226	325,557	46,851	572,116	4,173	70,176	1,334,383	35,739	54,000	90,143	—115,815
San Antonio & Aransas Pass.....	734	969,069	455,154	1,516,681	243,505	272,381	26,706	675,474	.....	46,126	1,264,191	252,489	48,000	204,353	—349,881
San Pedro, Los Angeles & Salt Lake....	1,132	2,055,502	897,119	3,250,196	375,628	515,462	128,818	1,029,925	55,360	73,348	2,178,541	1,071,655	162,136	909,036	—38,770
Seaboard	3,099	4,508,606	1,566,049	6,811,243	825,927	1,074,018	257,442	2,543,536	27,052	212,023	4,937,740	1,873,503	364,000	1,507,941	—474,778
Southern	7,036	14,125,240	6,395,478	22,434,865	3,122,988	4,151,295	767,519	8,182,486	151,167	693,550	17,041,709	5,393,155	875,377	4,512,613	—1,790,312
Southern in Mississippi	281	209,344	125,424	366,303	94,430	38,375	9,977	164,838	.....	14,533	322,154	44,149	29,443	14,647	—8,288
Southern Pacific	6,507	22,464,116	9,850,999	35,523,431	3,440,919	4,931,158	629,858	10,816,011	561,060	921,638	21,254,277	14,269,154	1,700,236	12,560,212	—1,622,598
Spokane International	163	227,913	70,397	313,595	52,639	20,722	9,273	90,536	.....	14,309	187,479	126,116	15,782	110,297	—54,461
Spokane, Portland & Seattle.....	556	1,055,701	611,450	1,832,749	204,960	141,563	33,423	374,347	15,025	53,875	823,192	1,009,557	213,600	795,806	—10,905
Tennessee Central	294	360,548	151,905	546,290	123,141	72,282	22,477	207,589	.....	26,862	452,341	93,948	17,886	76,020	—84,395
Terminal R. R. Ass'n of St. Louis.....	35	.....	742	941,523	78,320	47,641	3,582	309,603	.....	19,777	459,222	482,301	113,527	368,774	126,728
Texas & New Orleans	469	866,409	396,795	1,392,121	251,016	346,747	30,024	590,615	57,018	42,455	1,317,278	74,843	63,172	10,553	—113,875
Texas & Pacific	1,870	4,040,950	1,565,226	6,094,901	649,266	991,951	150,034	2,455,537	60 788	153,644	4,457,930	1,636,972	274,800	1,360,685	—101,483
Toledo & Ohio Central	446	1,684,469	239,707	2,057,614	280,925	329,215	27,630	692,736	7,290	39,722	1,377,517	680,097	85,408	594,034	111,919
Toledo, Peoria & Western	248	251,749	169,492	450,561	70,908	105,337	9,919	179,528	.....	14,320	389,013	70,549	24,400	46,149	11,141
Toledo, St. Louis & Western	451	1,350,000	134,060	1,595,089	201,653	247,363	65,269	569,364	.....	34,564	1,118,703	476,887	119,660	357,227	—153,293
Trinity & Brazos Valley	315	273,003	91,978	397,048	82,417	37,771	14,720	176,124	.....	33,326	344,358	52,690	19,600	32,945	34,828
Union Pacific	3,615	14,663,425	3,772,024	20,422,876	2,676,517	2,512,396	360,738	4,615,920	300,463	468,022	10,925,480	9,497,396	734,475	8,761,608	—88,229
Union R. R. of Baltimore	9	462,072	94,278	563,518	53,515	.....	.....	18,478	.....	8,704	80,697	482,821	24,821	457,999	—27,629
Union R. R. of Pennsylvania	31	.....	.....	1,560,664	183,756	413,787	409	559,629	.....	11,634	1,169,215	391,449	14,909	376,540	—173,594
Vandalia	910	2,683,804	900,357	3,996,685	602,766	754,737	91,256	1,455,723	48,259	84,709	3,037,450	959,235	129,164	830,071	—150,361
Vicksburg, Shreveport & Pacific	171	284,133	180,772	516,770	86,164	115,987	14,032	191,554	10,279	19,969	437,985	78,785	27,800	50,985	—55,431
Virginia & Southwestern	240	599,595	65,804	685,830	97,533	150,866	9,721	190,948	.....	15,463	464,532	221,299	25,000	196,299	—7,808
Virginian	503	1,809,317	154,112	2,088,345	260,399	368,328	22,529	464 537	42,287	44,516	1,183,555	904,790	90,000	814,780	—199,587
Wabash	2,518	7,272,712	2,418,344	10,668,355	1,256,396	1,803,702	341,952	3,930,465	65 143	242,020	7,624,914	3,043,442	329,752	2,712,825	—67,946
Washington Southern	36	149,049	149,362	404,243	53,754	63,360	5,347	163,911	5,190	11,876	303,439	100,804	13,280	87,519	—1,789
West Jersey & Seashore	356	677,072	2,055,000	2,978,667	383,323	368,800	54,310	1,038,669	11,990	53,680	1,909,772	1,068,895	111,644	957,120	127,727
Western Maryland	661	2,385,965	408,746	2,925,248	425,721	475,918	84,746	1,062,107	7,698	77 084	2,128,549	796,698	98,000	698,698	170,987
Western Pacific	943	1,648,957	487,698	2,266,208	563,532	269,174	99,358	686,826	50,826	86,859	1,756,575	509,633	120,062	388,558	—253,816
Western Ry. of Alabama	133	237,045	158,935	435,165	79,332	106,810	23,399	130,968	5,825	18,219	364,552	20,613	21,647	48,647	—58,853
Wheeling & Lake Erie	459	1,736,177	233,491	2,149,628	249,663	358,495	34,896	737,864	5,963	67,129	1,449,009	700,619	130,495	570,124	—303,484
Yazoo & Mississippi Valley	1,372	2,690,058	842,409	3,763,599	623,734	607,170	68,842	1,414,533	4,569	91,739	2,806,576	957,022	200,000	756,476	—17,884

iary operations, less taxes, averaged $351 per mile of line, and in September, 1913, $354, thus decreasing $3, or 0.9 per cent. Operating income for each mile of line for each day in September averaged $11.69, and in September, 1913, $11.80. Operating income is that proportion of their operating receipts which remains available to the railways for rentals, interest on bonds, appropriations for betterments, improvements, new construction, and for dividends.

The railways of the eastern district show a decrease in total operating revenues per mile of line as compared with September, 1913, of 5.5 per cent, the railways of the southern district a decrease of 8.9 per cent, and the railways of the western district a decrease of 5.0 per cent. Operating expenses per mile decreased 10.4 per cent in the east, decreased 4.9 per cent in the south, and decreased 7.1 per cent in the west. Net operating revenue per mile increased 6.9 per cent in the East, decreased 19.0 per cent in the south, and decreased 1.5 per cent in the West. Taxes per mile show increases of 2.4 per cent in the east, of 2.0 per cent in the south, and of 2.1 per cent in the west. Operating income per mile increased 7.5 per cent in the east, decreased 22.3 per cent in the south, and decreased 2.0 per cent in the west.

The operating ratio for September, that is, the per cent of total operating revenues absorbed in operating expenses, was 66.1 per cent, which is comparable with 67.9 per cent in September, 1913, and 64.3 per cent in September, 1912. The operating ratio in the eastern district for September was 67.9 per cent, as compared with 71.6 per cent for September, 1913; was 74.7 per cent in the southern district as compared with 71.5 per cent in 1913; was 61.4 per cent in the western district, as compared with 62.8 per cent in 1913.

Comparison of returns for three months of the current fiscal year with those of the corresponding months of the previous fiscal year reveals a decrease in total operating revenues per mile of 5.6 per cent, a decrease in operating expenses per mile of 7.6 per cent, and a decrease in net operating revenue per mile of 1.0 per cent.

This net operating revenue per mile increased 2.2 per cent in the east as compared with the corresponding period of the previous year, decreased 7.4 per cent in the south, and decreased 1.7 per cent in the west.

When the returns for the nine months of the calendar year 1914 are compared with those of the corresponding months of 1913, they show a decrease in total operating revenues per mile of 6.2 per cent, a decrease in operating expenses per mile of 5.3 per cent, and a decrease in net operating revenue per mile of 8.5 per cent. This net operating revenue per mile decreased 12.1 per cent in the east as compared with the corresponding period of the previous year, decreased 5.5 per cent in the south, and decreased 5.8 per cent in the west.

The diagram shows the variations in operating revenues, operating expenses, and net operating revenue per mile for the separate months of the calendar year 1913 and of the calendar year 1914 to date. The following table shows the per cent of operating revenues consumed by each class of expenses:

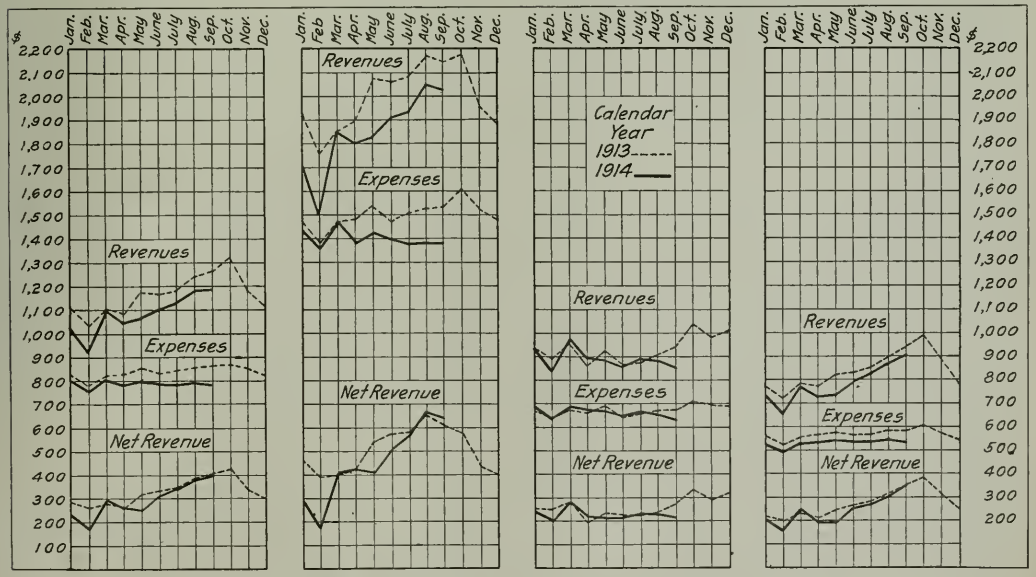
Per Cent of Total Operating Revenues

Account	September, 1914 United States	Eastern District	Southern District	Western District	Three months of the fiscal year 1915
Freight revenue	68.7	67.5	71.4	69.0	66.9
Passenger revenue	22.4	22.8	21.3	22.4	24.2
Mail revenue	1.8	1.5	1.7	2.2	1.8
Express revenue	2.2	2.2	2.2	2.1	2.2
All other revenues	4.9	6.0	3.4	4.3	4.9
Maintenance of way and structures	12.8	12.0	15.0	13.0	13.2
Maintenance of equipment	16.2	17.1	20.1	14.1	16.6
Traffic expenses	1.8	1.5	2.6	1.8	1.9
Transportation expenses	32.5	34.3	34.0	30.0	33.0
General expenses	2.3	2.2	2.8	2.2	2.3
All other expenses	0.5	0.8	0.2	0.3	0.6
Total operating expenses	66.1	67.9	74.7	61.4	67.6

Railway Business Association

The sixth annual dinner of the Railway Business Association was held at the Waldorf-Astoria, New York, Thursday evening, December 10, with George A. Post as toastmaster. There were almost exactly a thousand members and their guests present and the two speakers were Fairfax Harrison, president of the Southern Railway, and Warren G. Harding, United States senator-elect from Ohio. President Harrison's address is given in full elsewhere in this issue. Senator Harding's address will appear in the issue of next week.

One of the features which added to the general enthusiasm of the dinner was the distribution of a newspaper, printed especially for the occasion, containing a speech by Mr. Post,



Monthly Revenues and Expenses per Mile of Line in 1914

president of the association, and also containing news and advertisements of wit or humor, or both.

The New York Railroad Club

The New York Railroad Club will hold its eighth annual smoker and entertainment in the Grand Ball Room of the Waldorf-Astoria, New York, at 8:30, Friday evening, December 18. The program is to be the "Club Mystery," and will not be revealed until the evening of the meeting.

MEETINGS AND CONVENTIONS

The following list gives the names of secretaries, dates of next or regular meetings, and places of meeting of those associations which will meet during the next three months. Hereafter the full list of meetings and conventions will be published only in the first issue of the Railway Age Gazette for each month.

American Society of Civil Engineers.—Chas. W. Hunt, 220 W. 57th St., New York. Regular meetings, 1st and 3d Wednesday in month, except June, July and August, 220 W. 57th St., New York.

American Society of Engineering Contractors.—J. R. Wemlinger, 11 Broadway, New York. Regular meetings, 2d Thursday in month, at 2 P. M., 11 Broadway, New York.

American Wood Preservers' Association.—F. J. Angier, B. & O., Mt. Royal Sta., Baltimore, Md. Next convention, January 19-21, 1915, Chicago.

Association of Transportation and Car Accounting Officers.—G. P. Conard, 75 Church St., New York. Next meeting, December 8-9, Richmond, Va.

Canadian Railway Club.—James Powell, Grand Trunk, P. O. Box 7, St. Lambert (near Montreal), Que. Regular meetings, 2d Tuesday in month, except June, July and August, Windsor Hotel, Montreal Que.

Canadian Society of Civil Engineers.—Clement H. McLeod, 176 Mansfield St., Montreal, Que. Regular meetings, 1st Thursday in October, November, December, February, March and April. Annual meeting, January, Montreal.

Car Foremen's Association of Chicago.—Aaron Kline, 841 Lawler Ave., Chicago. Regular meetings, 2d Monday in month, except July and August, Lytton Bldg., Chicago.

Central Railway Club.—H. D. Vought, 95 Liberty St., New York. Regular meetings, 2d Friday in January, May, September and November. Annual meetings, 2d Thursday in March, Hotel Statler, Buffalo, N. Y.

Engineers' Society of Western Pennsylvania.—Elmer K. Hiles, 2511 Oliver Bldg., Pittsburgh, Pa. Regular meetings, 1st and 3d Tuesday, Pittsburgh.

General Superintendents' Association of Chicago.—A. M. Hunter, 321 Grand Central Station, Chicago. Regular meetings, Wednesday, preceding 3d Thursday in month, Room 1856, Transportation Bldg., Chicago.

New England Railroad Club.—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass. Regular meetings, 2d Tuesday in month, except June, July, August and September, Boston.

New York Railroad Club.—Harry D. Vought, 95 Liberty St., New York. Regular meetings, 3d Friday in month, except June, July and August, 29 W. 39th St., New York.

Niagara Frontier Car Men's Association.—E. Frankenberger, 623 Brisbane Bldg., Buffalo, N. Y. Meetings monthly.

Peoria Association of Railroad Officers.—M. W. Rotchford, Union Station, Peoria, Ill. Regular meetings, 2d Thursday in month, Jefferson Hotel, Peoria.

Railroad Club of Kansas City.—C. Manlove, 1008 Walnut St., Kansas City, Mo. Regular meetings, 3d Friday in month, Kansas City.

Railway Business Association.—Frank W. Noxon, 30 Church St., New York. Annual meeting, December 10, 1914, Waldorf-Astoria Hotel, New York.

Railway Club of Pittsburgh.—J. B. Anderson, Room 207, P. R. R. Sta., Pittsburgh, Pa. Regular meetings, 4th Friday in month, except June, July and August, Monongahela House, Pittsburgh.

Richmond Railroad Club.—F. O. Robinson, C. & O., Richmond, Va. Regular meetings, 2d Monday in month, except June, July and August.

St. Louis Railway Club.—B. W. Frauenthal, Union Station, St. Louis, Mo. Regular meetings, 2d Friday in month, except June, July and August, St. Louis.

Salt Lake Transportation Club.—R. E. Rowland, Hotel Utah Bldg., Salt Lake City, Utah. Regular meetings, 1st Saturday of each month, Salt Lake City.

Southern Association of Car Service Officers.—E. W. Sandwich, A. & W. P. R. R., Atlanta, Ga. Next regular meeting, January 21, 1915, Atlanta, Ga.

Southern & Southwestern Railway Club.—A. J. Merrill, Grant Bldg., Atlanta, Ga. Regular meetings, 3d Thursday, January, March, May, July, September, November, 10 A. M., Candler Bldg., Atlanta.

Toledo Transportation Club.—Harry S. Fox, Toledo, Ohio. Regular meetings, 1st Saturday in month, Boody House, Toledo.

Traffic Club of Chicago.—W. H. Wharton, La Salle Hotel, Chicago.

Traffic Club of New York.—C. A. Swope, 291 Broadway, New York. Regular meetings last Tuesday in month, except June, July and August, Waldorf-Astoria, New York.

Traffic Club of Pittsburgh.—D. L. Wells, Erie R. R., Pittsburgh, Pa. Meetings bimonthly, Pittsburgh. Annual meeting, 2d Monday in June.

Traffic Club of St. Louis.—A. F. Versen, Mercantile Library Bldg., St. Louis, Mo. Annual meeting in November. Noonday meetings October to May.

Transportation Club of Detroit.—W. R. Hurley, Superintendent's office, L. S. & M. S., Detroit, Mich. Meetings monthly, Normandie Hotel, Detroit.

Western Canada Railway Club.—W. H. Rosevear, P. O. Box 1707, Winnipeg, Man. Regular meetings, 2d Monday, except June, July and August, Winnipeg.

Western Railway Club.—J. W. Taylor, 1112 Karpen Bldg., Chicago. Regular meetings, 3d Tuesday in month, except June, July and August, Karpen Bldg., Chicago.

Western Society of Engineers.—J. H. Warder, 1735 Monadnock Block, Chicago. Regular meetings, 1st Monday in month, except January, July and August, Chicago. Extra meetings, except in July and August, generally on other Monday evenings.

Traffic News

The Atchison, Topeka & Santa Fe last week raised its embargo on grain to Galveston, Tex., for export.

During the month of October the Chicago, Burlington & Quincy ran 93 passenger trains from Denver to Chicago, 1,034 miles, of which 92 arrived exactly on time. One train was 11 minutes late because of fog.

The southwestern roads have filed tariffs with the Interstate Commerce Commission similar to those of the western trunk lines, advancing freight rates on a number of commodities and making changes in charges for special services.

The New York, New Haven & Hartford has invited large numbers of New England merchants and others to attend a conference at Boston, December 15, to consider the promotion of export business. The road will give a luncheon to its visitors at the American House, Tuesday noon.

At the recent annual meeting of the Traffic Club of Kansas City the following officers were elected for the ensuing year: President, Frank M. Cole, general agent, New York Central Lines; first vice-president, F. W. Fratt; second vice-president, H. A. Richards, commercial agent, Grand Trunk; secretary-treasurer, A. Wild.

The passenger department of the Nashville, Chattanooga & St. Louis has received a letter from a clergyman enclosing a draft for $6.31 to pay for a trip over the line in 1910 on which he failed to pay fare for his boy, although the boy was six years old. The amount included not only the half fare rate but interest at six per cent.

Precautions against the spread of the foot and mouth disease continue to be maintained strictly in many directions. In Massachusetts, Rhode Island and Connecticut the Department of Agriculture has ordered a quarantine prohibiting the transportation of hay, except where the shippers can certify that it has not been near infected animals.

The new Northern Pacific double track line from Tacoma, Wash., south to Tenino, 43.7 miles, which was built to replace the existing single track line between those places will be opened for business on December 15. This work was described in the *Railway Age Gazette* of July 24, 1914, page 159. The line is to be used jointly by the Northern Pacific and the Oregon-Washington Railroad & Navigation Company.

J. B. Munson, receiver of the Macon & Birmingham, has applied to the railroad commission of Georgia for authority to increase passenger fares from three cents a mile to four cents, to increase certain freight rates, and to take off two passenger trains. The passenger trains of the road, as a whole, are run at a loss, the pay received for carrying passengers, mail and express being insufficient to pay operating expenses, to say nothing of roadway interest and other fixed charges.

Joseph Beifeld, president of the Hotel Sherman Company, Chicago, is circulating 25,000 copies of a pamphlet entitled "How to Get Back Prosperity," advocating general advances in freight rates as the best means of promoting the prosperity of the country. "The more I talk with business men," said Mr. Beifeld, "the more I am convinced that the railroad situation is responsible for the financial condition of the people of the United States. The railroads need increased freight rates if they are to progress."

Notes from Japan.—There are now within a radius of 50 miles of Osaka nearly 250 miles of double track in operation and 80 miles more under construction or proposed in the near future. The growth of light railways has been slower, there being at present less than 50 miles, but another 50 miles are under construction. Numerous plans are projected, but hitherto these have been held up by lack of capital.

Commission and Court News

INTERSTATE COMMERCE COMMISSION

Investigation by the Interstate Commerce Commission of the financial history of the Pere Marquette was begun at a hearing in Detroit, Mich., last week before Commissioner Hall. The principal witnesses who testified were J. L. Cramer, controller of the Pere Marquette, and C. S. Sikes, auditor.

Kansas-Iowa Brick Rates

Standard Vitrified Brick Company et al. v. Chicago, Burlington & Quincy et al. Opinion by Commissioner Clements

Upon rehearing, the commission finds that a rate of 12½ cents per 100 lb. on brick (except bath, tile and enameled) in carloads from points in the Kansas gas belt to stations in Iowa on the Chicago, Burlington & Quincy is not unreasonable. A proposed increase from 10 to 12½ cents per 100 lb. from the same points of origin to certain stations in Iowa on the Chicago, Rock Island & Pacific is found justified. (32 I. C. C., 208.)

Rates on Glass from West Virginia Points

Central West Virginia Glass Manufacturers' Association et al. v. Baltimore & Ohio et al. Opinion by Commissioner McChord:

The commission finds that the rates on window glass from Clarksburg, W. Va., to destinations eastbound are not unreasonable. It is found, however, that the four points of Weston, Salem, West Union and Clarksburg should be grouped and given the Clarksburg rate, westbound, and that the Clarksburg group should be put on the same basis as the Pittsburgh group with respect to westbound rates. Although the present rates on westbound traffic are found unreasonable and discriminatory, reparation is denied. (32 I. C. C., 218.)

Grain Rates from Buffalo to New York Sustained

New York Produce Exchange v. New York Central & Hudson River et al. Opinion by Commissioner Clements:

Complainants allege that the rates on ex-lake export grain from Buffalo, N. Y.; Erie, Pa., and other lake ports to New York City are unreasonable per se; and that they are discriminatory in that they are higher than the divisions which the defendants receive of the all-rail export grain rate from Chicago to New York. It is also alleged that the defendants unduly prefer Montreal and discriminate against New York by the existing rate adjustment. Defendants maintain during the period of navigation an ex-lake export rate from Buffalo to New York on wheat, the principal grain here involved, of 5½ cents per bushel. The rate from Chicago to Montreal by water on the same traffic is 3½ cents per bushel. During the open navigation season of 1913, the amount of wheat exported through New York was about 31,000,000 bushels, and from Montreal about 34,000,000 bushels. Complainants wish the carriers to establish a scale of rates varying with respect to different periods of the year or a rate not exceeding 4½ cents per bushel from May 1 to November 1 of each year.

The commission notes that it is not unlawful to maintain during the period of navigation, in order to meet competition, lower rates than are maintained during the remainder of the year, provided the maximum rates are not unreasonable and the lower rates are not prejudicial.

It is held that the commission has no power to order the establishment of a scale of rates such as complainant requests. While carriers may take competition into consideration and make rates to meet it, the commission has never held that it could compel them to do so. In such a case the question of policy or expediency in fixing a rate which is less than the maximum of what is reasonable is under the law left to the discretion and judgment of the carrier. The carriers are also upheld in their argument that they have no voice in making rates to Montreal and do not participate in the movement of export grain to that port. It further appears that the present ex-lake domestic rate on wheat is 6½ cents per bushel, or one cent per bushel higher than the export rate. That has been the relation between export and domestic ex-lake rates since May 1, 1908, and in the opinion of the commission should be retained. (32 I. C. C., 212.)

STATE COMMISSIONS

The Illinois Public Utilities Commission held a hearing in Chicago on Monday on the proposed tariff, filed by the railways, imposing a charge for l. c. l. trap-car service. At the suggestion of the commission a committee of shippers was appointed to confer with the railroad attorneys and to present a report on the subject at a hearing on January 12.

The Illinois Public Utilities Commission has issued an order that when a change is made by a railroad in the time of arrival or departure of a passenger train, or when any regular train, or station or agency is to be discontinued, such information shall be posted in a conspicuous place in each station affected by the change at least five days before the change is to become effective.

A hearing was held before the Missouri Public Service Commission at Jefferson City, on December 2, on the application of the Missouri railroads for general advances in freight and passenger rates throughout the state. The principal witnesses for the railroads were B. F. Bush, president of the Missouri Pacific, and O. M. Spencer, general solicitor for the Chicago, Burlington & Quincy, who told the commission that if relief is not afforded the railroads of the state the results will be disastrous to the companies. Detailed testimony regarding the financial condition of the roads and the rate situation was given by Frank Nay, controller, and Stanley Johnson, assistant freight traffic manager of the Chicago, Rock Island & Pacific.

COURT NEWS

Stopping-in-Transit at Nashville

The Supreme Court of the United States has sustained the Interstate Commerce Commission in its decision prohibiting railroads from granting grain reshipping privileges at Nashville, to the disadvantage of Atlanta. This reverses the Commerce Court's decision, which had annulled the order. The commission held that Atlanta and like points must have the same privileges as Nashville. The railroads put Nashville in the same position with Ohio river points by allowing dealers at Nashville to stop their through shipments from the northwest to Georgia and other southern cities, at Nashville, for cleaning, classifying and sacking.

German Control of Belgian Railways.—It is reported that the German military authorities in Belgium have constituted three railway administration departments, with headquarters at Brussels, Charleroi, and Libremont.

The Japanese Train Boy.—According to a book treating of the lighter side of life in Japan, written by a native, T. Fujimoto, the train boy is a most important functionary in that country. His duties seem to be a compound of those of the conductor and of the youth in this country who peddles candy and magazines en route. Incidentally, he has to look after the itinerant vendors of postcards and other souvenirs who ply their trade on the trains despite the regulations. "Outsiders," said one of the train boys to the author, "think that our life is simple and easy, but on the contrary, we are in a weak and pitiful position with the passengers; we are strictly ordered that, even if we are beaten by them we must not strike back against them." For the discharge of these onerous functions, the salary is only $10 a month, "but we have such a confidence in our duty that we take the whole charge of the Imperial Japanese Railways." This is apparently due to the fact that the railways are known by the train boys they keep; "the reputation of the railways solely rests or depends upon the train boys, because if it becomes bad the cause is always ascribed to the bad treatment of passengers by the boys, while there are no faults in the train itself." Formerly the boys were not permitted to receive tips, but this regulation has now been abolished.

Railway Officers

Executive, Financial, Legal and Accounting

J. D. B. DeBow, assistant general counsel of the Nashville, Chattanooga & St. Louis, at Nashville, Tenn., has resigned.

W. M. Baugh, auditor of the Liberty-White at McComb, Miss., has been appointed also assistant to J. W. Johnson, receiver.

E. W. Beatty, general counsel of the Canadian Pacific, Montreal, Que., has been appointed vice-president and general counsel.

A. Mackrille, assistant general auditor of the New York, New Haven & Hartford and the Central New England at New Haven, Conn., has been appointed general auditor, with office at New Haven, and T. M. Prentice, assistant auditor, has been appointed auditor, with office at New Haven. A sketch of Mr. Mackrille's railway career was published in the *Railway Age Gazette* of April 24, 1914, page 961.

Ivy Ledbetter Lee, executive assistant of the Pennsylvania Railroad, with headquarters at the general office in Philadelphia, has resigned to become a member of the personal staff of John D. Rockefeller, New York City, and will take up the duties on this staff of Jerome D. Greene, who will in future devote his entire time to the Rockefeller Foundation. Mr. Lee was born on July 16, 1877, at Cedartown, Ga. He was educated at Emory College, Oxford, Ga., and graduated from Princeton University with the class of 1898, and took post graduate work at Harvard and Columbia Universities. After several years' experience in editorial work on New York newspapers he entered the service of the Pennsylvania Railroad in 1906, and took charge of the publicity work of the company, and in 1908 established its publicity bureau. The following year he resigned from the Pennsylvania Railroad and became general European manager for Harris, Winthrop & Company, bankers. On December 1, 1912, he returned to the service of the Pennsylvania Railroad as executive assistant, from which position he now resigns. From 1905 to 1907 Mr. Lee was the press representative for the anthracite coal operators and other corporations. He was a lecturer before the London School of Economics. He is a Fellow of the Royal Geographical Society and of the Royal Economic Society, also a member of the American Economic Association, and the Railroad Club of New York.

Ivy L. Lee

Operating

John W. Williams has been appointed superintendent of the Globe division of the Arizona Eastern, with office at Globe, Ariz., succeeding C. C. Mallard, deceased.

L. L. Marshall, trainmaster of the Lake Erie, Franklin & Clarion at Clarion, Pa., has been appointed superintendent in charge of transportation, and his former position has been abolished.

E. P. Laird, engineer of roadway of the Atlantic Coast Line at Rocky Mount, N. C., has been appointed superintendent of the Richmond district, with office at Richmond, Va., succeeding E. Phenneger.

The authority of J. W. Farrell, trainmaster of the Grand Trunk at Richmond, Que., has been extended to include the First district, vice E. S. Cooper, transferred. W. J. Nixon, trainmaster at Brockville, Ont., has been appointed trainmaster of the Fourth district, with office at Montreal, Que., succeeding T. H. Mason, transferred. N. P. North has been appointed trainmaster, and E. O. Dunn has been appointed chief despatcher of the 27th and 28th districts, with headquarters at Durand, Mich., vice R. Kelley, deceased, and Mr. North promoted.

Charles Armstrong Grimsley, whose appointment as superintendent of the Northern division of the Florida East Coast, with headquarters at New Smyrna, Fla., has already been announced in these columns, was born on December 25, 1883, at Eastman, Ga. He began railway work on February 1, 1902, with the Southern Railway, and subsequently served as operator on the Atlantic & Birmingham, and later as despatcher on its successor, the Atlanta, Birmingham & Atlantic, until May, 1906, when he was promoted to chief despatcher of the same road. In August, 1907, he entered the service of the Florida East Coast as despatcher, and later served as chief despatcher and then as trainmaster until August, 1914, when he was appointed acting superintendent at Miami, Fla., which position he held at the time of his recent appointment as superintendent of the Northern division of the same road as above noted.

Traffic

The title of J. M. Cousins, commercial agent of the Wabash at New Orleans, La., has been changed to general agent.

W. L. Thornton has been appointed district passenger agent of the Cincinnati Northern at Van Wert, Ohio, succeeding A. C. Stutsman, resigned.

William P. Wightman, westbound agent of the Lake Shore & Michigan Southern at Cleveland, Ohio, has been appointed commercial agent at that place, succeeding George F. Clough, deceased.

R. J. Kennedy, colonization agent of the Gulf, Colorado & Santa Fe, with headquarters at Galveston, Tex., has been transferred to Kansas City, Mo., in a similar capacity, with jurisdiction extended over the Atchison, Topeka & Santa Fe.

F. L. Word, live stock agent of the Southern Railway, Virginia & Southwestern, Georgia Southern & Florida, Hawkinsville & Florida Southern, and Macon & Birmingham at Atlanta, Ga., has been appointed live stock freight agent with headquarters at Atlanta.

F. J. Sullivan, traffic manager and superintendent of the Nevada Copper Belt at Mason, Nev., has been appointed general freight and passenger agent of the Salt Lake & Utah, with headquarters at Salt Lake City, Utah, in place of P. H. Cook, who succeeds Mr. Sullivan on the Nevada Copper Belt.

Paul Pinkerton, commercial agent of the Southern Railway at Atlanta, Ga., has been appointed commercial agent at Athens, succeeding George Robertson, transferred. G. H. Kerr, commercial agent at Pittsburgh, Pa., succeeds Mr. Pinkerton. E. C. Morgan, commercial agent at Buffalo, N. Y., succeeds Mr. Kerr, and the commercial agency at Buffalo has been abolished.

H. C. Davis having resigned as general agent of the Lehigh Valley at New York City, that office has been abolished, and Fred E. Signer, commissioner of the Lake Lines Association at Buffalo, N. Y., has been appointed to the new position of general eastern freight agent, with office at New York City. Mr. Davis' duties in the operating department have been assumed by the superintendent of the New York division.

J. H. O'Neill, district freight and passenger agent of the Oregon-Washington Railroad & Navigation Company at Seattle, Wash., has been appointed traveling passenger agent, with office at Portland, Ore. H. L. Hudson, district freight and passenger agent at Lewiston, Idaho, succeeds Mr. O'Neill at Seattle, and L. M. Foss, traveling freight and passenger agent at Bend, Ore., succeeds Mr. Hudson.

Iverson Lea Graves, whose appointment as general freight agent of the Southern Railway, with headquarters at Knoxville, Tenn., has already been announced in these columns, was born on June 21, 1870, at Augusta, Ga., and was educated at Emory

College, Oxford, Ga. He began railway work on March 1, 1892, and until 1895, was in the service of the Richmond & Danville, the Georgia Pacific, now a part of the Southern Railway and the Plant System of railroads, now part of the Atlantic Coast Line, at Savannah, Ga. He then served as secretary to the manager of the Southeastern Car Service Association, at Atlanta, and in 1897 went to the Southern Railway as secretary to the vice-president, and has been in the service of this road ever since. He was then consecutively secretary to traffic manager, assistant chief clerk to traffic manager, and chief clerk to fourth vice-president until 1905, when he was appointed assistant general freight agent at Memphis, Tenn. Two years later he was promoted to general freight agent at Memphis, remaining in that position until 1911, when he was appointed coal freight agent at Atlanta, Ga., which position he held at the time of his recent appointment as general freight agent of the same road at Knoxville, Tenn., as above noted.

Engineering and Rolling Stock

M. F. Clements has been appointed engineer in charge of track elevation of the Northern Pacific at Spokane, Wash.

S. S. Stiffey, having resigned as superintendent of motive power of the Toledo & Ohio Central and the Zanesville & Western, that office has been abolished, and all the duties thereof have been assumed by C. Bowersox, master mechanic, with office at Bucyrus.

H. C. Oviatt, whose appointment as assistant mechanical superintendent of the New York, New Haven & Hartford in charge of a new bureau just established and known as the bureau of fuel economy, with headquarters at New Haven, Conn., has already been announced in these columns, was born on December 5, 1871, at Milford, Conn., and was educated in the grammar school of his native town. He began railway work on May 23, 1889, as a locomotive fireman on the New York, New Haven & Hartford. In July, 1894, he was promoted to locomotive engineman, and in February, 1900, was appointed air brake inspector. Three years later, he was appointed foreman of engines, and in August, 1904, was promoted to master mechanic on the same road. He subsequently served as general inspector of the mechanical department, and in May, 1913, was appointed assistant mechanical superintendent. The following September, he was appointed superintendent of the Old Colony division, and on November 9, 1914, was selected to organize and supervise the bureau of fuel economy on the same road, with the title of assistant mechanical superintendent, as above noted.

H. C. Oviatt

OBITUARY

Edwin C. Brown, formerly general superintendent, and from September, 1891, to 1910, assistant to the president of the Michigan Central, died in Detroit, Mich., on December 5, aged 83 years.

Swiss Resorts to be Open.—The Swiss Federal Railways announce that most of the leading Swiss winter resorts will be open as usual during the coming season, including Arosa, Davos, Grindelwald, Klosters, Loèche, Pontresina, St. Moritz, Wengen, Celerina, Diablerets, Leuk, Les Avants, Montana, Rigi Kaltbad, Villars, Champéry, Engelberg, Kandersteg, Samaden and Weissenstein.

Equipment and Supplies

LOCOMOTIVE BUILDING

The Nashville, Chattanooga & St. Louis, reported some time ago as being in the market for locomotives, has issued new inquiries for 6 Mikado and 6 Pacific type locomotives.

Russian Government Railways.—The Railway Gazette of London in its issue of November 27 states: The Russian railways are short of rolling stock, and the Ministry of Ways of Communications finds it urgent to order 116 freight locomotives and 15,700 freight cars more than provided for in the ordinary credits.

CAR BUILDING

Russian Government Railways.—See note above under head of Locomotives.

The Pennsylvania Railroad has ordered 1,050 all-steel box cars from its Altoona shops.

The Philadelphia & Reading has ordered 200 underframes from the American Car & Foundry Company.

The Louisiana Railway & Navigation Company is installing metal draft arms and Cardwell friction draft gear on 900 60,000 lb. capacity box cars.

The Toledo, St. Louis & Western is reported to be in the market for about 1,700 box cars. This item has not been confirmed.

The Great Northern has ordered 13 coaches, 3 parlor cars, 3 mail and express cars, and 2 baggage cars for the Spokane, Portland & Seattle from the Barney & Smith Car Company.

The Oliver & Snyder Steel Company, Pittsburgh, Pa., has for sale at $150 each, 240 double hopper wooden coke cars which it is now using at its coke works at Oliver, Pa., and Redstone Junction, Pa., where the cars may be inspected.

The Intercolonial has recently ordered 6 first class coaches from the Canada Car Company, 8 sleeping cars from the National Steel Car Company, 200 flat cars from the Nova Scotia Car Works, and 250 coal cars from the Eastern Car Company.

The Northern Pacific has ordered 17 baggage cars, 4 baggage and mail cars, 18 mail and express cars, 47 coaches and 6 dining cars from the Pullman Company. This order is in addition to 21 sleeping cars also ordered from the Pullman Company, reported in the *Railway Age Gazette* of November 13.

IRON AND STEEL

The Oil Belt Terminal has ordered 3,000 tons of rails from the National Steel Rail Company.

The Vicksburg, Alexandria & Southern has ordered 1,500 tons of rails from the National Steel Rail Company.

The Fort Dodge, Des Moines & Southern has ordered three 96-ft. deck girder spans, amounting to 176 tons, from the American Bridge Company.

Atchison, Topeka & Santa Fe.—The item in the *Railway Age Gazette* of last week to the effect that the Santa Fe had ordered 63,450 tons of rails from the Colorado Fuel & Iron Company, was in error in that 12,000 tons of this allotment was ordered from the Illinois Steel Company.

Effects of the War on Industry.—The effect of the present European war on European industry is beginning to be expressed in figures. The British Board of Trade reports that the exports for August were $100,000,000 less than for August, 1913, and that imports decreased by $65,000,000. The exportation of manufactured articles alone decreased $75,000,000.

Supply Trade News

The Eddystone plant of the Baldwin Locomotive Works has been put on full time at least for the next month.

Morris G. Condon, senior member of H. B. Underwood & Co., Philadelphia, Pa., died on Thursday, December 3.

The National Steel Rail Company is filling an order for rails to be shipped to South America. It has also received an order for a tonnage of rails from an interurban railroad in western Kansas.

Alexander Harvey, secretary of the Detrick & Harvey Machine Company, Baltimore, Md., died in that city on November 22, of pneumonia. Mr. Harvey was a native of Baltimore, and with Jacob N. Detrick organized the company bearing his name in 1884. He leaves three sons and a daughter.

Charles Arthur Moore, president of Manning, Maxwell & Moore, New York, died of heart disease on board the steamer Rotterdam, on which he was en route for Naples. Besides being president of Manning, Maxwell & Moore, he was president of the Shaw Electric Crane Company, Consolidated Safety Valve Company, Ashcroft Manufacturing Company, Hancock Inspirator Company, Hayden & Derby Manufacturing Company, United Injector Company, and was a director of the Continental Insurance Company, the Liberty National Bank, the American Bank Note Company and the National Machinery Company. Mr. Moore was born in West Sparta, N. Y., in 1845, and was educated in the public and private schools of Rochester, N. Y., and Lynn, Mass. He enlisted in the navy at the outbreak of the civil war and served throughout the war. He then became a salesman in New England, and in 1880 joined the firm of H. S. Manning & Co., of New York, forming the firm of Manning, Maxwell & Moore, manufacturing railroad supplies. In 1905 the business was incorporated, and Mr. Moore became president and a controlling owner. Mr. Moore was a member of the Chamber of Commerce, National Civic Federation, New York Board of Trade and Transportation, American Society of Mechanical Engineers, Empire State Society of Sons of Revolution, Ohio Society, St. Andrew's Society, Pilgrims of the United States and Society of Genesee. He was a member of the Automobile Club of America, Army and Navy, Republic, Union League, Lotus, Engineers, New York Railroad, Machinery, Lawyers and Transportation Clubs, and the founder and for ten years president of the Montauk Club.

C. A. Moore

The plant of Thomas A. Edison, Inc., and its allied companies was almost entirely destroyed by a fire on Wednesday evening, December 9, which caused a loss estimated at $7,000,000. The greatest loss occurred in the buildings where Edison phonographs were made, but, fortunately, the trade had been well supplied for the Christmas holiday business. The building in which the Edison storage batteries are made was left untouched, and as there was but little damage to the facilities for manufacturing the Edison primary battery, there will be no delay in the manufacture or delivery of either of these products. The laboratory building in which Mr. Edison conducts his experiments and which houses many valuable records was also undamaged.

The United States Circuit Court of Appeals for the second circuit has handed down an opinion reversing the lower court and holding valid and infringed, the Watson corrugated culvert patent under which the Armco American ingot iron culverts made by the American Rolling Mill Company, Middletown, Ohio, are manufactured, in a suit against Frank McPherson, highway commissioner of Ithaca, N. Y. This decision, which is final with no opportunity for further appeal, upholds the Watson claim for a sheet metal culvert composed of connected cylindrical sections having circumferential corrugations extending to the extremities of the section.

Joseph Block, one of the founders and a director of the Inland Steel Company, died in Chicago on December 6, at the home of his daughter, Mrs. H. L. Hart. Mr. Block started his business career in Cincinnati, Ohio, where he founded the firm of Block & Pollak, and later organized the Cincinnati Forge & Iron Works. Both companies were eventually incorporated into the Block-Pollak Iron Company, of Chicago. In 1893 he helped to organize the Inland Steel Company and has since then served continuously as one of its directors. He was also a director of the Buffalo Steel Company, Tonawanda, N. Y. Mr. Block was 83 years old.

Francis V. McGinness, sales engineer of the Edison Storage Battery Company, Orange, N. J., has been appointed assistant manager of the railway department, succeeding William F. Bauer, recently made manager of the Chicago office. Mr. McGinness is a graduate of the Schools of Applied Science of Columbia University, and before graduation had considerable practical experience with the New York & New Jersey Telephone Company. After a few months in the engineering department of the New York & Queens Electric Light and Power Company, Long Island City, he joined the sales force of the Edison Storage Battery Company. He has been in the railway department of that company for the past two years.

TRADE PUBLICATIONS

Insulation.—This is the title of an attractive booklet issued by the Continental Fibre Company, Newark, Del., to describe the company's Vulcanized Fiber, Bakelite-Dilecto and Continental Bakelite. The characteristics of the three products are named. It is stated concerning them that all three are waterproof and that the latter two will stand upwards of 100,000 volts. Bakelite-Dilecto and Continental Bakelite have both been on the market for about two years.

Electric Railway Apparatus.—The General Electric Company has recently issued Bulletin No. 44,003, an attractive illustrated booklet entitled "Modern Electric Railway Apparatus." The bulletin is contained in a colored cover of artistic design and describes briefly the Curtis steam turbine for railway service, railway generator, transformers, switchboards, synchronous converters, motor-generator sets, G-E ventilated railway motors and electric locomotives. There are also illustrations of the G-E locomotives in use at the locks at Panama.

South African Passenger Train Service Curtailed.—It is interesting, in view of similar occurrences in this country, to know that the South African Minister of Railways has sanctioned a curtailment of the passenger train service throughout the system. The step is an economy made necessary by a decline in the freight receipts resulting from the dislocation of trade and the prohibition of the exportation of foodstuffs. A second reason may be that with the restriction of trade the passenger traffic has fallen off. A final reason, is the necessity which a state of war imposes on the administration of providing an ample reserve of engines and rolling stock.

Railway Construction in Madagascar.—A recent consular report states that considerable progress has been made in the construction of the railroad between Tananarive and Antsirabe, 107 miles south of the capital. A branch line between Tananarive and Tamatave is now being built 81 miles north from Moramanga, which is 133 miles from Tamatave, to Lake Abevava in the Ambatondrazaka district, a rich agricultural and cattle section in the west of the province of Tamatave. These two railway extensions will facilitate and develop the commerce of the Central Plateau and the Ambatondrazaka country and will improve conditions generally on the island.

Railway Construction

ALABAMA ROADS.—We are told that a contract has been given to J. N. Gillis & Sons by the Ensign Yellow Pine Company, Wetumpka, Ala., for building a 5-mile logging line out of Wetumpka.

BALTIMORE & OHIO.—The Magnolia cut-off, a new double-track line between Orleans road, W. Va., and Little Cacapon, 12 miles, was opened for traffic on December 6. This cut-off is 5.8 miles shorter than the old line between Orleans road and Little Cacapon. (July 17, p. 115.)

BESSEMER & LAKE ERIE.—We are told that this company plans to build 1.8 miles of second track from Culmerville, Pa., to C. O. Tower.

CENTRAL CANADA.—The Alberta legislature has passed an act providing for the financing and building of this line from its junction with the Edmonton, Dunvegan & British Columbia to the Peace River Crossing; authorizing the building of a branch line from Sucker Creek to Grouard, about 30 miles, and providing for the guarantee of bonds for $20,000 a mile in aid of the construction. The projected route is from a point on the E. D. & B. C., to be called McLennan, near Round Lake, Alta., where there will be a divisional point, northwesterly to the Hart river, thence to Peace River Crossing, about 45 miles, and southerly to Dunvegan. J. D. McArthur & Co., Winnipeg, Manitoba, has the contract to build the line. About 30 miles of grading has been finished. W. R. Smith, Edmonton, Alta., is chief engineer. (November 13, p. 924.)

CHICAGO & ILLINOIS WESTERN.—We are told that work is now under way on a three-mile extension from Hawthorne, Ill., to Western avenue, Chicago.

FAIRVIEW & INTER-MOUNTAIN.—An officer of this company, which was organized about three years ago, writes that grading work is almost finished on the line building from Delta, Colo., to Fairview Mine, 16 miles. Watson Ziegler, president, Fort Collins.

GLEN ROSE & WALNUT SPRINGS.—This line, which extends from Glen Rose, Tex., south by west to Walnut Springs, Tex., a distance of 14 miles, is about 90 per cent completed. The grading is practically finished. There will be a total of 600 ft. of bridge work. About 40,000 ties will be required and 60-lb. rails will be laid over the entire line. T. E. Luttgurding, Hillsboro, Tex., is the general contractor. J. H. Farr, Glen Rose, Tex., is president, and Dave Morris, Walnut Springs, Tex., is chief engineer.

GRAND MARAIS & NORTHWESTERN.—This proposed new line which is to extend from Grand Marais, Minn., through Cascade Junction, to Ely, Minn., a distance of 75 miles, is about 25 per cent completed, the section between Grand Marais and Cascade Junction, a distance of 20 miles, being under construction. The grading on this road will amount to about 15,000 cu. yd. a mile, and is mostly earth. The maximum grade will be 2.72 per cent, and the maximum degree of curvature will be 8 deg. This, however, will be only in a few instances and on temporary construction, and will later be changed to 4 deg. curves. There will be five bridges averaging 190 ft. long, which will be of wood. The contract for all the work under the ties was awarded to John Bergman, Duluth, Minn. The contract for track laying will be let about May, 1915. In connection with this railroad an ore dock is to be built in a year or two.

GRAND TRUNK PACIFIC.—An officer writes that work is now under way by the J. D. McArthur Co., Winnipeg, Man., on the Prince Albert branch from the South Saskatchewan river to Prince Albert, Sask., 25 miles, and work is also under way by Rigby Hyland & Plummer, on the Brandon branch from Harte, Man., to Brandon, 26 miles.

KANSAS CITY TERMINAL.—An officer writes that this company is planning to construct one mile of second track in Kansas City, Mo.

MILL CREEK.—An officer writes that this company has projected an extension from The Wilderness, Va., to Williamsville, about 18 miles. E. E. McCutcham, chief engineer, Staunton, Va.

MOTLEY COUNTY.—This company, which was incorporated last year in Texas with $100,000 capital, and headquarters at Matador, has completed work on the line from Matador to Matador Junction, eight miles. The company will operate gasolene motor cars on the line.

OKLAHOMA ROADS.—It is reported that C. N. Haskell has signed contracts with the Chamber of Commerce of Sapulpa, Okla., for the building of two railroad lines out of that city; one to connect Cushing, Drumright and Sapulpa, and the other to run from Sapulpa to Jenks and connect with the main line of the Midland Valley at that point.

J. H. Morgan and L. A. Walton, Alva, Okla., are promoting a railroad to be built from Ivanhoe, Okla., to Rosston, a distance of 20 miles. Capital is to be raised by subscriptions from farmers along the right of way.

PALATINE, LAKE ZURICH & WAUCONDA.—An officer of this company which operates a 15-mile line from Palatine, Ill., northwest to Wauconda, writes that the company has projected an extension from Wauconda north to Fox Lake, 10 miles.

PHILADELPHIA & READING.—An officer writes that a contract has been given to C. P. Bowers & Co., Reading, Pa., for grading and masonry work on a section of 1.84 miles, now under construction from Nicetown Junction, Philadelphia to Newtown Junction, and that the company will do the track laying with its own forces. In addition second track work between the same places is partly under construction.

SHELBY NORTHERN.—An officer writes that the line projected from Shelby, N. C., north to Casar, N. C., 21 miles, is only proposed and that definite arrangements for carrying out the work have not yet been made. C. R. Poole, Rockingham, N. C., is interested. (August 21, p. 369.)

SOUTHERN RAILWAY.—A contract has been given to Stewart & Jones, Rock Hill, S. C., for work north of Gainesville, Ga., in connection with the Southern Railway's plans for rebuilding and double tracking the Charlotte-Atlanta line. The work to be carried out calls for the construction of 6.5 miles of new line. This is to be built in two sections, one 4 mile section near Mt. Airy, and the other section 2.5 miles long near White Sulphur. The grading work will be heavy, as the new line is to be built through a rough country.

TEXAS ROADS.—A railroad to be known as the Texas, New Mexico & Eastern is projected from a point in the coal fields of New Mexico to the Gulf of Mexico, probably at Aransas Pass—a distance of 500 miles. The portion of the road under immediate consideration is to extend from Lamesa, the county seat of Dawson county, to the city of San Antonio, following in a general way the valley of the Colorado river. A bonus of $3,500 a mile of road is being secured. It is stated that construction work is to begin some time this month. James L. Himrod is vice-president and general manager.

TORONTO SUBURBAN (Electric).—An officer writes that during 1914 this company finished work on an extension from Weston, Ont., to Woodbridge, 12.05 miles, and also laid second-track between Weston and Woodbridge on 7.83 miles. Work is now under way by the Suburban Construction Company, Toronto, Ont., building from Toronto to Guelph, 42 miles.

WEST VIRGINIA ROADS.—We are told that the Horse Creek Land & Mining Company, which owns about 12,000 acres of coal and timber lands adjacent to Big Horse creek and Mud river in Lincoln county, W. Va., will build about 10 miles of railroad to develop this property. Contracts are to be let in sections of three and four miles at a time. The first section from a point on the Chesapeake & Ohio at the mouth of Peter Cave Fork on Big Horse creek, up Peter Cave Fork of Horse creek towards Mud river, about three miles, is expected to be finished by March, 1915, and on completion of this section the line will probably be extended during 1915 a total distance of 20 miles into Lincoln county. L. E. Poteet, general manager, Charleston, W. Va.

RAILWAY STRUCTURES

Albuquerque, N. M.—The Atchison, Topeka & Santa Fe has awarded a contract for the construction of a one-story reinforced concrete store house at Albuquerque, to the Leyden-Ortseifen Construction Company, Chicago. The building is to be 50 ft. by 400 ft., with a platform 70 ft. by 800 ft. in area. Work will be begun at once and is to be completed by April 1, 1915. The estimated cost is $60,000.

Brooklyn, N. Y.—The New York Public Service Commission, First district, has approved the award by the New York Municipal Railway Corporation to the P. J. Carlin Construction Company, the lowest bidder, of a contract for the construction of six stations on the Liberty avenue elevated railroad extension. The contract price is $232,000. (November 6, p. 878.)

The commission opened bids recently for the placing of crossovers and other reconstruction at the DeKalb avenue station, on the line of the Fourth avenue subway in the borough of Brooklyn. The lowest bidder was Samuel Beskin, Beacon, N. Y., who offered to do the work for $133,947. (November 20, p. 991.)

East St. Louis, Ill.—The Southern Railway has given the contract to the Murphy Construction Company, East St. Louis, Ill., for the construction of an 18-stall roundhouse, machine shop building, store, oil and office building, at Denverside yard, East St. Louis. (November 13, p. 925.)

Horace, Kan.—The Missouri Pacific will build a 10-stall 95-ft. frame engine house at Horace, Kan., to replace the one recently destroyed by fire. Work, which is to begin at once, will be done by company forces.

Marion, Ill.—The Illinois Central is building a new combination freight and passenger station at Marion, Ill. The building will be 153 ft. by 36 ft. in area and of brick and concrete construction. The grading has been finished and the structure is roof high. George B. Swift, Chicago, is the contractor. The estimated cost is $17,000. The freight station at Starkville, Miss., which is 123 ft. by 27 ft., and of brick and wood construction, and the roundhouse at Jackson, Miss., previously mentioned in the *Railway Age Gazette*, are both now being completed.

Tacoma, Wash.—The Oregon-Washington Railroad & Navigation Company has awarded contracts for the material and foundations for a bridge over the city waterways, Tacoma. The bridge consists of one 275-ft. swing span, two 125-ft. fixed spans, with railroad and highway decks, and highway approaches totaling a length of 330 ft. The contract for the fabrication of the steel, which amounts to 1,465 tons, was awarded to the American Bridge Company, and the contract for the foundation was given the Missouri Valley Bridge & Iron Company. There will be 5,000 cu. yd. of concrete and 310,000 ft. of timber required. The work is about 50 per cent completed. The total estimated cost is $275,000.

Tamaqua, Pa.—The Pennsylvania State Water Supply Commission has granted permission to the Philadelphia & Reading to build a bridge near Tamaqua; also to build a bridge at Virginville, and permission has been given to the Philadelphia & Chester Valley to build a bridge in Chester county.

Virginville, Pa.—See Tamaqua.

Willits, Cal.—The Northwestern Pacific is considering plans for the erection of a depot, roundhouse and shops at Willits, Cal.

Uganda Railway Results.—Owing to the failure of the usual increase of the traffic of the second half of the year, the report of the Uganda Railway for the year ending March 31, 1914, does not show the same gratifying progress in operation as that for the previous year. Thus gross revenue $2,655,237 increased by $277,574, or 11.68 per cent, but expenditure $1,617,704 was higher by 18 per cent, and the net profit $1,037,432 was only 2.08 per cent higher, giving a percentage on capital cost of 3.39 only against 3.52. The Uganda Railway is not in Uganda itself, but it runs from Mombasa, the chief port of British East Africa, up to Kisumu on Lake Victoria Nyanza, whence there is a steamer service to Uganda. This steamer service and two short railways in Uganda itself, the Busoga Railway (from Jinja to Namasagali) and the Kampala-Port Bell Railway, are also under the control of the parent undertaking. The average mileage operated was 602, as against 586 in the previous year.

Railway Financial News

Arkansas, Louisiana & Gulf.—J. M. Parker, receiver in charge of this road, announces that the Arkansas, Louisiana & Gulf, and the Ashley, Drew & Northern have been consolidated. Mr. Parker is general manager of the A. L. & G., and it is understood that he will become general manager of both companies; and that the receivership will be dissolved. The A. L. & G. extends from Monroe, La., northward, about 50 miles, to Crossett, Ark., and Hamburg; and the other road extends from Crossett farther north, about 40 miles, to Monticello, Ark., on the St. Louis, Iron Mountain & Southern. The new management hopes to build an extension northward from Monticello. In the map of the Ashley, Drew & Northern, as shown in the Official Guide, this extension is shown as running to Gillett and Helena, Ark.; but the present announcement speaks of Pine Bluff as the proposed northern terminus.

Ashley, Drew & Northern.—See Arkansas, Louisiana & Gulf.

Canadian Pacific.—The Guaranty Trust Company, White, Weld & Company, Brown Brothers & Company and Colgate, Parker & Company have bought from the Canadian Pacific $12,690,000 4½ per cent equipment trust certificates, maturing semi-annually from July 1, 1915, to July 1, 1928.

Chicago, Rock Island & Pacific.—Judge Pendleton has denied the application of a holder of some of the collateral 4 per cent railroad bonds for the appointment of a receiver for the railroad company, the holding company, holding that the bondholders can be adequately represented at the foreclosure sale.

Denver & Salt Lake.—According to press despatches, conferences have been held recently between Newman Erb, who now heads the syndicate controlling the Denver & Salt Lake, and Thomas L. Shadbourne, who has on various occasions represented the Gould interests. After the meetings Mr. Erb gave out the following statement:

"The entire capital stock of the Denver & Salt Lake Railroad Company is deposited under a voting trust agreement, which does not expire until May 1, 1918. It is controlled by seven trustees, of whom Newman Erb is one, and who designated three of the other trustees, whose successors he has the sole right to appoint. There can be no change in the management or control of the property except through the voting trustees. Newman Erb cannot, if he would, and would not, if he could, dispose of the control without the concurrence of the Denver interests."

Opelousas, Gulf & Northeastern.—William H. Peterman has been appointed receiver of this company.

San Antonio, Fredericksburg & Northern.—This company has been placed in the hands of a receiver as the result, according to press despatches, of the delay of the Texas railroad commission in granting an application for valuation of the property preliminary to an issue of $500,000 bonds.

Production of Aluminum.—Since the beginning of the aluminum industry in 1883, when the production amounted to 83 lb., the advance has been so rapid that the production in 1913 amounted to 72,500,000 lb.—*Machinery*.

An Aerial Railway in Venezuela.—The official organ of the Venezuelan government has announced that a contract has been made ebtween the minister of public works and the president of the Puerto Cabello & Valencia Railroad, operating a steam railway between the towns named, granting the right to construct an aerial cable line from Valencia to Nirgua. The line will be 37 miles in length and will be built in sections of six miles, each section having its own motive power. The contract requires that work be started within a year of the date of its signing and that it be completed within two years from the date of its beginning. The contract is for 99 years, with the exclusive right of territory for the first 40 years and is transferable with the consent of the government.

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Contents

*Illustrated.

Philadelphia Suburbanites Quickly Appeased

The Public Service Commission of Pennsylvania, in its decision on Philadelphia suburban ticket rates (reported in our news columns) has set an example of promptness and good sense from which some dozens of other commissions might learn a profitable lesson. The advances announced by the railroads a month ago made a great furore, if we may judge by the sensational columns of the newspapers. The general agitation may have been looked upon by the commission as a reason for haste. Again, the question at issue was quite simple, making promptness easy. Nevertheless, the commission's action must be classed as praiseworthy, if only because dilatory tactics are so common—not to say universal. Questions that are simple often seem to become complex just because they are taken into a commission's office. This case was simple for one reason, because a clear course of action was available, whatever differences of opinion might exist among the commissioners. The railroads for years have carried occasional passengers at about the same rate per mile as the commuter who travels every day; an abnormally low rate. A hundred rides a year, say one round trip a week, could be bought for one cent a mile. The carriers abolished this 100-ride ticket and the passenger found his fare more than doubled. The passengers' remonstrance was very loud, *of course*. The order of the commission is that the tickets shall be continued at 1½ cents a mile, and to be used in six months; which may be interpreted as a decision that, whatever the merits of the case, the shock to the passengers must be softened, postponed, divided; which is plain common sense. The people have encouraged trolley lines, greatly depleting the steam roads' profits. This, and the abuse of commutation tickets by petty frauds, constitute good reasons for abolishing the low-rate tickets; but in such a violent change the element of time is important.

Fatal Collision on the Manhattan Elevated

The Interborough Rapid Transit Company of New York City is not subject to the Interstate Commerce Commission, as it does no interstate business; but it has troubles of its own. There was a collision on one of its elevated lines last week, killing a passenger; and forthwith the newspapers demanded steel cars. It does not appear that the loss of life or the distress would have been materially less if the cars had been of steel, but the steel car affords a simple and direct issue—every one knows something of the horrors of fire—and so it must be made prominent, to show how the newspapers love the people. The people would have to stand the burden of the cost of steel cars; it would take $17,000,000 to provide enough steel cars to take the place of the wooden ones now in service, and another seventeen millions would have to be spent to strengthen the elevated structures for heavier loads; but what of that? Shall not safety be secured, whatever the cost? It is to be admitted that any passenger, any city editor, might freely approve the expenditure of thirty-four millions to protect his own individual person; but why should not the few conservative newspapers speak out, on an occasion like this? There are two facts, ignored or minimized by the press, which greatly modify this question of safety on the elevated lines (where, for all trains, at all times, the rule is to run with speed under control). First, the percentage of safety is very high; this is the third collision, fatal to passengers, in the history of the crowded Manhattan elevated lines—about 36 years. Second, the cause of the collision was very plain, making the lesson, as regards precautions, quite clear. The conductor, acting in the place of the motorman as lookout, was not sufficiently cautious in performing an unfamiliar duty. Comparatively unimportant auxiliary causes may be brought out, on further investigation; but there seems no question that adequate training of the men, so that complications due to unexpected failures of apparatus would not be unfamiliar, would provide all reasonable precaution against this kind of error.

THE VALUATI ON OF RAILWAYS

THE recent statement of Director Prouty of the Valuation Department of the Interstate Commerce Commission that the valuation of all the railways will cost $50,000,000, and the reported estimate of a member of the commission that it will take ten years, have called forth unfavorable comment from the press. The Wall Street Journal indorses the plan suggested by some railway officers, of having a valuation made of only certain roads, and thus testing the practicability of valuation as a basis for regulation of rates, before carrying out the scheme in its entirety and incurring all the expense this would cause. The Savannah (Ga.) Morning News of November 24, in referring to Mr. Prouty's remarks, denounces the whole valuation plan. Its cost, the News points out, will be much greater than its advocates anticipated, the time required to make it will be much longer; and when it is done the data on which it is based will be such ancient history that no court will accept it as a basis for fixing rates.

The *Railway Age Gazette* always has thought, and thinks now, that the theory of valuation as the proper basis for the regulation of rates is false. When the question whether a scale of rates fixed by public authority is confiscatory is an issue, valuation may be the best basis on which to settle it. But regulation ought to be such that the question whether rates fixed by it are confiscatory will very seldom be raised. If regulation is to be such that the rates made by it will constantly raise the question of confiscation, then a valuation kept up to date will be useful, but only because the system of regulation is wrong in principle; and such a system cannot endure.

Furthermore, a valuation is unnecessary to convince any fair and reasonable man with any knowledge of railway affairs that as a whole the rates in every section of this country are too low. It is almost universally conceded that the railways should be allowed to earn a net return of 6 per cent on a fair capitalization or valuation. On what capitalization or valuation would the net operating income of recent years yield 6 per cent? The following table gives for the last three years the net operating income per mile of the railways of the United States and those of each of the large sections of the country, and the amounts per mile of capitalization (or valuation) on which the net operating income would have yielded 6 per cent:

	1912		1913		1914	
	Net operating income per mile	Net operating income per mile capitalized at 6 per cent	Net operating income per mile	Net operating income per mile capitalized at 6 per cent	Net operating income per mile	Net operating income per mile capitalized at 6 per cent
United States.....	$3,045	$50,750	$3,680	$61,333	$3,094	$51,566
Eastern District....	5,264	87,733	5,802	96,700	4,443	74,050
Southern District..	2,226	37,100	2,669	44,483	2,588	43,133
Western District...	2,398	39,960	3,016	50,266	2,630	43,833

The *gross* capitalization per mile of our railways in 1912 was over $81,000 a mile; their *net* capitalization—arrived at by elimination of all duplications caused by incorporate ownership of securities—was $63,500; and yet in 1912 their net operating income would have yielded 6 per cent on only $50,750 a mile; in 1913 on only $61,333 a mile, and in 1914 on only $51,566 a mile. Would any engineer of reputation say that the railways of the United States could be reproduced for any of these amounts? Is there a single engineer of reputation who would say the railways of the West could be reproduced for $39,960 to $50,266 a mile, or those of the South for $37,100 to $44,483 a mile, or those of the East for $74,050 to $96,700 a mile? Even the government-owned railways of New South Wales are shown, by their latest report, to have a capital cost now of $75,000 a mile! It is not necessary to wait for the valuation to be finished to find out whether the rates of our railways are too low and their net return too small. Everybody who has studied the facts, and brought to their study enough brains to add 2 and 2 together, and enough fairness to admit, when he has done so, that the sum is 4, knows already that the rates and net return are too low.

Why, then, go on with the valuation? Must we spend ten years and $50,000,000, and perhaps even a great deal more in proving what every real student of railway matters knows already, viz., first, that on the whole rates are too low in this country, and, second, that valuation can never be made really serviceable in the fair regulation of rates? If it is necessary to make a wholesale valuation to prove to the public what every real student of the subject knows, perhaps we should go ahead with it; but the price is a very high one to pay for a form of popular education which it ought to be possible to secure a great deal cheaper.

"EFFICIENCY" IN THE POST OFFICE DEPARTMENT

THE postmaster general in his annual report, sent to Congress this week, congratulates himself and the country on the alleged success of his department in putting the postal business of the country on a self-supporting basis. The surplus for the last fiscal year was, he says, about $3,600,000; and there will be "no danger of recurring deficiencies." The fact that the railroads have been made to carry thousands of tons of parcels without compensation seems to be overlooked; yet Ralph Peters, chairman of the railways' committee, estimates that the loss to the railways this year, because of the not-paid-for parcel post, will be at least $8,000,000!

We shall not further comment at this time on what appears to be a childish, not to say frivolous, attitude, on the part of a high officer of the government. Judging by a number of editorial references already observed, Mr. Burleson's mistaken position is coming to be quite generally understood by the press throughout the country. Some of the editors—and they are not political opponents—almost laugh in his face. But the cure of the present mail-transportation abuse depends on a general knowledge of a good many facts and, pending the receipt of the full text of the forthcoming annual report, the reader will be interested in some grotesque incidents connected with the operation of the parcel post which may not receive detailed attention in the official publication.

Under the caption "Can This Be True?" Collier's Weekly reprinted in a recent issue the editorial note in the *Railway Age Gazette* of August 21, entitled, "Varied Parcel-Post Philanthropies," in which was related the means whereby the contractor on the star mail route between Holbrook, Ariz., and Snowflake shipped 10,000 lb. of barley from Mesa, Ariz., to Snowflake by parcel post, receiving for his portion of the haul $22 more than the total cost to him of the barley laid down at destination. The editor of Collier's pointedly remarked that "if this is true there's a good deal of explaining for some government officials to do."

This does not stand alone. A similar and even more flagrant case has come to our attention recently. The contractor carrying the mail on the star route from Holbrook, Ariz., to Hunt has arranged to purchase at Gallup, N. M., and ship to himself at the end of his route at Hunt 200,000 brick. These brick cost him $12 per thousand at Gallup, or a total of $2,400; the cost of packing for shipment by parcel post has been estimated at $600; the postage from Gallup to Hunt by parcel post is $1.08 per 100 lb. It is estimated that freight can be transported by team from Holbrook to Hunt for $0.50 per 100 lb., while the contractor receives $2.18 per 100 lb. for the transportation of the mail. By putting through this transaction the enterprising contractor could throw the brick away at the end of his route and still make a net profit of $4,800. This should surely produce some incentive for the establishment of a thriving business in the shipment of brick to Hunt. We are waiting with interest to see whether the contractor in question will be able to carry out his plan, in spite of the fact that the post office department has been notified of it.

That the parcel post may not be the boon that it is supposed

to be to the smaller communities is illustrated by the shipment by freight of three carloads of catalogs by one large Chicago mail order house to as many western towns, from which points these catalogs were distributed to the adjacent territories by parcel post. To avoid a delay in passenger trains of several hours in loading the catalogs, it was necessary in each instance for the railroad to set out a special baggage car in which this mail matter was loaded beforehand. The government, it will be recalled, has made the generous addition of five per cent to the mail compensation of the railroads because of the addition of the parcel post matter.

And this reminds us that while, in dealing with star route contractors, mail order houses, and so on, Uncle Sam is an amiable and charitable Dr. Jekyll; when he turns his face toward the railways he always becomes the villainous Mr. Hyde. For example, a steam road has operated two trains each way daily which carry the mail on a branch running from an important metropolis to a small town 25 miles distant. An electric line was built several years ago which gave hourly service between the same points. On application from the people of the smaller town, the post office department arranged for the establishment of mail service at frequent intervals on the electric line. At the time of the next quadrennial weighing the electric line was handling very much the larger part of the mail, and arrangements were made for paying for it accordingly. But an industrious clerk in the postal department discovered an old law stipulating that no "street car" should be paid more for hauling mail between any two points than was paid to a steam road between the same points. Thereupon, regardless of the difference between the amounts of mail handled by the two routes, the compensation of the electric line was cut down to the same amount as was being paid to the steam road. It has remained at this figure ever since, and no attempt has been made by the department to secure modification of the unjust law.

In another case, at the request of the post office department, a railroad consented to the establishment of closed pouch service on two mail routes running from a large city to two smaller towns, the two lines of the railway passing over common tracks to within seven miles of the termini. Upon the establishment of the parcel post the amount of matter handled increased far beyond the limits of the single closed pouch service, and the railroad refused to accept the parcel post matter. Relying upon the technical wording of the contract, the government then had pouches made of sufficient size to hold all the mail offered, including the parcel post, and forced the road to handle it at the old rate, although the amount of mail matter carried reduced the seating capacity of the cars for passengers. Furthermore, a clerk discovered that these two routes were operating over the same tracks for most of the distance and ordered that all this mail should be carried on one train to the common junction, in spite of the fact that the railway, in order to avoid stopping trains at this junction, would not permit passengers for either destination to board a train for the other terminal and change at the junction point. It is now not only necessary for the railroad to stop both trains at the junction, but to place a man there to transfer the mail. By this means the post office department saved 14 miles of closed pouch service, while the railroad was forced to stop its trains to handle this "local freight" traffic.

These illustrations are on a parity with the practice followed of shipping the empty mail sacks by freight until the close of the weighing periods, after which they are again turned over to the railroads for shipment in the regular mail cars. Uncle Sam is now trying to teach, and even compel, the business concerns of the country to be efficient and honest in their methods. But he seems to lack certain qualifications for the job. In his own business relations he is at times one of the biggest imbeciles and at times, where he has the upper hand, one of the most unscrupulous rascals, in the whole commercial world of North America.

EFFECTS OF THE PANAMA CANAL ON RAILWAY TRAFFIC

SOME startling statements showing the effect of the opening of the Panama Canal on the traffic of the transcontinental railways were placed before the Interstate Commerce Commission at the recent hearings in the intermountain rate case. More information of the same kind is coming out daily. If the commission grants the petition of the roads for such a modification of its fourth section orders as will permit them to reduce rates to the Pacific coast terminals on the commodities most subject to water competition without at the same time correspondingly reducing their rates to intermediate points, they will undoubtedly be able to retain some of the traffic. But this will be at the price of making very low rates; and they will lose a large amount of business on which they do not feel able to meet the competition. If the commission fails to grant the petition, and the roads are thereby forced to abandon the water competitive traffic entirely, or to make corresponding reductions in their intermediate rates, the results will be disastrous.

The effect of the canal competition on the roads is bound to be serious in any event—much more serious than railway men have expected. Within the past year or so, in anticipation of the opening of the canal, the water competition has been increasing by leaps and bounds, due partly to reductions in rates by the ocean carriers, which have had the effect of changing the sources of supply of many commodities from the Middle West to Atlantic seaboard territory, and partly to the growing disposition on the part of shippers to use the ocean service because of the recent change in the policy of the roads in failing to meet water competition. The opening of the canal, which occurred on August 15, has, of course, resulted in much better service by water than could be given by the steamship lines operating in connection with the isthmian routes. The time is shorter, the dates of sailing are more frequent, and the water lines are giving service from additional ports, principally South Atlantic and Gulf ports. Moreover, new steamship lines have established, or announced their intention of establishing service, and as a result both of this fact and of the reduction of cost of the water service caused by the opening of the canal route, there has been a very radical reduction in the rates of the water lines, which has attracted a large number of commodities formerly moving entirely by rail.

In September the total tonnage westbound from the Atlantic seaboard to Pacific coast ports via the canal was 77,915 tons, which if multiplied by 12 would be over twice the tonnage moving by water in any previous year since 1907. According to the Canal Record, from August 15 to October 15 the commercial vessels using the canal carried through it 583,949 tons of cargo, of which about 50 per cent was between the Atlantic and Pacific coasts of the United States, 24 vessels carrying 151,290 tons eastbound and 25 carrying 135,214 tons westbound on this route. Westbound manufactured goods of great variety and general merchandise have constituted the heaviest traffic, and eastbound the boats have carried chiefly canned fruits, vegetables and salmon, lumber, grain, sugar, pineapples and wine. Six lines are now engaged in the traffic through the canal, with an estimated monthly capacity of 111,600 tons, making the voyage from eastern ports to San Francisco in from 23 to 27 days. These lines are making rates from the seaboard not only far lower than those of the rail lines, but so low that freight is being carried eastward by rail from points as far west as Milwaukee and reshipped from the seaboard by water at a combination rate lower than the rail rate from the Middle West to the coast. As a result many commodities that were formerly shipped by rail from the Middle West are now being shipped from seaboard territory.

In a freight house of the American-Hawaiian Steamship Company at San Francisco recently were seen soap from Cincinnati, barbed wire from Allentown, Pa., canned goods from Milwaukee, and hardware from Wheeling, W. Va., all shipped by rail to the Atlantic seaboard, and thence by water to California. A boat sailing recently from Boston, which city formerly had no water service to the Pacific coast, carried nails, structural

iron and wire fencing from Pennsylvania, paper from Maine, automobile tires, ink, canned goods and boilers from Massachusetts, and electrical machinery from Schenectady, N. Y. Rails have been shipped from Lorain, Ohio; iron pipe from Wheeling, W. Va.; paper oyster pails from Chicago, and pipe and pig iron from Birmingham, Ala.

Rates far below those of the rail lines were announced on the opening of the Panama canal, and still greater reductions and low rates on a large number of additional commodities, were announced on October 1. In the case of pig iron from Birmingham the rate is 15 cents for the rail haul from Birmingham to New Orleans, plus 35 cents for the water haul from New Orleans to San Francisco, making a through rate of 50 cents against the all-rail rate of 65 cents. Paper bags have been shipped from San Hill, New York, at a rate of 55 cents, as against the former water rate of 65 cents and an all-rail rate of $1. Wrought iron pipe from Wheeling takes a rate of 16 cents to New York plus 30 cents from New York to San Francisco. Canned goods are shipped for 45 cents by water as against 75 cents by rail. Rates on iron and steel articles generally have been reduced to 30 cents compared with a rail rate of 80 cents or more. The rates mentioned have been applied on westbound shipments, which are involved in the case before the commission, but the increased activity of the ocean carriers has recently been particularly noticeable in connection with the eastbound business. Since January 1, the American-Hawaiian Steamship Company has taken from Puget Sound to Atlantic seaboard points 700,000 cases of canned salmon, and is now quoting a rate of 30 cents on this traffic as against a rail rate of 75 cents. In September the number of boats sailing from San Francisco for the east was trebled, one every second day. The American-Hawaiian Steamship Company alone operates 26 vessels, with a total capacity of 260,000 tons and with sailings every five days between New York and San Diego, Los Angeles harbor, San Francisco, Portland, Seattle and Tacoma, making the voyage from New York to San Francisco in 23 days. This company has announced its intention of making Gulf ports eastbound and Charleston, S. C., westbound.

Thus far the railroads have been obliged to let the water lines have the business, not being able to change their rates to the coast without at the same time reducing their intermediate rates. As a result both the railroads and the shippers of the Middle West have lost business to the boat lines and to the cities of the east and west coasts. Eventually, however, it seems likely that the Pacific coast ports will lose a great deal of business destined to Hawaii and the Orient, which will go direct via the canal instead of by rail through the ports.

The rates thus far announced by the water lines are far lower than they were expected to make. The American-Hawaiian Steamship Company has doubtless announced low rates at the start partly for the purpose of keeping other lines out of the service, and partly for the purpose of preventing the railroads from attempting to meet the competition. Moreover, the water lines, not being subject to regulation, are in a position to make whatever rates are necessary to get a cargo, quoting one rate today and another tomorrow without notice of change. When the American-Hawaiian Steamship Company has succeeded in killing off some of its new competitors it is likely to advance some of the rates. The railroads, however, are in a different situation. Not only must they give 30 days' notice of a change of rates, which change must be approved by the Interstate Commerce Commission, but at present they cannot reduce rates to the coast terminals to meet water competition without also reducing their rates to intermediate points not subject to such competition. Moreover, having reduced a rate to meet water competition they are prohibited by the act to regulate commerce from advancing the rate at a later time "unless after hearing by the Interstate Commerce Commission it shall be found that such proposed increase rests upon changed conditions other than the elimination of water competition."

Thus under our enlightened system of government regulation, designed to prevent discrimination, the people of the whole United States have built a canal which gives the Atlantic and Pacific coasts an advantage over the Middle West, and water lines an advantage over the railroads, and have also legislated to prevent either from meeting the competition. Railroad-owned boats are barred from the canal, and the roads are prohibited from making rates that will enable them to compete with the water lines without at the same time cutting rates not affected by the water; and if they do reduce rates to meet water competition they will have the greatest difficulty in raising them again.

The railroads formerly met water competition by whatever means they could by cutting rates, by giving rebates and by other devices—and after having put many of the boat lines out of business proceeded to advance their own rates. Now they object when the tables are turned. Regulation put a stop to their practices. They have been severely condemned for them and have been punished by all kinds of restrictive legislation. Perhaps they cannot object with much grace when the tables are turned. But there is manifestly a vast difference between unfair discrimination resulting from commercial competition and unfair discrimination caused by national legislation; and the latter is what we have now.

In the event of a refusal of the Interstate Commerce Commission to modify its order regarding transcontinental rates it would seem that the salvation of the railroads depends upon the exercise of restraint in meeting water competition. A possible decision on the part of some of the transcontinental lines to meet the ocean competition at Pacific coast terminal points in the face of such a refusal, with a consequent reduction of the intermediate rates also, would produce effects on the entire body of railway rates which would be fearful to contemplate. On the other hand, if the roads fail in their present effort to obtain a modification of the order, and stand firm and refuse to meet the competition under the conditions imposed as to terminal rates, an opportunity will be afforded for an actual demonstration of the unwisdom of the commission's order. Under such conditions there is reason to believe that the clamor from the Middle West would soon force the commission to grant a modification of its order just as the clamor from the intermountain shippers induced it to make its original order.

NEW BOOKS

The Western Blue Book and Buyer's Reference. Published by Allen Winch, 504 Sherman street, Chicago. 7 in. by 9 in., 592 pages, bound in cloth. Price $5.

This is a complete classified list of the constructional engineering, electrical, mechanical, mill, mining, foundry, iron, steel, quarry, machinery, railroad supply and kindred industries, arranged for the purpose of giving both buyers and sellers a ready reference to the names of companies engaged in these industries with their correct addresses and the names of the officers. The various industries are classified under a list of commodities, and also alphabetically under the names of the various classes of industries, subdivided geographically by states and cities.

Air Brake Catechism. By Robert H. Blackall. 406 pages, 4½ in. by 6½ in. 149 illustrations. Twenty-sixth edition. Bound in cloth. Published by the Norman W. Henley Publishing Company, 132 Nassau street, New York. Price $2.

This book needs no introduction to railway men. The fact that it is now in its twenty-sixth edition is evidence of the position it occupies among students of air brake operation. It is a complete treatise on the Westinghouse air brake, including the latest developments in steam railroad practice. In addition to descriptions of the apparatus and its operation, the book contains chapters on brake rigging calculations, air hose tests and train inspection and handling. The question and answer form previously used has been followed in the new edition and a number of full page colored plates are included.

Letters to the Editor

THE AMERICAN RAILWAY ASSOCIATION

Toronto, Ont.

To the Editor of the Railway Age Gazette:

The fall meeting of the American Railway Association held in Chicago, November 18, made a record for despatch and the operation of the "steam roller" in transacting its business.

The entire time occupied in disposing of its business was one hour and thirty minutes, during which ten committee reports were presented, many of them read, recommended for adoption by resolutions previously prepared, and offered in each case by a member of the committee presenting the report, voted upon by viva voce vote and passed. About one-half of the time was occupied in reading reports already printed and in the hands of members for several weeks previous to the meeting.

Article 2 of the Organization of the Association provides that "Its object is the discussion and recommendation of methods for the management and operation of American railways." The discussion of reports has been practically eliminated from its proceedings. A committee report presented with a resolution from one of the committees for adoption is equivalent to its being formally adopted by viva voce vote of those present, and the vote of a road having one membership in the association, and perhaps five representatives present, each of which may vote audibly, counts for more than that of a road having six memberships and only one member present.

The association has resolved itself into a close corporation with the object of discouraging discussion and accepting the reports and judgment of a committee as final on a particular subject, making in effect a minority rule, and in the final analysis one man's opinion is paramount to that of the members attending a meeting, as it is well known that in committee work a chairman does most of the work and his opinions are reflected in its conclusions, the rest usually concurring.

Ten to fifteen years ago the association usually occupied two days in its sessions and they were full of active interest and discussion, and it was worth while to attend its meetings for the benefit derived from the discussions alone. As now conducted it is a waste of time for some members to travel perhaps a thousand miles to simply hear reports read and formally rushed through by a vote which does not represent the association's membership by one-half. It would be an improvement to dispense with the meetings entirely and submit all reports to letter ballot, which at least would give every road an opportunity to vote in accordance with its privilege under the articles of organization.

The present practice of distributing memberships on various committees is not equitable. Many roads, large systems with as many as six and eight memberships, are not represented on any committees, and have absolutely no voice in the association's affairs, while small roads, in some cases less than one hundred miles in length, are represented on several committees.

Analyzing the personnel of committees according to the last report, it is found that one railway system has representation on each of fifteen committees, and on two of these two members in each. Another system has representation on seven committees, another representation on six committees. Again, large systems with eight and six memberships have no representation on any committees, and according to the present practice of rule by committees they have no voice in the association's affairs.

The perpetuation of some roads on a committee by re-election is also unfair to other roads, which are never given even a nomination for committee membership. It should be a rule, strictly observed, that no road shall have representation on more than one committee concurrently, and when the term expires shall not be renominated on the same committee without an interval of two years.

Chairmen of committees are also perpetuated to such an extent that the same routine in some cases goes on from year to year. An inactive chairman greatly retards the work of a committee, and by making senior members chairmen they automatically give place to successors who may have new ideas on the subject.

The principle of equitable distribution of opportunity to have a voice in the affairs of the association should be consistent with the policy of equal distribution of the cost of conducting its affairs, which is by membership and on a mileage basis, but this equality is now not observed.

The whole scheme of railway associations as now constituted represents a lamentable waste of time and money. There is a duplication of work and lack of co-ordination which should be corrected.

There should be one railway association governing operating matters and including transportation, maintenance of way and maintenance of equipment, instead of five associations covering the same ground, as at present, with numerous offshoots of these which could all be embodied in one organization with better results and a great saving of time and money to the railways, which in the end pay the bills. The expense of conducting the American Railway Association is over $100,000 per annum, and of the other associations combined about as much again, and adding to this the expense accounts and loss of time incident to attending the association meetings the cost to the railways is about $500,000 yearly.

It is time to consider seriously if we are getting value received and the best results from the expenditures on account of our railway associations, and whether the principles upon which they are conducted are correct.

L. C. Fritch,
Assistant to President, Canadian Northern Railway.

THE TRAINMASTER AND THE ENGINE HOUSE

New York.

To the Editor of the Railway Age Gazette:

The editorial on this subject in the issue of September 25, is, of course, only a further plea for co-operation, and it might not do any harm to go a little further and point out how this could be secured between the engine house and the trainmaster.

In far too many cases the "pull, push and jerk" policy followed by engine house foreman, trainmaster and despatchers, is not given proper notice by the man higher up; it should receive his most earnest attention. We all know that it is not always easy for him to determine just which one is most to blame, but a good plan to follow, after he has had a certain number of complaints and cannot find that the fault is all on one side, is to eliminate both sides and start new men, with the understanding that when they cannot agree among themselves, they cannot agree with him.

In a plan of team work that I have seen worked out to good advantage, the engine house foreman laid down the rule that his engine house was to be run on the plan of a fire station; that it had its regular daily and nightly duties to perform, and in addition, must respond promptly to all extra calls, so far as equipment on hand permitted. When time card trains had been provided for, the foreman placed in the hands of the trainmaster each morning, a list of his remaining engines. This list showed so many engines available at once, giving the numbers and class; so many under light repairs available, in a certain number of hours; and the remainder as nearly as he could estimate. The trainmaster then knew how many trains he could send out, and could make up his trains to suit the power available. There is nothing very remarkable in all this; but when so many are working on no plan at all, it may be worth while to point it out.

Storekeeper.

Railway Troubles Due to Lack of Public Understanding*

Importance of Railway Service to the People Demands Intimacy of Understanding and Mutual Confidence

By W. G. Harding†

Perhaps our "hot or cold" affections for our transportation lines are due to inherent traits in human nature. We are seemingly eager to seek that which we have not and find excessive fault with that which we possess. The enthusiasm over our railway acquirement ebbed when transportation gave us an era of development unmatched in all the progress of mankind. No sooner was the triumph recorded than sentiment veered, and hostility to railroads became a gospel of wide popularity. But popular sentiment eventually gets right, and I can say tonight that the intelligent public thought of this land of ours is demanding just treatment of the American railroads.

EFFICIENCY OF RAILROADS ESSENTIAL TO NATIONAL PROSPERITY

Amid all the clamor and appeal, two thoughts are indisputably established—the efficiency of American railways is absolutely essential to American agricultural, mining and manufacturing industries, which are the component parts of our boasted commerce; and the good fortunes of the American railways and the American people are indissolubly linked together. The present distress of our industrial and commercial interests, happily showing some signs of relief, has its reflex in the distress of our railroads, or if you prefer it differently expressed, the distress of our American railroads is very evident in the halted condition of business throughout the land. This is not to say that the ebb-tide of American good fortune is wholly due to the distressed conditions of our railroads, but the fortunes of the transportation lines and our people are so indissolubly linked together that the one cannot be injuriously affected without finding its reflex in the other.

The argument never has strongly appealed to me that we ought to prosper our railroads for the specific purpose of promoting general prosperity. It seems to me more important to prosper our transportation lines as a simple matter of fairness and justice to this important single agency in our modern lives. The popular mind has been slow to grasp the surpassing importance of railway transportation. Ten thousand captains of industry, notably in the interior, have realized that railway facilities made their enterprises possible and profitable, but the toiler in the ranks has taken it all as a matter of course. The interior farmer, far from water routes, has seen the market brought to his door, almost, and has been a beneficiary of the elevation of farming from a mere struggle for subsistence to a conquest for accomplishment, but has been unmindful of the contributing agency which did so much to open the way.

I can recall full well how the railway extensions were heralded with glad acclaim, and I have heard, since then, the inevitable reverse which comes in the loud complaint of those who quickly forget the agency which made possible the astonishing shift from wilderness to the glorious garden, where sunshine is shaped into profitable products of commerce.

THE RAILROADS NOT BLAMELESS

This reversal of popular sentiment toward railroads in general is not wholly without reason. There had been profligacy of management, excessive profits in promotion, piracy in financing, along with unrighteous discrimination and contempt for popular opinion, more or less heralded in the press. These were seized upon by politicians, more eager to profit in the proclamation thereof than to correct the abuse, until there was good reason for popular suspicion and unrest. Hateful as these things are in public estimate, there was some extenuation. Many a railway was constructed for the profit in promotion, else it had never been projected. In this fact lies the explanation of much of our development. Builders were not content to wait for the profits of carrying, because the awakened production and carrying thereof had to come of too slow a process. It is fair to say, however, that in most cases the fictitious values have become very real in the processes of attending growth. The piracy of high financing—watered stock and excessive bonding—is not to be so readily excused, and is, in fact, mainly responsible for the hostile frame of the public mind. Much of the predatory plundering attended the evolution of lines into systems, an accomplishment which none of us would undo, because the advent of systems marked a higher stage of capacity for public service, and our people must not let their righteous hostility to this plundering blind them to the progress made. Hateful as it was, it nevertheless was a practice of the period, partly to deserve our tolerance because of improved capacity for service.

One thing is certain, though our people cry out against the great predatory captains who dashed by in their special cars, the lumbering trains of honest investment have traversed the same rails, and the honest endeavor and best thought and best energies of American life have reared this American railway giant and furnished us the best and cheapest rail transportation in the world. There must be—there is—a righteous mean between plundering on the one hand, and popular assault on the other, and the problem of the day is to find that righteous mean and give to our railroads our boasted square deal.

I believe, in all sincerity, that the day of plundering financing has passed. I should like to proclaim, in the same breath, the passing of railroad baiting on the part of press and politicians, who have been less inspired by public good than by personal profits and political gain. It has been a great stunt to hammer the railroads.

AN EXCESS OF COMMISSIONING

Fortunately the drift is toward the sober second thought, and there is a realization that these vital factors in making for profitable production and general good fortune are entitled to just treatment. There is the conviction that when governmental regulation leads to paralysis, we require less of it—that is to say, less of doctoring in order to give the patient a chance. It cannot be disputed—there has been an excess of commissioning, and our people have not stopped to count the public cost of the practice, nor to measure its hampering influence. Do not mistake my meaning. I believe, most heartily, in the government regulation of public utilities, but it must be righteous and understanding regulation. The best railway knowledge in all the land ought to light the way. Public service ought to be the impelling purpose, unheeding of public clamor. There can be a species of excessive regulation which will lead to but one logical result—and that is government ownership. It is the logical outcome of the present drift, it is the only remedy if we are to require a service at rates inadequate to meet fixed charges and provide means for maintenance and needed improvements. The answer to this statement is readily anticipated. Ten thousand tongues are ready to cry out about over-capitalization in stocks and bonds. It is true, in the main, but the over-capitalization comes of a previous era. It comes of the evolution into systems, and the crime of over-issue does not justify the wreck of the surpassing structure of American railroading.

*Abstract of an address which was made at the annual meeting of the Railway Business Association, Waldorf-Astoria, New York City, December 10, 1914.

†Mr. Harding has been editor of the Marion (Ohio) Star for the past thirty years. He has served as state senator and lieutenant-governor of Ohio and made the nominating speech for Mr. Taft at the 1912 republican convention in Chicago. He has just been elected United States senator.

Our problem is not of yesterday, it is of today and the morrow. It is up to fair-minded American intelligence to deal with the rail transportation problem as it exists today, recognizing that increased cost in transportation is quite as natural as increased cost in labor and taxes. Transportation cannot be eliminated from the cost of a single article of commerce in the complexity of our modern life, nor escape the upward trend of cost.

THE WISDOM OF JOSEPH

I believe it is the opinion of ninety-nine of every hundred thinking people that the railways of the country are entitled to an increase of rates, and would gladly see it granted. The thinking citizen not only desires that the railroads shall be able to exist in dull times, and earn money to meet their obligations; they are also entitled to earn a profit in fortunate years which may be turned to betterments when the lull comes.

The wisdom of Joseph holds good to this day, and my application of the story to American railways is that they ought to be able to earn enough in the fat years to be prepared to carry on their vast improvements in the lean years which inevitably come. Under our present system of reduced and insufficient earnings, along with increased cost of operation, there are no marked railway betterments except in the high tide of earnings, when cost is highest and improvements are hampered by traffic operations. We ought to reverse this order, and provide ample revenue in good times to enable extensive betterment to be made in the dull period, all of which would tend to better service in the days of the revival, and, meanwhile, the expenditure for betterments would relieve the general dullness amid such conditions as we complain of today.

PHYSICAL VALUATION A COLOSSAL FOLLY

This thought grows upon me when I am reminded that billions are said to be required to be expended to bring our railroads up to the facility for efficient service which managers themselves believe to be the due of our people. I have heard railway men say that they gladly would be making expenditures now, but they cannot borrow and do not earn sufficiently. Through agitation and restriction there has come impaired credit, until there is a threatened collapse of the railroad edifice, and it's up to American fairness to make the restoration and provide for maintained eminence. These items of maintenance and betterments have been overlooked by the political exhorters who have baited the railroads to catch unthinking popular favor. The advance from the dinkey wood-burner, which I helped to wood-up as a boy, willingly, while Dad's wood-pile needed attention, to the great locomotive of today, with heavier rails, and the thousand conceits of modern genius, which add to safety and enhance the service, has involved renewal costs beyond all comprehension. When we come to a physical valuation, if we must commit that colossal and costly folly, I wonder where the genius will be found who can apply apt figures to cost and worth of experience and evolution. The agitating politician makes no new investment and knows nothing about cost, but continues to blow with the same old blather.

WE DO NOT WANT GOVERNMENT OWNERSHIP

This railway problem is so big and so important that I feel the inadequacy of my words to portray it. We do not want government ownership, though that is the logical drift. I am opposed to it because it is contrary to the spirit of our institutions and violates the very conception of the rights and duties of government and citizenship which has given us an individual accomplishment which the world can nowhere match. It would stifle our further development and take from individuals the impelling purpose to accomplish and achieve. We might as well adopt paralyzing socialism, and fling aside, once and for all, the surpassing American accomplishment which has been the pride of our own people and the admiration of the world.

Does any one believe that government ownership would have pushed the railway along the sands, and connected up the Florida Keys with arched concrete and bands of steel, which clipped twenty-four hours from the commercial time between Cuba and the United States, and set fairyland abloom for three hundred miles en route? Does any one believe that federal ownership would have threaded the plains and pierced the Rockies as individual enterprise has opened the way from coast to coast, and touched the desert as well as the valley and mine with man's developing hand?

I shall be fearful of government ownership until France and Germany have given real proof of government efficiency and economy in railway management, and our own government has given some assurance that it may carry on any business with the economy which characterizes every well-managed, individual enterprise. Nay, more, I shall doubt all plans of government control until we have acceptable proof that the government can fairly regulate through its commissions, when real railroad men are making the tremendous struggle to conserve their properties and serve the public with these vastly important agencies.

Perhaps the lack of successful regulation is due to the newness of the undertaking, to the unavoidable political agitation and to the harassment of conflicting authority because of varied state legislation and state commissions. Our American railroad enterprises are so vast that it has seemed to me that none is longer small enough to be encompassed by intra-state lines, and we ought to put the entire service under inter-state control. Such a policy would save millions in public expense and put us on a broad plane which is befitting the gigantic character of American railway operation. We should then escape the excess of state legislation. I speak deliberately—the law-making industry is too often worked overtime. This country needs today less legislative bills pending and more railroad bills of lading.

RATE INCREASE NECESSARY

It is apparent that the Interstate Commerce Commission believes in the pressing necessity for increased earnings for our railroads. The suggestions of increased passenger rates, baggage charges and other collections for service not charged for heretofore, indicate the controlling body favors increased earnings, but opposes the short and direct route. The rate increase would be direct and immediate, and these other remedial efforts could be left to follow by the slower process of evolved adoption. If the combined income from increased rates and added service charges made excessive earnings, contrary to public policy, the same authority which grants the increase could order a reduction.

The simple public mind, unbiased in the matter, thinking only of fairness and the common good, favors the increase and does not expect a later reduction. We have seen the advance of wages. We know of mounting taxes. We can understand all about more costly equipment. Having come to pay more for our food, we only wonder that we have not been charged more for its transportation. Knowing the increased cost of operation in every other industrial and commercial enterprise, we have wondered how any one could escape added cost in the chief agency of exchange and distribution.

Our American wage scale is twice to thrice that of Europe. Our rates of interest are generally higher. Our distances are greater and our population less dense. Under all these conditions it would be very natural for our railway transportation to be higher. Our freight rates are notably less, and our passenger service only a trifle higher, and it is vastly superior. When classification is taken into account I believe ours is the cheaper. And yet on this very branch of business which costs the more in this country, the railway commission recommends the increase which it is powerless to grant. If argument were needed for the general advance, the commission has presented it. I hope it will speedily come. It will not bring the complete revival of American activity, but it will not only save the crash of the temple of transportation, but will re-establish railway credit, and lead to that physical rehabilitation which is of prime importance in ministering to greater American activities. More, and very

significant, too, the governmental assistance in the hour of need will be new assurance that it is neither the function nor the purpose of government to destroy, but to foster and protect, and American business success, lawfully achieved, is to be encouraged and heralded as important to American progress.

Perhaps a considerable part of political play in hostility to our railroads is due to the mistaken impression that they are the property of a few of the enormously rich. If this were true it would not alter the demand for just treatment, for the civilization which ignores property rights will quickly trespass human rights. As a matter of fact, however, our railroads are largely the property of those we term the people, and their securities are in the assets of savings banks, life insurance companies, hospital and college funds, and the foundation of thousands of sacred trusts. The directing heads of these lines and systems are not the scions of wealth, nor the creatures of privilege, they are the finest examples of the reward of merit which we have developed in the boasted opportunities of American life. When the moneyless American youth may climb from the humblest rank of railroading to the direction of the energies of hundreds of millions of capital and many thousands of men, through sheer force of ability and conscientious service, the system cannot be far wrong. It is our inspiration to developing youth and assurance doubly sure that ours is the civilization of opportunity. In every city throughout the land is some allied industry, and at the head of these are the worthy captains of American endeavor, who have grown up from village or farm, and toiling with them, when the tide runs full, is a thrifty, well-compensated, prospering people, rejoicing in American triumphs and eager to go on.

There are two things to commend to the public, to railway managers and to members of the Railway Business Association. One is simple honesty, the other is greater intimacy—the fullness of understanding—between the railway management and the public served. There has been too much aloofness, sometimes a contempt for public regard. The minds which lead in making dependable public opinion mean to be fair, and need only to be informed. Railways have suffered needlessly because of the lack of public understanding. The public has an ear for the manager, as well as for railway baiters, and the growth of favorable public opinion today is traceable to the fact that railways have laid their case before the public. The importance of railway service to the people, the public character of the business, and public regulation, all demand intimacy of understanding and mutual confidence. Add to this the unalterable honesty that is essential to right management and the abiding honesty that makes for sincerity in politics, and we shall hail a new era, which shall mark a greater and swifter stride to our American astonishment of all the world.

THE TRAIN DESPATCHER'S OFFICE

[E. T. Mulquin, in Train Despatchers' Bulletin]

Generally speaking there is a lack of painstaking effort exercised as to location and office equipment for the train despatcher, to aid him in reaching and maintaining the highest standard of efficiency. How often do we see the despatcher's office consolidated with the telegraph office with its boiler-shop noises and with persons continually running in and out. This disturbs the despatcher, as he will unconsciously take some notice of what is going on about him.

Where the telephone is used for train despatching and at offices where more than one set of despatchers are employed they are frequently located too close together; often one table being equipped for two men. The conversation of one despatcher on the 'phone is annoying to the other. If the chief despatcher is also quartered in the same office, this adds to the confusion, as he has many callers.

The train despatcher's office should be as private as possible and separate from the chief despatcher's office. Each despatcher should have an individual table, and where the telephone is used the tables should be far enough apart to prevent the talk of one despatcher from attracting the attention of the others. The tables should be constructed on commodious lines. . . .

RAILWAY AFFAIRS IN OTHER COUNTRIES

A recent issue of the Railway Gazette of London contains the following editorial comment: Not the least important undertaking whose future will be profoundly modified by the outcome of the war is the Bagdad Railway. Being wise after the event is easy enough, but it is somewhat difficult today to understand the lack of diplomatic prescience which gave Germany the control of this railway. Knowing what we now do of the comprehensiveness and foresight which have characterized the German plans, it does not require much imagination to assume that a country which counted on inducing Turkey to take the field must have realized to the fullest extent the military potentialities of the Bagdad Railway. Indeed, it is today rather surprising that any financial considerations should have been allowed to stand in the way of pushing on the line as rapidly as possible. The real objective of the Bagdad Railway is the Persian Gulf. In the light of present events it is amusing, or it would be amusing if it were not so serious, to reflect that a short time ago public opinion in this country was quite satisfied by the projected arrangement to place the terminal section of the line under international control, with Turkey and Germany among the controllers. History seems likely to repeat itself, and just as the fruits of German enterprise and expenditure in Kiao-Chau and her African and Australasian colonies will be reaped by other powers, so in the final adjustment the intrigues and the expenditure on the Bagdad Railway will not result in any gain to Germany.

* * *

The Railway Gazette of London, which has recently compiled the latest available figures regarding the number of employees of the British railways who have left their work to join the army or navy since the beginning of the war, estimates that the total at the end of September was 56,874. Most of the British railways have adopted the suggestions of the railway executive committee, which has had charge of the railways for the government since the beginning of the war. Each company is making an allowance to the wives and families which, supplemented by separation allowances and an amount deducted from the army pay in accordance with the government regulations, is equivalent to not less than four-fifths of the individual's pay when he was in the company's service. Allowances are also made to the dependent relatives of unmarried men and widows without children according to individual needs. The companies are paying their employees' contributions to superannuation and other funds during the men's absence and will endeavor to restore to them their former or equivalent positions if they are physically fit. As far as possible, also, work will be found for such as have been incapacitated. The figures as compiled for some of the larger companies are shown below. The numbers have probably not increased greatly since the end of September, because to prevent the railways from becoming crippled, instructions were issued by the war office that no one in the railway service was to enlist without the permission of the head of his department. For the purpose of comparison there is also shown the total number of adult male employees of each company on December 31 last:

	Enlistments	Adult male employees Dec. 31, 1913
Caledonian	1,600	21,477
Great Central	2,700	29,460
Great Eastern	3,000	30,512
Great Northern	2,500	31,352
Great Western	8,019	72,454
Lancashire & Yorkshire	3,608	36,525
London & North Western	9,528	79,348
London & South Western	2,100	22,614
London, Brighton & South Coast	1,510	14,477
Midland	6,700	66,340
North British	2,000	23,243
North Eastern	5,400	52,984
South Eastern & Chatham	1,702	21,224
Underground Railways of London	931	6,232

THE HANDLING OF LOCAL OR WAY-FREIGHT TRAINS

By R. R. Farmer
Trainmaster, M. K. & T., Parsons, Kansas

The local or wayfreight is a train of necessity, but in many instances it is a forced expense. In some places locals have to be run to handle local C. L. and L. C. L. business that does not actually pay the cost of the operation of the train, due to certain parts of the district originating no business and the other parts originating more business than the local can take care of. As a result the local on that part of the division where no business is originated will earn nothing by handling its full tonnage to the intermediate or local terminal, as the local on the other part of the division where a large volume of business is originated cannot handle it on account of the local business making full tonnage for it. In such cases it is necessary to run through trains light out of terminals and across part of the division to handle the tonnage that the local has handled to such point, therefore nothing has been gained by running such local and its only real earnings are from the local business handled between its terminals.

In many instances locals are run when their cost of operation tends to decrease greatly the profits or earnings, caused principally by inefficient crews, poor facilities, tracks and facilities located without regard to economical operation (caused by leases made to industries with only the view of leasing the ground and securing the location of the industry on the railway's tracks), indifferent and inefficient station forces, and poor power. Any or all of these cause delays which run into overtime which costs from 28 to 35 cents for each 10 minutes according to the number of men in the crew.

The most important factor in wayfreight operation is the conductor. This man, when big enough for the position, will perform miracles on a heavy overtime local. He will organize his crew, selecting the most efficient and intelligent brakemen, who are not afraid of work and who work regularly, judging them by their disposition, honesty, quickness, sobriety and reliability. In a few weeks he will line up the station forces by his cheerful disposition and ability, by his willing and obliging nature and his efforts to get his work done and get over the road. He will employ a method of making accurate records of all cars, seals, OS&D merchandise, delayed cars and other irregularities. He will not set out a good, clean car fit for grain or flour loading, if a car is wanted to load empty oil barrels or fertilizer, when by making a short switch he can set out an old car suitable for the purpose wanted. He will transfer freight to release cars and will consolidate all L. C. L. freight that he can, taking as small a number of merchandise cars as possible into the terminal, which will obviate the necessity of taking up all the room at the transfer platform for his train. He will not set out an empty box car for wood loading when he has an empty stock car that is not in demand at the time. He will keep posted on the movement of all classes of equipment and will keep in touch with the maximum and the average capacity of all industries and mines on his division.

To successfully fill the position, a local conductor should be accommodating and courteous to all. He should not be too old nor too young, but his age should be sufficient to give him mature judgment and discernment. He should have had experience as a brakeman on all kinds of freight trains. He should have a good common education, be familiar with waybills, and posted to some extent on tariff matters such as the minimum carload weights on various commodities in order that he will know that a shipper cannot load the minimum weight of hay in a 30 ft. car and that by filling such orders with small cars he will only delay the car, annoy the shipper and cause additional work picking up the small car and setting out a car large enough to get the minimum weight in. He should also be posted on demurrage and per diem rules.

My observation has been that a great many locals are held by rights of seniority and not by qualifications of the men operating them. I have seen men running locals who were good enough for through freights but entirely impossible as local conductors. They will drag over the division earning three to four hours overtime daily and increasing the cost of operation from $150 to $250 per month. They have no initiative and no interest in their work, they are sore-headed and their crews are disloyal, feeling that they would rather see them laying off than at work. They do not figure on their work until they arrive at the point where it is to be done. Every one they come in contact with meets them only because it is necessary to transact business with them. They take a technical advantage of all instructions whenever possible to make it to their advantage. Their records are only such as the rules force them to keep. They simply hold their runs by seniority rights given them by agreements and will cry "Discrimination" at every effort to dislodge them from the runs.

In my opinion the local conductor should be picked from the ranks for his qualifications as a local conductor, as an assistant to the chief despatcher and a lieutenant to the trainmaster. He must be a man who can handle men and yards, as he is a traveling yardmaster over the part of the division to which he is assigned. He is the agent at all non-agency stations. He should represent the policy of the company in politeness and courtesy to all patrons he comes in contact with, and what representative of the railroad comes in contact with as many big shippers in a day as a local conductor on a heavy division?

In the make-up of wayfreights it is preferable that the merchandise cars be placed on the rear end and the short loads on the head end, when conditions will permit, in order that the merchandise cars can be placed to work while the loads on the head end are set out or other loads picked up. However, this feature depends on the physical characteristics of the division and the location of the various stations. Each local caboose should be equipped with pinch bars and two pairs of rollers to facilitate the handling of heavy freight that may be shipped L. C. L. All local engines should be equipped with foot boards on the rear of the tenders and a 3-in. nipple and hose attachment on the rear of the tanks for the purpose of filling water barrels at stations, cotton platforms and wooden trestles, especially during the hot, dry weather. Wayfreight engines should also be equipped with straight air to facilitate and expedite the switching. The tonnage rating should be light enough for the power assigned to handle with ease over the ruling grades and to make a fair speed between stations.

A local division should be established on the basis of a ten-hour work day controlled by the business to be handled. The hours should be from 7 o'clock in the morning until 5 o'clock in the evening, as any time of arrival at terminals after 6 o'clock in the evening is not conducive to good service. The men figure that if they arrive at the terminal after 6 o'clock they cannot get their meals in time to spend the evening out and as a consequence they lag. When an arrival time from 5 to 6 o'clock will enable them to get their meals and allow them to spend the evening as they please, the earlier hour of arrival is an incentive all day to do their work as expeditiously as possible in order to arrive at the terminal on time.

Station forces should be on hand ready to break the seals, take records of same, and unload the freight as soon as the cars are placed. Switch lists of cars to be picked up or placed should be made out and a copy of same kept in the station records. All freight should be checked out of the cars by the agent or his representative. All over, short or damaged freight should be so noted on waybills and the conductor should sign each waybill under such notations. These matters are of little trouble but will save time, trouble and money to the company. It will enable the freight claim department to handle all OS&D claims expeditiously. All freight loaded at small way-stations should be checked into the car by the conductor, the same as the freight is checked out of the cars by the agent or his representative.

TRAIN CREW REGULATIONS IN CONNECTICUT

The Public Utilities Commission of Connecticut, acting under a law passed in 1913, has investigated the question of the adequacy of train crews, as managed by the railroads of Connecticut, and has issued a code of regulations for passenger trains. The investigation was ordered by the Legislature, as an alternative to passing a full crew law which was demanded by the trainmen's brotherhood. No order is issued in regard to freight trains, the commission holding that freight trains are already properly manned.

The commissioners have studied the subject for a year and have examined the records of 589 passenger trains of the New York, New Haven & Harfford, and in addition to this they have made personal observation and inquiry on 47 important trains, including those which had been mentioned in complaints. Members of train crews were carefully questioned.

There was already in existence a rule, issued by the former railroad commission 18 years ago, regulating the number of brakemen on passenger trains, and this is not much modified; it is deemed in the main reasonable. To increase crews beyond a reasonably safe requirement "would lessen efficiency by dividing responsibility." No instance has been disclosed where the safety either of the public or the employees has been jeopardized by an insufficient number of men in the crew. The railroads are vitally interested in the successful and safe movement of freight trains and should have some discretion as to the number of trainmen to be employed, unless it shall be made to appear that the safety of employees or the public is endangered and that freight commerce is unnecessarily delayed by reason of the lack of an adequate crew. This opinion in regard to freight trains is a confirmation of the opinion of the railroad commissioners, uttered in a report issued in 1911.

In the matter of the safety of passenger trains, the commission recognizes that a parlor car porter, a baggage man or a train porter can be made available in cases of emergency, and evidently holds that these men should be so availed of. "It is not always practicable in any line of business of considerable magnitude to maintain a sufficient force to meet all possible emergencies, and in emergencies all loyal and faithful employees have a moral duty to do extra work, where practicable, to save life or protect property."

The only hint of any criticism of the railroads of the state that is to be found in the report is a paragraph to the effect that "all well-managed railroads should anticipate with a reasonable degree of accuracy the needs of the service" on holidays and other special occasions.

In conclusion the commission holds that safety would not be increased by any general order for an increase of the number of men in crews, and proceeds to formulate its requirements in substance as follows (all referring to passenger trains):

1. Trains of two cars, at least one brakeman, who may be a baggageman.

2. Trains of three or four cars, exclusive of parlor, dining, sleeping, baggage, mail or express cars, two brakemen, one of whom may be baggageman, assistant conductor or ticket collector.

3. Trains of five to eight cars, exclusive of parlor, etc., three brakemen, which three may include an assistant conductor or ticket collector.

4. Nine or more cars, exclusive of parlor, etc., at least four brakemen, one of whom may be assistant conductor or ticket collector.

5. Trains composed entirely of parlor, dining, sleeping, baggage, mail or [and] express cars, at least two brakemen, one of whom may be a baggageman.

A combination baggage and smoking car is to count as a passenger car; a club, official, or private car is to be considered a parlor car.

The order is not to apply to cases of emergency, due to circumstances which may not be foreseen.

SUPPLEMENTARY ORDER IN THE FIVE PER CENT CASE

The Interstate Commerce Commission has issued an order under date of November 28 making such modifications in its findings in the Five Per Cent case (31 I. C. C., 351), published in the *Railway Age Gazette* of August 7, page 235, as will permit the carriers to establish increased joint through rates between points in central freight association territory and southwestern territory, and between many points in central freight association territory and southeastern territory. An abstract of the commission's order follows, the language of the commission being preserved in so far as possible:

In accordance with the report of the Five Per Cent Case, the carriers have filed increased intra-territorial rates in central freight association territory. Since rates between points in that territory and points west and northwest thereof, along the Missouri river, in Colorado and Utah, are generally combinations of intermediate local or proportional rates to and from the Mississippi river crossings, these increased intra-territorial rates in central freight association territory now apply between points west of the Mississippi river and points in central freight association territory. The increased intra-territorial rates likewise apply between points in central freight association territory and points in southeastern territory upon which joint through rates are not published, and upon which the central freight association territory lines receive their separately-established local or proportional rates to or from Ohio river crossings.

On the other hand traffic between points in central freight association territory and southwestern territory, and between many points in central freight association territory and southeastern territory moves under joint through rates, inceases in which were cancelled by the order entered in the Five Per Cent case. Many of these tariffs naming joint rates between central freight association and southeastern territory frequently specify the separate factors of said rates which accrue respectively to the lines north and south of the Ohio river.

In the opinion of the commission it now appears that the above mentioned order should be so modified as to permit the establishment of joint through rates between the points aforesaid which shall be sufficiently increased over the existing joint through rates to allow the central freight association lines an increase of 5 per cent in their divisions.

It is therefore ordered that respondents be authorized to make effective on not less than five days' notice joint through rates between points in central freight association territory and points in western, southwestern and southeastern territories, which shall be in excess of the existing joint through rates only to the extent that may be necessary to allow the lines in central freight association territory an increase not in excess of 5 per cent above the divisions which these lines have heretofore received. In cases where the tariffs containing said joint rates state separately the factors thereof applicable north of the Ohio river and east of the Mississippi river, the new tariffs published under authority of this order shall state separately the increased factors accruing to the central freight association lines; under the authority hereby granted, however, no increased rates shall be established upon commodities as to which increased rates were not authorized by the commission in its report; and where the relationship between through and intermediate rates would be altered by the permission incorporated in this order involving a departure from the strict requirements of the fourth section, the carriers must first file applications for relief under that section.

Fan Drafting as Applied to Locomotives*

Loss Due to Back Pressure With Existing Type of Front End Arrangement; Results of Tests Made With Fans

By H. B. MacFarland
Engineer of Tests, Atchison, Topeka & Santa Fe, Chicago, Ill.

The method of drafting a locomotive with its exhaust steam has varied in detail only during the long period of development of the steam locomotive. The basic principle is exactly that of 50 or 60 years ago. The exhaust from the engine was early utilized to produce the necessary draft and is commonly so used today.

The magnitude of the loss due to back pressure as it existed in representative locomotives on the Atchison, Topeka & Santa Fe was shown in a paper presented by the writer at the fourth annual conventon of the International Railway Fuel Association† in May, 1912. The material was collected from a large number of locomotives in actual service operating under greatly varying conditions and showed conditions existing at that time. A general statement is drawn based on tests conducted on 18 different locomotives representing as many different types, working under such varied conditions as are encountered upon the Santa Fe system, with territory extending from Chicago to the Pacific Coast, and presenting at one place or another most of the conditions encountered in railway service. This statement shows that for every 100 horsepower used as actual tractive effort, there are 66 horsepower wasted through the exhaust, over 70 per cent of which may be credited to the excessive back pressure necessary to produce draft for the locomotive boiler. A study of the facts has led the writer to the consideration of a more economical method of drafting locomotive boilers.

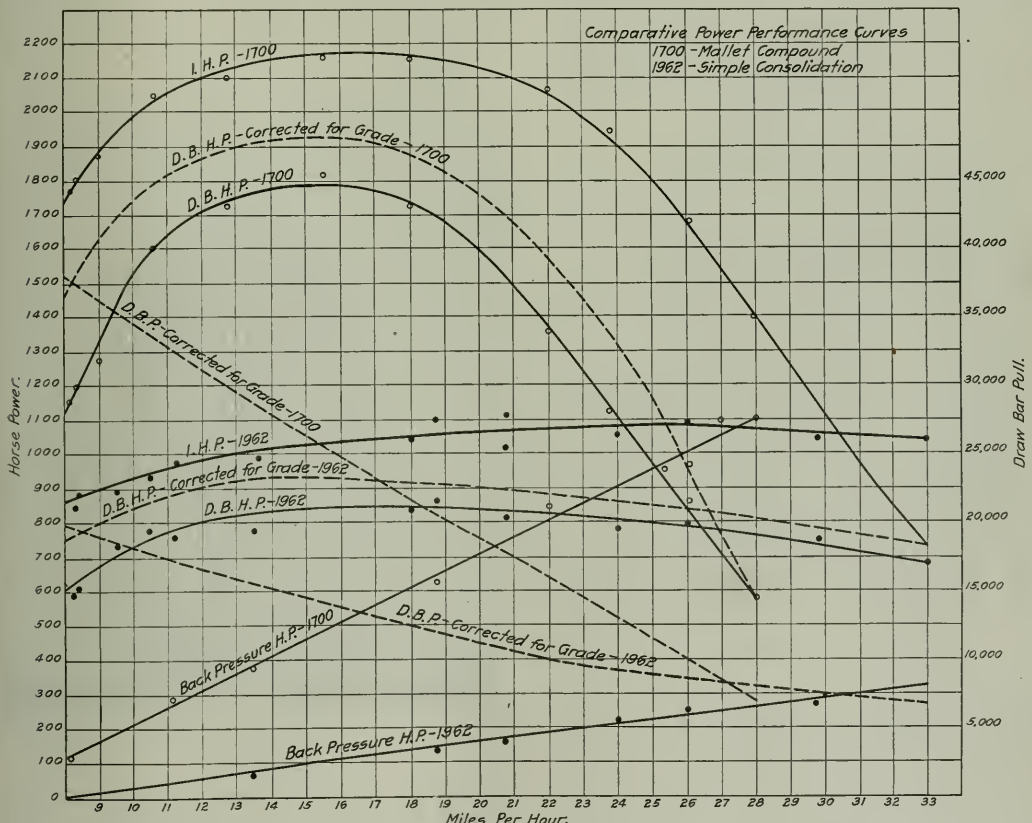


Fig. 1—Comparative Power Performance Curves

Comparative power performance curves for locomotives 1,700 and 1,962 are shown by Fig. 1. These curves were plotted as a result of data obtained during comparative tests on these locomotives on the third district, Arizona division, between Barstow and Bakersfield, Cal., a distance of 140 miles, in the winter of 1909. Locomotive 1,700, a Mallet compound (2-8-8-2), fitted with a Jacobs-Shupert firebox, Buck-Jacobs superheater,

*From a discussion of a report on Steam Locomotives of Today, at the Railroad Session of the annual meeting of the American Society of Mechanical Engineers, New York, December 2, 1914.

†See *American Engineer*, June, 1912, page 300.

and feed-water heater, cylinders 26 in. and 38 in. by 34 in., had a tractive effort of 108,000 lb. Locomotive 1,962 was of the simple consolidation (2-8-0) type, fitted with Baldwin superheater, cylinders 24 in. by 32 in., and had a tractive effort of 49,500 lb. These curves are presented because they show the enormous back pressure horsepower loss which is an inherent defect in the Mallet type locomotive. The curves show that the

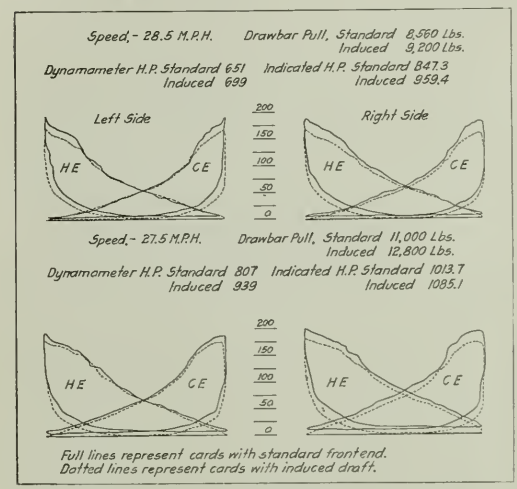


Fig. 2—Indicator Cards Taken with Standard Front End and with Induced Draft

maximum power of the Mallet was developed at a speed of approximately 17 miles an hour and that drawbar horsepower and back pressure horsepower equalized at a speed of approximately 25 miles per hour, showing that at this speed the locomotive exerted 950 drawbar horsepower and that an equal power was required to draft the boiler. The curves for the consolidation type show that the maximum power of the locomotive was developed over a wide range of speeds and that

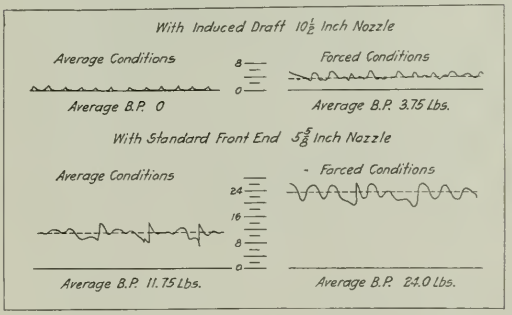


Fig. 3—Exhaust Cavity Diagrams

back pressure horsepower was not appreciable except at high speed.

The data accumulated from a great many tests conducted over the various divisions of the Santa Fe system, have shown the desirability for some other method of furnishing draft for locomotives to supplant that now commonly used. These tests have forcibly demonstrated the inefficiency of the present arrangement when viewed from a thermodynamic standpoint. The chief advantage in favor of the present arrangement is that it is very efficient speaking from a purely mechanical standpoint; that is, it is free from any complicated parts which are liable to get out of adjustment and does its work when once it has been set up with very little attention other than minor adjustments to keep it in good working order. It is this feature alone that has enabled the present front end arrangement to exist to the present day. In view of existing conditions, attention was attracted to the possibilty of drafting a locomotive by some method of forced or induced draft, but because of the impracticability of installing a system of forced draft on a locomotive, except possibly in the case of stoker-fired locomotives where it is not necessary to open the fire door, this form of draft was abandoned and attention directed to the adaptation of induced draft for the purpose. It is a well known fact that induced draft has been successfully applied in stationary and marine service, and its development in these fields has been rapid during the past few years, so that we now have many installations of this character. The development of the steam turbine and progress in the theory and construction of centrifugal fans for this work has added much to the progress made and it seemed logical that if the system could be so successfully applied to other fields, it would find ready application to the locomotive.

The problem, however, was not as simple as it at first ap-

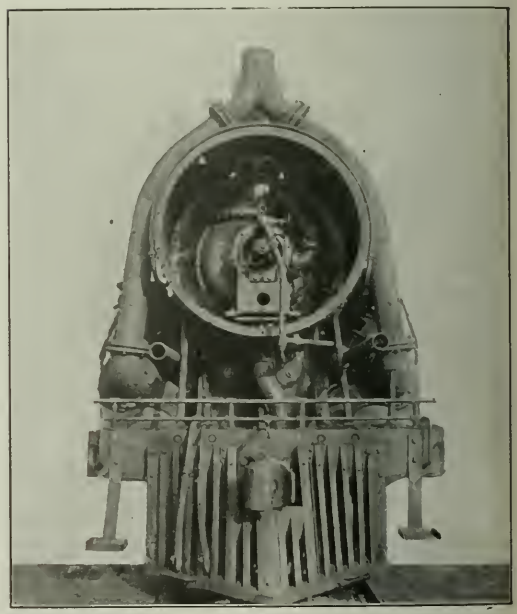


Fig. 4—Front of a Locomotive Fitted with the MacFarland Fan Draft

peared. Although there were many existing installations of induced draft, and several manufacturers making a specialty of these installations, yet they were not readily adaptable to the locomotive. In power plant and marine service the space occupied by the draft apparatus is not as important an item as with the locomotive. When the problem of furnishing draft apparatus of this character was presented to the manufacturers, they were able to calculate the size of the fan and the horsepower necessary to drive it to burn the required amount of coal per hour, but when the space that such an apparatus would occupy was taken into consideration, they were astounded, and were not able to furnish either data or apparatus satisfactorily to meet the requirements. For this reason it was absolutely necessary to start in at the beginning and develop such an apparatus.

The first step in the development was to secure data showing just what could be expected in draft obtainable, in fuel consumption, in boiler efficiency, and in power requirements to operate a fan draft system. Locomotive 932 was secured for experimental purposes and an experimental plant constructed to secure the data. The test was confined to the boiler of the locomotive with a 48-in. ventilating fan attached to the smokebox. No attempt was made at this time to run the engine on the road. Connection was made between the inlet of the fan and the smokebox of the locomotive so that the exhaust was through the fan rather than through the ordinary stack. The fan was driven by means of a 25-horsepower constant speed motor, belt connected. The variation in speed at which the fan was driven was accomplished by changing the diameter of the pulleys. The power necessary to drive the fan at various speeds was accurately determined by measuring the current necessary to drive the motor. With this arrangement a series of tests were made in Topeka, Kan., in February, 1912. A maximum of 3,350 lb. of coal was burned per hour, and a maximum of 830 boiler horsepower was developed. This was accomplished at an expenditure of 20 horsepower required to drive the 48 in. fan at an average speed of 715 revolutions per minute; the maximum draft in the smokebox was 2¾ in. of water. The first tests in the series were made with the diaphragm in place in the smokebox, but this was removed during the latter runs and it was found that with the fan draft it was possible to get a very uniform distribution of the draft without employing deflector plates of any kind. It was not possible to develop anywhere near the maximum boiler horsepower with this installation, but valuable data were secured for use in the construction of an experimental unit for drafting purposes.

From the data obtained from these preliminary tests with the 48 in. fan applied to both coal and oil burning locomotives, an experimental unit adaptable to locomotives was furnished by the manufacturers and delivered to Topeka in September, 1912. This unit consisted of a stock 24-in. fan with special provision for direct connection to a 40 horsepower steam turbine, the entire apparatus being so constructed as to be a compact unit suitable for application in the ordinary smokebox of a locomotive. Preliminary tests were made with this unit, during which the volume of air at atmospheric pressure and temperature, discharged at various turbine speeds, was determined when the fan was operated against various resistances simulating locomotive service. These tests indicated that the fan was of sufficient size for the locomotive for which it was ordered, so that application of the apparatus was made to locomotive 1302 at Topeka shops in January, 1913. The first actual test of the apparatus installed on this locomotive was made on January 12, 1913. It was soon apparent that the 24-in. fan did not have the capacity to furnish the necessary draft, and it was not until after a great deal of experimental work, during which it was necessary to design and build three fan rotors and make modifications of the fan casing, that a fan of sufficient capacity was secured to permit of actual road tests. During the development of these fans, however, several stationary and road tests were made with the locomotive, during which valuable data were secured.

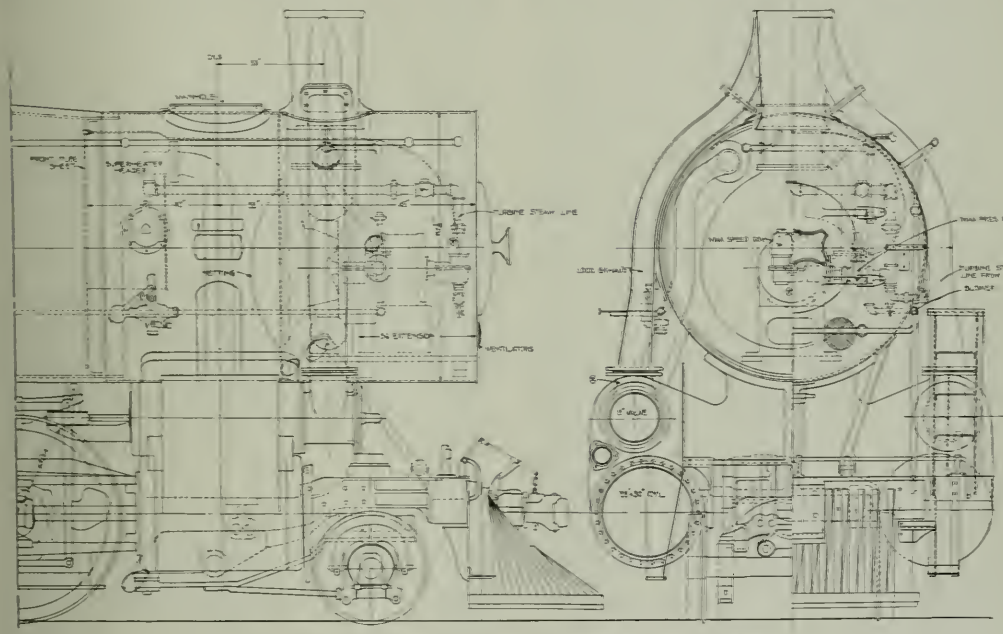


Fig. 5—MacFarland Fan Draft Applied to a Mikado Type Locomotive

Prior to tests with the fan draft apparatus, complete tests of the locomotive with the standard front end arrangement had been made for a basis of comparison of results obtained with the two arrangements. Typical indicator cards secured under the various conditions show the possibilities of the fan draft in eliminating the back pressure of the engine. While the fan used during the later series of tests was not mechanically correct or of sufficient capacity to develop the maximum power of the locomotive, it was of sufficient capacity to bring out many valuable points relative to the general performance to be expected from a system of this kind. The locomotive burned its fire as satisfactorily with the fan draft arrangement as with the standard front end arrangement, and there was no more tendency for the fire to bank or clinker. A uniform draft varying from 4 in. to 6¼ in. of water was maintained with the fan draft.

The capacity of the fan was limited to the maximum safe speed at which it could be run, and when the demand upon the boiler was such that it could be supplied with the draft available within the maximum speed of the fan, there was an economy shown. This was evident when the locomotive was working on grades, where, although more steam was used per stroke, the relatively low speed of the locomotive made the total steam consumption lower than on the level stretches where less steam was used per stroke, but the higher speed and consequent increase in the number of strokes per unit of time, placed a demand for steam on the boiler which could not be supplied by the draft available with the fan. For this reason, it was not possible to maintain full boiler pressure at all times with the fan draft arrangement, so that the initial pressure available in the cylinders was from 12 lb. to 13 lb. lower from runs with the fan draft than runs with the standard front end arrangement. Analyses of the indicator cards show that although there was a gain in power as indicated by an increased area at the bottom of the cards, there was a corresponding decrease at the top of the card. This was due to the difference in initial pressure, so that the gain in power due to the elimination of the back pressure was just about sufficient to operate the fan draft apparatus, and there was no apparent gain in the over-all efficiency of the locomotive. This is demonstrated by the indicator cards in Fig. 2.

A comparison of the performance of the locomotive under the two systems of drafting during periods in the runs when such comparison is at all possible, that is, when working conditions are similar, is favorable to the induced draft arrangement. Such a comparison based upon the actual power delivered at the drawbar shows a saving of nearly 20 per cent in fuel for the fan draft, and it is entirely possible to effect a marked saving in indicated horsepower with it.

Typical exhaust cavity cards are shown in Fig. 3. These pressure readings were taken in the exhaust cavity of the valves by means of an independent indicator fitted with a 20-lb. spring. They were chosen to cover the entire field as nearly as possible.

The conclusions drawn from these comparative tests were that it is entirely possible to draft a locomotive boiler by means of an induced draft fan to replace the exhaust tip commonly used; that it is possible to entirely eliminate the cylinder back pressure under normal conditions and greatly reduce it under forced conditions of operation of the locomotive; that with equal steam chest pressures, cut-offs, and speeds there is an appreciable increase in indicated horsepower due to the elimination of the cylinder back pressure, and that it is entirely possible to successfully operate an installation of this character at the necessary high speed during intervals of time representing a run over the average division of a railroad.

The logical field for locomotive mechanical draft is upon compounds in general and Mallet compounds in particular, where the excessive back pressure results in more pronounced cylinder losses. The development of this branch of locomotive engineering will necessarily be gradual, on account of the absence of data or lack of experience on the subject.

The experience gained with tests of the 24-in. fan unit applied to locomotive 1302 led to the design of a special 30-in. unit. The fan for this unit was constructed along the lines of the later development with the 24-in. fan which had given the best service on locomotive 1302. The new design embodied several improvements in size and proportioning of parts. Attention was given to the adaptation of the design to work at the peripheral speed found most desirable and provision was made for improved lubricating facilities and a maximum speed governor for protection.

One of these units was applied to a New York Central switching locomotive, and comparative tests were made before and after installation near West Albany, N. Y., in January and February, 1914. This locomotive was of the 0-6-0 class, built after the design which is standard for this class of power for the New York Central Lines. It was equipped with a Schmidt superheater, had a calculated tractive effort of 33,150 lb., cylinders 21 in. by 28 in. and 57-in. drivers, a total heating surface of 2,020 sq. ft., a superheating surface of 382 sq. ft., and a grate area of 31.5 sq. ft. The tests were confined to short runs between West Albany and Karners, N. Y., a distance of eight miles upgrade, and were made primarily to determine the suitability of the MacFarland fan draft for drafting switching locomotives, with a view of developing a system of draft which would insure noiseless operation.

This installation of the fan draft was never satisfactory from a mechanical standpoint, because the unit employed was not adapted to the size of the smokebox on this particular locomotive, but the tests further demonstrated the possibilities of this form of draft for locomotives, and justified the conclusion that the engine could be successfully drafted with the MacFarland fan draft. A maximum of 9 in. of draft was developed in the front end with an average of 8¼ in. throughout one of the test runs, and the fan operated successfully against depths of fire ranging from 6 in. to 18 in. The exhaust could be muffled to any desired point by the introduction of proper netting stages and the engine could be operated practically without smoke. The full operating steam pressure was readily maintained and the back pressure was entirely eliminated.

The experience with the fan draft gained from actual tests led to the development of an automatic control system to govern or regulate the speed of the turbine, and consequently regulate the intensity of the draft. It was found that it was highly desirable to make the operation of the fan as nearly automatic as possible and not have to depend on the engineer or fireman to regulate its action. At the same time, its operation should be under the control of the fireman at all times should he choose to exercise control. The essential features of the automatic control system which have been developed are the provision of both maximum speed and pressure governors and an arrangement which insures the starting of the turbine at the time the main locomotive throttle is opened, and shutting off when the throttle is closed. In addition to these features, an independent steam line is provided which makes possible the operation of the turbine at nearly its maximum speed when the locomotive is standing.

The maximum speed governor is made a part of the steam turbine itself and is designed to automatically throttle the supply of steam into the turbine when the pre-determined maximum safe speed has been reached. The maximum pressure governor is fitted into the steam line supplying the turbine and is so constructed that the flow into the turbine is automatically throttled when the locomotive boiler pressure has reached within a few pounds of the normal working pressure. This governor is also fitted with an attachment which makes possible the control of steam through the valve from the locomotive cab. An installation applicable to a Mikado type locomotive embodying all these features is shown in Fig. 5.

DEAD TRAIN ORDERS

By J. L. Coss

To promote prompt movement of trains, despatchers can lend a helping hand by closely watching dead orders. It requires time for an operator to clear a train with a hand full of orders, the conductor to read their contents to the operator and the engineer to read them to the conductor; and if any of the orders delivered are dead, just that much time is wasted. The train despatcher is, of course, held responsible for this lost motion; it is therefore, up to him to guard against the delivery of such orders. A despatcher should work close with his operators and instill into them the importance of watching this feature at their respective offices. They should call the despatcher's attention to any order which in their opinion is no longer necessary. The operator may be busy, it is true; but if operators are educated in this matter they can be of great assistance to the despatcher.

There is danger in the practice of allowing orders of a precautionary nature, such as reducing speed over certain pieces of track, bridges, etc., to remain in force after the repairs have been made, because the train and engine men become acquainted with the facts and they will be likely to take chances somewhere else, thinking perhaps the despatcher has forgotten to take up the order. It is the general practice on most roads to revise and consolidate all slow orders under a new number just after midnight. If, then, after the slow orders have been sent out a telegram comes in giving an O. K. on a certain place which has been covered in the new order the despatcher, if easy going, will allow that place to remain in the order until the next night at midnight. This entails much waste of energy. The moment an O. K. on any place is received a new and corrected order should be put out. Then the enginemen will adhere closely to the contents of all slow orders.

Each roadmaster, supervisor and trainmaster should receive a copy of all slow orders each morning, look them over carefully and immediately apprise the chief despatcher of anything irregular.

I have heard roadmasters complain that certain parts of slow orders were not being complied with by enginemen, and request that a "31" order be used for the place in question. But why burden the despatcher by having him use that form? There is no more important order than a slow order, and if an engineman will ignore that he is liable to do the same on a "31" order. If the roadmaster or any one else finds a man not complying with a slow order he should report the fact to the proper officer.

For the despatcher, however, the main feature is, keep your slow orders up to date and do not let it be said by enginemen, when you hand them an order, that they know a particular place was repaired a week ago because the foreman in charge of the work has so advised. Also, when it becomes necessary to abandon a certain switch or side track, as is frequently done, cover it by a general order addressed to all concerned, the order to be placed in a book to be signed for by train and enginemen. Do not put it out day after day in your slow orders. Where the necessary precautionary features are provided for in the book of rules, or time table notes, do not burden your slow order book with matters thus covered.

ARBITRATION OF ENGINEMEN'S DEMANDS

W. S. Carter, president of the Brotherhood of Locomotive Firemen and Enginemen, was the principal witness last week at the hearing before the board of arbitration on the demands of the western firemen and engineers. Much of his testimony was in explanation of a large volume he introduced as an exhibit, comparing the wage scales in 46 industries in 16 cities with those of engineers and firemen in freight service on roads that have a 10-hour basis, to show, as he said, that most of the men in the other industries receive higher rates of pay, have received larger increases since 1907 and since 1910 than enginemen, and that the latter, while required to work hours far in excess of employees in other industries, receive much less compensation for overtime.

The classes of employees which he said rank higher in hourly rate of pay than engineers include bricklayers, plasterers, steamfitters, plumbers, gasfitters, marble setters, structural iron workers, cement workers, granite cutters, compositors, stone cutters, inside wiremen, carpenters and linotype operators. The hod carrier in these cities, he said, receives an average wage of 40.27 cents an hour, while the locomotive fireman on coal-burning engines in freight service receives 33.85 cents, and on oil-burning engines 32.86 cents. The engineers stood sixteenth in the list in 1913 and firemen on coal-burning engines thirty-eighth and on oil-burning engines thirty-ninth. In a table arranged to show percentages of increase, 1913 over 1907, the engineers ranked thirty-ninth and firemen on coal-burning engines ranked thirty-sixth, while those on oil-burning engines ranked forty-fourth. Comparing overtime rates he said that an engineer on a $6.40 a day engine would get $6.40 for 8 hours or 10 hours, $7.68 for 12 hours and $8.96 for 14 hours, while a plasterer would get $6 for 8 hours, $9 for 10 hours, $12 for 12 hours and $15 for 14 hours.

One part of his exhibit included a discussion of piece work and seniority, in which he said that so long as the speed of a train is equal to or exceeds 10 miles an hour the wages are on a piece-work basis, or so much per 100 miles, and as the speed of the train increases the earnings for a given time are increased, but this he said does not take into consideration that a crew may be called two hours before starting to make mileage, or may be delayed afterward. "It is difficult to determine when a man goes on duty," he said, "he may be asleep after eight hours rest at 2 o'clock in the morning. The caller or the telephone may waken him and his train leaves two hours later. It takes him a certain time to put his clothes on, get something to eat, and get to the place where he will find his engine. Possibly that is his own time, but that is something that has to be done. It is difficult therefore to say just how much time after a man is called is really time contributed by himself or required by the company. Some schedules provide for pay for preparatory time working around the engine and others do not. As in all industries where rates of wages are based on the piece-work system a comparatively few locomotive enginemen earn high wages, and the high wages of these few are accepted by the public as typical of the earnings of all. An engineer or fireman may earn two days' pay in one day with the knowledge that he may earn nothing the next day, or may earn in one busy month twice as much as in a dull month.

There is no class of labor whose opportunities to earn money are so precarious as those of the fireman for his many years of experience. This he attributed to the peculiarity of railroad employment. On account of the seniority system, he said, the oldest men may earn high wages because they get the high-speed trains, but on the other hand the highest man on the firemen's list may be promoted to engineer and find his earnings decreased or may be demoted to fireman and find himself way down on the list again. The seniority system, however, he said, is absolutely necessary, bad as it is.

Mr. Carter said that the public and even some members of the Interstate Commerce Commission had been "grossly misled" by erroneous methods of reporting wages formerly required by the commission. Some roads, he said, have reported to the commission only the number of employees in service on June 30 on one form, and on another have reported the total compensation paid during the year. Dividing this compensation by a smaller number of men, therefore, gives an average rate that is too high. Figures compiled on this basis, he said, were used in the eastern enginemen's arbitration, but the commission has since recognized the error and has changed the method of reporting. The commission's statistics are also misleading, he said, in showing increases in pay without showing that the increases were brought about by the introduction of larger engines on which higher rates were paid.

Much of the effect of Mr. Carter's comparative tables was destroyed on cross-examination by James M. Sheean, counsel for the railroads, who showed that as the wage scales used for other industries are all for time rates they are not properly comparable with any of the "piece-work" or mileage rates of the railroads, and that the rates given for the railroads are only comparable when the enginemen are working on the hourly basis or when the speed is not greater than 10 miles an hour. This excluded the effect of the rates for passenger service, which are practically all on the mileage or piece-work basis; no distinction was made between the fast freight and other freight rates, although much of the fast freight service is paid for on the mileage basis, nor for the higher rates paid for way freight service.

Mr. Carter said his tables were intended only to show average rates, not earnings; that it would be impracticable to show earnings. He also said that his average rates had been ob-

tained by simply adding together all rates shown in the schedules for large and small locomotives, without regard to the number of each or whether any of them actually paid the rate. "So that if one engine took a $4 rate and 999 engines took a $6 rate, you would show the average rate as $5?" asked Mr. Sheean. Mr. Carter admitted this was true, but said he did not hesitate to criticise this method of reaching averages. Mr. Sheean also called attention to the fact that the rates for other indusries apply only to the large cities, while the railroad rates cover a wide extent of territory. Mr. Carter also admitted that he knew of no other industry that has a provision for a day's pay for less than a day's work. He also admitted that the number of men retained on the extra board is largely in the hands of the men themselves and that in dull times, under the seniority system, the older men may cause the younger men to drop out of service in order to keep their own earnings up, as opposed to the practice in other industries of reducing the hours of all the men.

He said he had made no investigation of the continuity or certainty of employment in other industries, and admitted that in the case of assigned crews their earnings are regular; that if called in emergency for another run they are guaranteed the same or higher rates. He said the only reason that switch enginemen have not asked for an eight-hour day is that they could not make a living in eight hours.

In reply to questions by Mr. Nagel, one of the arbitrators, as to whether the uncertainty and irregularity of employment in the case of engineers and firemen can be fairly compared with the uncertainty in the case of industrial wage earners, Mr. Carter said that the "panics" which throw men out of employment in mill industries at certain intervals of time occur on railroads, sometimes two or three times a year. Mr. Byram asked the witness if he thought it would be possible for the railroads to find enough money to give all of their employees what he would consider an adequate payment. Mr. Carter replied that he thought if it were possible to put it to a referendum vote the people of the United States would vote for higher rates if they knew the increase would go to increase wages. Mr. Nagel asked whether the entire rate question of railroads ought not to be considered, with a view to proper service for the shipper and passenger and proper conditions for the employees. Mr. Carter agreed, and thought the consumer would be liberal, but that the shipper considered only his freight rates.

Mr. Carter also introduced an exhibit on the earnings of enginemen during their first year's service, and the effect thereon of fluctuations in railroad business, based on information furnished by the railroads, to show that a large proportion of the younger men in the service have irregular employment and therefore receive low earnings. This showed that of 4,098 engineers promoted since January 1, 1912, 2,249 or 54.88 per cent have earned for the months worked an average of less than $80 per month. Of 1,296 hired engineers 518, or 39.97 per cent, have earned for the months worked an average of less than $90 a month.

Of 23,919 firemen hired, 10,786, or 45.09 per cent, have earned for the months worked an average of less than $50 per month. He said that if all months had been considered the earnings would have been much less. On February 1, 1914, there were 32,038 men on the engineers' list for the roads reporting, and 5,229 on the engineers' extra list, while 5,451 engineers had been set back to firing. On the firemen's list there were 29,645 and on the firemen's extra list 7,197. The number of firemen hired between January 1, 1912, and February 1, 1914, was 23,919. Mr. Carter said that most of the men that entered the service found out that they didn't like it, that their earnings were not high enough or that the work was too hard, and very few remain long enough to get the more highly paid runs. Over 12 per cent of the engineers and firemen promoted earned less than $20 per month. He said that in times of great depression in railway traffic it is not unusual to find all of the passenger engines and most of the regular freight engines fired by men who have been demoted. For all the roads reporting, the oldest fireman had an average of 3.44 years' seniority as an engineer on February 1, 1914. Of the 29,645 firemen in service on that date, 5,451 were demoted engineers. Without seniority, he said, the irregularity in employment would be the same, except that instead of the burden falling on the younger men, the man who had charge of assigning the service would pick the men upon whom the burden would fall.

On some roads the introduction of larger engines had the same effect on the number of men employed as a depression in business, he said, "except that business might pick up, but the engines never will get little." He admitted, however, that the number of regularly assigned runs, which are less affected by fluctuations, is gradually increasing. On cross-examination Mr. Sheean showed that many of the men listed as having small earnings as engineers earned far larger amounts in the same months as firemen, and that the list included men who might not have been available for service.

Mr. Carter remarked several times during his testimony that the employees would be willing to enter into a profit-sharing basis of wages if they could manage the roads, and that if the employees had jurisdiction over the financial affairs the money would be spent differently. Mr. Park asked: "Isn't it a fact that nearly all of the presidents and managing officials did start as firemen or machinists, or clerks, or operators, or agents? Do you think that the firemen without any experience, or with the experience they have had, would be more competent to run these railroads?" Mr. Carter replied: "If we owned the railroads we would hire the same presidents, but we would tell them what to do with our money."

Mr. Nagel asked if the government took over the roads, whether compensation would be continued at the rates which now obtain, or be raised or lowered? Mr. Carter said he hoped the government will not take over the railroads, but that if it were done, he believed the men would be placed on an eight-hour-day basis, and under civil service and that perhaps to the section men and clerks it would be a godsend, but he doubted whether it would be to the advantage of the organized crafts.

Mr. Carter admitted, in reply to questions by Mr. Sheean, that standardization of earnings could not be brought about unless the standard rates and rules proposed were applied to a uniform base, but said that the "saving clause" in the arbitration agreement indicated the "conservatism" of the men; because they had asked for standardization at lower rates than the highest now in effect, but wished to protect the higher rates. If they had been radical, he said, they would have asked for standardization on the basis of the highest rates in effect.

Mr. Carter also introduced an exhibit to show the increased cost of living since 1910 of enginemen in 29 western railroad towns, based on reports by special investigators who interviewed the merchants and secured affidavits from them as to the accuracy of the figures. Out of 111 articles of groceries, he said that there had been increases in the retail prices for all but 11, ranging from 0.54 per cent to 44.82 per cent; on meats, an increase of about one-third, and on men's clothing from 12 to 20 per cent. He also submitted tables taken from government figures and other exhibits bearing on the cost of living. Asked by the chairman whether the railroads intended to controvert the proposition that there has been an increase in the cost of living during the past four years, Mr. Sheean said "we contend that the increase in the cost of living is no greater in ratio than the increased earnings of the men during the same period."

Mr. Carter was followed on the witness stand by a number of engineers and firemen, who testified concerning their working conditions.

Extensive Electrification on the St. Paul

First Step Toward the Equipment of 440 Miles for Electric Operation; 3,000 Volts, Direct-Current Adopted

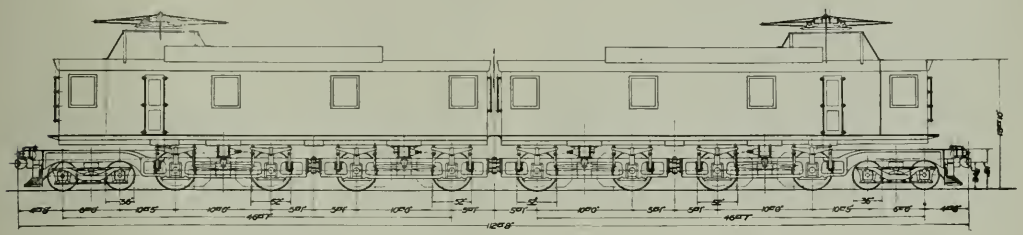
Plans for the electrification of the first engine division of the Puget Sound lines of the Chicago, Milwaukee & St. Paul* have been completed and contracts let to the General Electric Company for the electric locomotives, substation apparatus and line material, and to the Montana Power Company for the construction of the transmission and trolley lines. The work is under the direction of C. A. Goodnow, assistant to the president, in charge of construction. This initial electrification of 113 miles of main line between Three Forks and Deer Lodge is the first step toward the electrification of four engine divisions extending from Harlowton, Mont., to Avery, Idaho, a total distance of approximately 440 miles, aggregating about 650 miles of track, including yards and sidings. While this comprises the extent of track to be equipped in the near future, it is understood that plans are being made to extend the electrification from Harlowton to the coast, a distance of 850 miles, should the operating results of the initial installation prove as satisfactory as anticipated.

The plans for this work are of special interest, as this is the first attempt to install and operate electric locomotives on tracks extending over several engine divisions, under which conditions it is claimed the full advantage of electrification can be secured. The various terminal and tunnel installations have been made necessary, more or less, by reason of local conditions; but the electrification of this road is undertaken purely on economic grounds, with the expectation that superior operating results with electric locomotives will effect a sufficient reduction in the present cost of steam operation to return an attractive percentage on the large investment required. If the anticipated savings are realized in the electric operation, this initial installation will constitute one of the most important milestones in electric railway progress.

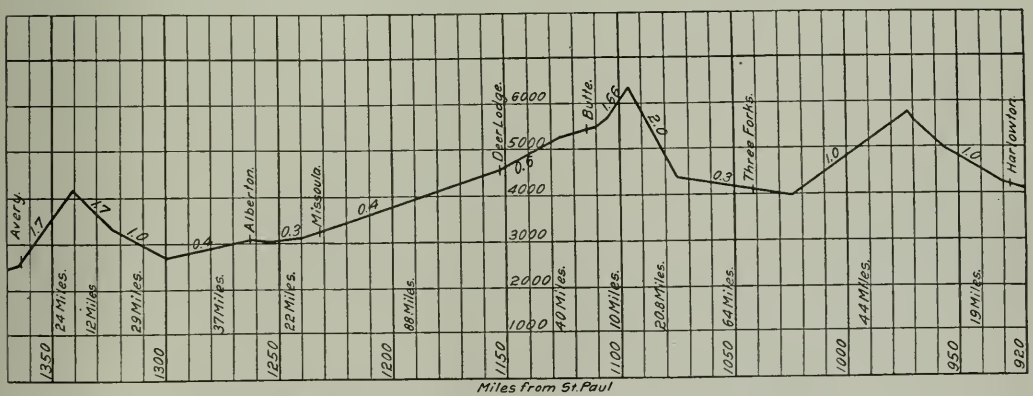
Due to the facilities available and the low cost of construction under the favorable conditions existing, the railway company will purchase power at a contract rate of $0.00536 per kilowatt-hour, based on a 60 per cent load factor. It is expected under these conditions that the cost of power for locomotives will be considerably less than is now expended for coal. The contract between the railway and power companies provides that the total electrification between Harlowton and Avery, comprising four engine divisions, will be in operation January 1, 1918.

In order to connect the substations with the several feeding-in points of the Montana Power transmission lines, a tie-in transmission line is being built by the railway company that will permit feeding each substation from two directions and from two or more sources of power. This transmission line will be constructed with wooden poles, suspension type insulators, will operate at 100,000 volts, and will follow, in general, the right of way of the railway company, except where advantage can be taken of a shorter route.

The immediate electrification of 113 miles will include four substations containing step-down transformers and motor-generator sets with necessary controlling switchboard apparatus to convert 100,000-volt 60-cycle three-phase power to 3,000 volts



Elevation of the Locomotives to Be Used on the St. Paul's Electrified Lines



Chicago, Milwaukee & Puget Sound from Harlowton, Mont., to Avery, Idaho

*See *Railway Age Gazette*, January 2, 1914, page 19.

direct current. This is the first direct current installation using such a high potential as 3,000 volts, and this system was adopted in preference to all others after a careful investigation extending over two years. The 2,400-volt direct current installation of the Butte, Anaconda & Pacific in the immediate territory of the proposed electrification has furnished a demonstration of high voltage direct current locomotive operation during the past year and a half, and the selection of 3,000 volts direct current for the St. Paul was due in a large measure to the satisfactory performance of the Butte, Anaconda & Pacific installation.

The substation sites of the Chicago, Milwaukee & Puget Sound electrified zone provide for an average intervening distance of approximately 35 miles, notwithstanding that the first installation embraces 20.8 miles of 2 per cent grade westbound and 10.4 miles of 1.66 per cent grade eastbound over the main range of the Rocky Mountains. With this extreme distance between substations and considering the heavy traffic and small amount of feeder copper to be installed, it becomes apparent that such a high potential as 3,000 volts direct current permits of a minimum investment in substation apparatus and considerable latitude as to location sites. The substations will be of the indoor type, transformers being three-phase, oil cooled, and reducing from 100,000 volts primary to 2,300 volts secondary, at which potential the synchronous motors will operate. The transformers will be rated 1,900 and 2,500 kv-a. and will be provided with four 2½ per cent taps in the primary and 50 per cent starting taps in the secondary.

The motor-generator sets will comprise a 60-cycle synchronous motor, driving two 1,500-volt direct current generators connected permanently in series for 3,000 volts. The fields of both the synchronous motor and direct current generators will be separately excited by small generators direct connected to each end of the motor-generator shaft. The direct current generators will be compound wound, will maintain constant potential up to 150 per cent load and will have a capacity for momentary overloads up to three times their normal rating. To insure good commutation on these overloads, the generators are equipped with commutating poles and compensating pole-face windings. The synchronous motors will also be utilized as synchronous condensers, and it is expected that the transmission line voltage can be so regulated thereby as to eliminate any effect of the fluctuating railway load.

The location and equipment of the several substations is as follows:

Station	Miles from Deer Lodge	No. of units	Kw. per unit	Total
Morel	17.1	2	2,000	4,000
Janey	50.5	3	1,500	4,500
Piedmont	77.9	3	1,500	4,500
Eustis	120.6	2	2,000	4,000

The trolley construction will be of the catenary type, in which a 4/0 trolley wire is flexibly suspended from a steel catenary supported on wooden poles, the construction being bracket wherever track alinement will permit and cross-span on the sharper curves and in yards.

As the result of careful investigation and experiments, a novel construction of trolley will be installed, composed of the so-called twin-conductor trolley. This comprises two 4/0 wires suspended side by side from the same catenary by independent hangers alternately connected to each trolley wire. This form of construction permits the collection of very heavy current by reason of the twin contact of the pantograph with the two trolley wires, and also insures sparkless collection under the extremes of either heavy current at low speed or more moderate current at very high speeds.

Including sidings, passing and yard tracks, the 113 miles of route mileage is increased to approximately 168 miles of single track to be equipped between Deer Lodge and Three Forks in the initial installation.

The locomotives to be manufactured by the General Electric Company are the first to be constructed for railroad service with direct-current motors designed for so high a potential as 3,000 volts. They will weigh approximately 260 tons and will have a continuous capacity greater than any steam or electric locomotive yet constructed. Perhaps the most interesting part of the equipment is the control, which is arranged to effect regenerative electric braking on down grades. This feature as yet has never been accomplished with direct-current motors on so large a scale.

The Chicago, Milwaukee & Puget Sound, from Harlowton to the coast, crosses four mountain ranges, the Belt mountains at an elevation of 5,768 ft., the Rocky mountains at an elevation of 6,350 ft., the Bitter Root mountains at an elevation of 4200 ft. and the Cascade mountains at an elevation of 3,010 ft. The first electrification between Three Forks and Deer Lodge calls for locomotive operation over 20.8 miles of 2 per cent grade between Piedmont and Donald at the crest of the main Rocky mountain divide.

The initial contract calls for nine freight and three passenger locomotives having the characteristics given below and similar in all respects, except that the passenger locomotives will be provided with a gear ratio permitting the operation of 800-ton trailing passenger trains at approximately 60 m. p. h., and will be equipped with an oil-fired, steam-heating outfit for the cars.

The eight motors for the complete locomotive will be type GE-253-A. This motor has a normal one-hour rating of 430 horsepower, with a continuous rating of 375 horsepower. The eight motors will thus give the locomotive a one-hour rating of 3,440 horsepower and a continuous rating of 3,000 horsepower. The drawbar pull available for starting trains will approximate 120,000 lb. at 30 per cent coefficient of adhesion.

Each motor will be twin-geared to its driving axle in the same manner as on the Butte, Anaconda & Pacific, the Detroit River Tunnel and the Baltimore & Ohio locomotives, a pinion being mounted on each end of the armature shaft. The motor is of the commutating pole type and has openings for forced ventilation from a motor-driven blower located in the cab.

The freight locomotives are designed to haul a 2,500-ton train on all grades up to 1 per cent at a speed of approximately 16 m. p. h., and this same trainload unbroken will be carried over the 1.66 and 2 per cent ruling grades on the west and east slopes of the Rocky mountain divide with the help of a second similar freight locomotive acting as pusher. Track provision is being made at Donald, the summit of the grade, to enable the pusher locomotive to run around the train and be coupled to the headend to permit electric braking on the down grade. In this case the entire train will be under compression and held back by the two locomotives at the headend, the entire electric braking of the two locomotives being under the control of the motorman in the operating cab of the leading locomotive. It is expected that electric braking will prove valuable, as in addition to providing the greatest safety in operation, it also returns a considerable amount of energy to the substations and transmission system. In this connection, the electric locomotives will have electric braking capacity sufficient to hold back the entire train on down grade, leaving the air brake equipment to be used only in emergency and when stopping the train.

With the completion of the remaining engine divisions, it is proposed to take advantage of the possibilities afforded by the introduction of the electric locomotive by combining the present four steam engine divisions into two locomotive divisions of approximately 220 miles length, changing crews, however, at the present division points.

The general characteristics of the locomotives are given below:

Total weight	260 tons
Weight on drivers	200 tons
Weight on each guiding truck	30 tons
Number of driving axles	8
Number of motors	8
Total length of locomotive	112 ft.
Rigid wheel base	10 ft.
Voltage	3,000
Voltage per motor	1,500
Horsepower rating; one hour, each motor	430
Horsepower rating, continuous, each motor	375
Horsepower rating, one hour, complete locomotive	3,440
Horsepower rating, continuous, complete locomotive	3,000
Trailing load capacity, 2 per cent grade	1,250 tons
Trailing load capacity, 1 per cent grade	2,500 tons
Approximate speed at these loads and grades	16 m. p. h.

THE MANUAL BLOCK SYSTEM WITHOUT STATION ATTENDANTS

That the block system or space-interval system is the only adequate and satisfactory arrangement for running trains at high speeds with a suitable degree of freedom from the collision hazard has come to be quite generally appreciated, although the American railway world has been a long time in reaching this point. That the system can be managed with a good degree of flexibility, to meet needs imposed by changes in the volume of traffic or by lack of money, is not so well appreciated. As showing the adaptability of the principle to conditions which usually are considered unfavorable to its adoption, except at unreasonably high cost, we describe below two small installations—one of them in use only about six weeks—where no station operators are employed. In both cases the trainmen perform the functions of the station man.

ELECTRIC TRAIN STAFF ON THE LONG ISLAND

The Long Island road, on its Whitestone branch, is using the electric staff system without station attendants, the conductor or his assistant changing the staffs at each stop. On this branch, four miles long, with two block sections, there are on week days about 25 trains each way, daily, nearly all passenger trains; and each staff station is at a passenger station, so that no extra stops are necessary to take staffs, except for the few freights. There are no express passenger trains. The electric train staff has been used in this way on a short section of the Delaware, Lackawanna & Western for several years, but on that section there are no passenger trains.

In one of the staff sections on the Long Island is a siding, where there is a junction staff instrument, by means of which a train clearing the main track, can clear the block for other trains. The conductor uses the staff to unlock the switch, and having cleared the main track, and locked the switch straight, can insert the staff in the instrument, thus making a staff available, at either end of that section, for a superior train.

There are no semaphores or other fixed visual signals on this staff-operated line. At each station is a booth outside the building, locked with a padlock; and in this the staff instruments are placed. The stations have high platforms and the car platforms are at the same level, so that the trainman can alight, go to the booth, unlock it, change the staffs, lock the door and return to the train in about ten seconds. Before going back into the train he holds the staff up where it can be seen by the motorman (all passenger trains are electric). Motormen and enginemen are required to see the staff before proceeding from a station. In each booth there is a telephone, connecting with the despatcher's office; but in the ordinary routine the passenger-train men have no communication with the despatcher; if the desired staff can be obtained (is not held in the machine by the electric lock) it is taken out at once, and the train proceeds.

All trains are required to keep clear of opposing superior trains, in accordance with ordinary time-table rights, so that observance of precise block-section limits is not necessary, and at staff stations trains can and do run to the station platform to discharge passengers.

LIGONIER VALLEY; FIVE BLOCKS CONTROLLED BY THE DESPATCHER

On the Ligonier Valley Railroad, which connects with the Pennsylvania main line at Latrobe, 40 miles east of Pittsburgh, the trains are run by the manual block system, without station operators; and there are no fixed signals, in the usual meaning of that term; the building, booth or box, containing the telephone with which conductors can speak to the train despatcher, being the recognized landmark by which the beginning and end of a block section are indicated.

This road is ten miles long, with a branch of four miles, and there are, altogether, five block sections. On the main line there are three passenger trains each way daily. The method of operation will be understood by a perusal of the rules for the block system, printed below. Freight trains are allowed to follow freight trains permissively, but under all other conditions the absolute space interval is maintained.

The usual procedure for the movement of a train through a single block is, for example, as follows:

The conductor goes to the telephone and says: "This is Conductor Brown, Extra 15 north, at Darlington Block Station." The despatcher then says to him "Block is clear (or caution) Darlington block station to Kingston block station, for Extra 15 north." The conductor then repeats the despatcher's exact words. The despatcher then closes the conversation by saying "O. K. Ligonier train director."

When train movements can be facilitated by giving an order conferring the right to the road for more than one block section, the regular form 19 is used. A sample order reads:

To C and E No 4 Latrobe Passenger Station
No 4 has clear blocks
Latrobe Block Sta to
Ligonier Block Sta

W. V. H.

In the occasional instances where the telephone wires or telephone instruments have been out of order, so as to prevent communication with headquarters, the trainmen have used the long distance Bell telephone to get instructions from the train director.

BLOCK SIGNAL RULES

38. Manual block system is in effect between Ligonier and Latrobe Block Station and on Mill Creek Branch between Ligonier and Wilpen.

Definitions

Block System—A series of consecutive blocks.

Block—A length of track of defined limits, the use of which by trains is controlled by block signal or block signal instructions.

Block Station—A place from which block signals are operated, or block signal instructions are received by telephone.

Unattended Block Station—A place at which block signal instructions are received by telephone.

Stations

Block stations will be located as follows and block system will be controlled by train director at Ligonier:

Ligonier—(telephone in train director's office).
Darlington—(in station building).
Kingston—(in station building).
Oakville—(in station building).
Latrobe Block Station—(Booth Junction, West Leg Y).
Wilpen—(in booth).

All above block stations are unattended except Ligonier. Telephones connected with the train director are installed at each block station.

General Rules

39. A train must not enter a block at a block station or between block stations without permission from the train director. The conductor or engineman must obtain from the train director permission to enter, and ascertain condition of the block. If the information concerning the block is received by the conductor, he must personally give it to the engineman, and the movement through the block must be made according to the instructions received from the train director. Trains clearing a block must report promptly to the train director.

40. Train director must not permit a train to enter a block which is occupied by an opposing train or by a passenger train, and a passenger train must not be admitted to a block which is occupied by any train except by train order. A freight train with proper instructions from the train director will be permitted to follow another freight train in the block.

41. Passenger extras must be given the same block protection as regular trains.

42. The condition of block over one block only will be given verbally; over more than one block, it must be in writing.

43. At an unattended block station, the conductor or engineman must obtain permission to enter, and ascertain the condition of the block; and report when clear of the block.

When a train clears a block between block stations or at an unattended block station, the flagman may, when authorized by the conductor or engineman, report clear to the train director.

44. If telephone fails at an unattended block station and trainmen cannot in the usual manner obtain instructions, every effort must be made to obtain instructions in some other manner and avoid undue delay. Such failures must be promptly reported to the train director from the most accessible point.

45. At unattended block stations, trains must run to but not beyond the building, booth or box which contains the telephone, unless otherwise instructed by train director.

USE OF TELEPHONES

46. The following instructions must be observed when the telephone is used for manual block operations, transmitting train orders or making any arrangements pertaining to the movement of trains.

Each person must satisfy himself that he is in communication with the person desired.

Train director and trainmen, when making arrangements by telephone for movement of trains, will be governed by the following instructions:

First: Trainmen calls train director by telephone.

Second: Train director answers "Ligonier train director."

Third: Trainman answers "Conductor ..... of train ..... at ....."

Fourth: Trainman asks for information or instructions desired.

Fifth: Train director gives information or instructions to trainman.

Sixth: Trainman repeats information or instructions given by the train director.

Seventh: Train director closes conversation by saying "O. K. train director, Ligonier."

Trainman must not consider any information or instructions from the train director as being completed and must not act upon such information or instructions until the train director has given "O. K.," followed by his name and office.

47. If there is not a proper supply of train order blanks and carbon sheets at an unattended block station or telephone booth, the fact must be promptly reported by telephone to the person from whom orders are received, who will arrange for necessary supply.

RAILWAY BUSINESS ASSOCIATION

The following officers were elected at the business session of the Railway Business Association which was held at the Waldorf-Astoria, New York, on Thursday afternoon, December 20: President, Geo. A. Post of New York; vice-presidents, S. P. Bush of Columbus, Alba B. Johnson of Philadelphia, H. G. Prout of New York, W. G. Pearce of New York, Walter H. Cottingham of Cleveland, W. B. Leach of Boston, E. B. Leigh of Chicago; treasurer, M. S. Clayton of New York.

An appropriate eulogy was adopted as a tribute to the late Charles A. Moore, who had been treasurer of the association since its formation.

The following resolutions were also adopted:

I—We again urge co-ordination of the various agencies of railway regulation. One of the most serious embarrassments under which the Interstate Commerce Commission labors is that it cannot enforce its findings when they conflict with state action. Until some permanent and satisfactory solution is reached, the federal commission should initiate and state commissions should join in conferences, exhausting all reasonable efforts toward co-operation. The country should consider its transportation problem not piecemeal but as a whole, with a broad outlook on the general prosperity. The financial condition of the railroads ought to be made plain to every public officer and no burden placed upon the railways without due consideration of the effect upon their net income.

II—We regard general rate advance cases as a proper subject of propaganda. As a matter of public policy the people have a vital interest in strengthening railway credit. They have the right to expresss their opinion and to promote public discussion.

III—We vigorously dissent from the view that the supreme concern of railway regulation is to avoid the risk of too much railway revenue. In business and in the affairs of government, what men dread is not a surplus but a deficit. The railroads should be put beyond reasonable doubt of having income enough. It is now known on the highest authority that their income is too low in the public interest. Various substitutes are proposed in place of advances in freight rates as a remedy. It has been demonstrated that some of these suggestions are not immediately practicable. Certain relief should be granted forthwith. National prosperity depends upon it. The people cannot afford mistakes on the wrong side of the ledger. Any superfluous surplus can be dealt with when and if it materializes.

IV—Underpayment of railways for carrying mail demands correction. Quadrennial weighings result in substantial increases in service performed without added compensation. The initiation of the parcel post service without adequate remuneration to the railroads aggravates this discrepancy. This inequity should be minimized through a change to annual weighings. Instead of this, the House has passed and the Senate is considering a method of payment based on advance estimates of car space to be used. We oppose this experiment. It prescribes no method for measuring space actually used, no check-up of estimates by actual measurement, no way of proving whether the space authorized approximates that furnished. The computation of mail pay should be on a basis of ascertained facts so far as practicable, and all findings of the Post Office Department should be subject to review by some less interested arm of the government.

V—Federal regulation of railway security issues would be an advantage if it did away with regulation by states. Superadded to state supervision, it would further confuse and harass the roads in their financing, already made complex, cumbersome and slow by multiplicity of masters. Inasmuch as authorities differ as to what can ultimately be done, we advocate that federal action be confined to publicity, as recommended by the Hadley Commission.

VI—President Wilson by his sympathetic reception of railway executives and his generous response to their plea for public co-operation has shown that the time has come when political leaders are willing to listen without prejudice to appeals on behalf of the carriers. Members of our association can do effective work in arranging conferences with governors, state legislators and members of Congress. The more open and public such meetings are the better.

VII—We congratulate the people of Missouri on their veto of the extra crew bill. In most states railroad commissions have ample power to require safety precautions according to actual circumstances, which vary from time to time and from road to road. Details should be left to regulation. Needless men promote danger rather than safety, and their compulsory employment is a waste of money collected from the rate payers In those states which have extra crew laws our association will advocate repeal.

VIII—America has lagged too long behind Europe in protecting against himself the person who risks life and limb by trespassing on the railroad right of way. Our laws are loose, our enforcement lax, the result a yearly toll of awful magnitude. We favor absolute prohibition of trespassing on railroad property under heavy penalties and rigid severity in dealing with offenders.

IMPORTANCE OF SAVING TIME.—The element of greatest expense in manufacturing is time, for a little time wasted here and there will lessen, and possibly destroy, the year's profits.—*American Machinist.*

Heat Treated and Alloy Steels for Locomotive Parts

Possibilities of Lighter Sections and Increased Fibre Stresses; Comparisons with High Grade Carbon Steel

The following is part of the discussion of a report on "Steam Locomotives of Today," presented before the railroad session of the annual meeting of the American Society of Mechanical Engineers, held in New York, December 2, 1914:

USE OF HIGH GRADE ALLOY STEEL TO REDUCE WEIGHT

C. D. Young, engineer of tests, Pennsylvania Railroad: With the ordinary annealed carbon steel as used generally for locomotive forgings, such as axles, crank pins, side rods, etc., the minimum physical properties may be considered to be as follows:

Tensile strengtb.....80,000 lb. per sq. in.
Elastic limit .....½ tbe tensile strength
Elongation in 2 in.....22 per cent
Reduction of area.....30 per cent

With properly quenched and tempered carbon steel we may expect an increase in the elastic limit of 30 per cent or more, about 15 per cent increase in tensile strength, the elongation remaining the same and the reduction of area increasing about 50 per cent. These are conservative figures and a great deal better elastic limit and tensile strength may be obtained, depending upon the chemical composition of the steel and the heat treatment.

From alloy steels, such as chrome-vanadium or chrome-nickel, we may expect to obtain the following minimum physical properties after heat treatment:

Tensile strength.....95,000 lb. per sq. in.
Elastic limit.....75,000 lb. per sq. in.
Elongation in 2 in.....20 per cent
Reduction of area.....30 per cent

On an average these alloy steels will show an increase in physical properties over those of annealed carbon steel of 20 per cent or more in tensile strength, 80 per cent or more in elastic limit, with elongation in 2 in. about 9 or 10 per cent less than that of the carbon steel, and the reduction of area 75 per cent or more greater. These figures are also subject to considerable variation on account of variation in the chemical composition of the steel and the heat treatment.

In carbon steel castings approximately the same per cent increases in physical properties as were given for carbon steel forgings may be obtained after proper heat treatment. The experience with alloy steel castings has been too limited to furnish any satisfactory data.

Up to the present the majority of users of heat treated steels seem to have made but little, if any, use of the increased physical properties as determining the fiber stresses used in design, though some of the larger builders of locomotives have made such increases in fiber stresses for both heat treated carbon and alloy steels. In certain parts where heat treated carbon steel has been used, the fiber stress has been increased about 25 per cent above that used for annealed carbon steel, and in the case of heat treated alloy steels an increase of as much as 50 per cent has been made. In some cases, depending upon the design and service for which the forging is intended, it is preferable to allow no increase in the fiber stress, but to consider the excess strength of the heat treated material as contributing to increased life in service, or to safety.

Recent practice has indicated that it is desirable, when using heat treated designs, to carefully study the sections, so as to avoid abrupt changes, and also in the case of larger shafts, such as axles or crank pins, that they should be hollow bored in order to provide for better treatment and to relieve shrinkage strains which occur during the quenching process.

While there is no objection to the change of the present standard section, it would seem, with our present knowledge of heat treated material, that it would be entirely safe to use certain increases in the fiber stresses when designing the locomotive parts, and, as a suggestion as to what could be done in this respect, the accompanying table shows what is recommended for three grades of steel as to working fiber stresses and the minimum ultimate strength and elongation. This has been tabulated for the grades of .45 annealed carbon, quenched

Parts	Grade of Material	Working Fiber Stress, Lb. per sq. in., in Tension or Compression	Working Fiber Stress, Lb. per sq. in., in Bending	Minimum Ultimate Tensile Strength	Minimum Elongation in 2 in.	
Main and parallel rods	Annealed .45 carbon	8,000	10,000	80,000	1,800,000 T. S.	20 per cent
	Quenched and tempered .52 carbon	10,000	14,000	85,000	2,000,000 T. S.	20 per cent
	Quenched and tempered alloy	12,000	18,000	100,000	..... T. S.	20 per cent
Piston rods	Annealed .45 carbon	9,000	.....	80,000	1,800,000 T. S.	20 per cent
	Quenched and tempered .52 carbon	10,000	.....	85,000	2,000,000 T. S.	20 per cent
	Quenched and tempered alloy	12,000	.....	100,000	..... T. S.	20 per cent
Driving axles	Annealed .45 carbon	Combined bending and torsion in starting	18,000	80,000	1,800,000 T. S.	20 per cent
	Quenched and tempered .52 carbon		20,000	85,000	2,000,000 T. S.	20 per cent
	Quenched and tempered alloy		25,000	100,000	..... T. S.	20 per cent
Crank pins	Annealed .45 carbon	.....	13,500	80,000	1,800,000 T. S.	20 per cent
	Quenched and tempered .52 carbon	.....	16,000	85,000	2,000,000 T. S.	20 per cent
	Quenched and tempered alloy	.....	20,000	100,000	..... T. S.	20 per cent
Cast steel parts	Annealed .28 carbon	8,000 (Tension)		60,000	1,400,000 T. S.	22 per cent
	Quenched and tempered .28 carbon	10,000 (Tension)		75,000	1,800,000 T. S.	20 per cent
				Transverse Strength		Bend Test
Springs	Drawn 1.0 carbon	70,000	.....	90,000		25 deg.
	Quenched and tempered 1.0 carbon	90,000	.....	120,000		25 deg.
	Quenched and tempered alloy	100,000	.....	150,000		50 deg.

Note.—Maximum figures for working fibre stress may be 20 per cent in excess of those shown.

and tempered .52 carbon, and quenched and tempered alloy steels.

Results seem to indicate that heat treated carbon and alloy steels will show greater resistance to wear and to the fatigue stresses in service than annealed carbon steel, and it is our opinion that the increase in resistance to wear is about in proportion to the increase in Brinell hardness, which is brought about by the heat treatment.

CARBON AND ALLOY STEELS

H. V. Wille, Baldwin Locomotive Works: The use of high grade alloy steels is at present largely confined to reduction of weight of the reciprocating parts in order to permit a corresponding increase in the dead weight on drivers. It is, however, undesirable to greatly reduce the sections and weight of rods, even though they may be made of alloy steels, for the reason that they are subject to failure by buckling and when loaded as a column under a compressive load will not show much superiority over a high grade carbon steel.

With many other railroad metallurgists, I do not consider that the possibilities of high grade carbon steel have been utilized to the fullest extent by designers. This is no doubt due to the fact that designers and metallurgists look at the properties of steel from entirely divergent views. The metallurgist wishes a steel of great ductility with a good elongation and reduction of area, or in other words, a steel that will readily flow under limiting loads, whereas the designer desires a stiff steel, one of high elastic ratio or a steel that will not readily flow under loads above the elastic limit. The metallurgist, therefore, specifies a steel with a high elongation and reduction of area and to meet these conditions the manufacturer is compelled to use a steel of medium carbon.

As for possibilities of improvements, a decided reduction in weight as well as the elimination of failures would result from a modification of existing specifications for forgings for the purpose of permitting the use of steel of high tensile strength and elastic limit, even at a sacrifice of the ductility as measured by the elongation and reduction of area. These views are sustained by the results of an elaborate series of tests conducted by the United States government at the Watertown Arsenal by Jas. E. Howard, on the endurance of rotating shafts. The enormous increase in endurance following the use of material having high elastic limit and tensile strength is notable in that a .66 carbon steel shaft exhibits as much endurance as 5.6 per cent nickel steel.

These figures carry an obvious lesson and one which is gradually being appreciated for its full worth, and it is in entire accordance with our past experience. When steel forgings were first proposed for use in locomotives a soft grade of steel was generally employed, the purpose being to secure a steel of properties similar to the iron formerly employed. The use of this material resulted in an unusual number of failures of axles, pins and rods, and after studying these failures, Dr. C. B. Dudley, S. M. Vauclain and S. T. Wellman experimented with higher carbon steels. This led to the general adoption of steel of 80,000 lb. tensile strength for locomotive work, with the result that the failures were eliminated and the great superiority of this steel over the softer steel was demonstrated, notwithstanding the great difference between the two steels in elongation and contraction of area. This grade of steel is still being universally employed and any changes were for the purpose of increasing the ductility requirements rather than the tensile requirements, thus handicapping the manufacturers in the development of this grade of steel. If specifications were revised to permit the use of a .65 carbon steel there would be but little necessity to employ the expensive alloy steels.

Machine Power and Piecework.—In any shop if the feeds, speeds and power of machine tools of the same class vary, it is a practical impossibility to establish a just and efficient piecework or premium system.—*American Machinist.*

POINTS FOR THE ROAD FOREMAN*

By W. P. Danforth

During ten years of service as road foreman of engines on one of the leading railroads located at a terminal which might be called the business center of the road, I was called upon to employ, examine, and promote an army of men. It gave me an insight into the general make up of this class of men; and, while I have occasionally found an obstinate one who wants his own way, most of the candidates sincerely desired to be known as good engineers.

From conversations with the engineers on the line on which I am employed, I find that the greatest factor in building up a class of men who will "deliver the goods" on a busy single-track line (one which has been reasonably free from distressing accidents) has been the pattern set by a long line of good clean, honest and successful men. *Example* is the most important item. I myself, in my youth, selected a noble man as my ideal, an engineer who became one of the ablest superintendents of motive power in the United States; and I derive greater satisfaction from my record as an engineer, than from the position of superintendent, which I now hold.

The engineer must be clean as a hound's tooth, and temperate in all things. He must cultivate the habit of having the greatest respect for the rules. I know of a young engineer who sidewiped a passenger train, before he learned to respect the rules that required him to stop a certain distance from a signal. He always wanted to get closer than the rules allowed. I warned him several times, and after the accident he acknowledged, that, had he followed my advice the collision would not have occurred.

An engineer must study and never allow himself to become rusty. We learn and soon forget, unless we keep everlastingly at it. The successful engineer will study his time-table and book of rules, at every opportunity, as a lawyer studies his law books. The study of speed and the distance required to stop under everyday conditions is of the greatest importance. I would suggest that every engineer post himself on the table of speed and distance required to stop, as given in the Westinghouse Air Brake Instruction Book. A slight increase in speed throws the distance in which we have to make the stop all out of proportion. There is an element in the service of all railroads who think locomotives, air brakes, cars and every thing else placed in their hands should be in perfect order at all times, and, if defects show up they are relieved of all responsibility. My advice to young engineers would be, shun this class of men; always strive to overcome the difficulties which may arise in your work.

Pooling engines and taking all the work off the engineer in the way of caring for the general upkeep of the engines has not been beneficial in developing in engineers those painstaking traits that make them successful. Filthy engines have a great deal to do in developing a slip-shod engineer. Neat surroundings have a tendency to make men more particular about their work. The painstaking, particular men rarely get into serious trouble; therefore surround the engineer with neatness. Note the difference between the cab of a locomotive and the engine room of an ocean liner.

Officers, especially those in the passenger department, who are always making extravagant promises in regard to schedules, should be as considerate as possible in their requirements for speed. In my experience as an engineer I never allowed this pressure to remove from my mind, for a second, the all-important subject of safety of the passengers riding on the train.

Harsh methods on the part of railway officers in an attempt to accomplish the impossible, that is to prevent all accidents, have

*This is the fifth of a series of articles, made up of useful hints to locomotive runners, which were written in connection with the prize competition of several months ago. The previous articles of this series were printed in the issues of September 25, October 2, November 27 and December 11.—Editor.

done much to increase accidents by putting something in the minds of runners, namely, the fear of losing their positions, which ought not to be there. Here again may be seen the importance of example. Officers must lead their men by example, by kindness and by firmness. The Brown system of discipline was a timely innovation. It brought in the element of humanity, and did more to develop a good class of men than carloads of the harsh methods which so widely prevail.

TRAIN ACCIDENTS IN NOVEMBER[1]

The following is a list of the most notable train accidents that occurred on the railways of the United States in the month of November, 1914:

Collisions

Date.	Road.	Place.	Kind of Accident.	Kind of train.	Kil'd.	Inj'd.
21.	New Orleans G. N.	Pool's Bluff.	bc.	.....	3	4
*24.	Southern	Alexandria.	rc.	F. & F.	1	0
27.	Vicksburg S. & P.	Mounds.	bc.	P. & P.	0	37
28.	Bangor & A.	Crystal.	xc.	P. & F.	0	11
28.	Ches. & Ohio.	Richmond.	rc.	P. & F.	0	1

Derailments

Date.	Road.	Place.	Cause of Derailm't.	Kind of train.	Kil'd.	Inj'd.
2.	Southern	Belleville.	.....	F.	1	3
†12.	Lehigh V.	Mud Run.	unx	P.	2	6
*17.	Louisville & N.	Goodlettsville.	b. rail	P.	0	6
19.	Louisville & N.	Garland.	b. rail	P.	0	5
21.	Delaware & H.	Waterford.	unx	P.	0	0
22.	Balt. & Ohio.	Mendota.	b. spring	P.	0	11
27.	Chicago & Alton.	Clark, Mo.	unx	P.	0	27
29.	Central of Ga.	Toomsboro	washout	P.	0	13

The collision at Pool's Bluff, La., on the night of the 21st was between a log train of the Great Southern Lumber Company and a motor car ordinarily used by the track repair forces, but in this case carrying 10 passengers. Three of these passengers were killed and four others were injured. It is said that a section foreman was using the motor car to carry passengers without authority. How the collision came to happen is not clearly explained, but there was smoke from forest fires which may have interfered with the view of the men on the motor car. Testimony before the coroner, however, indicated that there was gross carelessness in assuming that no train was due.

The trains in collision on the Southern Railway near Alexandria, Va., on the 24th were northbound freights, a train of the Chesapeake & Ohio running into the rear of one of the Southern Railway. The caboose of the leading train was wrecked and a brakeman, off duty, sleeping inside of it, was fatally injured; and the caboose was burnt up. The second train was running in disregard of the yard-limit rule.

The trains in collision at Mounds, La., on the 27th were westbound passenger No. 5 and eastbound passenger No. 12. Both locomotives were badly damaged and 34 passengers and 3 trainmen were injured, none very seriously. Mounds was the appointed meeting place for these trains, and it is said that the westbound train, No. 5, approached at uncontrollable speed and so failed to enter the side-track, where it should have gone to clear the eastbound train. The engineman of No. 5 had a perfect record of 20 years' service.

The trains in collision at Crystal, Me., on the night of the 28th were a northbound passenger and a freight train which was switching in the yard. Eleven passengers were injured. The freight was on the main line without right.

The trains in collision on the Chesapeake & Ohio at Richmond, Va., on the night of the 28th were westbound passenger No. 15 and an extra freight, the passenger running into the rear of the freight. One passenger was injured.

[1]Abbreviations and marks used in Accident List:
rc, Rear collision——hc, butting collision——xc, Other collisions——b, Broken——d, Defective——unf, Unforeseen obstruction——unx, Unexplained——derail, Open derailing switch——ms, Misplaced switch——acc. obst., Accidental obstruction——malice, Malicious obstruction of track, etc. ——boiler, Explosion of locomotive on road——fire, Cars burned while running——P. or Pass., Passenger train——F. or Ft., Freight train (including empty engines, work trains, etc.)——Asterisk, Wreck wholly or partly destroyed by fire——Dagger, One or more passengers killed.

The train derailed at Belleville, Ill., on the 2nd was an eastbound freight and the engine and seven cars were ditched. A trespasser was killed and the engineman and two other trainmen were injured.

The train derailed at Mud Run, Pa., on the morning of the 12th was an eastbound through passenger. The locomotive and seven cars were derailed, one of the coaches sliding down the embankment, but remaining upright. Two passengers were injured fatally, and six other persons, including the engineman and the fireman, less severely. The cause of the derailment has not been determined.

The train derailed at Goodlettsville, Tenn., on the 17th was southbound passenger No. 93 and two baggage cars and one coach were overturned. The engine and the rear car, which was a sleeping car, were not derailed. The baggage car caught fire, but the flames were soon extinguished. Four passengers and two trainmen were slightly injured. The wreck occurred at 2 a. m., and the cause was a broken rail.

The train derailed near Garland, Ala., on the 19th was northbound passenger No. 2. The engine and three baggage cars fell down a bank. Four passengers and an express messenger were injured. The derailment is believed to have been due to a broken rail.

The train derailed at Waterford, N. Y., on the 21st was westbound passenger No. 31 consisting of four cars and a locomotive, the locomotive moving backward, pulling the cars. While running at low speed the engine was derailed on the bridge over the Mohawk river. Both the tender and the engine ran off the rails and broke through the ties, but were held up by the floor system of the bridge and were not badly damaged. The bridge was damaged to the extent of about $4,500.

The train derailed at Mendota, W. Va., on the 22nd was northbound passenger No. 714. Eleven passengers were injured, none seriously. The tender was the first vehicle to leave the track. The cause of the derailment, which occurred on a curve, is reported as the fracture of one leaf of an elliptic spring of the forward tender truck.

The train derailed near Clark, Mo., on the 27th was eastbound passenger No. 22, and four coaches fell down a bank. Twenty-three passengers and four employees were injured. The train was running about 30 miles an hour. The cause of the derailment was not discovered.

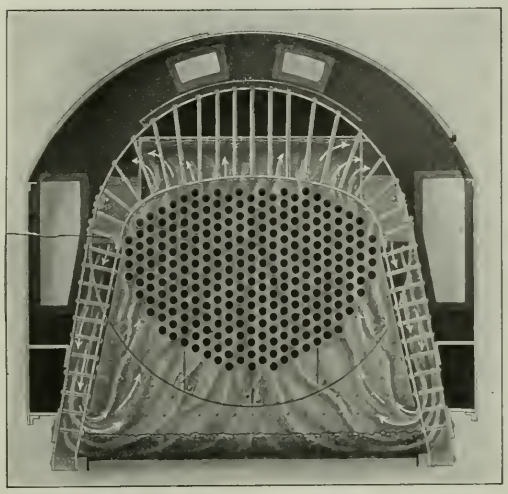
The train derailed near Toomsboro, Ga., on the night of the 29th was eastbound passenger No. 22, and one car was overturned. Eight passengers and five employees were slightly injured. The train was running about 20 miles an hour and the derailment was due to a washout caused by unusually heavy rains.

A SYSTEM OF WATER CIRCULATION FOR LOCOMOTIVE BOILERS

A device has recently been developed for the application of the Ross-Schofield system of circulation to locomotive boilers and is now in service on a number of locomotives. In this system, which has been successfully used in marine and stationary service for a number of years, the circulation is produced by utilizing the displacement of water caused by the formation of steam bubbles and their rise toward the surface. The water space above the hottest portions of the heating surface is enclosed by means of plates, communication with the body of the water space being provided at the top and bottom only. The generation of steam within the water column thus formed produces a rapid upward circulation of water which is properly directed by means of a guide at the surface.

The device for locomotive service is made up of three parts. A baffle plate which surrounds the tubes and separates the barrel of the boiler from the firebox portion, is secured to the shell of the boiler at the throat sheet. This extends to a height level with the highest point of the crown sheet, openings being provided at the sides below the center

line of the boiler. The space betwen the baffle plate and the firebox flue sheet is separated from the water legs at the sides of the firebox by side plates which extend downward to a point about 10 in. above the mud ring. A water column is thus formed which is enclosed by the flue sheet, the baffle



End Elevation Showing Direction of Currents from the Barrel of the Boiler

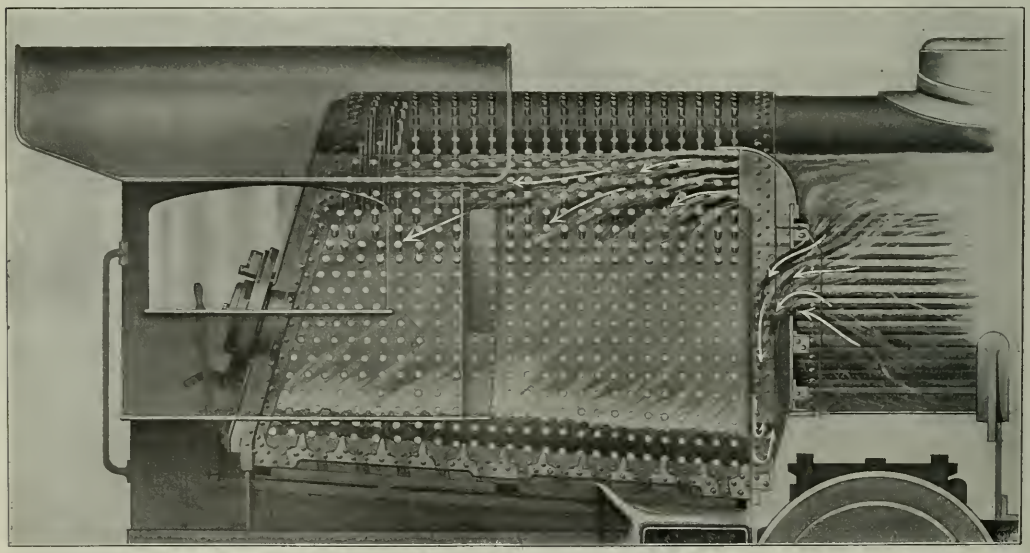
plate and the two side plates. All circulation from the barrel of the boiler must pass through the openings in the baffle plate, downward through the water leg to the bottom of the side plates and thence upward over the rear flue sheet and the rear ends of the tubes. Supported to the top of the baffle plate is a curved hood extending up to the normal water line, which directs the circulation over the crown sheet toward the back of the firebox. The water about the firebox thus moves in a circuit upward across the flue sheet, backward and downward along the crown sheets, side sheet and door sheet, and forward near the bottom of the water legs. As the water in the firebox space is evaporated more flows in from the barrel of the boiler through the openings in the baffle plate.

Among the advantages which are claimed for this device is increased rapidity of evaporation due to the constant freeing from the heating surface of the steam bubbles by the sweeping action of the water. Priming is overcome by means of the hood which directs the rush of the rising steam and water in a horizontal direction, thus making available the entire surface of the water over the crown sheet for the separation of steam with a consequent decrease in violence of ebullition at any one point. The rapid circulation of the water prevents the formation of stagnant pockets of cold water near the corners of the firebox and produces a uniform temperature at all points around the firebox, thus in a measure preventing the effects of unequal expansion and contraction of side sheets and staybolts. It is also claimed that the formation of scale is largely prevented by the rapidity of the circulation, the particles of scale-forming material collecting at the mud ring where they may be disposed of through the blow-off cock. This is borne out by experience with the system in stationary service.

This device, which is being introduced by the Q & C Company, 90 West street, New York, may be readily applied to boilers of existing locomotives whenever the tubes are removed for repairs. The baffle plates may be made in sections of any size suitable to be taken into the boiler through the dome, the parts being assembled inside the boiler before the tubes are applied.

Iron Exports from Sweden.—Iron ore heads the list of Sweden's exports. During 1913, 6,440,000 tons were exported to foreign countries, chiefly England and Germany.—*Machinery.*

Oxygen in Blast Furnace Practice.—If oxygen is added to the air-blast for a blast furnace, so that it is present to an extent of 23 per cent in the air instead of the normal 21 per cent, there is a saving of from 110 to 130 lb. in the amount of coke required to smelt a ton of iron, and the iron produced is said to be of a higher quality.—*Scientific American*



Direction of Currents Over the Crown Sheet, Ross-Schofield System of Circulation

Maintenance of Way Section

In accordance with our practice for the last three years, the maintenance of way section for January will be delayed one week in order to include a complete report of the eleventh annual convention of the American Wood Preservers' Association, which will be held in Chicago on January 19-21, 1915. This section will therefore appear in our issue of January 22 instead of January 15.

Protecting Concrete from Freezing

It was universally the practice a few years ago to discontinue concrete work at the approach of cold weather, and this is still generally the practice today. An increasing amount of such work is being carried on throughout the winter, however, as the means of protection of the green concrete from the cold are becoming more generally known. On the larger projects this subject is of sufficient importance to attract the proper amount of attention and insure reasonable precautions being taken. It is on the smaller railway work, which may be under the charge of a foreman of limited experience, that the common methods of protection are not always so well understood and greater risks are taken. It is therefore advisable for the supervisors of bridges and buildings to assure themselves that their foremen in charge of concrete work at this season of the year are thoroughly familiar with the common means of protection against the cold and the action of concrete under low temperatures. These methods are so simple and inexpensive that much work can be continued through the winter to advantage without injury to the finished work.

Unnecessary Physical Requirements

There is merit in the criticism of W. E. Schott, published in another column of this issue, regarding the physical standards set for section foremen. In view of the severe shortage of section foremen, it would appear questionable if in many cases physical standards are not emphasized to the neglect of other qualifications such as experience and ability. These standards were originally established for the examination of men in the train service where they were necessary. In too many instances they have since been extended to cover employees in other departments without proper modifications to meet the different and less severe conditions existing in those departments. As a case in point, a rodman was employed on a western road and hurriedly sent out to join an engineering party without opportunity to take the required physical examination. Two months later the company physician gave him the routine examination and found that he had only one good eye. The medical department immediately ordered the man discharged, although his work had been of such high grade that none of his associates knew of his defect. Such universal applications of standards in places where they are not necessary, work to the detriment of a road.

The Snow Problem

The most serious problem confronting the maintenance of way department for the next three months is that of keeping the tracks free from snow and ice in order to maintain uninterrupted service. Frequently little opportunity is afforded to prepare for severe storms and this work becomes of an emergency character. Under such conditions a knowledge of efficient methods is invaluable. Numerous practices of this nature have been described in our columns from time to time. In the January maintenance of way section we expect to present several descriptions of methods actually followed on different roads in preparing for winter conditions and in meeting them as they arise. We solicit other discussions of this subject from those who have had experience along this line. Such discussions should be confined to practical methods for anticipating winter conditions in advance through proper preparations the use of labor saving equipment in clearing the tracks, the organization of the forces and the proper means of caring for the men when working under extreme conditions. To be published in the January maintenance of way section, all contributions should be sent to the Engineering Editor before January 8.

THE PAST YEAR IN MAINTENANCE WORK

IN looking back over the year now closing the one feature which has characterized it from the standpoint of the maintenance of way department has been the severe retrenchment in expenditures. A comparison of these charges on 15 representative roads for the period from April 1 to September 30, inclusive, of this year, with the same period last year, shows a decrease of 10.5 per cent. As there are many items entering into maintenance of way work on which little or no retrenchment can be made, the reduction has been correspondingly greater on others. This has been especially marked with reference to the placing of new rail and ballast, and is indicated best by the fact that the steel mills have been working at very much reduced capacity during the entire season. As the traffic has not shown any marked decrease in amount, the wear on the rail now in track has been practically normal and any reduction in such items made during the past season means that they are only deferred until a later date.

The tendency toward the rolling of heavier rail sections up to 100 lb. has continued. One important eastern road has devoted extensive study to the design of a 125-lb. section which it proposes to make standard for future rolling. While this is not as heavy as the 135-lb. section used on one division of the Central Railroad of New Jersey, it is a marked advance over the weights commonly used.

Partially counteracting the retrenchment in expenditures has been the lower average wage rate for laborers. In contrast with recent years there has been an ample supply of labor throughout the season, and as a result it has been possible to secure considerably more work per dollar expended. Also the very general retardation of heavy improvement work has permitted the maintenance of way forces to concentrate their attention on their regular duties. Largely as a result of these conditions, the track as a whole is going into the winter in better shape than might otherwise be expected.

While the adoption of new materials has been generally retarded during the past year, their use has been extended on many roads. A notable example is that of the installation of 845 turnouts, with manganese frogs and guard rails throughout, at the Clearing yard, Chicago. There is also an increasing demand for labor-saving devices of all kinds.

While the more universal use of concrete in bridge and building work has been general for several years, it is meeting with a wide adoption for many small details of maintenance construction, such as fence and sign posts. Several roads have already made this form of construction standard, while an increasing number are using it experimentally.

While the past year has been one of rigid economy, the retrenchment in general has not been sufficient to seriously affect the condition of the track and structures if proper expenditures are made during the coming year. However, a period

such as we are now passing through cannot extend for any great length of time without being evidenced; and these facts become noticeable more quickly as the demands upon the track increase from year to year.

ECONOMICAL HANDLING OF MAINTENANCE OF WAY PAINTING

THE entire force of maintenance of way painters on a western road was discharged late in the fall last year, only the master painter being retained. He was then instructed to mix the paint for derails and switch targets which was sent out to be applied by the section foremen. On receipt of his consignment, one man thought it was too thick and thinned it with signal oil; another did not take the time to remove the sand from the derails; and the remainder of the foremen handled their work with about the same degree of efficiency. The net result was that all the brushes were ruined and had to be thrown away and most of the work was done again the following spring when the paint gangs were reorganized.

On account of the inexperience of the average section foreman as a painter and the natural tendency to postpone such "extra" work until there is nothing else to do, this road's experience is probably typical of the economy to be expected from the expedient of turning over small maintenance painting work to the section men. Even if the foremen could be instructed until they are competent to handle such work, under present conditions many maintenance men would oppose the plan on the ground that the proper maintenance of track should fully occupy the time of the section forces.

Another expedient frequently adopted, particularly for repair work and the priming coat on new work, is to have the paint applied by the carpenter gang. Under some circumstances this practice may be justified. When a repair job involves a small amount of painting and is located at a remote point the cost of sending a painter to handle it is out of proportion to the results secured. The priming coat on a new building should be applied as soon as possible after it is erected, and if the painter cannot reach such work at once it is better for one of the carpenters to apply it immediately than to allow the building to stand unpainted until it is convenient for a painter to reach it. In addition to the objections to having such work done by an inexperienced man, however, this system has the further disadvantage that no carpenter likes to paint and if there is any opportunity to slight the painting, he is likely to do it. The painting of the tops of girders, stringers, etc., by bridge carpenter gangs when relaying bridge ties is quite common, but this also is objectionable from the standpoint of preserving the steel, since the carpenters frequently apply the paint without proper cleaning, during unsuitable weather, or without proper brushing out.

It is important, then, for railway officers to consider whether true economy is not promoted in most cases by the employment of regular painting gangs for bridges, buildings and miscellaneous work under the maintenance of way department. The recent convention of the Maintenance of Way Master Painters' Association at Detroit passed a formal resolution after the reading of the paper on this subject, abstracted elsewhere in this issue, declaring it to be the sense of the meeting that the employment of incompetent painters is "wasteful and extravagant," and that it is the "truest economy to employ competent and trained mechanics for every class of bridge and building painting." The need for trained men is well emphasized by a study of the paper on Prevention of Paint Defects presented at the convention referred to. This particular discussion of what a competent man can accomplish in securing a lasting protective coating is suggestive as to the contrasting results that would be secured without such a man in charge.

As was brought out in the discussion following the first paper mentioned, a different class of workmen is needed on steel bridges from those employed in house painting. A house painter dislikes to "chip rust," and some experienced men who have never worked on steel "do not know black rust when they see it," as one speaker stated. A minor advantage of keeping the gangs separate is that the equipment for bridge and building painting differs considerably and a saving results if a steel gang is kept busy on steel all of the time and a building gang on buildings.

If it is granted that a force of skilled painters should be employed for the maintenance of way department, the question then arises as to how this force should be organized to be most effective. The methods in use differ considerably on various roads and the best system for a given road depends largely on the organization with which its other maintenance of way work is handled. The principal conflict of practice is between the divisional force and the general force. On some roads the stations, sign posts, wing fences, etc., are painted by a gang from some large terminal traveling over the entire road and following out a prearranged program. Such a gang can be large enough to make efficient organization possible among the members of the gang and the men can live in a car kept close to the work so that little or no time is lost in getting to and from the job. On the other hand, the local officers who are familiar with the relative needs of the buildings in their territory are able to direct the efforts of a force under their direction to better advantage and plans can be made and changed to suit conditions with much greater facility than is the case with a central force.

NEW BOOKS

Supplement to Manual of the American Railway Engineering Association, 1914. Size 6 in. by 9 in., 91 pages, illustrated, paper cover. Price $1.

In accordance with the rules for the publication of its manual, the American Railway Engineering Association has issued a third supplement to its 1911 manual. This presents concisely the amendments and addenda adopted at the annual convention in March, 1914. The entire manual will be republished in 1915.

Conventional Signs, for use on Railway Profiles, Right of Way and Track Maps and Structural Plans. Size 6 in. by 9 in., 27 pages, paper cover. Published by the American Railway Engineering Association, 900 South Michigan avenue, Chicago. Price $0.25 for single copies.

A pamphlet has just been issued containing the conventional signs for use on profiles, maps and plans, which have been adopted as standard from time to time by the American Railway Engineering Association. The occasion for the collection of these standard plates in a separate pamphlet is the specification made by the Interstate Commerce Commission, referring to maps and profiles to be used in connection with the valuation of railway property now under way, that the symbols shall be the standards recommended by the A. R. E. A. in so far as they are applicable. The magnitude of this work makes it very desirable that these signs should be available in convenient form, and in addition, the pamphlet should be found of considerable use in all drafting rooms.

Structural Design, Volume 2, Design of Simple Structures. By Horace R. Thayer, assistant professor of structural design, Carnegie Institute of Technology. Size 6 in. by 9 in., 495 pages, illustrated. Bound in cloth. Published by the D. Van Nostrand Company, New York. Price $4.

The author of this book has attempted to cover a very broad field both from a theoretical and a practical standpoint. He takes up in detail the design of plate girder bridges, steel viaducts and elevated railroads, simple riveted truss bridges, simple pin-connected bridges, steel mill buildings, high office buildings, miscellaneous buildings, standpipes and elevated tanks. The volume is the second of a series of three, the first of which treats of elementary mechanics, stresses and the mathematics on which they depend. The third volume, which is in preparation, will cover the design of advanced structures. While each of the last two volumes presupposes a knowledge of the subjects treated in the former volume, they are also prepared for independent use.

Letters to the Editor

MORE ABOUT WOOD PRESERVATIVES

Philadelphia, Pa.

To the Editor of the Railway Age Gazette:

Almost every trade journal article nowadays starts with "The present European situation." Then follow details outlining the actual, possible, probable and unlikely effects on the particular material or industry. The Forest Products Laboratory early got on the firing line with an article and told those who did not know "How the Wood Treating Industry Can Avoid Possible Injury Resulting from the War." The article by Mr. Teesdale referred to (*Railway Age Gazette*, October 23, 1914), outlines some of the recognized preservatives and processes, and mentions others which have not been accepted. Its conclusions are based in part on laboratory or experimental service tests, and while it is not fair to say they are not practical, because the man who plans and experiments is the most practical of all, they do not help materially in the present contingency. In fact, it is very doubtful if any immediate provision can be made for supplying from domestic sources the creosote formerly imported from Europe. Edison is reported to have perfected a process and had in operation a plant for the production of synthetic carbolic acid 17 days after the foreign supply was cut off. Perhaps an Edison will arise in the coal tar industry, although the maintenance of an adequate creosote supply does not depend on the building of domestic plants for its production, but on commercial conditions affecting the market for pitch and other coal tar by-products.

It is suggested by Mr. Teesdale that two courses are open "to avoid the possible result of a great reduction in the amount of timber treated." These are:

(a) The uses of substitutes for creosote.

(b) Lighter treatments where creosote must be used.

As substitutes for coal tar creosote, zinc chloride, creosote-zinc chloride mixture, creosote-crude oil mixture, wood tar creosote, and sodium fluoride are mentioned. The refined tar-creosote solution used since 1908, and in 1912 to the extent of 14 per cent of all the creosote used for tie treatment, and of wide commercial possibilities, is not mentioned for reasons which will be discussed later. The important question is what the treating plant manager is going to do who has a six weeks' creosote supply on hand and half a million sap ties in the yard which will badly deteriorate before spring. Is he going to switch to zinc chloride or sodium fluoride, and is his decision going to be based on "petri dish" experiments? It is more likely that commercial factors of plant equipment, delivered cost of available preservatives, character and ultimate use of his timber, and service results from preservatives and processes, will determine his policy. Moreover, the very conditions which curtail the creosote supply change the economic factors of plant operation. Railroads must economize, commercial plants must curtail output to the reduced demand, operating costs must be cut down, and, in short, the whole industry put on a reduced emergency basis. Therefore, to some extent the shortage in creosote is met by a reduced demand by the industry.

Zinc chloride is given as "the best known preservative that could be substituted." Its efficiency in dry situations is fully demonstrated and the effect of leaching is probably not as great as generally supposed. Definite service tests on a commercial scale are needed in wet regions, and the authentic records now available should be compiled. Low initial cost leads to the use of zinc chloride in preference to creosote and not as a substitute for it under many conditions.

It is stated that "with the prices which have prevailed, the annual charge against creosoted crossties has been less than for ones treated with zinc chloride"; also that should the price of creosote increase, "the annual charge for ties treated with zinc chloride would become the lower." These deductions are drawn from the table of annual charges in Forest Service Bulletin No. 118 and are based on the use of tie plates. The annual charge on zinc treated ties is often lower than for creosoted ones, since the mechanical life is limited in either case, and the initial cost of creosote treatment is high. On the other hand, the table bases the annual charge for creosoted ties on 10 lb. of creosote per cu. ft., which is 20 to 50 per cent more than most of the railroads are using. The New York Central, Lackawanna, Lehigh Valley, Santa Fe, Pennsylvania and others of the larger systems use an empty cell treatment which would probably average only 5 to 7 lb. per cu. ft. The comparisons drawn from such average figures mean very little, and local service conditions must be used as a basis of accurate comparisons between zinc chloride and creosote.

The unquestioned merit of the zinc chloride-creosote mixtures is mentioned, and it is mildly suggested that the present situation can be partly relieved by an increased use of such mixtures. Reading further, however, we find that the laboratory tests indicate that less than half a pound (.343 and .140 lb.) of creosote per cu. ft. of wood is enough to prevent attack by wood destroying fungi, while .312 and .468 lb. of zinc chloride per cu. ft. prevented the growth of the two fungi experimented with. The theoretical apriori deductions from these tests are, that one pound of creosote per cu. ft. of wood gives over 100 per cent margin of safety, but that the usual ½ lb. of zinc chloride injected would leave less than 10 per cent margin of safety. While the value of theoretical tests as to the amounts of preservatives required is to be strongly questioned, posterior reasoning from the above leads to the conclusion that the 3 lb. of creosote usually injected with the zinc chloride mixture would in itself be more than sufficient to protect the wood against fungus attack, presuming, of course, that it is properly distributed. We therefore have recommendations for the increased use of a preservative mixture as generally recognized and widely used, followed by theoretical conclusions which indicate that either one of the preservatives, and particularly the creosote, will be sufficient if used alone.

Another mixture recommended is that of crude oil and coal tar creosote. This is based on the high toxic properties of a small amount of creosote, the crude oil being added for its bulk and waterproofing qualities. This seems such a simple solution to the whole problem that it is passing strange every one has not applied it, particularly since we are told that the treatment by a 10 per cent creosote and 90 per cent crude oil mixture of all the timber which was creosoted in 1913 would have left a surplus of over 30 million gallons of domestic oil, and made us entirely independent of foreign oil. The one slight drawback to this plan is that the crude oil with a high asphaltic base which is suitable for such a mixture is available only in Southern California and parts of Mexico, and the item of freight to eastern points is considered by most plant managers as not making for economy. Perhaps with the Panama Canal in operation, suitable crude oil may be generally available at reasonable cost. If this is such a practicable plan, however, it seems strange that the Santa Fe, with ample crude oil supplies on its own line, and after extensive experiments with crude oil alone and in mixture with creosote, should still continue the importation of more coal tar creosote than any road in the country, and when this supply was cut off, switched to zinc chloride at its largest plant.

"Further relief could also be had by utilizing creosote from water gas tar." The wood preserving industry has been waiting for years for definite proof that creosote from water gas tar will serve the same purpose as the coal tar product. Pend-

ing final decision, the former oil has been used both openly and surreptitiously, but its use is still felt to be experimental. Sections of piling treated with a very high boiling distillate of water gas tar are reported as showing "only slight evidence of attack" after nearly two years of immersion in the Gulf of Mexico; but these forest service tests in this particular case are absolutely without value, because the water gas tar creosote fraction used was not a commercial product. The industry is keen to know whether this oil will protect against marine borers, and it is hoped that other tests of real practical value will be made. Whatever the outcome, it should be remembered that the output of water gas tar creosote is limited and that the price is not so very much less than coal tar creosote.

Refined wood tar creosote and sodium fluoride are mentioned as possible substitutes for creosote. Their use in this country, however, has been very limited, and the results are not sufficiently conclusive to justify their adoption on a commercial scale.

The refined coal tar creosote mixture is not mentioned in the Forest Products Laboratory article, yet since 1908 nearly 25 million ties have been treated with a combination of creosote oil and refined coal tar, while practically all paving blocks have been treated with such a solution since 1907. During 1912 it was estimated that about 28 million gallons of coal tar creosote solution were used, which is about 40 per cent of the total creosote consumption for that year. To ignore such a general practice and not to recommend its further use in the present emergency, or at least to mention its existence, is to leave out one of the most promising means of making the available creosote meet the demands.

The American Railway Engineering Association has recognized the existence of this practice and recommends certain precautions to be followed in the use of the solution. The refined coal tar used in such a combination should not be considered an adulterant of creosote, because it is the mother liquor from which creosote is derived, and in itself carries a considerable percentage of high boiling creosote, composed of toxic or antiseptic compounds.

The principal objections advanced against the addition of refined coal tar is that the presence of free carbon or the high viscosity retard penetration. Those objections are largely done away with by the use of tar which is refined by filtration or mechanical methods, while it is now known that free carbon particles actually enter the wood—freely in aqueous solutions, less readily when suspended in oils—(The Preservative Treatment of Wood, Bailey, Forestry Quarterly, Vol. XI, No. 1; The Use of Refined Coal Tar in the Creosoting Industry, Von Schrenk and Kammerer, Bulletin 163, American Railway Engineering Association). Definite experiments have been made which clearly indicate that a solution of coal tar and creosote oil is essentially a heavier creosote, and that the two substances combine so that it is impossible to separate them by any physical or chemical process. The evaporation from such a solution is less than from straight creosote, and the toxic properties are certainly ample to prevent the growth of wood-destroying fungi. Furthermore, tests on different kinds of pine show that when properly applied, the penetration with the solution is at least as great as with domestic and foreign creosote (Von Schrenk, Bulletin 163, American Railway Engineering Association). Furthermore, in two cylinder charges of red oak ties given identical treatment, one with straight creosote and one with 20 per cent coal tar added, the absorption from the solution averaged higher than with the straight oil.

The Forest Products Laboratory presented at the American Wood Preservers' Association meeting in 1913 a report on "Some Tests to Determine the Effect Upon Absorption and Penetration by Mixing Tar with Creosote." On the face of it this report seemed to indicate that the addition of coal tar materially retarded penetration, but analysis of the tests and conclusions clearly indicated that the equipment was entirely inadequate, that the temperatures used were too low and the relation of temperature to viscosity and its consequent effect on penetration were practically ignored. It has since been ascertained, however, that at the usual working temperatures of 180 to 200 deg. F. in the creosoting cylinders, the viscosity of the mixture is practically the same as that of straight creosote. In discussing possible means of making our available creosote supply go further, the Forest Service has entirely ignored this whole important subject, and apparently for no other reason than that their own experiments with limited temperatures and inadequate equipment did not give favorable results. If their conclusions on the other creosote substitutes mentioned—crude oil and creosote, for example—were also confined to their own laboratory experiments, there would be little that they could say one way or the other about the materials described.

The question of lighter treatments where creosote must be used is dismissed with a seven-line paragraph which makes no recommendations. Theoretical conclusions are drawn for other preservatives and processes, so why should not the tests above referred to, which indicate that half a pound of creosote per cu. ft. will prevent decay, be applied in the case of the empty cell process? To the theory can be added definite service tests for limited periods. The efficiency of reduced injections depends mainly on the thorough penetration of all sapwood and other treatable portions of a stick with the reduced quantities of oil, and any empty cell process which will not do this is worthless. It can be done commercially, and all sap ties (loblolly pine) have been given a through and through penetration with less than 2 lb. of creosote per cu. ft. It would be a real solution of the emergency which various plants are facing if they could safely reduce the creosote injection from 6 or 8 lb. to 4 or less per cu. ft. Such a policy would at least double the amount of material which could be treated by the same amount of oil, and would, beyond argument, be preferable to using the same timber untreated.

Sap ties given such light treatment would no doubt give twice as long life as untreated, and the real problem for the operator is whether to stick to creosote and reduce the injection or change entirely to zinc chloride, or to a mixture. The mineral salt promises well, but its value has not been fully demonstrated in wet regions, while in addition there is the expense at some plants of putting in the equipment to handle zinc chloride. Most of the mixtures recommended do not reduce the amount of creosote required below that which could theoretically be used in a reduced empty cell treatment, but the oil mixture in most cases would be a guarantee of longer life through the waterproofing or toxic effects of the material added to the creosote.

It may be that the present crisis will be of short duration, and certainly the wood preserving industry is not going to be put out of business by the reduction in creosote imports. The curtailed demand for treated timber, the use of mixtures and substitutes, and light impregnation, will go far towards relieving the situation. Moreover, our imports are not entirely cut off, and since the British Admiralty has not requisitioned all of the available creosote, a limited amount of English oil promises to be available so long as the British fleet maintains control of the seas. Two cargoes were en route when the war broke out and were safely delivered, and four additional shipments have been made since, with prospects of two or more cargoes to come before the end of the present year.

E. A. Sterling,
Consulting Forest and Timber Engineer.

Maintenance of Way Master Painters' Convention

Abstract of the Papers and Discussions Presented at the Meeting Held November 17-19, at Detroit, Mich.

The Maintenance of Way Master Painters' Association held its eleventh annual convention at the Hotel Tuller, Detroit, Mich., on November 17-18-19, with about 100 members and guests in attendance. The secretary's report showed an increase in membership during the past year. The officers of this association were: President, C. H. Plummer (C. R. I. & P.), Topeka, Kan.; first vice-president, F. C. Rieboldt (C. M. & St. P.), Milwaukee, Wis.; second vice-president, E. R. Cope (P. L. W.), Bloomingdale, Ohio, and secretary-treasurer, T. I. Goodwin (C. R. I. & P.), Eldon, Mo.

F. C. Rieboldt (C. M. & St. P.) read a paper on glazing in which he favored the use of beaded sash instead of putty for engine house windows, and the practice of placing the curved surface of a pane of glass toward the outside. H. B. Wilson (B. & L. E.) favored laying glass in cold weather with the curved surface down, although he thought that in warm weather it would make no difference. J. T. Lewis (Wabash) objected to the use of brads with wire glass, saying that zinc points are better.

H. B. Wilson (B. & L. E.) discussed at length the types of staging used on his line. In general, one-inch manila fall lines are provided on heavy work, even when it is low. It is found difficult to make a tie with these lines when they are new, but they become pliable after a little use. On a 150-ft. drop the tension in a one-inch line will reduce the size to 7/8 in. For stack work 3/4-in. to 1/2-in. lines are used. The staging is 24 ft. long, made of Norway pine with ash for the rungs, the sides being 6 in. deep in the middle and 4 in. at ends. On viaducts with open floors, 1 1/2-in. hooks and a 1 1/2-in. steel sling are used to support the planks. This sling cannot be cut by malicious persons or damaged by objects falling from trains. Extra large hooks are provided in the blocks. A center fall line is used to handle the center of the plank and to strengthen it.

On under span work, where there is no chance of dropping staging through the deck, the ends of two light wire cables are clamped around two column posts and a plank is supported between them. This can be moved along as needed. On through plate girder bridges the staging is hung from large hooks over the tops of the girders. If the bridge is too wide for planks, steel cables are run across to carry them, although planks as long as 38 ft. are used. When there is a railing on the bridge, a set of angles is used which hang over the top of the railing.

F. C. Rieboldt (C. M. & St. P.) did not think that the use of one-inch rope for staging would be safe. A. B. Phelps (L. S. & M. S.) stated that on his road light chains with a grab hook on one end and a ring on the other are used, the plank being supported on two-inch gas pipe. Martin Kane (D. & H.) favored the use of 5/8-in. chains, and F. A. Higgins (L. S. & M. S.), W. H. Clark (C. & N. W.), and T. I. Goodwin (C. R. I. & P.), also reported the use of chains. Mr. Wilson objected to the use of chains on the ground that there is danger of weak links existing without being discovered.

A stereopticon lecture on Fire Retardant Paint was delivered by H. A. Gardner of the Institute of Industrial Research, Washington, D. C. He reported tests which are being made on the feasibility of painting woods that have been made fire retardant by treatment with salts such as zinc chloride or ammonium chloride. There is no indication as yet that such woods cannot be satisfactorily painted. Numerous tests are being made on the effects of various stains and paints on the fire resisting quality of shingles. Creosote stains, which are frequently used, are found to increase the flammability of the wood, while paints containing zinc, lead and iron oxide retard the burning very materially. Silicate of soda also retards burning but will not wear outdoors. Any good oil paint will resist fire and will wear well outdoors.

A paper on Test Paint on Water Tanks was read by Bert E. Darrow (A. T. & S. F.). He reported that as a member of a committee to test paint on the interior of steel water tanks he applied four kinds of paint, which had previously been used on the outside of tanks, to the interior of tanks filled with treated water. In one month the paint commenced to blister and at the end of four months it was entirely gone. He was of the opinion that no paint will stand in water treated with soda and lime. His company has discontinued the painting of the inside of tanks except the two top sheets. He recommended that tanks holding untreated water be given three coats of some good paint, the first coat to dry at least four days, the second coat two days and the third coat a week before the tank is filled with water.

A paper on Membranous Waterproofing was read by William B. Jenkins of the Billings-Chapin Company, Cleveland, Ohio.

Other topics discussed on the floor included, Priming and Patchwork Done by Carpenter Gangs; Making Estimates on Bridge Painting; The Economy of the Use of Putty on Roundhouse Windows; Sanitary Conditions Around Bunk Cars, and the Best Method of Enameling Woodwork.

In the closing business session a committee was appointed to investigate the practice of enginemen blowing off water treated with soda and lime on steel bridges, leaving the structures coated with a white substance resembling whitewash and severely injuring the paint. A new by-law was adopted by the association providing that no paper read before a convention or discussion made on the floor shall mention the name of manufacturers or brands of material. The same officers were re-elected for another year, and it was decided that the next convention should be held October 19-20-21, at St. Louis, Mo.

INTERIOR WALL FINISHES AND PAINTING OF CONCRETE

By W. R. Parker
John Lucas & Co., Inc., Chicago.

Of the interior wall finishes developed during the past ten years none quite equals in importance the flat finishes, which produce a coating that can be washed and scrubbed without injury. They can be applied over plaster, paper, wood, metal, burlap, canvas, cement or concrete. Different kinds of surfaces require different treatment in order to obtain the best results. Newly plastered or green cement walls, which are damp, and where free lime is still present on the surface, require a zinc sulphate wash. This zinc sulphate solution is prepared by dissolving about three pounds of zinc sulphate crystals in a gallon of water. The solution should be applied from 24 to 48 hours before the first coat of paint, thus allowing the surface to dry out as much as possible and also to obtain the full benefit of the neutralizing properties of the solution. All dirt and grease should be removed from the wall before painting. It is advisable to go over the surface with a stiff brush or broom in order to remove all loosely adhering particles.

Plastered cement walls, which are dry, and which have not been previously finished, make necessary the reduction of paint for the first coat in order to stop up the suction of the surface. Boiled linseed oil should be used as a reducer. The amount of reduction necessary will depend entirely upon the character of the surface to be painted, and will vary from one to two quarts of boiled linseed oil to the gallon of paint.

There are two distinct reasons for treating concrete surfaces, namely, to preserve the structure against forces which exert deteriorating influences, and to improve the appearance. Al-

though quite generally the greatest stress is placed upon the decorative properties, the fact remains that proper coatings impart protection which annually amounts to millions of dollars. Unfortunately, in obtaining the desired decoration, frequently at the lowest possible cost, the proper methods of application in order to insure the maximum protection are sadly neglected.

For the reason that lime has a saponifying action on oils, and furthermore in cognizance of the fact that all cement and concrete construction contains alkali in varying amounts, the first matter to consider is how to treat surfaces in order to either eliminate this material by neutralizing it, or in some manner to keep it from exerting its harmful influence on the vehicle portion of the paint which is to be applied. A treatment which has for its object the elimination of whatever free alkali is present on and near the surface in many instances proves injurious to the structure. The use of mineral acids, while neutralizing the lime, will detract from the life of concrete construction. Solutions of materials which change the lime to insoluble salts, which do not act on oils, have been suggested from time to time, and have been used with varying success. What is known as the Macnichol zinc sulphate treatment has proven very successful for the treatment of interior walls before applying prepared flat wall finishes or other coatings. It is very generally recommended, and its satisfactory character is based on the reaction which changes the free lime to the sulphate form, the latter possessing no saponifying action on the thinner of the paint which is subsequently applied. This treatment has given excellent results on walls which are free from permeation. On walls, however, through which moisture forces its way, the soluble salts present throughout are dissolved and brought to the surface, where they give rise to such undesirable conditions as staining, etc., and upon the evaporation of the moisture, efflorescence develops.

Up to the present time the most satisfactory results are obtained by the use of a thin, varnish-like mixture, specially adapted for the work. This filler, as it is more correctly called, is practically a wash which penetrates into the concrete and prevents whatever action alkali would have on the oil paint coats which are to follow. Capillarity is destroyed by the oxidized film, which forms upon drying. This makes the passage of moisture through the paint coat impossible, and therefore represents the greatest benefit derived from this treatment. It is possible to apply paints ordinarily used on wood over the filler with assurance of equally satisfactory results, the number of coats it is advisable to apply and the method of application being practically the same.

As is the case in other painting, one of the most important factors in connection with good service consists in the proper preparation of the surface to be coated and the correct application of the material. Before applying the filler, all dust and loosely adhering particles should be brushed away. Surfaces which have grease or oil adhering to them must be carefully washed with benzine, turpentine or benzol before applying the filler, or otherwise it cannot properly perform its functions, and the paint coat will break away in the form of "scaling," because of lack of penetration.

Because of the tendency that concrete has for holding moisture, it is not advisable to use water in cleaning surfaces, because any paint coat applied over surfaces containing moisture will most likely result in "peeling." Wherever possible, the surface to be coated should be allowed to stand from three to five weeks in order to give it time to dry out. The undesirable effects obtained by the presence of alkali in the concrete are also lessened when the surface is allowed to stand for some time.

When applying the "filler" care should be exercised not to obtain a varnish or gloss surface, as this will hinder the succeeding paint coat from obtaining the necessary penetration. If the surface to be treated is very hard and smooth, as is the case in cement finishes, it is frequently necessary to go over it thoroughly with a stiff wire brush, otherwise the penetration may not be sufficient to allow the paint coat to obtain a firm hold within the concrete. When properly applied the filler penetrates into the concrete, and when dry nothing would indicate its application but a slightly brightened appearance. Gloss should not be perceptible.

One of the most undesirable features connected with concrete floors is the continual "dusting" which is caused by the natural grinding action of wear on the surface. Wherever the floor is subjected to hard usage the "dust" may, besides becoming a source of irritation, prove injurious to health. The "dust" adheres so firmly to the surface of the untreated floors that it is impossible to remove it. Sweeping tends only to aggravate, to a certain extent, the tendency to "powder," as many small particles are loosened or torn away. The floor is made sanitary by painting, because it can be kept clean and free from dust and dirt. All opportunity for "powdering" is overcome by the thin film of paint, which, when properly applied, has a firm hold within the mass of concrete, and, besides eliminating the possibility of surface wear, makes an impervious coating which prevents the absorption of moisture.

In applying the paint two factors must be given careful attention. While the pigment is a requisite of considerable importance, the vehicle will, in almost every instance, determine the wearing properties. Floors are subject to hard usage and must stand severe strains. It is necessary therefore to use a material which will oxidize to a dry film and which will retain sufficient elasticity to withstand the strains to which it is exposed. Ordinary floor paints, which prove satisfactory when used over wood, give like results when used over a properly applied filler. The wear closely resembles that found on a wooden floor. The paint coat invariably possesses better bonds within the concrete and the service in many cases is superior to that obtained from the same paint applied on wood.

Natural wear will gradually make necessary the repainting of floors. It is not necessary to again apply a filler. One coat of paint brushed out well gives the best results. In preparing the surface for repainting no strong alkali should be used for cleaning, as it will not only act upon the paint, but if not thoroughly removed will also affect the following coat. It is advisable to go over the surface with warm water and soap and allow sufficient time to elapse for drying.

PAINTING DEFECTS, THEIR CAUSES AND PREVENTION

By G. W. Thompson
Chemist, National Lead Company

So much has been written connecting painting defects with materials used, the writer proposes in this paper to show how paint defects may in many cases be corrected without radical change in the materials used. One cannot, of course, ignore the materials, but one can seek to find out to what extent such a defect may be the result of the condition of the surface painted, the proportioning of the materials, the application of these materials, the time allowed between coats, etc. No paint material is perfect, but if it is to be commercially judged in comparison with other paint materials, it should be judged at its best and not at its worst.

CHECKING AND ALLIGATORING

Checking and alligatoring consist in the development of fine interlacing lines on the surface of a paint. Lines embracing small areas are called checks, and large ones, alligatoring. These phenomena are closely related and are probably due to the same general cause.

The outer coats of varnish and paint always tend to shrink greatly in volume and to become progressively harder and more coherent, thus producing either of two possible effects. One is the rupturing of this outer coat with consequent alligatoring or checking; the other is that the outer coat becomes thinner without rupturing. Which of these effects occurs depends upon the under coat. If it is soft, the outer coat in oxidizing and shrinking will draw up and slip over it with consequent rupturing. If the under coat is sufficiently hard, the outer coat does not slip

over it and simply becomes thinner by shrinkage and no rupturing occurs. Alligatoring also occurs whenever a paint is applied over another paint that inherently will not dry hard, as in the case of a harder paint applied over an asphaltum or a yellow ochre paint. Very extreme examples of checking or alligatoring occur where a non-volatile mineral oil has been used in an under coat.

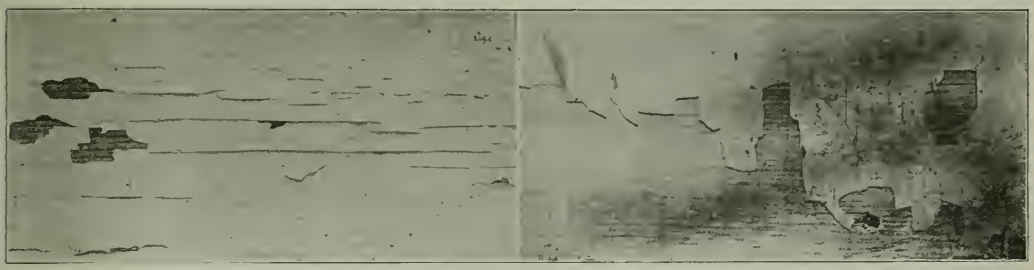
In order to avoid checking and alligatoring, it is best to have the under coats as hard as is practicable, much harder than the outer coats. It should not be assumed, however, that in all cases checking is an unmixed evil. In some cases checking may be the lesser of two evils, one of which is necessary. When a paint film has so great a tensile strength that it will not check, trouble is apt to ensue with the expansion and contraction of the foundation on which such a paint film is applied. If the foundation expands or contracts more than the film, the latter is sure to break loose, and the result is scaling. This would be a more serious defect than checking, and the competent painter must use his judgment in some cases to choose between the two.

It is important to point out that no materials should be used in the foundation coats which will not harden sufficiently or which cannot be made to harden by the addition of other materials. Such materials include all asphaltum, tar or bituminous materials, mineral oils which are not completely volatile, and such resinous products as resin oil, which harden too slowly to give good results. In all paints a drying oil is used. The drying oil should have in a high degree the power of being oxidized into a solid substance. Linseed oil is the principal material used by painters for this purpose, and the use of substitutes which are liable to be deficient in this respect should be carefully avoided. It is also important that those pigments which retard the drying or hardening of priming coats should not be used in excess. This refers particularly to lampblack and yellow ochre. On the other hand, pigments which assist in the drying and hardening of under coats should be used as far as is practicable.

Although drying oils are essential in paint for the prevention of checking and alligatoring, no more drying oil should be used in the foundation coats than is necessary for the filling in of the pores of the priming coat and the proper binding of the particles of pigment together in the body coat. By so doing two things are accomplished; one is that the natural hardness of the coating is increased by the increase in proportion of pigment, and the other is that, less oil being used, it takes less time to bring it to a fit condition for the reception of the other coats. Probably the most important thing to do in the avoidance of checking and alligatoring is to allow as much time as possible between the coats.

CRACKING AND SCALING

It would appear that cracking and scaling are closely related, that is, that in many cases scaling naturally follows cracking.

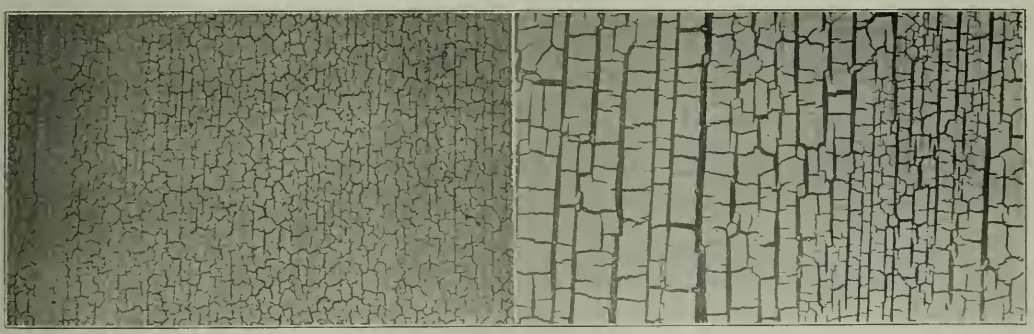


Longitudinal and Transverse Cracking with Consequent Scaling

By cracking we refer to the formation of hair-like lines on the surface, which an examination shows extend from the surface practically through the paint layer down to the foundation. In this respect cracking differs from checking or alligatoring. The areas included by the cracks are usually relatively large, although not necessarily so.

In case the painted object is wood, the cracks may be at right angles to or parallel with the grain of the wood. Wood is porous, containing at all times more or less free moisture. It has been found experimentally that in the drying out of wood, the greatest contraction takes place at right angles to the grain. The structure of wood is largely fibrous, the fibres running mostly with the grain. Free water or moisture in the wood is probably located between the fibres. This water forces the fibres apart. As the water dries out, the fibres come closer together, producing contraction across the grain. It would appear also that the variation of the amount of water in wood shows very little tendency to affect the length of the fibres, and so produce contraction and expansion parallel with the grain.

At the same time the paint contracts both across and with the grain. Consequently if the paint contracts less than the wood



Typical Checking and Alligatoring Caused by the Use of Ochre Priming

there will be a bulging and cracking of the paint with the grain. The contraction of the paint with the grain will not be compensated by a similar contraction of the wood, and cracks may appear, the lines of the cracking showing across the grain.

Cracks, as we have referred to them, extend down to the wood. As soon as cracks occur, there is an opportunity for moisture to enter the wood. This moisture, entering by the cracks, travels under the paint film, exerts a pressure against the paint film, the bond between the paint film and the wood is weakened, and scaling results. It seems to the writer that there is a difference between peeling and scaling. Both are due to moisture forcing the paint film away from the wood. Peeling, however, is due to the presence of moisture under an unbroken paint film in the wood or back of the wood, which forces the paint away from the wood. But in the case of scaling the moisture enters through the cracks.

It is to be noted that as a rule cracking and scaling take place most often when the paint film is thick. The thicker the paint film, the greater its tensile strength, therefore it does not conform as readily to the changes in the shape of the wood. One method of prevention is to avoid the accumulation of paint coats upon a surface. If the surface needs repainting, as much of the old paint should be sandpapered off as is necessary, provided, of course, it is too thick, and the new coats of paint applied should be comparatively thin. This refers particularly to paints which are naturally inclined to crack and scale. It is obvious, of course, that those pigments which give hard, strong and contracting coats, should be used only in moderation. Cracking and scaling can be avoided to some extent by having the wood thoroughly dry and contracted before painting.

BLISTERING AND PEELING

Blistering and peeling are due to the water in wood forcing its way through the wood to the surface, breaking the bond of the paint and forcing it away from the surface. Blistering is very apt to occur where moist painted wood is subjected to heat such as the heat of a radiator. Sometimes the heat of the sun is sufficient to increase the vapor pressure of the water enough to produce blistering.

Blistering and peeling are more apt to occur if a very impermeable paint is used. Painters sometimes complain that boiled linseed oil gives a more impermeable paint. The one safe method of preventing blistering is to remove the cause, that is, the moisture in or back of the wood. If one is in doubt as to the condition of wood for painting, the best practice is to allow considerable time after the priming coat has been put on before applying the body coat.

LOSS OF GLOSS AND CHALKING.

Chalking follows loss of gloss and is probably produced by the same general cause. Gloss is due to an excess of oil or binding material, which, lying over the particles of pigment, gives a smooth, even, glass-like surface. The binding material in paints, whether it is linseed oil or varnish, is an organic substance which is subject to fairly rapid destruction when exposed to the influence of air, moisture and sunlight. Loss of gloss is due to this destruction, and it would appear that the chalking of paint is but a step further in this destructive action, whereby the binding material is destroyed, and the pigment becomes loosened on the surface.

Chalking is objectionable principally because of the tendency of the pigment to come off when touched. It must not be overlooked, however, that some kind of paint decay is inevitable and a certain amount of chalking, that is, loss in thickness of coating, is therefore the least objectionable form of decay. If this loss in thickness does not occur, the result on continued repainting will be the production of so thick a coat of paint that scaling is apt to follow. Chalking, as it ordinarily occurs, has a further redeeming quality in that it nearly always leaves on the surface a roughness, usually called a tooth, which is favorable to repainting.

For the prevention of chalking and loss of gloss, it is evident that what is desired is a vehicle which can be used on the surface of paints that will be less destructible than what is ordinarily used. I regret that there is no such material that can be unqualifiedly recommended. Therefore, if chalking is a defect, it is not an unmitigated evil, nor is it one that can readily be avoided without other more serious defects arising.

WASHING

The washing of paint is characterized by the surface of the paint giving up certain water soluble substances. Apparently washing takes place when a paint contains such substances, or when they are formed either through a reaction of the constituents of the air upon the pigment or a reaction between the pigment and the binding material. For the prevention of washing, omitting any reference to the avoidance of the use of those pigments most inclined to wash, the only thing that I can say is what I have already said in the case of chalking.

SPOTTING AND DISCOLORATION

In the spotting of paint, the following characteristics are noted. The spots, which may be small or large, are much lighter in color than the remainder of the paint. Such spots show greater chalking than the body of the paint. Moistened with linseed oil, the spots return to practically the original color of the paint, indicating that there has been no destruction of the tinting material, and indicating also that at these spots there had been some excessive destruction or loss of the oil which was originally present.

The most common cause of spotting is that the wood at the points where spotting occurs was not completely filled by the priming or body coats. It is to be avoided then by the proper filling of the pores of the wood, and by allowing sufficient time between coats for weaknesses to develop that can be corrected by subsequent coats. It will be avoided to some extent by the competent workman using a stiff brush for the under coats, thereby forcing the paint into the wood.

There are two known causes of yellowing of paint out-of-doors. One is the presence of heavy mineral oil, and the other is the presence of alkalies or alkaline materials. The prevention of such discoloration depends on the avoidance of such materials. The cause of the yellowing of paint indoors is variously explained, but the one explanation which seems most satisfactory is that it is caused by ammonia which is more or less present in the atmosphere. The prevention of this yellowing is to have good ventilation, good light, avoid the presence of excessive quantities of ammonia in the atmosphere, and protect the paint as far as practicable by varnish coatings wherever such a treatment is necessary.

Discoloration of paint due to dirt is a defect for which the painter sometimes feels he is not to blame. There still remains the fact, however, that paint will sometimes become dirty more rapidly than exterior conditions would seem to warrant. The conditions favorable to dirt becoming attached to paint are softness and elasticity, which the painter naturally thinks are the best for the paint. The obvious method for the prevention of this discoloration of paint is the use of harder coats, obtained either by cutting down the amount of oil in the paint, or by the use of those pigments which tend to harden the paint. If, however, the painter secures hard coats of paint to prevent discoloration, he may run into the trouble of cracking and scaling.

Discoloration of paint on account of mildew is rather uncommon in the North, but is fairly common in the South. Experiments indicate that it is killed by the presence of very small quantities of mercury compounds and can therefore be prevented by a minute percentage of mercurous chloride added to the paint. It is also prevented to some extent by the use of paint which forms a hard coating and by the use of the best quality of linseed oil.

Discoloration due to the presence of sulphur compounds

occurs with those paints containing lead pigments. Sometimes this discoloration is due to the intentional or accidental presence in a paint of small amounts of sulphides of the other metals, particularly sulphide of zinc, which may be contained in lithopone to the extent of 30 per cent. The discoloration of lead compounds due to sulphur compounds in the air is not common.

THE ECONOMY OF SKILLED MECHANICS

By Edward Hurst Brown
The Painters' Magazine

It might seem strange to a master painter that any question should be raised as to the economy of skilled mechanics if he did not know from every day experience that a large proportion of railroad officers either overlook the fact or do not realize that it requires skill to properly apply paint to obtain its full protective value and the greatest possible durability.

Too many engineers pay particular attention to the quality of the paint and little or none to the skill of the painter. This is a very mistaken notion, for the good mechanic will produce a reasonably satisfactory job of painting with poor materials, while the poor mechanic or the "handy man" will produce unsatisfactory results with the very best materials. It has often been said that satisfactory results in painting depend on "25 per cent material and 75 per cent man," and this does not over state the case. Some engineers admit that the good mechanic may be necessary in painting a station or varnishing the hardwood finish of a waiting room, but seem to believe that any men you can pick up are good enough to do bridge painting or other rough work. It is possible that there may be certain classes of rough work, such as whitewashing sheds, that need so little skill that the "handy man" can be utilized to advantage, though even in such cases, I believe that the man who has been trained to use his brush can accomplish so much more work that it is economical to employ him.

When it comes to painting structural iron or steel, there can be no greater mistake than the employment of cheap labor. An examination of the painting done on a bridge by a crew of "slushers" will show runs, sags, "holidays," and spots of rust that soon begin to show, because these so-called painters have not been impressed with the necessity for the removal of every particle of rust before the paint is applied.

The difficulty in getting satisfactory shop painting is explained largely by the fact that the work is often done by cheap, foreign laborers who have never been taught to handle a brush and whose only thought is to smear over the surface in the easiest possible way. They are too ignorant to understand anything about the real mission of the paint they are applying and so long as they cover up the metal with a red wash they are satisfied. The worst feature of painting of this kind, done over rust and shop scale, is that it affords no satisfactory foundation for subsequent paint coats, no matter how carefully they may be applied, and the protective value of the paint is minimized by the mistaken economy of employing cheap and unskilled laborers to put on the shop or priming coat.

An engineer may be told that paint needs to be tempered to suit the temperature, the weather conditions and the surface to which it is to be applied, but the idea that such tempering—a variation in the proportion of turpentine or other volatile thinners or the quantity of driers to be employed—can be safely left to the practical mechanic who is working on the job seems to be beyond his comprehension, especially when the paint has been made in accordance with a formula furnished by the company's chemist. Nevertheless, it is a fact that the skilled painter is better able to determine the proportion of thinners and of driers than the chemist who has never had any experience in actual paint mixing, or who has never learned to handle a brush. The practical painter, by long experience, has learned to judge by the feel of the paint as it spreads out under the brush; he has learned to judge the weather and to make allowances for a greater or less amount of moisture, or to vary his paint to suit the temperature. A skilled mechanic can paint in zero weather, so long as the surface is free from frost and is dry, and he will obtain as durable and satisfactory a job as he could produce in warm weather, for he will know enough to add turpentine to make the paint flow out more freely and to correct the thickening tendency of the cold weather, while at the same time he will depend upon "elbow grease" brushing out the paint into thin coats, rather than upon an excess of driers, to produce a firm and solid paint coating.

Painting requires more technical skill than almost any other trade, yet this fact is not recognized because of the mistaken idea fostered by the advertisements of the makers of household paints that "any one can paint." In these days when efficiency is the aim in all departments of a railroad, it would be well if the officers would recognize that only by the employment of skilled mechanics can satisfactory, durable and economical painting be done. They must remember that there is a dearth of skilled painters in this country today, and they cannot expect to hire them for the same wages that they can obtain unskilled labor, but the skilled painter can accomplish so much more work in a day and the value of the work he does will be so much greater in protective efficiency that the higher wage rate will be the most economical in the end.

COMPUTATION OF CROSS SECTION AREAS

In view of the large amount of cross sectioning of roadbed that is required in the federal valuation of railways, now under way, the method which is being used on the San Pedro, Los Angeles & Salt Lake for computing these areas in accordance with the standard method of recording notes in use by the Federal Board may be of interest to other engineers. The government parties take their notes as shown on the accompanying plan with the 0.0 points at the shoulders, showing the side heights at the toe of slope and the distance out. Referring to the sketch, the area of the section is equal to $\frac{(C+B)\,H+(D+A)\,H_1}{2}$.

A is equal to B when the roadbed is of uniform width on both sides of the center line. As an example, when the roadbed

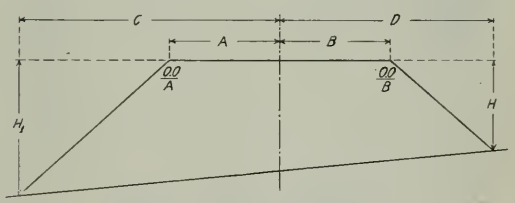


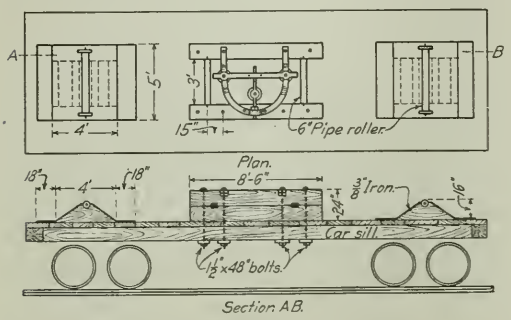
Diagram of Roadbed Cross Section

width is 18 ft., 9 ft. on each side of the center line of track; when H is equal to 4 ft.; H_1, 6 ft.; C, 18 ft.; and D, 15 ft.; the area is equal to $\frac{(18+9)\,4+(15+9)\,6}{2}$ which is equivalent to $\frac{27\times 4+24\times 6}{2}$ or 126 sq. ft. This method is applicable to prisms in cuts and fills for any widths of roadbed on either side of the center line. Our attention was called to the above method by M. E. Thompson, assistant engineer, and Arthur Maguire, chief engineer, of the Salt Lake line.

CURVING RAIL WITH POWER BENDER

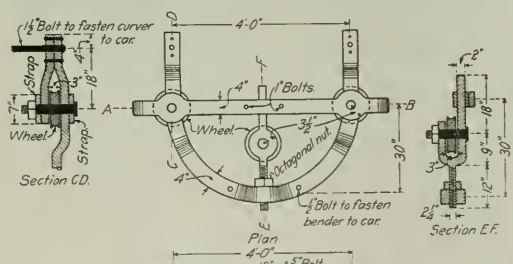
The Baltimore & Ohio uses a power bender whenever it is necessary to curve a large number of rails, although on this road curves up to 4 deg. are laid with straight rails. The curver is mounted on a flat car and the rails are pulled through it from another flat car to a car on which they are stored or from which they are distributed on the ground for laying. Either a locomotive or a hoisting engine mounted on another car can be used for the power.

The curver is of the common type, consisting of a semi-circular steel yoke, a strap connecting the jaws of the yoke



Method of Mounting Rail Curver on a Flat Car

and a plunger between the yoke and the strap, the position of which can be regulated by a threaded end passing through the yoke and a nut abutting against the yoke. The curving is produced by the three wheels, two of which are located at the intersections of the strap and the yoke, and the third is carried by the plunger. The rails are pulled between these wheels, the amount of curve produced being regulated by the position of the plunger. The jaws of the yoke are 4 ft. apart, and the wheels are 10 in. in diameter. The curver is mounted on two 12-in. by 12-in. timbers and is securely fastened to the flat car body through these timbers by 1½-in. bolts. The rails are



Details of Rail Curver Used on the Baltimore & Ohio

guided through the curver by 6-in. pipe rollers, mounted one on each side of the curver and one near each end of the car, the elevation of these rollers being so adjusted that the rail will enter the wheels of the curver properly.

It has been found that with this machine and an engine, operated by eight men and a foreman, 20 rails can be curved per hour, or 200 a day, at an expense of about $40 or $0.20 for a 33-ft. rail. Flat cars are ordinarily used, although the same method of operation would be possible with drop-end gondolas or stock cars. If it was necessary to curve a great deal of rail, it would be more economical to use a platform with a hoist to unload and load the rails and a hoisting engine with three drums and cables to pull the rails through the curver. It is thought that with this equipment the cost could be reduced to $0.10 a rail. The principal difficulty that has been experienced is to get a hook small enough and at the same time strong enough to pull the end of the rail through the rollers at the start.

When curving large quantities of rail, continuous operation with this machine would be possible by using a gondola car in which the straight rail is shipped, a short car with an air unloader, an empty flat car, a flat car on which the curver is mounted, another empty flat car and a flat car on which a hoisting engine is mounted. The locomotive could be placed on either end. With this outfit the air unloader could pick up a rail from the gondola, and swing it around to the empty flat car; the hoisting engine could then pull it through the curver to the other empty flat car, from which it could be unloaded on the track. By providing a trough or slide of channel iron along this empty flat car, the rails could be unloaded easily and safely by throwing the hoisting cable over a pulley on the corner of the car on which the hoisting engine is mounted so that the rail would be pulled out by the cable with a little assistance with a bar.

BRIDGE AND BUILDING ASSOCIATION COMMITTEE APPOINTMENTS

The following committees have been appointed by the president of the American Railway Bridge & Building Association for the coming year:

Conditions Under Which Pile and Timber Trestle Bridges Should Be Repaired, Reinforced, Renewed or Replaced. A. B. McVay, chairman (L. & N.), Evansville, Ind.; C. E. Smith (M. P.), St. Louis, Mo.; F. G. Jonah (St. L. & S. F.), St. Louis, Mo.; S. T. Corey (C. R. I. & P.), Chicago; J. J. Taylor (K. C. S.), Texarkana, Tex.; E. J. Auge (C. M. & St. P.), Wells, Minn.; A. J. James (A. T. & S. F.), Topeka, Kan., and S. C. Tanner (B. & O.), Baltimore, Md.

Railway Water Tanks. C. R. Knowles, chairman (I. C.), Chicago; A. A. Wolf (C. M. & St. P.), Milwaukee, Wis.; O. M. Suter (I. C.), Chicago; T. J. Stuart (W. P.), Elko, Nev.; Jas. Dupree (C. T. H. & S. E.), Chicago; A. C. Sydell (C. B. & Q.), Chicago, and F. M. Case (C. & N. W.), Belle Plaine, Ia.

Coaling Stations. Lee Jutton, chairman (C. & N. W.), Madison, Wis.; W. T. Krausch (C. B. & Q.), Chicago; Grosvenor Aldrich (N. Y. N. H. & H.), Boston, Mass.; B. F. Pickering (B. & M.), Salem, Mass.; J. L. Talbott (A. T. & S. F.), Pueblo, Col.; A. W. Pauba (Colo. & So.), Denver, Col.; G. A. Manthey (M. St. P. & S. S. M.), Minneapolis, Minn., and William Mahan (W. & L. E.), Canton, Ohio.

Costs of Structures. G. A. Rodman, chairman (N. Y. N. H. & H.), New Haven, Conn.; F. E. Weise (C. M. & St. P.), Chicago; J. H. Nuelle (N. Y. O. & W.), Middletown, N. Y.; J. S. Robinson (C. & N. W.), Chicago; R. C. Sattley (C. R. I. & P.), Chicago; C. W. Wright (L. I.), Jamaica, N. Y., and W. A. Pettis (N. Y. C. & H. R.), Rochester, N. Y.

Efficient Methods of Handling Work and Men. G. W. Rear, chairman (S. P.), San Francisco, Cal.; J. F. Pinson (C. M. & St. P.), Seattle, Wash.; E. R. Wenner (L. V.), Ashley, Pa.; C. R. Knowles (I. C.), Chicago; R. H. Reid (L. S. & M. S.), Cleveland, Ohio; H. A. Horning (M. C.), Jackson, Mich., and S. C. Tanner (B. & O.), Baltimore, Md.

Warnings for Overhead and Side Obstructions. E. G. Storck, chairman (P. & R.), Philadelphia, Pa.; M. M. Barton (P. R. R.), West Philadelphia, Pa.; F. E. Schall (L. V.), South Bethlehem, Pa.; T. E. Thomas (B. & O.), Wilmington, Del., and E. S. Meloy (C. M. & St. P.), Chicago.

Reinforced Concrete Bridge Work. O. F. Dalstrom, chairman (C. & N. W.), Chicago; I. L. Simmons (C. R. I. & P.), Chicago; J. A. Bohland (G. N.), St. Paul, Minn.; C. J. Scribner (C. B. & Q.), Chicago; D. C. Zook (P. L. W. of P.), Ft. Wayne, Ind., and T. J. Stuart (W. P.), Elko, Nev.

Station Buildings for Passenger Service. M. A. Long, chairman (B. & O.), Baltimore, Md.; E. B. Ashby (L. V.), New York City; G. W. Andrews (B. & O.), Baltimore, Md.; K. Peabody (N. Y. C. & H. R.), New York City; R. McKibben (P. R. R.), Altoona, Pa., and W. T. Krausch (C. B. & Q.), Chicago.

Concrete Culvert Pipe and Concrete Piles. H. Rettinghouse, chairman (C. St. P. M. & O.), St. Paul, Minn.; S. T. Corey (C. R. I. & P.), Chicago; G. H. Stewart (B. R. & P.), East Salamanca, N. Y., and C. F. Urbutt (C. M. & St. P.), Chicago.

TUNNEL LINING BY COMPRESSED AIR

The compressed air method of mixing and placing concrete which was described in the *Railway Age Gazette* of March 18, 1914, is being used at present on a number of railways for the lining of tunnels and similar construction work. In addition to the Chicago, Burlington & Quincy tunnel at Bonneville, Wyo., on the Thermopolis-Orin Junction extension, this method has been adopted for lining a double-track tunnel on the Louisville & Nashville, about 65 miles south of Nashville on a relocated line extending to Athens; for three tunnels recently completed in realinement work on the Oil City branch of the Pennsylvania Lines; and for placing about 100,000 cu. yd. in retaining walls, etc., for the Northern Pacific track elevation work at Spokane, Wash. An interesting use of this method which shows its possibilities has also been developed in the construction of a sewer tunnel at Memphis, Tenn., which is being built under pressure. In this case the machine is located outside of the tunnel and the pipe is carried through the lock into the forms. The only change necessary in the operation of the machine in this case is an increase in the air pressure at the mixer equal to the pressure maintained in the tunnel.

The Louisville & Nashville tunnel, on which work has just been started, is 1,600 ft. long, one track being used by the operating department and the space for the other being utilized for construction. Two sets of traveling Blaw steel forms 35 ft. long are being used to place the lining and all concrete will be supplied by one pneumatic mixer and conveyor located at the portal. One of the forms will first be placed 800 ft. from the portal or at the center of the tunnel, and the other form 400 ft. from the portal. They will then be filled alternately through a pipe from the mixer and gradually moved toward the portal. The other half of the tunnel will then be handled from the opposite portal in the same way. The Pennsylvania tunnels are also being lined by pneumatic mixers located at the portal, the contractor in this case, however, using separate wooden side wall and arch forms. Several of the machines mounted on cars, are being used in the Spokane track elevation work, which has only recently been placed under contract.

The Burlington tunnel referred to above is 800 ft. long and was excavated about a year ago in rather treacherous sandstone which required timbering throughout its length. This line is in operation while traffic is being handled on a temporary line over the summit, pending the completion of the permanent lining in the tunnel and the excavation of the west approach cut.

The work of lining the tunnel consists of three operations, first, the removal of the timbers; second, the erection of the Blaw steel forms, and third, the mixing and placing of the concrete. The timbers are pulled down by a dinky engine attached to cables running through snatch blocks located in the center of the track, to the bottoms of the uprights. When the posts are pulled out, the roof falls, after which the debris is cleared away and loose rock is picked down to insure the safety of the men erecting the forms. To further protect the men, planks are laid from the remaining timbers to the concrete, so that in case any small pieces of rock should fall they will be caught on these planks, or if a large rock should come loose it will be impeded by the planks and will give warning in time to permit the men to get out of the way. The amount of timber taken down at one time depends upon the apparent safety of the rock above and varies from 5 to 20 ft.

The erection of the forms consists of placing a steel channel rib which fits the section of the tunnel, and connecting it with the last rib by means of steel plates 4 ft. long and 3 ft. high. These plates are built up solid to the top of the arch, as the fact that the concrete is placed by the compressed air method permits the forms to be built complete before concreting begins. The steel ribs of the forms are 4 ft. apart, corresponding to the length of the plates, and from one to five sections are set up at a time, depending upon the character of the rock.

The mixing and placing outfit consists of a pneumatic concrete mixer and conveyor mounted upon a 40-ft. flat car, equipped with bins holding 26 cu. yd. of material. The cement is stored in bags under one of the bins and discharged toward the center of the car through chutes into a measuring hopper. This measuring hopper is lifted and tilted automatically to discharge into the pneumatic mixer. The lifting device consists merely of a 6-in. air cylinder. The 8-in. delivery pipe leads from the mixer under the car and vertically up at the end to the crown of the arch, where a 90-deg. elbow enters through the bulkhead of the form. Air is supplied from a compressor at the mouth of the tunnel through a 4-in. main laid on brackets fastened to the timber posts and a connection can be made at any point from the main to the air receiver on the car by means of a hose. This car was completely described in the issue of March 18, 1914.

The proper sized compressor to run a portable outfit of this kind is about 300 cu. ft. capacity of free air per minute, compressed to 80 or 100 lb. In beginning the work, however, a compressor of 134 cu. ft. capacity was furnished by the railway

Interior Views of Tunnel Lining Equipment. At Left, Pneumatic Mixer Car with Hose Connections to Air Line; in Middle, Material Hopper of Mixer Car and Delivery Pipe Entering Forms Through Bulkhead at Crown of Arch; at Right, Finished Section of Lining, a Section of Form in Place and Mixer Car in Operating Position

from one of its yards, as this was the only compressor available at that time. This compressor was operated by a gasolene engine and was found to be badly worn and inefficient. The amount of air furnished by the compressor was approximately 50 cu. ft. per minute. This, of course, had its effect upon the output of the mixer and conveyor and is mentioned because it applies to the data given below.

The car is run into the tunnel by means of a dinky engine and "spotted" at a point next to the forms. The upper elbow of the delivery pipe remains suspended in place so that when the car is spotted the upper pipe can be bolted to the pipe on the car, which comes directly under it. The air connection is then made and concreting immediately begins. The car is loaded by a portable derrick, which handles a wooden skip, as a clamshell bucket was not at first available. This wooden skip is loaded by several men, shoveling the bank run gravel into it, and is then lifted above the bins on the car and dumped into them.

The first work done by the outfit, which included the lining of the first 20 ft. of forms, required five carloads of concrete material to fill the form. The entire work of tearing down timbers required 128 men hours; the total time erecting forms was 229½ men hours; the total time loading gravel and cement on to the car required 140 men hours; the total time required for mixing and placing concrete in the forms was 204 men hours; the total yardage placed was 132 cu. yd. From these figures the number of men hours required for the various items per cubic yard of concrete was as follows:

	Men hr. per cu. yd.
Tearing down and clearing timbers	.97
Erecting forms	1.74
Mixing and placing concrete	1.5
Loading gravel and cement	1.06

Two delays were experienced on this form, 3½ hours on account of blowing off an 8-in. nipple and replacing the same, and 2 hours on account of a derailment of the derrick car. The substitution of a clamshell bucket, when available, will cut the cost of loading the car to about ⅓ men hours, or 10 cents per cu. yd., and the substitution of a 300-ft. compressor will make it posible to mix and place one batch per minute. The number of batches on the car varies between 112 and 118. The time required at present to unload one car, including time of transporting and connecting and disconnnecting pipe, is about 210 to 240 minutes.

These pneumatic mixers and conveyors are leased by the Concrete Mixing & Placing Company, Chicago.

NEW YORK CENTRAL ANNUAL TRACK INSPECTION

The New York Central & Hudson River has just made public the results of its annual track inspection for 1914, the inspection of the main line between New York and Suspension Bridge being made by the general committee, and the branch lines by sub-committees from other divisions. While no cash prizes are awarded the supervisors, their respective subdivisions are rated on their condition. A. M. Clough, supervisor of subdivision 23, between Buffalo and Rochester, received the highest rating of 83.5, while supervisors P. S. Green of Syracuse, N. Y., and W. N. Skelton of Utica received the second highest rating of 82.8.

The section foreman receiving the highest rating on each main line subdivision received a premium of $3 per month for the coming year, while the foreman having the best section on each division except the electric division, received an additional premium of $2 per month for the year. Nine premiums of $2 per month were also awarded to foremen on branch line sections and ten prizes of $3 per month to foremen of yard sections.

SWITCH INSPECTION AND TEST

By W. F. Rench,
Supervisor, Pennsylvania R. R., Perryville, Md.

The condition of the various members that compose the switch connection and the adjustments maintained are of such vital importance that frequent tests are prescribed on all roads, and in order that these tests may not be perfunctory it is customary to require that they be conducted jointly by a representative of the signal department and of the track department and that they be made on or about certain dates.

To facilitate the rendering of the periodical reports each switch or cross-over in a given interlocking is numbered and each switch rail distinguished by a letter. The opening at switch points is prescribed by the standards of the road and is usually 4 in. The opening at which the switch lock will foul when the switch is closed is fixed by the signal practice of the road and is generally 3/16 in. Terms are indicated to describe the condition of the switch points, stock rails and ties as good, fair and bad. The gage is measured and any other features are noted under the head of remarks. The signal department's responsibility is in the adjustment of the interlocking connections, the track department's responsibility in the condition and general maintenace details of the several members of the switch connections. As the signal department does not have any concern with the frogs or guard rails these are covered in another test made by the track foreman alone. The switch test develops the exact condition of the switches and their connections at intervals, which for the best practice is every two weeks, and not only safeguards the traffic but supplies an excellent defense in the event of an accident from some obscure cause.

These tests by the signal and track maintainers are invaluable, but there is still necessary the occasional inspection by the signal supervisor and the more frequent detailed inspection by the track supervisor. The inspections by the supervisor of track should take in the physical characteristics of the entire layout, and his notes should be full and be recorded in permanent form. He should especially observe the points of frogs to note if they are being touched by passing wheels as indicating a loose guard rail gage, and he should then try the gage and order the necessary correction. This test is especially important at crossings which require constant attention to gage. The condition of all switch points should be noted and also, as far as possible, their adjustments when thrown for a movement. The two rails should be sighted to discover any tight gage that may have developed, as the movement of the rails through creeping sometimes introduces tightening of as much as 5/16 in., whereas ¼ in. is the most that is entirely safe. It should be observed particularly whether the joints at the heel of the switches and the insulated joints are properly surfaced, and whether the full complement of bolts is inserted at the rail joints. Any points unfavorably reported by the maintainers should be examined.

The inspections made by the higher officers are usually by proxy, many divisions having a special duty man who makes such tests for the division officer with an occasional test by the representative of the engineer maintenance of way. The division superintendent and his staff make superficial observations of the interlocking layouts about once in every three months when the cabins are being inspected as to their sanitary condition.

The record of switch inspection and test is very important in view of the insistence of the road and civil authorities for exact information in the investigation of derailments. One has but to walk over a few miles of railroad to note the many parts of cars that drop off in passage, and to wonder that so few of them drop into the throats of frogs and switches. Cases where such obstructions have caused derailment are not rare, but the proof of the occurrence is seldom found and the record of the exact condition of the switch connections may be the needed evidence to clear the maintenance department.

Conducting Track Inspection on the Grand Trunk

A Description of a Car Recently Designed for This Purpose and Methods of Rating Different Sections

The Grand Trunk inaugurated a new track inspection system this year, which, while similar to that used on a number of other roads in purpose and the general method of conducting it, has a number of interesting features. An inspection car is used, which is a rebuilt baggage car fitted with an observation end and seats for 32 persons arranged on an inclined floor to give an unobstructed view of the track. This car is pulled at the rear of a special train at the rate of about 25 miles an hour when making the inspection.

The detailed inspection is made by a committee of five men who are seated side by side across the rear end of the car. Below the observation window are placed 10 sets of push buttons electrically connected to indicators above the window, which are easily visible from any point in the car. By means of each set of push buttons an observer can register on the corresponding indicator any number under 10 with one decimal. Each set of push buttons is used for one of the 10 features which are observed, each of the five observers being responsible for two of these features. For example: one man grades on line and surface, another on joints and tie spacing, etc.

As each milepost is passed the supervisor on whose territory the train is running, calls the number of the milepost. Each of the observers decides what grade, on a basis of 10 as perfect, the features he has been watching over the past mile merit, and he records those decisions by the push buttons. The grades shown on the indicators are copied down by a clerk on a form reproduced herewith, and from this record the average for each mile is secured by weighing the various items according to the percentages shown on the blank. The averages for all of the miles on a given section are averaged to secure the grade for that foreman.

The observing committees on the main line inspection are ordinarily composed of superintendents and supervisors, the latter being used preferably for line and surface, joints and tie spacing. These men make observations only on territory not under their charge and the committees are usually changed at the end of each day's run or at the completion of the inspection on a superintendent's district. In order to secure close supervision over the observations made by this committee, a revisory committee of three men sits immediately behind the five

Observation End of Inspection Car Showing at the Bottom the Bank of Push Buttons Used by Observers in Registering the Grades and at the Top the Indicators Which Display These Markings. The Light Lines in the Cut Connect the Corresponding Push Buttons and Indicators

observers and, when necessary, calls their attention to tendencies to rank uniformly high or low. It is usually possible in this way to correct any wrong tendencies in grading immediately, although if thought advisable, the revisory committee may alter

Interior View of Inspection Car Looking Towards the Rear End Showing Seats for Observers and Bank of Indicators Above the Observation Window

the record slightly. This revisory committee on the main line is usually composed of the grand division staff officers, who include division engineers, superintendents of bridges and buildings and superintendents of track. On branch lines the observers are in most cases section foremen and the revisory committee supervisors or superintendents. One stop is made on each section to measure the gage and test the level, although this is not counted in the grade of the section, as it refers only to a single point.

No cash prizes are awarded as it is felt that such an inspection cannot equate properly for differences in natural conditions affecting the track. The result of the inspection showing the grade on each section is published and distributed to all fore-

The Grand Trunk Track Inspection Car

men and the officers interested and the toolhouse sign is awarded to the foreman having the highest average on each superintendent's division, each grand division and the system. It has also been proposed as an inducement to the foremen that those receiving the highest average one year will be taken along on the inspection trip the following year.

In addition to this system of inspection above outlined, which is of course an examination of conditions as found by disinterested parties having no connection with the particular district inspected, recognition is given to the section foreman who has accomplished the best result during the year, taking into

GRAND TRUNK RAILWAY SYSTEM

(Ch. Eng. 6)

ENGINEERING DEPARTMENT

ANNUAL INSPECTION 19____

_____ Division. _____ District. _____ Supervisor B. & B.

_____ " Track.

Committee 1. _____ Committee 5. _____

" 2. _____ " 6. _____

" 3. _____ " 7. _____

" 4. _____ Revisory Com. _____

Date _____

Mile	Section No.	Foreman	Com. 1		Com. 2		Com. 3		Com. 4		Com. 5		Average for Section
			A 15	B 15	A 15	B 10	A 10	B 10	A 5	B	A 10	B 10	
			Line	Surface	Joints	Tie Spacing	Drainage Banks Ditches	Ballast	Sta. Gr'nds Policing Fencing	Buildings	Spikes	Side Tracks	

Form Used for Recording the Grades Fixed by the Inspection Committee for Each Mile

account physical conditions, force expenditure, etc. This, of course, cannot be determined by committees not familiar with these details and is accomplished by a committee formed of the track supervisor, division superintendent and superintendent of track, the latter a staff officer of the general superintendent. These three men determine the section foreman on each district who is entitled to this recognition and a letter is written to him, signed by the general superintendent, to this effect. In addition the names of these men are given in the report.

The first inspection was made on the main line during the third and fourth week of October. The branch lines were covered later at irregular intervals as it was convenient to handle the car. A special train carried a party of about 60 over the entire main line, the train including six business cars, one Pullman, one baggage car and the inspection car. In addition to the chief engineer, who was in charge of the inspection, the train was accompanied by the engineer maintenance of way, the three general superintendents, all the division superintendents, and their staff officers.

PHYSICAL EXAMINATIONS OF SECTION FOREMEN

By W. E. Schott

Section Foreman, Southern Pacific, Gila Bend, Ariz.

Every section foreman, when entering the service of most of our standard railroads, is required to go to the company surgeon to be examined as to his physical fitness. This is undoubtedly a wise precaution, not only to protect the railway company against any possible future damage suit, but also to insure greater safety to the traveling public and to other employees.

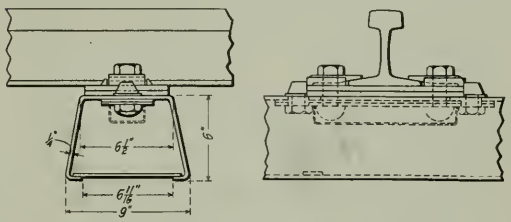
As yet, a satisfactory definition of what constitutes exact fitness for the position of section foreman is sadly lacking. Rules covering such fitness are applied to all alike, and the consequence is that many applicants eminently fitted for the positions are turned down for some slight physical defect which would not in the least interfere with their duties.

No work in any department of a railroad is harder on the eyes than track work. To sight along and over brightly polished steel rails under a cloudless Texas or Arizona sky for hours and days, months and years, is bound to affect the strongest pair of eyes more or less. The consequence is that at a period when the foreman's usefulness is greatest on account of this experience he is, theoretically, according to the rules governing his physical condition, unfit for his position. One of our western roads after a period of 10 years 80 per cent of the foremen could not pass the physical examination in regard to their eyes, if performed by a physician who followed the rules literally.

On account of the nature of track work it is impossible to have a sufficient supply of experienced men with two perfect eyes, and to sacrifice all qualities necessary to make a good foreman to a slight unimportant defect in his eye seems far from increasing service efficiency. There is no reason why a foreman wearing glasses should not be as safe and competent as one without. A majority of the best and most efficient foremen are not found on big standard railroad systems, but on smaller roads, where they are not barred on account of slight physical shortcomings. As long as the rate of pay of the foreman is the same on the first day of his employment as 20 years after he will continue to make changes from one road to another, trying to improve his condition. Every change forces on him a re-examination and sooner or later he will meet an especially particular physician, who will reject him. Although he may be capable and thoroughly competent he will have to turn to a smaller road, which in most cases will gladly accept him. By taking up this matter the railroads could relieve to some extent the perplexing problem of securing sufficient capable section foremen.

STEEL TIES UNDER HEAVY TRAFFIC

An installation of 203 steel ties made by the National Steel Tie Company, Harrisburg, Pa., has been in service since December, 1913, in the main westbound passenger track of the Pennsylvania Lines at a point one-eighth mile west of Emsworth, seven miles west of Pittsburgh, Pa. The traffic at this point is very fast and heavy, including about 100 passenger trains and a great number of freight and local passenger trains. The track is on a two-degree curve. An inspection of these ties was made 10 months after they were installed and it is stated that both the ties and the condition of the track are as good as when first installed.



General Details of Design of the National Steel Tie

The general design of the tie is shown in the accompanying drawing. It has an inverted channel section with steel straps connecting the lower edges. The rail is secured to each tie by two bolts, which pass up through a stiffening plate on the underside of the top of tie, the shell of the tie, an insulation pad, the tie plate, and a clip on which the nut is held down. These clips fit snugly within recesses provided in the tie plate so that it is impossible for them to turn. One end of the clip is beveled to fit firmly against the flange of the rail. The insulation pads, made either of waterproof paper or fiber, serve the double purpose of taking up the shock and vibration caused by a moving train, and providing insulation against electric current.

Main Line Passenger Track on the Pennsylvania Lines Laid With National Steel Ties

The tie plate is designed to take the thrust of the rail, thus preventing the rails from spreading, also the wear in the rail can be taken up by simply turning the plates around. The outer two bolts shown in the figure merely support a casement, shown in dotted lines. This protects the main bolts from concrete or asphalt, or any other material with which the shell of the tie is filled.

A SUGGESTED ORGANIZATION FOR TRACK MAINTENANCE

By G. C. Crites
Southern Pacific, Tucson, Ariz.

The section gang as now organized is forced to localize its work on the bad spots, leaving the "out of face" work for the extra gang. After a soaking rain, much of the section gang's localized "spotting" is undone, for the spots and the undisturbed portions are not equally affected, while the extra gang's "out of face" work is uniform even when saturated. However, the extra gang laborer is a rover and a spasmodic worker and therefore his work never has the quality and nicety of small detail that is found in the work of the section gang.

The section gang should be so organized that it can handle its work in an effective and economical manner. Each regular section gang usually has houses and grounds, representing a cost of from $600 to $6,000, and special tools that would equip a gang three or four times its size, such tools costing from $60 to $200. Interest, taxes, insurance and depreciation on the above will amount to from $80 to $770 per year. Supervision will cost from $700 to $1,250 per year per gang; making a total overhead cost of from $780 to $2,020 on from $1,300 to $6,000 worth of labor. This big overhead cost should be reduced and a more effective gang organized.

If a roadmaster with 150 miles of main track is allowed 0.8 of a man per mile, he will have 120 men for track work. By dividing these into six gangs, an economical and efficient unit would be secured. All the advantages of an extra gang would be obtained with the quality and nicety of a section gang's work. An organization of 20 laborers is easier to build and keep than one of from 3 to 10 men. Organization within the unit is possible and interest in the tasks may be created and held. If curtailment of expenses is necessary, the gangs can be cut to 0.6 or even 0.4 of a man per mile without altogether destroying the workable unit. Such gangs could take their track out of face every two years, besides keeping the whole safe for operation.

Permanent headquarters should be furnished. If possible these headquarters should be in a small town, but surely at a telegraph and water station. Such headquarters will cost from $3,000 to $7,000 and special tools from $60 to $300. Interest, taxes, insurance and depreciation will amount to from $375 to $875 per year and supervision will cost from $2,100 to $2,500 per year, making the total overhead costs from $2,475 to $3,375 per year on from $8,000 to $22,000 worth of labor. Under the present system the overhead costs may reach 150 per cent of the labor costs. Under the proposed organization it should seldom reach 30 per cent of the labor costs.

The section foreman in charge of this permanent gang should be king of his 25-mile domain and his pay should measure up to the position. He should have 80 per cent as much salary as the roadmaster. The place will find the man if salary and authority are given. The roadmaster would polish up a bit, as he would have six competent men under him. To get from their place to his would be only a small step and not the wide jump that is now required when a section foreman is promoted to roadmaster. Further, a foreman with 20 able-bodied consumers, and probably several voters under him would have a better status in the community he inhabits.

The signal maintainer should, of course, report to the section foreman. Complete and accurate statistics of everything pertaining to the section should be made up and kept on the section and the maintainer should perform the clerical work involved. He should inspect track daily, and once a week or oftener, as necessary, the foreman should make his inspection with the maintainer. In this way the entire gang's little "joy ride," while the foreman is inspecting track and switches, would be cut out. The maintainer would know the statistics of the section and the plans of the foreman, and, if he was capable, he would have a gang of his own some day. Where there are no signals, a trackwalker, rated as assistant foreman, would do small jobs and make the daily inspection. The section should be provided with an inspection motor car for the use of the maintainer or trackwalker.

There are many foremen of present section gangs who would not measure up to the new foreman's job. Some of these men are good trackmen, but they usually have to be told when and where to work and they have a world of trouble with their "books." One of these old-time trackmen should be given to each section as a track assistant at from 65 per cent to 75 per cent of the foreman's salary. He would handle the gang in the absence of the section foreman and, with a small detail, do the "spotting up" and other small jobs not worthy of the whole gang's attention.

As a "safety first" man, an old-time carpenter should be detailed with each section. He should be provided with a small shop and substantial living quarters. He should see that the section tools are kept in working condition, fix the loose or broken boards in station platforms, make all light repairs to buildings, look after fences, road and station signs, inspect roadway openings and do the small painting and whitewashing jobs.

LIGHT MOTOR CAR OF IMPROVED DESIGN

The new No. 36 gasolene motor car which has been placed on the market by Fairbanks, Morse & Company, Chicago, is the lightest car of the two-cycle type ever built by that company. It was designed for the use of roadmasters, linemen and signal maintainers, whose work requires a car light enough to be handled by one man and at the same time strong enough to carry two when the occasion arises. Another distinctive feature is the fact that the battery box and gasolene tank are located below the deck, leaving the seat free of all obstructions.

The car has a single frame of steel tubing which combines strength with light weight. It is fitted with 17-in. main wheels and 14-in. guide wheels with wooden centers and M. C. B. flanges, the front axle being 1½ in. in diameter, brass bushed, and the rear axle 1⅛ in. in diameter with removable

Steel Frame Motor Car of Light Weight and Strong Construction

brass bearings in malleable iron boxes. In addition to the equipment usually provided with these cars, a tray which rests on and is secured to the guide arms is regularly furnished with this car. For convenience in transportation, the tray and the guide arms can be removed from the main frame in one piece, permitting the parts to be easily loaded for baggage car shipment. The weight of the car equipped with the tray is approximately 360 lb.

The power plant is the same as the standard two-cycle engine equipment used on other cars built by this company. The engine has a rated capacity of four horsepower, is of the two-cycle, air-cooled type, direct connected to the front wheel, and is enclosed in a dust-proof crank case. Lubrication is effected by mixing oil with the fuel and also by two com-

pression grease cups on the main bearings. The engine is mounted by suspending it from a malleable iron casting attached just below the main frame. The battery box under the seat contains five dry cells which are conveniently accessible through a door in the seat.

REMODELED MAIL CARS FOR HOUSING GOVERNMENT FIELD PARTIES

As the field work of the engineering parties sent out by the Interstate Commerce Commission in the physical valuation of railways requires their frequent moving from place to place, it is desirable for them to make their headquarters in cars. To accommodate the parties sent out on its North Dakota lines last

Fig. 1—Government Outfit Cars, Sleeping Car at Left and Diner at Right

May, the Great Northern remodeled some of its old 50-ft. mail cars which serve as very convenient and pleasant quarters for the men.

Each party was supplied with two of these cars, one being

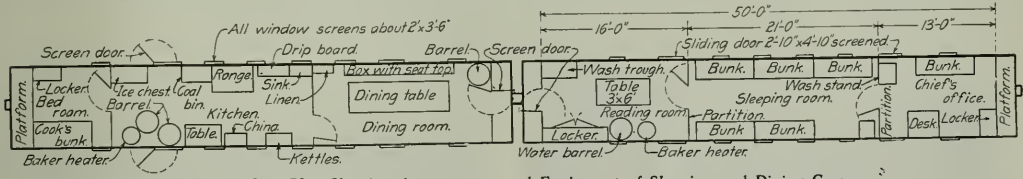


Fig. 2 Floor Plan Showing Arrangement and Equipment of Sleeping and Dining Cars

arranged for sleeping and the other for dining. Both cars are partitioned off into three compartments. The office of the chief of party is located at one end of the sleeping car. Next to it is the sleeping room proper, which is 21 ft. long and contains

Fig. 3—Interior View of the Sleeping Car

ten bunks arranged as shown in Fig. 3. The third compartment is furnished as a reading room. In the dining car one end is devoted to the dining room proper. The kitchen occupies the middle section and at the other end is the cook's bedroom and bunk. There are four provision boxes under each car, two on each side. These boxes are 3 ft. by 3 ft. by 12 in. deep, are very convenient for carrying supplies, and at the same time do not take up any space inside the cars.

The partitions are constructed of ¾ in. pine flooring, matched and dressed on both sides, and are held in place by end cleats. The doors are of the same material and located as shown in Fig. 2. All lockers and closets are made of dressed flooring. The tables, washstands, box seats, etc., are made of dressed and matched pine. All the interior exposed woodwork was painted a light cream color and the exterior of the cars was repainted with the company's standard dark coach color. Fine meshed copper screens are provided for all doors and windows, and the office, sleeping and reading rooms are furnished with carpet. The cars are heated by a hot water system, using Baker heaters, and lighted by double oil coach lamps. The ventilation was very good, due to the numerous doors and windows, so that it was not necessary to improve it. Six of these cars were used on the North Dakota lines during the past season.

WOOD PRESERVERS' CONVENTION PROGRAM

The eleventh annual convention of the American Wood Preservers' Association will be held in the Florentine room of the Congress hotel, Chicago, on January 19-21, 1915. A growth in membership of nearly 100 is reported during the past year and a large attendance is expected at the convention. The policy of this association is undergoing a change in regard to its convention program, increasing emphasis being placed on the reports of standing committees. At the coming convention reports will be presented by committees on Preservatives, Specifications for the Purchase and Preservation of Treatable Timbers, Wood Block Paving, Plant Organization, Miscellaneous Subjects, and Constitution and By-Laws. In addition to these reports the following papers of special interest to railway men will be presented: "A Problem in Air Seasoning Ties," by A. H. Noyes, assistant treasurer, Ayer & Lord Tie Company; "Temperature Changes in Wood Under Treatment," by George M. Hunt, of the Forest Products Laboratory; "Mechanical Life of Ties as Affected by Ballast," by Earl Stimson, engineer maintenance of way, Baltimore & Ohio; "Economical Use of Steam in Connection with Wood Preserving Plants," by A. M. Lockett, mechanical engineer; "Determining the Soundness of Timber Before Treatment," by C. M. Taylor, superintendent, Port Reading Creosoting Plant; "Facts on Creosoted Piling," by T. G. Townsend, piling inspector, Southern Railway; "Facts on Treated Ties," by J. H. Waterman, superintendent timber preservation, Chicago, Burlington & Quincy; "Sill Ties," by F. J. Angier, superintendent timber preservation, Baltimore & Ohio, and "Creosoted Piling," by Edmund Christian, general manager, Norfolk Creosoting Company.

CORRECTION

In the article entitled, "A Simplified Method for the Location of Sidings," in our issue of November 20, page 963, the length of the chord was shown in Figs. 3, 4 and 5 as "2 R sin x." This should have read "2 R sin ½ x." Also, in the first paragraph on page 965 the character ⌒ was substituted incorrectly for △

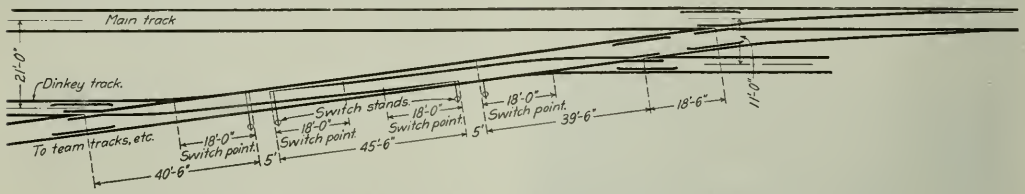
A SPECIAL CROSSING OF A NARROW GAGE AND A STANDARD GAGE TRACK

By T. C. Herbert
Resident Engineer, P. C. C. & St. L., West Jefferson, Ohio.

In connection with the second track and grade reduction work on the Pittsburgh, Cincinnati, Chicago & St. Louis between Alton, Ohio, and Glade Run, it was necessary for the grading contractor to cross a standard gage side track with a narrow gage track at West Jefferson. This crossing was subjected to considerable use by both standard and narrow gage equipment, but there was not time nor justification for the installation of a special crossing frog, neither were there any movable or double-point frogs available. So it was decided to construct a crossing out of standard frogs and switches which were on hand. The crossing, as shown by the illustrations, consisted of two No. 8 frogs and four switch points operated separately with a switch-stand for each point. The switch targets showed white when set for the normal position in line for side track movements.

A crossing watchman, who also acted as a switch tender, was kept on duty during the working hours of the contractor, and at night the crossing was locked clear for the side track. It would be possible to pipe connect such a crossing with the main track switch, thus eliminating the necessity for a watchman, and this would perhaps be advisable if traffic over the crossing was very light. In an emergency such a crossing could be used on main track by pipe-connecting the crossing switch points with the signals.

The crossing, as constructed, was installed by a gang of 25 men in seven hours, and as there was no charge for material the entire cost amounted to only $35.



Details of Crossing of Standard Gage and Narrow Gage Track Using Only Standard Frogs and Switches

Arrangement of Switch Stands and Signals for Operating Crossing of a Narrow Gage Track and a Standard Gage Track

Inspection.—Next to the intelligent selection of help, the inspection of the product is the most important factor of efficiency. —*American Machinist.*

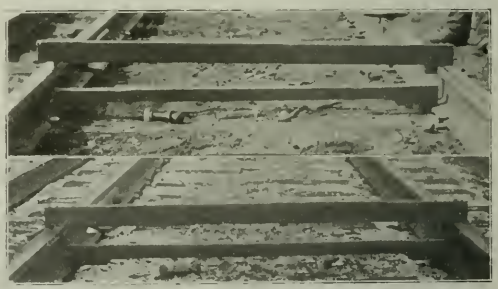
GAGING TRACK BETWEEN RAIL FLANGES

By E. Keough
Roadmaster, Chicago, Burlington & Quincy, Aurora, Ill.

The matter of correct gage in relaying rail has always been a problem for maintenance men, but as laborers are becoming less skilled and the height of rails has increased, the satisfactory gaging of such track by the common method has become even more difficult. When the adzing of ties is left to common laborers a fair gage is about all that can be expected. Some roads are adzing all new ties by machine before they are treated, which must do away with considerable poor gage, but will not prevent it all unless spike holes are put in the ties before laying the rail.

In order to secure a correct top gage the writer has experimented with a flange gage with very satisfactory results. It was found that in relaying 100-lb. A. R. A. rail on an old bed the new rail after settling to place was sufficiently close to correct gage to need no further gaging when being surfaced or retied. Where the standard track gages are used the rail will usually require regaging after it settles. An inspection of such cases generally shows that the bottom is too wide and the top widens a corresponding amount after settling.

With the degree of care used by present laborers no error over a small fraction of an inch should exist by gaging at the flange. Trial measurements show, however, that practically all rail in good main track on hand-adzed ties actually inclines inward, whether plated or not. When 100-lb. rail shows correct gage at the head it will be found that the base is practically 3/16 in. wide. Where rails are in correct gage and stand vertical the surface of the ball is but little over half covered and has the appearance of tilting outward. In adzing ties for relaying rail all laborers seem to have the same personal equation of adzing a little deeper on the inside edge.



Top and Bottom Gages at Time of Laying Rail and 24 Hours Later

The accompanying photographs illustrate what may be expected when using the bottom gage. In this case the standard gage was 3/16 in. tight, as shown in one view, and 24 hrs. later, when the second picture was made, the top gage dropped into place of its own weight and just stuck slightly. Had this top gage been used when the rail was spiked to place it certainly would have resulted in ¼ in. wide gage after the rail had settled.

Overcoming Defective Foundations for Three Piers*

Settlement Arrested by Construction of Annular Caissons at Iron Mountain Bridge at Little Rock, Ark.

By C. E. Smith
Assistant Chief Engineer, Missouri Pacific System, St. Louis, Mo.

The St. Louis, Iron Mountain and Southern has two bridges across the Arkansas river at Little Rock, Ark. The lower bridge, commonly known as the Little Rock Junction bridge, is founded on masonry piers, timber cribs and pneumatic caissons on rock, and is used only by freight trains from northeastern points to Louisiana and Southeastern Arkansas. It consists of one 352-ft. 10-in. swing draw-span, three 253-ft. 4-in. simple truss spans, and one 127-ft. 11-in. simple truss span and trestle approach, all single-track, built in 1883. The south abutment is of masonry built on the rock that outcrops on the south bank. The pivot pier, commonly known as pier 2, and piers 3, 4 and 5, are rock-faced, concrete-filled, masonry piers, about 45 ft. high, resting on filled timber cribs and pneumatic caissons about 40 ft. high, the masonry of the draw-pier being annular, with a well down to the crib. Piers 6 and 7, are rock-faced, concrete-filled masonry piers built on piles. The only specifications that can be found for the piers are as follows:

"The piers are to rest on pneumatic caissons sunk to rock and are to be filled with concrete, with timber cribbing reaching from the roof of the caissons to 4 ft. below low-water mark. These cribs are to be drift-bolted and planked on the outside and filled with sand and stone; on these cribs the masonry is to be started and built up to grade line.

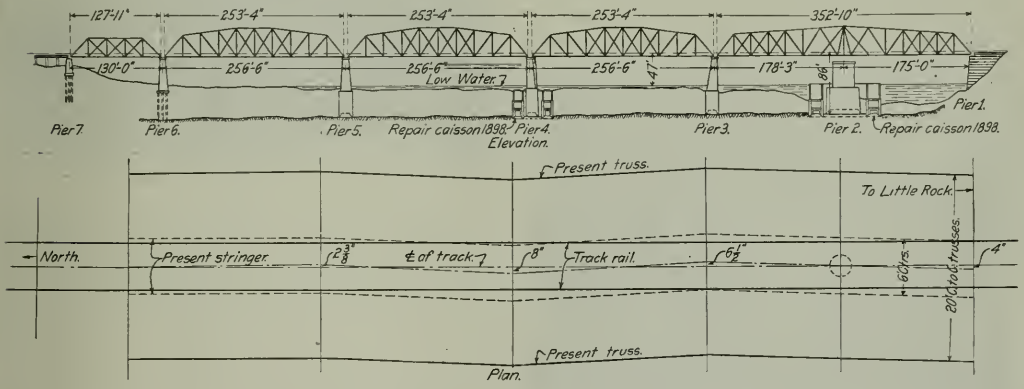
"Piers are to be 6 ft. 6 in. wide under the coping and 20 ft. long, with semicircular ends, with a batter of ½ in. per ft. on the sides and up-stream ends, but no batter on the down-stream ends; the piers are to consist of solid walls, averaging 2 ft. thick, built of dimension stone so as to make the joints not to exceed ½ in.; the inside space is to be filled with concrete. This refers to three piers.

"The draw-pier is to be 30 ft. in diameter under the coping, with an 8-ft. wall and the center to be left open; the pier is to rest on caissons sunk to rock and filled with concrete with the crib as before.

"The fifth pier on the east bank is to rest on piles sawed off and capped below low-water mark; it is to be 6 ft. 6 in. wide under the coping and 20 ft. long, with semicircular ends, and is to have a batter of ½ in. per ft. on the sides, but no batter on the ends; in other respects it is to be the same as piers 1, 2 and 3."

The spans were so well designed and constructed that they are now carrying safely the present-day heavy engines and trains, and will continue to do so for many years. The design and construction of the south abutment and of piers 6 and 7 were good and well executed. The design of the four pneumatic piers, although not in accordance with the best present-day practice, was adequate, but the construction was so faulty that trouble was experienced with them from the first, and the efforts that have been made during a period of 30 years to correct the defects resulted in a sequence of events that partook of the nature of a farce comedy in the face of impending disaster, which latter was narrowly averted.

There was nothing unusual or defective about the design or construction of the caissons, but they were very poorly located and carelessly controlled during sinking, resulting in their having been founded considerably out of place—from two to three feet in one or two cases. The timber cribs, extending vertically upward from the caissons, reflected at their tops the improper location of the caissons.



Plan and Elevation of Little Rock Junction Bridge

The design evidently contemplated filling the cribs with rip-rap, and for 25 years it was not believed that any other filling had been used. After that time, however, it was suspected, and after 30 years it was learned that, instead of having been filled with rock, only a small quantity had been used, most of the filling having been sand discharged from the caisson.

The incorrect location of the caissons and cribs was discovered before starting the masonry, and as the spans were on the ground, the errors in location were corrected partly by placing the masonry piers to one side or the other of the cribs, partly in the batter of the piers, and partly in the placing of the bedplates on the pier tops.

Pier 4 was built near the north edge of the crib and was given equal batter on the two sides, and pier 3, the north rest pier of the draw-span, was built near the center of the crib; but the north face was given a batter of 1½ in. per ft., and the south face

*Abstracted from a paper in the Proceedings of the American Society of Civil Engineers for November, read before the society on December 16.

was built plumb; the draw-span barely got a bearing on pier 3, and the next fixed span reached well over on the pier.

EARLY TROUBLE

The early record of the trouble is not clear, but it appears that, immediately after the completion of the bridge, the pivot pier under the draw-span (pier 2) and pier 4 began to settle and lean. As the bed of the Arkansas river is composed of fine sand which scours and shifts greatly during floods, it was thought that the settling was due to scour, the opinion immediately being formed that the cutting edges had not been founded on rock. Consequently, large quantities of rip-rap were unloaded around the piers, only to be washed down stream in following floods and requiring replacement. In addition, from time to time as necessity arose, the spans were shifted back and forth, to keep their bearings on the piers, the tops of which had been made so small that very little variation could be permitted. The movement of the pivot pier was quite pronounced, and necessitated frequent leveling and adjustment of the draw-span, at great expense.

After the railway forces had handled the problem for 15 years, the late W. M. Patton was called in as consulting engineer. He studied the history of the bridge and, after making borings through the timber crib and caisson under the pivot pier within the well inside the pier, and examining the exposed portions of the crib by divers, came to the conclusion that the caissons were not founded on rock, and gave a full and very plausible report and recommendation.

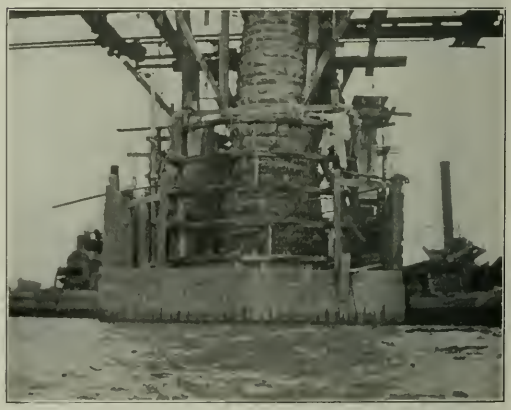
In brief, Mr. Patton concluded that one corner of the cutting edge of each pier rested on rock and the remainder on inferior material, which condition, together with the eccentricity of loading, caused the settlement, and that greater scour at one corner than at the others caused the greatest settlement at the corner

Little Rock Junction Bridge, Little Rock, Ark.

of greatest scour. He suggested pumping grout into the underlying sand to convert it into concrete, removing the inferior material under the caisson and replacing it with concrete, and building an entirely independent annular coffer-dam. His diver found that the timbers were sound, but that some damage had occurred to the crib sheeting and timbers on account of the settling, and that the filling was of small rock, sand and gravel. Mr. Patton recommended replacing the sheeting and filling the spaces with concrete. He recommends the sinking of annular caissons and coffer-dams to rock, supporting the span on falsework, removing the material between the old and new piers, putting jacks under the cutting edges to right the piers, and underpinning them with concrete.

The work of sinking the annular caissons and coffer-dams went forward in the fall of 1898, and was completed early in the summer of 1899. At pier 4, a timber caisson, about 50 ft. by 70 ft., was constructed around the old pier. Two rows of piling were driven around the old pier, about 8 ft. or 10 ft. apart, and were capped and cross-capped; the caisson and crib were built on top of these caps to a height of 12 ft. Large screws 16 ft. long were then used to lower the crib until it floated. The crib projected 4 ft. above the water, and the cutting edge floated about 4 ft. above the bed of the river; sand was used to fill the crib to sink it, while men were raising timber on top of the crib.

On April 2, 1899, at 41 ft. below low water, hard shale was struck near the center of the up-stream end. At an elevation of 45 ft., the inside cutting edge on the south side was landed on rock except about 10 ft., where the rock was 6 in. below the



The Steel Caisson and Coffer-Dam Around Pier 3

edge. The rock under the outside cutting edge on the south side was from 12 to 13 in. below it. However, the sand was taken out down to the rock, and the working chamber was sealed with from 2 ft. to 4 ft. of concrete, depending on the depth of rock.

The crib was built 58 ft. high, the top being 13 ft. above low water when the caisson was sealed. Later the top of the crib was disconnected from 6 ft. to 7 ft. below low water after concrete had been placed between the old and new cribs. The sealing of the working chamber was completed on April 24, 1899.

Investigation of the timber in the old crib disclosed crushing on the north side, but only to the extent of compressing the timber, and not dividing the grain. The timber was good and sound. A great deal of the 3-in. sheeting was found to be torn off, and it was seen that the spaces between the timbers of the crib were filled with sand and loose rock. The sheeting which had been torn off was replaced. It was also observed that the deck or top of the old crib dipped from 1 in. to 1½ in. from a point near the center on the south side of the pier toward the up-stream end.

On July 1, while the loose material between the new coffer-dam and the old crib was being excavated, it was discovered that the pier had settled about ½ in. This led to the immediate abandonment of the excavation, but the spaces on the north and west sides were driven full of piles, with a penetration of about 15 ft., and the space already excavated was filled with concrete up to the top of the old crib. None of the material within the old crib was removed, and no effort was made to grout it or to fill in the vacant spaces with concrete. In fact the sheeting that was replaced effectually prevented the concrete from flowing into the vacant spaces within the crib. The concreting around the old pier was completed on July 6, 1899, and both walls of the annual coffer-dam were then removed, down to 6 ft. or 7 ft. be-

low low water. The annular caisson was about 50 ft. wide and 70 ft. long, the sides were 10 ft. apart, and spaces from 6 ft. to 7 ft. 6 in. wide were left between the old and new work.

The work at the pivot pier was similar in character, except that the new caisson was 70 ft. square and the concrete about 15 ft. thick, the extra depth having been caused by scour and not by excavation.

The contractor considered the removal of the material between the new and old caissons to be very hazardous, and he continually recommended that only part of the material be removed and that the remainder be confined by placing concrete over it. Unfortunately the railway was guided by his advice in this matter. It is to be regretted that, after having incurred the great expense of sinking the annular caissons, more benefit was not derived from them.

Truss Shoe Overhanging Bearing

Truss Shoe Supported on I-Beam Grillage

On account of the large quantity of concrete placed around the pivot pier, and the depth to which it reached, 15 ft. below the top of the crib, no further movement has been detected in this pier. However, the movement of pier 4 was not arrested, but as the settlement and movement continued a policy of "watchful waiting" was followed for several years. The situation again became critical early in 1906, when pier 4 had moved so far that one of the spans was in imminent danger of falling off.

I-BEAM SUPPORTS FOR SHOES

One of the first duties assigned to the writer when he entered the bridge department of the railway, late in 1907, was an inspection of this bridge to determine how to maintain it in safe condition. At that time pier 4 had moved out so far from under the shoes that the center of the end pins was almost exactly over the edge of the timber blocking under the shoe, and the edge of the shoe overhung the edge of the pier.

The roller end of the span to the south being on pier 4 permitted the pier to move out from under. The fixed end of the span to the north being on pier 4, the thrust caused by the leaning of the pier in that direction had crowded the roller end of this span on pier 5 against the fixed end of the next span. This thrust, added to the similar, though less, defective construction of pier 5, caused the latter to lean north, crowding the roller end of the next span to the north, against the fixed end of the north span on pier 6, bringing three spans in direct contact. On hot days when the bridge was not loaded the chord bars in the end panels of these spans could be seen to be more or less buckled, but they always straightened out under trains, undoubtedly because the elasticity of the timber cribs permitted the piers to move back and forth.

Immediately following his first visit to the bridge, the writer worked up plans for placing a nest of I-beams under the truss shoes at each end of pier, so that the overhanging ends of these beams would afford support for the end of the next span south. There was only sufficient depth for 15-in. I-beams at the high end of the pier, but at the low end there was sufficient depth for 20-in. beams, the difference in height being due to the settlement.

The plans first contemplated driving piles on both sides of pier 4 to be used for jacking during the placing of the I-beams, but on account of the extreme length of the piles required (from 80 ft. to 90 ft.) and the hazard attending their maintenance in the Arkansas river, it was decided to avoid their use and jack from the pier top.

After placing the I-beams the spans were shifted slightly to remove their interference, and the rollers were cleaned and oiled. No further attention was paid to the placing of the falsework. The bearing having been made safe the matter of permanent repairs was then given further study.

In 1908 some one got the idea that it would be of advantage to provide further rigid support for the overhanging ends of the I-beams on the high side of the pier by building a concrete footing on the wide edge of the crib up to low water and placing a steel bent on top of that footing. The I-beams under the pedestals were to be shifted far enough south to get bearing on the bent, and the spans were to be shifted as far south as possible in order to bring the load over toward the high side of the crib. This method might have been very effective had it been possible to move the spans any great distance, but on account of the proximity of the south span to the draw, and of the north end of the north span to the edge of pier 5, only a 6 in. to 10-in. movement could be made, and the effect on the line of pressure

Pier 4, Showing Steel Bent Encased in Concrete

Pier 3 After Work Was Completed

was barely perceptible. However, the work was done in the fall of 1903 by the Missouri Valley Bridge & Iron Company at a cost of about $2,000.

Following this work no appreciable movement in the direction of the bridge was apparent for several months, but the movement at right angles to the bridge appeared to increase its rate, indicating that the work had no appreciable effect.

The movement of the pier was greatly dependent on the scour line. When the current shifted away from the pier, the bed of the river filled up and stopped the movement; when the opposite was true, the movement was resumed.

Following the work in the fall of 1908 the observations were continued, and the matter of proposed permanent repairs or re-

construction was kept constantly alive for 3 years, during which time scheme after scheme was evolved and considered, but nothing was started until the fall of 1911.

For two or three years prior to 1911 the channel of the river had been moving away from pier 4 and concentrating under the draw-span, resulting in the building up of the river bed around this pier with clear fine sand which early in 1911 covered the top of the crib and reached up on the masonry within 1 ft. or 2 ft. of extreme low water. This sand evidently filtered into the crib and gave increased supporting power in addition to that provided by the sand that enclosed it. As a consequence the movement of pier 4 gradually slowed down, so that it was barely perceptible, and the great uneasiness that had prevailed for several years was partly allayed.

In order to protect and preserve this sand surrounding the pier, the writer attempted in the fall of 1910 to secure authority to spend about $2,000 to construct a standard brush and pole mattress, about 150 ft. square, around pier 4, to be securely bound together with wire and wire strand, and covered with rip-rap placed in pockets of the mattress to be formed by placing two sets of poles one across the other on top of the mattress to prevent the rip-rap from rolling off.

At the low stage of the river following the request for authority, the work could have been done without barges or other floating equipment and brought to completion in 30 days. The authority was not granted, and after the next flood it was not needed as much of the sand had been washed away.

While the river bed was building up around pier 4 it was scouring away around pier 3, the north rest pier of the draw-span, and this pier started to move quite rapidly directly up stream at right angles to the axis of the bridge.

The movement in 1911 was more rapid and constant than any experienced previously in the other piers, and indicated the necessity for immediate action. The pier did not move dangerously in the direction of the bridge. Its natural tendency would have been to move south as the plumb south face and eccentric bearings of the spans made the pressure heaviest on the south side. It was restrained from movement in that direction, however, by rods and yokes which made this pier an anchor for the pull of pier 4.

FINAL PLAN OF REINFORCEMENT

The method of reinforcement that was finally brought to successful conclusion was first suggested by E. J. Pearson, first vice-president of the railway. To overcome all uncertainties he suggested securing the necessary additional supporting power by the use of a pneumatic caisson on each side of the old crib. This was extended later by adding caissons for the ends, forming an annular caisson surmounted by a coffer-dam, the space above the annular caisson to be filled with concrete, doing the same to the crib, and encasing the old pier in a new reinforced concrete shell.

Unfortunately, the delay in arriving at a decision as to what would be done at pier 3 consumed the best months of the year for the work. The change to pneumatic construction, necessitating the assembling and erection of the pressure plant and the construction of the caisson, further delayed the work up to the time of the flood period. The compressor plant was finally ready, and the steel caisson was shipped early in November.

The old records showed the old caisson under pier 3 to be 14 ft. by 31 ft., so the dimensions of the inner cutting edges of the new caisson were made 16 ft. by 33 ft. The caisson was made of steel primarily to reduce its necessary width and consequently the displacement; the presence in the old bridge-material yard of a large number of duplicate second-hand floor-beams which could be converted readily into a caisson also encouraged the use of steel. It was decided to build up a coffer-dam on the outer wall of the caisson, connecting the coffer-dam to steel lattice work or towers bolted to the roof of the caisson. These towers were provided in order to form the backbone of the rigid framework it was known would be required to brace the new coffer-dam against the old crib during excavation.

The greatest care was taken in the design of the joint between the caisson and the coffer-dam. The timbers in the bottom row, 8 in. thick, were cut to fit the steel as closely as possible, and were set in a bed of hot tar and oakum. Surfaced timbers were used, and each layer was set on the next below in hot tar and caulked. Tar-paper was then placed over the timbers and 2-in matched sheeting placed outside. The lower ends of the sheeting were driven into a groove filled with hot tar and oakum, over the roof of the caisson, formed between the bottom timber and the upstanding leg of the angle at the top corner of the caisson. A space about ½ in. wide between the sheeting and the angle was then caulked. To bind all parts together effectually and to provide additional weight for sinking, a 2-ft. 6-in. layer of concrete was then placed over the roof of the caisson enclosing the bottoms of the towers. This concrete was banded to the steel roof by a large number of ¾-in. bolts 21 in. long fastened to the steel plate and extending vertically into the concrete. The construction of the remainder of the coffer-dam was similar to that just described.

During and after the placing of the 30-in. layer of reinforced concrete over the roof of the caisson, the sinking progressed as fast as the work permitted. Trouble was continually experienced by the caisson catching on the protruding upper ends of the sheeting planks of the old crib, which had been torn loose by the settlement of the timbers and bulged by the pressure of the material escaping from the crib. On all the old records available the caisson of the old pier was shown to be plumb, and a clearance of 2 ft. was supposed to have been allowed between it and the new caisson, but it was found that the old caisson had a sharp batter, which necessitated ripping off the old vertical sheeting before the new caisson could be landed. The cutting edge of the old pier was founded on rock everywhere except at short dips which had been filled with concrete.

All the material within the new caisson had to be removed through the locks because sufficient pressure could not be maintained to force the sand through the blow pipes. Mattson locks were used and permitted the rapid removal of the material. No other particular difficulties were encountered.

The cutting edges were everywhere landed on rock, except over short dips, which were cleaned out and filled with concrete. The working chamber was filled with concrete carefully rammed to the roof, and before it had set, the lower sections of the shafting were also filled with grout.

The filling of the old pier was found to consist of some rip-rap and more sand. In order to remove the sand much rock had to be taken out. In fact, all the loose rock was removed with the sand, and only the tight rock was permitted to remain. The latter and the entire inside of the crib was washed out with a strong jet and then filled carefully with concrete. On account of the rather rapid settlement of the pier up stream, that end of the crib was first concreted, and, following the placing of that stiffener, the squeezing of the timbers at the down-stream end caused the pier to settle in the other direction, righting itself several inches. The entire space inside the coffer-dam was filled with concrete, being brought up as the concreting of the crib progressed.

After filling the crib and the surrounding space with concrete, the pier was safe, but, as it was canted so much that it presented a poor appearance, and as the draw-span had only a very small bearing on the pier and was causing the upper courses of masonry to break away, the pier was encased in a reinforced concrete shell. As the new caisson had made the footing large enough, the reinforcement was built for double-track. The bridge seats under the spans were entirely renewed in concrete finished at the proper level for double-track spans. The difference in level was made up by concrete pedestals placed in sections.

No falsework was used for the support of either span, and the bridge was never out of service during the conduct of the work.

The outer surface of the timbers in the crib under pier 3 were squeezed down at the ends an almost imperceptible amount. The

upper timber was burst open on account of the crushing load.

On account of the success at pier 3, all concerned were agreed that pier 4 should receive like treatment, making use of the caisson and coffer-dam sunk in 1898. Soundings showed that the top of that coffer-dam had been cut up when the upper courses were removed, and it was necessary to smooth it by cutting off drift-bolts under water and removing loose timbers. It was decided to make an effort to extend the outer wall upward and make it sufficiently tight to permit the pump to expose the inner wall, and, after extending the latter, to rely on it for the rest of the work.

The extension was made in a very short time, and a canvas having been stretched around the work, the dam was pumped out at the first trial. The inner wall was then very carefully dressed down in the dry and extended upward thoroughly water-tight, making it possible to pump out the water between that and the pier and start excavation. The concrete between the 1898 coffer-dam and the old crib was first removed on the south side, but was not disturbed on the north side until some time later, after the yokes and cables were in place anchoring the pier to pier 3.

The removal of the material down to rock was slow and tedious. The old coffer-dam had been badly racked during sinking, and large leaks were found all the way down. They were overcome, and the rock was laid bare and covered with concrete up to the top of the caisson of the old pier, after which the crib was cleaned out, filled with concrete, and surrounded at pier 3.

Some of the timbers were crushed to 6 in. in height, and on account of the inclination of the pier new cracks developed in the timbers while the excavation progressed. The weakest portions of this crib were concreted as they were reached. Attention was given to the up-stream end, and excavation was first made there. The movement of the pier increased while that work was in progress, but was immediately arrested when the excavated pockets were filled with concrete.

In fact, by concreting at the up-stream end and cleaning out the spaces at the down-stream end, the pier was made to right itself, the top moving back about 9 in. The first concreting was done in the two up-stream pockets of the crib, for its full width for a height of 5 ft. below the top, after which 5 ft. more below that were placed. The situation was always well under control, and the top of the pier could have been sent in any direction by guiding the work. The underpinning was hurried as much as possible, however. In placing forms within the crib and concreting individual pockets the men worked inside the crib. No falsework was used while pier 4 was under reconstruction; the pier carried traffic at all times.

The reinforced concrete shell placed around pier 4 is practically a duplicate of that placed at pier 3. The tie-bars at the bottom were passed through the pockets in the crib and concreted in, instead of being passed through the pier. At this pier the ends of the spans were shifted sideways to permit the construction of each concrete pedestal in one piece.

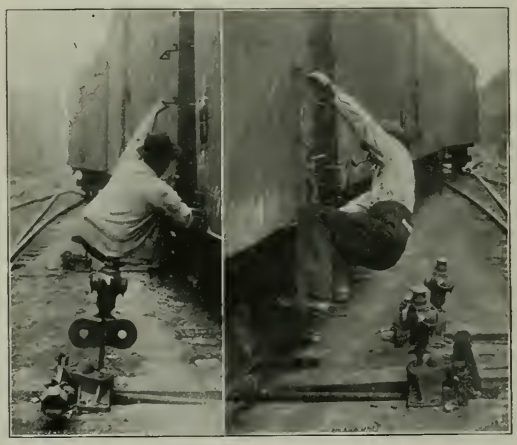
The small tops of these piers, their reported movement, and the frequent shifting of the spans, all contributed to a very poor condition of the bridge seat on pier 5, on which the stones were breaking out under the end of the south span which rested close to the edge of the pier. To strengthen the bridge seat, the top 10 ft. of the pier was encased in a reinforced concrete jacket about 9 in. thick. The sides were connected by passing the reinforcing rods around the curved ends of the pier and also by three sets of rails set vertically in the reinforced concrete at the middle and quarter points of the length of the pier. The lower ends of these rails were attached to the pier by 2-in. anchor-bolts set in grouted holes. Their upper ends were connected by 2-in. rods extending across the pier tops in channels cut in the bridge seat and filled with concrete. All cracks in the pier top were carefully grouted. The bridge seat appears to have taken on a new lease of life.

Following the reconstruction of piers 3 and 4 and the reinforcement of pier 5, the entire bridge, which was badly out of line and level, was lined and leveled. It was found that the draw-span was somewhat twisted and one end hung lower than the other. As far as could be done without injury to the span, the inequalities were corrected.

The work on the three piers and spans cost about $100,000, which is much more than it would have cost had the work on pier 3 been started earlier and the floods avoided. The reinforcement of piers 3 and 4 was executed on a force-account basis by the Bates-Rogers Construction Company. The adjustment of the spans and the reinforcement of pier 5 were executed by the railway company forces.

AN IMPROVED SWITCHSTAND BANNER

One of the measures adopted by the Chicago Junction in its campaign to increase the safety of its employees has been to replace the old banners which extended above the switchstand with a new type of banner invented by one of the company's switchmen which is no higher than the switchstand proper. The new banners have been made by straightening the old ones and cutting the proper holes for the fastenings in the new position. The shape of the target is shown in the accompanying illustration. It is 7 in. wide at one end, 3 in. at the other and 16 in. long. These banners have been applied on yard ladder tracks and at points where tracks are close together, thus decreasing the danger of switchmen being struck by the banners when hanging on the sides of cars or engines.



Old Style Banner Showing Dangerous Condition

New Type of Banner Not Extending Above Switchstand

ABSTRACT OF ENGINEERING ARTICLES

The following articles of special interest to engineers and maintenance of way men, to which readers of this section may wish to refer, have appeared in the *Railway Age Gazette* since November 20, 1914:

A Comprehensive Low Grade Trunk Line Development.—When the projected lines have been completed, the Chicago, Burlington & Quincy will have a low grade trunk line from Billings, Mont., to Paducah, Ky., a distance of 1,500 miles and a connecting line to Denver. The plan for working out this important development and the interesting construction details of the line between Thermopolis, Wyo., and Orin Junction, recently completed, were described in an illustrated article in the issue of November 27, page 999. Editorial comment on this development appeared in the same issue, page 995.

Construction of the Gwynn's Falls Arch Bridge.—The Pennsylvania Railroad is completing the construction of a four-track reinforced concrete bridge over Gwynn's Falls in Baltimore, Md., consisting of four arch spans, the design and construction of which are typical of the best in modern bridge practice for such structures. An illustrated description of this work was published in the issue of December 4, page 1037.

The Mechanical Elimination of Seams in Steel Rails.—An abstract of a

paper by Robert W. Hunt, read before the American Society of Mechanical Engineers, in which was outlined a new method of eliminating seams in rails by removing the surface metal of the ingot by a milling machine, was published in the issue of December 4, page 1055.

Comparative Service Tests of 100-lb. Section, P. S. and A. R. A. Section A Rails on the Pennsylvania Lines.—W. C. Cushing, chief engineer maintenance of way, Southwest System, Pennsylvania Lines, has outlined in a paper recently published the results of extensive service tests of rails on the Pennsylvania Lines showing the traffic handled, the amount of abrasion and the number of broken rails of each type. An abstract of this paper was published in the issue of December 11, page 1078.

Driving a Five-Mile Tunnel Through the Selkirks.—The Canadian Pacific is building a double-track tunnel five miles long under Mt. McDonald at the summit of the Selkirk mountains as a part of a line revision which saves 4.4 miles in distance, reduces the length of the 2.2 per cent ruling grade on each approach, and eliminates 552 ft. of rise and fall and 2,600 deg. of central angle. This tunnel, which will be the longest in America, is being constructed by the use of a pioneer tunnel parallel to the main bore in order to hasten its completion. It was described in the issue of December 11, page 1082. An editorial note commenting on modern tunneling methods, calling attention to the lack of progress in reducing cost on such work as compared with grading and other construction work, was published in the same issue, page 1074.

TESTS ON TREATED AND UNTREATED OREGON FIR PILING

The results of comparative tests, made by H. B. MacFarland, engineer of tests, Atchison, Topeka & Santa Fe, on treated and untreated Oregon fir piling, are published in bulletin No. 168 of the American Railway Engineering Association. The object of these tests was to determine the effect of the steaming process of creosoting upon the physical properties of the piling.

Two lots of material were selected for test purposes. The logs had ordinarily been cut from three to six months before treatment. Twenty logs, varying in diameter at the butt from 12 to 18 in., and in length from 40 to 60 ft., were selected. From each log two specimens, each 15 ft. long, were cut for test purposes. Ten of the 40 specimens were given regular treatment, known as the 18-hour treatment, and another lot of 10 was given an extra heavy 26-hour treatment for the specific purpose of permitting heavier and deeper penetration. In order to get the best comparative figures as to the effect of creosoting on the different parts of the log, alternate butts and tops were treated.

In the steam creosoting process the material was ultimately subjected to three processes, namely, steaming, removing moisture and filling with creosote. Just previous to treatment, the logs were taken from the salt water in which they had been soaked and the bark removed. They were then placed in the treating tanks, and by the introduction of steam were slowly brought up to a temperature of about 330 deg., which was maintained for 1½ hr. A vacuum of about 28 in. was then produced and the temperature reduced to a minimum of 190 deg., this condition being maintained for 10 hr. The tanks were then filled with oil at 190 deg., and an average pressure of 75 lb. was maintained for a period of five hours, or until the piles had taken up the proper quantity of creosote, after which the oil was transferred from the treating tank to the general storage tank, and the timbers removed.

In every case the treated material showed a decided loss in strength as compared with untreated. The greatest loss was in transverse strength, due to the influence of treated sapwood. There was also a considerable loss in compressive strength. The material was found to be very refractory to all kinds of treatment, while subjecting this wood to high abnormal temperatures and pressures, extending over considerable lengths of time, caused permanent deterioration of the fiber.

The purpose for which the material is intended should be taken into account in the consideration of comparative results. The transverse strength of piling is not of as great importance as the compression strength. The loss in compressive strength is manifested in the failure of piling to withstand the sudden severe vertical stresses applied by the pile-driver. It is also important that the piling have sufficient strength in shear parallel to the grain to prevent "shelling out" during the driving. The tests showed that the deterioration and loss of strength resulting from treatment is a minimum when treated under as nearly normal conditions as possible. Excessive time and high temperatures of steaming should be avoided.

The following conclusions were drawn:

The depth of penetration of creosote is mainly dependent upon the depth of sapwood.

The heartwood is almost impervious to treatment.

The depth of penetration of creosote is the same in the butts as in the tops.

The depth of penetration of creosote should be interpreted to mean the depth of "active" penetration.

Tests of minor specimens show that injury to fiber through method of treatment is not localized to treated fiber alone, but extends throughout the whole specimen.

The transverse strength of Oregon fir piling is decreased 42 per cent due to the steaming process of creosoting.

The compressive strength perpendicular to the grain is decreased 32 per cent due to the steaming process.

The compressive strength parallel to the grain is decreased 27 per cent due to the steaming process.

In general average, the strength of Oregon fir piling subjected to the steaming process of creosoting is only two-thirds its original strength.

ENAMELED STEEL SIGNS

The Stonehouse Steel Sign Company, Denver, Colo., has recently developed an enameled steel sign which is especially adapted for use at highway crossings because of its conspicuousness, its rigid construction, and the ease with which it can be mounted on almost any kind of a post. The sign is 20 in. by 28 in., with 4-in. white letters on a red center background. It is attached to the post without any bolts, screws or rivets through the enameled face of the sign. This is accomplished by the use of bands bent around the post and bolted to the lips on fasteners

An Illuminated Enameled Steel Sign Compared With an Unilluminated Painted Sign

which extend across the sign and are electrically spot-welded to a ¾-in. angle bar around the edge on the back. These signs may be illuminated as shown in the illustration, which also shows an old painted sign without illumination.

This company also makes numerous other standard and special signs, including one for use in shops and factories where men speaking many different languages are employed. It consists of a standard sign in English at the top with 12 small, but similar signs, arranged below, having the word "danger" translated into as many other languages.

General News Department

All of the principal car shops of the New Haven road have been closed until January 4.

W. H. Lyford, general counsel of the Chicago & Eastern Illinois Railroad, addressed the Chicago Engineers' Club at a luncheon on December 10, on "Handling Freight at Chicago."

By a fire in the shops of the Atchison, Topeka & Santa Fe at Albuquerque, N. M., on the night of December 8, the company suffered a loss of $22,000; parts of two buildings and 14 freight cars.

Dr. Hermann Von Schrenk, consulting timber engineer, of St. Louis, read a paper on Modern Uses of Wood before the Western Society of Engineers, Chicago, on Monday evening, December 14.

At Pinner's Point, Va., on Monday last, 70 employees of the Southern Railway and 41 of the Atlantic Coast Line were arrested on charges of violating the Sunday labor law. The persons arrested were clerks and workmen on the freight docks of the railroads.

The Great Northwestern Telegraph Company, of Canada, announces that the Canadian Northern Telegraph Company has been consolidated with the G. N. W.; and the larger company expects, within a few months, to operate the lines and offices of the Western Union in the maritime provinces.

"Independent Order of Railroad Employees of Pennsylvania and New Jersey" is the name of an organization which has held a meeting at Reading and which announces that application is to be made to the Philadelphia & Reading for increased pay for station agents. The president of the organization is James F. Tatlow, of Philadelphia.

The American and the National express companies have begun suits in Vermont to test the constitutionality of a recent law of that state increasing the taxes assessed against express companies. The new rate is $20 a mile for each mile of railroad over which an express company operates, more than twice the rate formerly in effect.

Although it was reported recently that the members of the shop craft unions had voted to call off the strike which was declared in September, 1911, on the Illinois Central and the Harriman lines, announcement has since been made by the railway department of the American Federation of Labor that the boilermakers voted in favor of calling off the strike, but that their vote was not large enough to offset the vote of the machinists, blacksmiths, car men and sheet metal workers.

The United States Civil Service Commission announces examinations January 12 for the position of telegraph and telephone inspector, under the Interstate Commerce Commission, in the work of valuation of property, salary $1,200 to $1,800 a year. Applicants must be between 25 and 55 years of age. The commission also announces examinations January 20 for six other positions, as follows, the range of salary in each being from $720 to $1,680: Junior railway structural engineer, age not over 36; junior railway mechanical engineer, age not over 36; junior railway signal engineer, age not over 36; junior railway electrical engineer, age not over 36; junior telegraph and telephone engineer, age between 21 and 35; junior railway civil engineer, age between 21 and 36.

A committee of the Senate held hearings at Washington last week investigating charges that the Southern Railway had obtained control over certain minor railroads in Virginia, Kentucky and Tennessee for the purpose of suppressing the coal traffic in the Appalachian coal fields, the purpose being to promote the business of other mines. The committee had employed an investigator who testified as to the deficits of certain roads controlled by the Southern, the charge being that if these roads—the Atlantic & Danville, the Danville & Western, the Cape Fear & Yadkin Valley, the Carolina & Northwestern, the Tallulah Falls and the Knoxville & Bristol—had been devoted to the legitimate use for which they had been constructed, namely, to furnish an outlet for the Appalachian coal mines, they would have been more profitable.

The executive committee of the Chicago Association of Commerce has adopted a resolution in favor of setting the clocks throughout the nation ahead one hour in order to secure more daylight after working hours in the summer months. The resolution also asked the United States Chamber of Commerce to consider the question at its annual meeting in February, in Washington, with the idea of bringing about a nation-wide movement in favor of the change. A special committee of the association held a meeting last week to consider a plan for adopting Eastern time for Chicago instead of Central, but so much opposition was expressed by railroad men present, on account of the confusion which would result if Chicago made the change, that it was decided to push the movement along national lines.

The postmaster general, in his annual report, again proposes that the government shall take over the telegraph and telephone lines of the country. He says that he wishes to see the railways properly compensated for carrying the mails, but at the same time he says that the department has been more than self-sustaining during the last fiscal year, a statement which has no reasonable basis, for if the railroads had been properly paid for carrying the mails, the surplus would have been more than wiped out. The postmaster general again recommends that the rate of one cent a pound for the transmission of periodicals be limited to publications issued oftener than once a month, and that monthly magazines be charged for at the rate of two cents a pound.

The House Committee, at Washington, has reported the Post office appropriation bill for the next fiscal year, with a rider in which are embodied the provisions of the Moon bill for changing the basis of railway mail pay; and Mr. Peters, the chairman of the railways' committee, says that an attempt is being made to secure from the Rules Committee a rule to facilitate the proposed new legislation. Mr. Peters reiterates his declaration that the provision of the Moon bill for payment to the railways on the basis of space occupied is not only unfair in principle, but embodies rates per mile very much too low. With the space in a car fully loaded, the compensation would amount, in many cases, to less per ton per mile than ordinary rates for the transportation of coarse commodities by freight train. The railroads are now losing not less than eight millions annually because of the parcel post, and if the space rates are adopted this loss will be still greater. The small railroads, which are now the worst sufferers from inequitable rates, would lose from 25 per cent to 65 per cent additional if the plan should be adopted.

The different lines that comprise the National Railways of Mexico are again divided into several sections, each under control of opposing political factions. The Cuernavaca division, which runs from Mexico City to the Balsas river, will soon be opened for through traffic for the first time in more than three years. This is made possible by the merging of the territory occupied by General Zapata and his armed forces with that which is under control of General Villa. The branch lines of the Interoceanic in the State of Morelos are also again open for traffic after a long suspension of operations. As an offset to this extension of the opened system, however, the troops of General Carranza are in control of some of the northern divisions running out of Monterey, Tampico, Laredo, Eagle Pass and Saltillo and of a part of the Interoceanic, running from Vera Cruz. The Carranzistas are also in charge of the National Tehuantepec line and all of the Vera Cruz & Pacific, the latter being a part of the National Railways of Mexico. On the whole, the railways of the country appear now to be in about as chaotic a condition as they have been at any time since the revolutionary troubles started, more than four years ago.

The western railways are making an effort to secure a more rigid enforcement on the part of conductors of the rules requiring payment of half fare for children between the ages of 5 and 12; and forms have been prepared for distribution to conductors on which the parent or guardian may be required to certify that the child is under age, in case the parent or guardian makes such a statement and the conductor is in doubt as to its truth. The form contains a notice to parent or guardian stating that the lawful interstate fare for children between 5 and 12 years of age is one-half the regular one way fare, and the lawful interstate fare for children above 12 years of age is the regular adult fare, and that failure of a common carrier to collect published tariff fare constitutes a violation of the interstate commerce law; also that the person who evades the payment of a lawful fare is equally liable, with the carrier, to punishment under this law. Conductors are instructed to give passengers the benefit of any reasonable doubt as to the age of the child. In cases where conductors are absolutely satisfied from observation or otherwise, that a child without ticket is of proper half-fare age, they are instructed to collect half fare covering not only their own run, unless the journey commences and terminates on such run, but to require parent or guardian to purchase at the first convenient stop a half ticket for the child to destination, or to junction point with the connecting line.

R. C. Richards, chairman of the central safety committee of the Chicago & North Western, has issued a bulletin showing that in the 53 months since the safety committees were established on the North Western, there have been 369 fewer deaths and 11,258 fewer injuries on the road than in the corresponding previous period. He has also issued a series of colored charts to illustrate graphically the various causes of accidents. For the years ending June 30, 1912, 1913 and 1914, one chart shows that 401, or 2.2 per cent, of the injuries were incurred in collisions and derailments, while 17,380, or 97.8 per cent, occurred in "little accidents that can be prevented in less time than it takes to make reports." Another table shows that of the employees killed during the three years 17, or 8.4 per cent, were killed in collisions and derailments, while 185, or 91.6 per cent, were killed in little accidents. Another chart shows that of the accidents in which employees were injured while on duty during the calendar year 1913, 5,232, or 81.81 per cent, were caused by careless practices, 131, or 2.05 per cent, were collisions and derailments, 651, or 10.18 per cent, were classed as unavoidable, and 381, or 5.95 per cent, were caused by defective engines, cars, tracks, tools, machinery, etc. Another chart shows for the same year, that of the accidents in which employees were killed, 51, or 76.12 per cent were caused by careless practices, 8, or 10.94 per cent, were collisions and derailments, 1, or 1.49 per cent, was classed as unavoidable, and 7, or 10.45 per cent, were caused by defective engines, cars, tracks, machinery, etc.

Supply-Men's Gifts Disapproved

President Ripley, of the Atchison, Topeka & Santa Fe, has published in the December issue of the Santa Fe Magazine the following letter addressed to all employees:

"Most individuals and companies dealing in railroad supplies have given up the practice of sending Christmas presents to railroad employees and officials. However, to a certain extent the practice was in evidence last year. I have always been opposed to this practice, have discouraged it, and am glad that it is decreasing. I want Santa Fe men to take such action as seems proper to eliminate it entirely. I appreciate that many of the presents given are tokens of friendship extending over many years; nevertheless the practice is bad, and certainly so where the presents have any value. The high standing enjoyed by Santa Fe men makes it all the more desirable that the practice cease."

Passenger Killed in Collision on New York Elevated

In a rear collision of northbound passenger trains on the Sixth avenue elevated line of the Interborough Rapid Transit Company, New York City, on the evening of December 9, one passenger and one trainman were killed and fifteen or more passengers injured. The leading train was standing at the 116th street station and the following train was moving at low speed, yet it was going fast enough to force some distance upward the rear end of the rear car of the standing train and the front end of the leading car of the other. The cars took fire from a short circuit and the bodies of the persons killed (or fatally injured) were badly burned.

It appears that in the second train the electric apparatus of the three leading cars was out of order, and the motorman was riding in the fourth car. The conductor was at the rear platform of the leading car and regulated speed by giving hand motions to the motorman. It is said that these motions were given by flag, although it was after 6 o'clock and quite dark.

Foreign Employees of the Pennsylvania

More than 19,000 employees of the Pennsylvania Railroad were born in those countries now engaged in the European war. More Italians are employed than any other class of foreigners. Of the 137,525 employees east of Pittsburgh and Erie, on September 1, 1914, 33,804 were foreign born, while 103,721 were native citizens of the United States. Of course, many of the foreign born employees have become naturalized citizens of this country. The number of employees from each of 38 foreign countries is:

Italy	13,193	Belgium	11	Denmark	62
Ireland	5,494	Mexico	10	Roumania	60
Austria	4,251	Servia	7	France	54
Germany	2,679	Portugal	5	Syria	38
Russia	1,830	East Indies	5	Australia	14
England	1,407	Chile	1	Brazil	4
Hungary	1,339	Canada	315	India	3
Poland	1,106	Greece	227	Argentine Republic	2
Sweden	514	Turkey	207	British Guiana	2
Scotland	449	Norway	170	Japan	2
Bulgaria	25	West Indies	113	Panama	1
Holland	20	Switzerland	99	Hawaiian Islands	1
Spain	12	Wales	72		

Attorney General's Report

The Attorney General, Mr. Gregory (formerly special counsel for the government in the prosecution of the New Haven road), has sent his annual report to Congress. In it he recommends an amendment to the commodities clause of the interstate commerce act to make it more effective. He recounts the history of the cases against the Delaware & Hudson and the Lehigh Valley. In the D. & H. case the Supreme Court construed the commodities clause as prohibiting a railroad from transporting articles in which at the time of transportation it has any interest, direct or indirect, in a legal or equitable sense. It further held that a railroad does not necessarily have an interest, direct or indirect, in a legal or equitable sense, in articles manufactured or produced by a bona fide corporation of which the railroad is a stockholder. In the subsequent case against the Lehigh Valley the court held that if the corporation owning the articles transported by the railroad was so identified with the railroad as in fact to be but an arm of the railroad, then the railroad would have an interest in the articles in the sense of the statute. Under this construction it has been claimed that the statute is not violated unless the railroad has the required interest in the articles at the date the transportation is begun.

The report then goes on to describe the organization of new and separate corporations to take and sell the railroads' coal, and continues: "This plan has been challenged in the case now pending in the Supreme Court of the United States against the Delaware, Lackawanna & Western. The government lost in the district court. Even though it should be successful in the Supreme Court, the commodities clause will still fall short of the purpose of Congress in enacting it, which was, I think, to divorce transportation from production. I recommend an amendment which will prohibit a railroad from transporting in interstate commerce articles which were manufactured or produced by any corporation controlled by it or affiliated with it by having the same controlling stockholders, irrespective of whether such railroad or such controlled or affiliated corporation has an interest in the articles at the time of transportation. It is also necessary, if transportation and production are to be completely divorced, that Congress prohibit any railroad owned or controlled by a producing or trading corporation, and not operated merely as a plant facility, from transporting in interstate commerce articles produced or owned by such corporation, and I recommend appropriate legislation to that end."

International Engineering Congress

Some confusion has arisen between the International Electric Congress, which was to have been held in San Francisco in September, 1915, and the International Engineering Congress, which is to be held during the same month. Owing to the unfortunate situation abroad, and the impossibility of convening the International Electrotechnical Commission, under whose authorization the Electrical Congress was to have been held, it has been decided by the governing body of the American Institute of Electrical Engineers to postpone indefinitely the holding of the Electrical Congress. This does not affect the International Engineering Congress, which goes ahead as originally planned.

MEETINGS AND CONVENTIONS

The following list gives the names of secretaries, dates of next or regular meetings, and places of meeting of those associations which will meet during the next three months. Hereafter the full list of meetings and conventions will be published only in the first issue of the Railway Age Gazette for each month.

American Society of Civil Engineers.—Chas. W. Hunt, 220 W. 57th St., New York. Regular meetings, 1st and 3d Wednesday in month, except June, July and August, 220 W. 57th St., New York.

American Society of Engineering Contractors.—J. R. Wemlinger, 11 Broadway, New York. Regular meetings, 2d Thursday in month, at 2 P. M., 11 Broadway, New York.

American Wood Preservers' Association.—F. J. Angier, B. & O., Mt. Royal Sta., Baltimore, Md. Next convention, January 19-21, 1915, Chicago.

Association of Transportation and Car Accounting Officers.—G. P. Conard, 75 Church St., New York.

Canadian Railway Club.—James Powell, Grand Trunk, P. O. Box 7, St. Lambert (near Montreal), Que. Regular meetings, 2d Tuesday in month, except June, July and August, Windsor Hotel, Montreal, Que.

Canadian Society of Civil Engineers.—Clement H. McLeod, 176 Mansfield St., Montreal, Que. Regular meetings, 1st Thursday in October, November, December, February, March and April. Annual meeting, January, Montreal.

Car Foremen's Association of Chicago.—Aaron Kline, 841 Lawler Ave., Chicago. Regular meetings, 2d Monday in month, except July and August, Lytton Bldg., Chicago.

Central Railway Club.—H. D. Vought, 95 Liberty St., New York. Regular meetings, 2d Friday in January, May, September and November. Annual meetings, 2d Thursday in March, Hotel Statler, Buffalo, N. Y.

Engineers' Society of Western Pennsylvania.—Elmer K. Hiles, 2511 Oliver Bldg., Pittsburgh, Pa. Regular meetings, 1st and 3d Tuesday, Pittsburgh.

General Superintendents' Association of Chicago.—A. M. Hunter, 321 Grand Central Station, Chicago. Regular meetings, Wednesday, preceding 3d Thursday in month, Room 1856, Transportation Bldg., Chicago.

New England Railroad Club.—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass. Regular meetings, 2d Tuesday in month, except June, July, August and September, Boston.

New York Railroad Club.—Harry D. Vought, 95 Liberty St., New York. Regular meetings, 3d Friday in month, except June, July and August, 29 W. 39th St., New York.

Niagara Frontier Car Men's Association.—E. Frankenberger, 623 Brisbane Bldg., Buffalo, N. Y. Meetings monthly.

Peoria Association of Railroad Officers.—M. W. Rotchford, Union Station, Peoria, Ill. Regular meetings, 2d Thursday in month, Jefferson Hotel, Peoria.

Railroad Club of Kansas City.—C. Manlove, 1008 Walnut St., Kansas City, Mo. Regular meetings, 3d Friday in month, Kansas City.

Railway Business Association.—Frank W. Noxon, 30 Church St., New York.

Railway Club of Pittsburgh.—J. B. Anderson, Room 207, P. R. R. Sta., Pittsburgh, Pa. Regular meetings, 4th Friday in month, except June, July and August, Monongahela House, Pittsburgh.

Richmond Railroad Club.—F. O. Robinson, C. & O., Richmond, Va. Regular meetings, 2d Monday in month, except June, July and August.

St. Louis Railway Club.—B. W. Frauenthal, Union Station, St. Louis, Mo. Regular meetings, 2d Friday in month, except, June, July and August, St. Louis.

Salt Lake Transportation Club.—R. E. Rowland, Hotel Utah Bldg., Salt Lake City, Utah. Regular meetings, 1st Saturday of each month, Salt Lake City.

Southern Association of Car Service Officers.—E. W. Sandwich, A. & W. P. R. R., Atlanta, Ga. Next regular meeting, January 21, 1915, Atlanta, Ga.

Southern & Southwestern Railway Club.—A. J. Merrill, Grant Bldg., Atlanta, Ga. Regular meetings, 3d Thursday, January, March, May, July, September, November, 10 A. M., Candler Bldg., Atlanta.

Toledo Transportation Club.—Harry S. Fox, Toledo, Ohio. Regular meetings, 1st Saturday in month, Boody House, Toledo.

Traffic Club of Chicago.—W. H. Wharton, La Salle Hotel, Chicago.

Traffic Club of New York.—C. A. Swope, 291 Broadway, New York. Regular meetings, last Tuesday in month except June, July and August, Waldorf-Astoria, New York.

Traffic Club of Pittsburgh.—D. L. Wells, Erie R. R., Pittsburgh, Pa. Meetings bimonthly, Pittsburgh. Annual meeting, 2d Monday in June.

Traffic Club of St. Louis.—A. F. Versen, Mercantile Library Bldg., St. Louis, Mo. Annual meeting in November. Noonday meetings October to May.

Transportation Club of Detroit.—W. R. Hurley, Superintendent's office, L. S. & M. S., Detroit, Mich. Meetings monthly, Normandie Hotel, Detroit.

Western Canada Railway Club.—W. H. Rosevear, P. O. Box 1707, Winnipeg, Man. Regular meetings, 2d Monday, except June, July and August, Winnipeg.

Western Railway Club.—J. W. Taylor, 1112 Karpen Bldg., Chicago. Regular meetings, 3d Tuesday in month, except June, July and August, Karpen Bldg., Chicago.

Western Society of Engineers.—J. H. Warder, 1735 Monadnock Block, Chicago. Regular meetings, 1st Monday in month, except January, July and August, Chicago. Extra meetings, except in July and August, generally on other Monday evenings.

REVENUES AND EXPENSES OF RAILWAYS

Month of October, 1914

Name of road.	Average mileage operated during period.	Operating revenues: Freight.	Operating revenues: Passenger.	Operating revenues: Total, inc. misc.	Operating expenses: Maintenance: Way and structures.	Operating expenses: Maintenance: Of equipment.	Operating expenses: Traffic.	Operating expenses: Transportation.	Operating expenses: Miscellaneous.	Operating expenses: General.	Operating expenses: Total.	Net operating revenue (or deficit).	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
Atlantic City	170	$67,740	$72,355	$153,599	$78,571	$17,619	$2,275	$87,365	$98	$1,361	$187,289	—$33,690	$13,500	—$47,242	$15,455
Boston & Maine	2,252	2,553,739	1,404,493	4,384,245	720,295	548,263	29,912	1,772,564	16,655	100,712	3,188,400	1,195,844	141,500	1,054,344	217,163
Delaware & Hudson	881	1,746,155	196,274	2,055,964	152,903	338,846	31,054	707,634	10,518	60,157	1,299,996	755,967	56,250	699,712	....
Detroit, Toledo & Ironton	441	174,752	16,051	201,711	38,426	28,568	5,349	121,113	....	6,170	199,627	2,084	6,000	—3,916	12,410
Kansas City, Mexico & Orient	740	181,925	40,453	234,941	39,344	26,353	8,889	80,198	....	9,464	164,248	70,692	10,029	60,663	....
Louisiana Ry. & Navigation Co	351	128,749	20,828	158,983	35,839	19,863	5,695	62,652	....	5,674	129,723	29,260	7,500	21,760	7,638
Louisville, Henderson & St. Louis	200	84,112	33,961	127,438	25,008	18,597	6,014	41,565	....	3,087	94,271	33,167	3,800	29,366	—5,999
Oahu Ry. & Land Co	109	45,354	22,241	74,648	12,058	8,013	589	20,116	....	3,192	43,967	30,681	7,186	23,495	—10,387
Philadelphia & Reading	1,120	3,404,490	578,892	4,177,951	391,189	701,803	48,818	1,466,458	3,934	74,861	2,687,062	1,490,889	99,488	1,391,050	—297,830
Port Reading	21	115,218	....	135,472	26,171	6,940	41	43,255	....	163	76,570	58,903	12,000	46,903	—1,740
Ulster & Delaware	129	52,787	19,170	85,760	14,191	18,612	1,037	39,946	57	2,944	76,788	8,972	3,300	5,672	—6,013

Four Months of Fiscal Year Ending June 30, 1914

Name of road.	Average mileage operated during period.	Operating revenues: Freight.	Operating revenues: Passenger.	Operating revenues: Total, inc. misc.	Operating expenses: Maintenance: Way and structures.	Operating expenses: Maintenance: Of equipment.	Operating expenses: Traffic.	Operating expenses: Transportation.	Operating expenses: Miscellaneous.	Operating expenses: General.	Operating expenses: Total.	Net operating revenue (or deficit).	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
Atlantic City	170	$295,233	$835,201	$1,177,253	$158,528	$101,369	$13,076	$507,271	$319	$7,337	$787,900	$389,353	$54,000	$335,265	—$32,897
Boston & Maine	2,252	9,476,432	6,301,538	17,268,920	2,858,653	2,648,639	162,734	7,004,316	75,815	378,478	13,128,635	4,140,285	645,210	3,495,075	—341,467
Delaware & Hudson	881	6,511,693	1,260,101	8,225,380	587,784	1,189,922	112,368	2,822,827	54,139	235,321	4,992,478	3,232,902	225,000	3,007,774	....
Detroit, Toledo & Ironton	441	616,990	75,355	734,776	98,234	87,328	15,452	379,367	....	23,806	604,186	130,590	24,000	106,590	278,438
*Kansas City, Mexico & Orient	...	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Louisiana Ry. & Navigation Co	351	520,516	94,091	656,577	137,196	67,839	22,730	251,385	....	20,777	499,927	156,651	32,000	124,651	26,101
Louisville, Henderson & St. Louis	200	334,641	150,248	517,630	106,311	72,285	21,625	161,605	....	12,541	374,366	143,263	15,200	128,053	—3,705
Oahu Ry. & Land Co	109	377,907	92,981	496,642	43,150	38,368	2,476	89,874	....	14,710	188,578	308,064	28,936	279,128	28,109
Philadelphia & Reading	1,120	13,032,327	2,431,810	16,209,846	1,705,019	2,892,695	188,119	5,546,839	43,989	279,298	10,655,959	5,553,887	401,856	5,150,206	—558,992
Port Reading	21	405,522	....	491,374	76,592	40,006	156	155,967	....	1,902	274,623	216,751	48,000	168,751	—2,796
Ulster & Delaware	129	203,322	194,134	461,007	68,953	57,899	7,621	193,101	206	12,173	339,954	121,054	13,200	107,854	—27,748

*This company was reorganized July 6 and 8, 1914, hence cumulative figures are not shown.

Traffic News

Tariffs have been filed by the railways advancing the rates on copper bullion 50 cents a ton from the Missouri river and points west to the Atlantic seaboard and other eastern points.

The car ferry which is to run between Key West and Havana is expected to begin business about January 1, and the principal railroads in the southeastern states have issued their announcements, bidding for through freight.

The local freight agents of the railroads and boat lines in the city of Milwaukee will visit Chicago on Friday, December 18, for the inspection of the local freight offices and houses, and to attend a regular meeting of the Local Freight Agents' Association of Chicago. They will be entertained at a luncheon by the Chicago local freight agents.

A special train of 19 cars of mules for shipment to Europe moved over the Nashville, Chattanooga & St. Louis last week from Atlanta, Ga., to Nashville, Tenn., in record time. The shipment made the 289 miles in 11 hours and 55 minutes, or an average of 25 miles an hour. Over the same road a shipment of 20 cars of mules for Europe moved as a special train, making the run from Nashville to Jackson, Miss., 151 miles, in 7 hours and 6 minutes.

"The time has come when an appeal should be carried to Congress over the head of the Interstate Commerce Commission, for authority to make reasonable advances in freight and passenger rates." This view, expressed by Harry Scullin, president of the Scullin-Gallagher Iron & Steel Company, of St. Louis, is one which, he says, prevails in that region to some extent. Mr. Scullin's firm is a large shipper of freight, yet he advocates an increase in transportation rates because of the benefit to be derived by business generally.

The Southern Railway, complying with a request from the United States Department of Agriculture, has granted leaves of absence to Dr. C. M. Morgan, livestock and dairy agent of the company, Dr. Walter Sorrell, Dr. Morgan's assistant at Greensboro, N. C., and Dr. C. D. Lowe, assistant at Atlanta, to permit them to accept temporary service with the Department of Agriculture in the work being done to stamp out the foot-and-mouth disease among cattle. Drs. Morgan and Sorrell have had experience with the foot-and-mouth disease in the Philippine Islands. This far this disease has been found in only two states in the South—Virginia and Kentucky.

Railways in the western trunk line territory have announced their intention to charge full tariff rates on and after January 1, on shipments of supplies consigned from various sources for the relief of Belgians. The lines in the Trunk line and Central Freight Association territory have issued similar notices, that free transportation for donations for European war sufferers will be canceled on December 20. The railroads have already contributed very generously to this movement in the free transportation which has already been furnished, and in commitments which have been made for the immediate future. In the meantime, all interested parties have been notified that all shipments on which the railroads are committed to free or reduced transportation should be tendered for shipment prior to January 1. In order to facilitate the handling of such shipments arrangements were made by the western roads with the American Commission for the Relief of Belgium, the Rockefeller foundation and the Belgian Relief Committee, the principal societies handling this traffic, so that all shipments on which free or reduced transportation was given were consigned to the American Commission for the Relief of Belgium.

Freight Blockade at Galveston

J. H. Hill, vice-president and general manager of the Galveston, Houston & Henderson, and president of the Texas General Managers' Association, on December 11, gave out the following statement bearing on the congestion in the export traffic at Galveston, and on the demurrage question:

"On hand yesterday on Galveston island all lines, 1,767 cars, containing 2,000,000 bushels of wheat, and there is approximately the same amount in elevators A, B and the Star mills, making a total of 4,000,000 bushels on hand. The amount in transit all lines within a few days' movement from Galveston, is 2,000,000 bushels more. The heaviest month's export this season was 6,505,715 bushels. The Santa Fe has found it necessary within ten days after raising its former embargo to again embargo against wheat for Galveston in order that it might not only have facilities left in Galveston to handle its cotton and other commodities, but that its equipment might be available for the needs of its patrons.

"Neither the past nor present conditions indicate that the question of demurrage has taken one bushel of wheat from Galveston that Galveston could have cared for had there been no demurrage. The necessity for placing an embargo is much more harmful to a port than is demurrage. The latter in a great measure prevents the former."

Russo-Mongolian Railway Convention.—It is announced in Petrograd from Urga, that the Russian diplomatic agent in Mongolia has signed in Kyachta, on September 17-30 last, along with the authorized agents of the Urga government, an agreement respecting railways in Mongolia, to give effect to a project for connecting the Mongolian railways with the Siberian railways by constructing suitable connecting lines. The agreement recognizes the right of the Mongolian government to build railways within its own territory, and approves the construction of railways in Mongolia to serve the interests of both that country and Russia, which country will co-operate with the Mongolian government in giving effect to such a railway policy, in the form of practical assistance. The Russian government will not interfere with Mongolian railway construction if effected at the cost of the latter. But with respect to railway concessions, the Mongolian government, in virtue of the strictly friendly relations with its Russian neighbor, will, before giving a concession, consult with the Russian government with the object of obviating either economic or strategical injury to Russia in the granting of such concessions. Other conditions of the usual formal nature are attached to the convention, which has been duly signed, and copies exchanged in the Russian and Mongolian languages.

Cuban Railways' Results.—Although the development of German bounty-fed beet sugar practically ruined the sugar industry in the Greater Antilles, Cuba, unlike the other islands, consistently extended the cane plantations, whereas the others combined the fruit industry. The cane being less susceptible to weather conditions provides a more reliable article for railway traffic than fruit; but there is more fluctuation in its prices. Nevertheless, the railways have expanded and shown good results, and there is good reason to believe that the policy of retaining sugar and tobacco as the staple articles and main traffic feeders for the railways will eventually triumph. The summarized figures for the year 1913-14 show the financial position of the principal lines in which British and American capital is invested:

	Miles	Gross receipts	Inc. or dec.	Net receipts	Inc. or dec.	Op. ratio P.C.	Dividends P.C.
United Havana	680	$7,832,721	—$72,915	$3,213,724	—$380,820	58.97	5
Cuban Central	341	2,847,168	—154,383	1,057,905	—229,577	62.84	2
West'n Havana	147	1,393,386	+26,438	491,492	—67,627	64.73	7
Total	1,168	$12,073,275	—$200,860	$4,763,121	—$678,024		
Cuba Railroad	602	$5,020,059	+$518,721	$2,401,734	+$248,268	52.16	6

The set-backs shown in the table are due to an overproduction of beet. The first three lines form a group distinct from the Cuba Railroad, which is American owned. The United group shows decreases, but the balance sheets show a combined reserve of $3,376,800. On the other hand, the Cuba Railroad not only shows an increase in the year's turnover, but has paid 6 per cent, an increase of 2 per cent, though nothing is added to reserve. A recent rise in price of sugar will add materially to the traffic and financial prospects, since an increase of one cent a pound will represent a gain of about $50,000,000 to the revenue of the island.

Commission and Court News

INTERSTATE COMMERCE COMMISSION

The commission has suspended until April 15 proposed increased rates on live stock, fresh meats and packing house products from Chicago, St. Louis and other western centers to eastern cities. The new rates from Chicago to New York, for instance, would have been 33 cents per 100 lb. on cattle as compared with 28 cents, and on fresh meats 50 cents as compared with the present rate of 45 cents.

Dispute Concerning Divisions No Justification for Cancellation of Joint Rates

In re transit regulations on grain and dried beans at points on the Michigan Central. Opinion by Commissioner Daniels:

The commission finds that a dispute over divisions does not justify the Michigan Central in cancelling transit rules and joint rates on dried beans and grain from points on the Detroit & Mackinac, to points on the Michigan Central and its connections. (32 I. C. C., 39.)

Rates from Joplin, Mo.

Commercial Club of Joplin, Mo., v. Missouri Pacific et al. Opinion by Commissioner Clark:

Complaint is made that various rates to and from Joplin, Mo., are unreasonable and discriminatory, as compared with rates to and from Kansas City and Springfield, Mo. The commission finds that no testimony having been offered with respect to rates on newsprint paper from Minnesota points, or on petroleum and its products from Chicago rate points to Joplin, these rates cannot be considered. It also holds that the complaint as to commodity rates on imports from New Orleans and other Gulf ports, and commodity rates from points in Oklahoma, Arkansas, Louisiana and Texas to Joplin is not sustained by competent evidence. Existing class and commodity rates from St. Louis, Mo., to Joplin, applied as parts of through rates on shipments originating east of the Mississippi River are not found unreasonable or discriminatory; and it is held that no such similarity of traffic or transportation conditions exists between Joplin and Kansas City as to justify prescribing proportional rates to Joplin. The carriers are called upon, however, to correct certain inequalities growing out of abrupt increases in rates to points just beyond the limits of the application of so-called outbound jobbers' rates, from Joplin to points in Kansas, Oklahoma and Arkansas. (32 I. C. C., 226.)

STATE COMMISSIONS

The Nebraska Railway Commission, on December 8, denied an application of the Missouri Pacific to increase passenger fares in the state from two to three cents a mile. The commission said that the Nebraska two-cent fare law placed the subject outside the jurisdiction of the commission.

The Illinois Public Utilities Commission on December 9 issued an order in the industrial railways case in which the railways had canceled their allowances to industrial lines controlled by shippers. The commission holds that such lines are common carriers and are consequently entitled to receive allowances and to participate in through rates with the trunk lines.

At a meeting of the members of state railway commissions of eight western states held in Omaha, on December 12, it was agreed that these commissions should concentrate their resistance to proposed advances in freight rates by western railroads which have been suspended by the Interstate Commerce Commission, and that they would combine to engage accountants and other assistants to prepare their case. The commissions of Kansas, Nebraska, Iowa, Minnesota, North Dakota, South Dakota, Oklahoma and Arizona were represented.

The Illinois Public Utilities Commission has rendered a decision approving the proposed consolidation of the Lake Shore & Michigan Southern and its various subsidiaries with the New York Central & Hudson River. The commission in its opinion announces that it does not disapprove of unification, merging or consolidation of public service corporations in Illinois where it can be effected without violating some positive law. The commission also states that with such comprehensive regulatory laws as are now enforced in the states competition loses its force as a corrective agency. "It follows, therefore," the commission says, "that the general plan of consolidation proposed is in complete harmony with the modern idea of governmental regulation in control of public service corporations."

The Public Service Commission of Pennsylvania has ordered that a Certificate of Public Convenience issue approving consolidation and merger, in the matter of the petition of the Lake Shore & Michigan Southern, the Geneva, Corning & Southern, and the Dunkirk, Allegheny Valley & Pittsburgh, these to have leave to consolidate, with other railroad companies into the New York Central. Substantially the same action has been taken by the Public Service Commission of New York state. A protest against the merger was filed at Harrisburg by minority stockholders on the ground that it would be unconstitutional, but the commission's inquiry developed that the consolidation is not within the language of the prohibition in the constitution, inasmuch as no corporation consolidates with or purchases a competing or parallel line. The commission declares, however, that the legality of the action taken by the roads may be questioned at any time in a proper manner before a proper tribunal. The stock remains in precisely the same situation after such a merger as it was before; in fact, the merger is based upon a statutory right which exists even though the parties may have participated in many unlawful transactions. To refuse the merger would in no way correct the alleged wrong. If the commission were to assume jurisdiction of this question and should find the stock to be held illegally it ought to compel a disposition of such stock; but it has no such power. In fact, says, the commission, the contention appears to be based on the illogical thought that if a party to a controversy has committed offenses, he may be denied by way of penalty his legal rights. This, however, is not the law. Even a professional burglar may make a valid will.

Advances in Philadelphia Suburban Fares

The Pennsylvania Public Service Commission, following a hearing held in Philadelphia last week on the complaints of passengers relative to advances in suburban passenger fares which had been announced by the Pennsylvania, the Philadelphia & Reading and the Baltimore & Ohio, on Saturday issued a decision sustaining most of the items in the tariffs filed by the roads, except that the proposed advance of certain rates from one cent a mile to two cents or more is modified so as to make the increase only about five mills; or from 1 cent a mile to 1½ cents. The order, in substance, is as follows:

" . . . It is the judgment of the commission that the withdrawal from sale of the fifty and 100 trip individual commutation tickets, which have been maintained for many years, would unreasonably increase the fares paid by persons who have found these tickets suited to their needs.

"That 2¼ cents a mile is an unreasonably high basis for the charge for a ten-trip ticket, and

"That the sixty-trip monthly commutation ticket and the forty-six-trip monthly school ticket should be valid for a period of one month, and the 180-trip commutation ticket should be valid for a period of three months, all from date of issue, instead of being valid for periods of one and three calendar months only, as heretofore and proposed. . . . The proposed tariffs are unreasonable in making a charge of more than 2 cents a mile for ten-trip tickets.

"A reasonable scale of the charges for suburban passenger transportation in Pennsylvania is one providing for the scale of:

"One-hundred-trip individual tickets, sold at a rate not to exceed 1½ cents a mile, good six months.

"Ten-trip tickets, good for bearer and persons accompanying

bearer, sold at a rate not to exceed 2 cents a mile, good three months.

"Sixty-trip individual monthly commutation as proposed [increased 25 cents a month].

"The carriers are required to file proper tariffs to become effective December 15. . . ."

The Pennsylvania Railroad announced that it would acquiesce in the order.

Declaring that the simultaneous action of the three roads in advancing rates on the same day and to the same degree, gave evidence that they had been engaged in an illegal conspiracy, some of the objecting passengers had called upon the attorney-general at Washington to prosecute the roads under the anti-trust law; but whether this request will be followed up, does not appear.

The Interstate Commerce Commission did not suspend the interstate suburban rates, which were advanced simultaneously with those here dealt with.

Advanced intrastate tariffs filed in New Jersey (to Camden, across the river from Philadelphia) were suspended by the New Jersey commission.

PERSONNEL OF COMMISSIONS

Ross D. Rynder, chief examiner of the Interstate Commerce Commission, has resigned to become commerce counsel for Swift & Co. at Chicago.

George Welch, recently elected, becomes a member of the Tennessee State Railroad Commission on January 1, in place of Frank Avent, who has been a member of the commission for eight years.

John H. Roemer, chairman of the Wisconsin Railroad Commission, has announced his resignation, effective February 1, 1915. He is to take charge of the legal department of H. M. Byllesby & Co., Chicago.

COURT NEWS

The Manufacturers' Railway of St. Louis and the St. Louis Southwestern last week filed a petition in the United States district court at St. Louis for an injunction against the order of the Interstate Commerce Commission, fixing $2.50 a car as the maximum to be paid to the Manufacturers' Railway by trunk lines for switching cars over its line. The petition states that cars from the St. Louis Southwestern can be taken to certain industries only over the line of the Manufacturers' Railway, and that a rate of less than $4.50 a car is not sufficient to pay the Manufacturers' Railway enough to cover the expense.

Russian Railway Policy.—It is reported from Russia that fresh concessions to construct railways will not be granted. But those companies that have begun constructional operations will be allowed to continue. Those, however, with concessions who have not begun construction, will have to put off operations until the end of the war. It may be only a war measure; but it is not so stated.

Will the Railway Map of Africa be Revised.—Whatever may be one's personal opinion of Germany's fitness as a colonizing power, it must be admitted that no other nation, not even France, has realized more fully the imperative necessity of railway construction in colonial development work. As a result, the German railway schemes in her African colonies have been on a grandiose scale. Millions of money have already been spent on the construction of *lignes de pénétration*, together with port and harbor works. Not a single line has so far been productive, but none has been expected to yield a profit yet awhile; the railways have been planned under a policy of developing natural resources, and it is to be presumed that considerations of strategy have also not been overlooked. The question now is, whether other powers will not reap the harvest. A glance at the map of Africa shows that the German colonies are sandwiched in between those of Great Britain, France, Portugal and Italy. For instance, Togoland, together with the Gold Coast, forms an enclave in French territory. The ultimate disposal of these colonies, and their railways, is therefore an interesting subject for speculation.

Railway Officers

Executive, Financial, Legal and Accounting

M. Dailey, general manager of the Muscatine North & South Railway, has been appointed receiver, with office at Muscatine, Iowa.

H. K. Brooks, western manager of the financial department of the American Express Company at Chicago, has been elected vice-president, with headquarters at New York.

E. W. Beatty, whose appointment as vice-president and general counsel of the Canadian Pacific with headquarters at Montreal, Que., has already been announced in these columns was born on October 16, 1877 at Thorold, Ont., but moved with his parents to Toronto when he was ten years old. He is the son of the late Henry Beatty, a well known steamboat man in Canada. After graduating from the Toronto University he studied law in Toronto with a firm of which A. R. Creelman, who was his predecessor as general counsel of the Canadian Pacific was a member. In 1901 Mr. Beatty entered the legal department of the Canadian Pacific as one of the assistants to Mr. Creelman and in March, 1910, he was appointed general solicitor. He remained in this position until July 1, 1913, when he was appointed general counsel with headquarters at Montreal, Que., which position he held until his recent appointment also as vice-president.

E. W. Beatty

George Bury, vice-president in charge of the Canadian Pacific west of Lake Superior, who on January 1, will go to Montreal, Que., to succeed David McNicoll as senior vice-president, was born on March 6, 1866, at Montreal, and was educated at the Montreal College. He began railway work in 1883, as a clerk in the purchasing department of the Canadian Pacific, and has been in the continuous service of that road ever since. From 1887 to 1889, he was secretary to vice-president, and secretary to president, then to March, 1890, was acting superintendent of dining, sleeping and parlor car service. From 1890 to September, 1899, he was successively assistant superintendent in charge of the division from Chalk River to Cartier and Sault Ste. Marie, and superintendent at North Bay, Ont. He was then superintendent at Fort William, Ont., until his appointment in February, 1901, as superintendent of the Crows Nest Pass division. From May, 1902, to 1905, he was general superintendent of the Lake Superior division and then was general superintendent of the

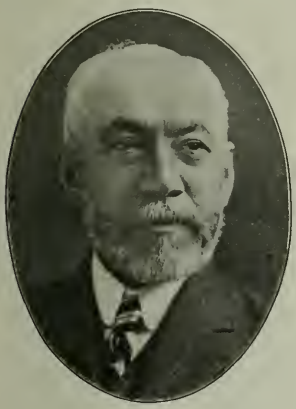
George Bury

Central division, until February, 1907, when he was appointed assistant general manager of the western lines of the Canadian Pacific, at Winnipeg, Man. On March 1, 1908, he was promoted to general manager of the western lines, and in October, 1911, he was elected vice-president and general manager of the same lines, and later was made vice-president in charge of the company's interests west of Lake Superior, with headquarters at Winnipeg, Man. On January 1 he will succeed David McNicoll, senior vice-president, with headquarters at Montreal, Que., and in his new office Mr. Bury will have jurisdiction over the entire system.

The offices of B. W. Fernald, auditor, and of H. Escherich, cashier, of the Tonopah & Tidewater and the Death Valley, have been removed from Oakland, Cal., to Los Angeles.

Thomas R. Beman, assistant general attorney of the Rock Island Lines, has been appointed general attorney. He will have charge of the preparation and approval of contracts. Wallace T. Hughes has been appointed assistant general attorney, and will continue in his present duties in matters relating to interstate commerce. A. B. Enoch has been appointed assistant general attorney, in charge of litigation in Illinois. Headquarters, Chicago.

David McNicoll, whose resignation from the position of senior vice-president of the Canadian Pacific, with headquarters at Montreal, Que., effective January 1 next, has already been announced in these columns, was born in April, 1852, at Arbroath, Scotland, and began railway work in August, 1866, as clerk in the goods manager's office of the North British Railway in Scotland. He remained in that position until 1873, when he went to the Midland Railway in England in the same capacity. The following year he went to Canada and was appointed billing clerk on the Northern Railway of Canada, and then from 1874 to 1881 was chief clerk in the general manager's office of the Toronto, Grey & Bruce, now a part of the Canadian Pacific. From 1882 to 1883 he was general freight and passenger agent of the same road, and then was general passenger agent of the Eastern and Ontario divisions of the Canadian Pacific until 1889, when he became general passenger agent of all lines, rail and steamship, of the Canadian Pacific. He was then appointed passenger traffic manager, remaining in that position until April, 1899, when he was appointed assistant general manager. One year later he was elected second vice-president and general manager and since December, 1903, was senior vice-president of the same road. Sir Thomas G. Shaughnessy, president of the Canadian Pacific, in announcing the resignation of Mr. McNicoll, said that he desired to be relieved of the duties of vice-president in order to rest and recuperate, but he will remain on the board of directors and when his health permits it is expected that he will be asked to accept another important post in connection with the company's affairs.



D. McNicoll

Operating

J. S. Gillespie has been appointed acting general superintendent of the Columbus & Southern, with headquarters at Laurelville, Ohio, succeeding I. F. Anderson, general superintendent, resigned.

R. F. Ledford, assistant division superintendent of the Beardstown division of the Chicago, Burlington & Quincy at Centralia, Ill., has been transferred to St. Joseph, Mo., as assistant superintendent of the St. Joseph division. M. C. Hughes, trainmaster at St. Joseph, succeeds Mr. Ledford.

It is announced that the offices of assistant superintendent of telegraph and assistant signal engineer of the Baltimore & Ohio Southwestern and the Cincinnati, Hamilton & Dayton are abolished. E. T. Ambach, assistant signal engineer of these roads, has been appointed assistant superintendent of telegraph and signals, with headquarters at Cincinnati, Ohio, effective December 15.

Albert D. Caulfield, trainmaster of the Illinois Central at Water Valley, Miss., has been appointed superintendent of the Mississippi division, with headquarters at Water Valley, succeeding John M. Egan, who has been granted leave of absence. The jurisdiction of Ned W. Spangler, trainmaster at Water Valley, has been extended to include Jackson, Water Valley and Grenada districts.

Traffic

R. W. Hunt, superintendent of ticket collections of the Southern Railway, has been appointed division passenger agent, with headquarters at Nashville, Tenn.

W. B. Wheeler, general western passenger agent of the Lehigh Valley at Buffalo, N. Y., having resigned to enter the service of the United Fruit Company, his former position has been abolished, and Norman W. Pringle, New England passenger agent at New Haven, Conn., has been appointed division passenger agent at Buffalo.

W. B. Hinchman, general agent of the Tonopah & Tidewater, has been appointed assistant to traffic manager of that road and the Death Valley, with headquarters at Los Angeles, Cal. D. Aspland, general agent at Goldfield, Nev., has been transferred to San Francisco, Cal., and H. R. Grier, assistant general agent at Tonopah, Nev., has been appointed general agent at that place. The office of F. M. Jenifer, traffic manager, has been removed from Oakland, Cal., to Los Angeles.

Albert J. Simmons, whose appointment as assistant general passenger agent of the Lehigh Valley, with headquarters at New York, has already been announced in these columns, was born on June 2, 1861, at London, Eng., and began railway work in 1872 as an office boy on the Pennsylvania Railroad. He was subsequently clerk on the St. Louis, Iron Mountain & Southern, then clerk on the Wabash, St. Louis & Pacific at New York, and in 1880 was appointed soliciting freight and passenger agent of the Union Pacific, at Boston, Mass. He was later New England agent of the Baltimore & Ohio, and then was New England passenger agent of the Lehigh Valley at Boston. In December, 1904, he was appointed general eastern passenger agent at New York, which position he held at the time of his recent appointment as assistant general passenger agent, as above noted.

A. J. Simmons

Engineering and Rolling Stock

Joseph Korvol has been appointed roadmaster of the Northern Pacific at Sedro Woolley, Wash., in place of W. J. Calvin, resigned.

A. D. Brice, assistant to the master car builder of the San Antonio & Aransas Pass, has been appointed master car builder, with headquarters at Yoakum, Tex., succeeding W. T. Cousley, resigned.

J. A. Cassady, master mechanic of the Alabama Great Southern at Birmingham, Ala., has been appointed master mechanic of the Cincinnati, New Orleans & Texas Pacific, with office at Somerset, Ky., succeeding H. B. Hayes, who has been transferred to Birmingham as master mechanic of the Alabama Great Southern, succeeding Mr. Cassady.

OBITUARY

Charles J. Eddie, formerly for 16 years general western agent of the Chicago, Milwaukee & St. Paul, died at his home in Chicago on December 10, aged 70 years.

F. Wetherald, special passenger agent of the Chicago, Burlington & Quincy at Boston, Mass., died in that city on December 8. He had been connected with the Burlington since 1856. He was traveling passenger agent from 1876 to 1893, when he was appointed special passenger agent at Boston.

Frederick A. Nash, general western agent of the Chicago, Milwaukee & St. Paul, at Omaha, Neb., died on December 11, aged 66 years. Mr. Nash was born at Akron, Ohio, and had been in railway service since September, 1867. He was with the Union Pacific until 1882, when he went to the Chicago, Milwaukee & St. Paul as general agent at Omaha. In 1897 he was appointed general western agent.

Henry S. Hayward, consulting engineer floating equipment of the Pennsylvania Railroad, with headquarters at New York, died on December 14 at Augusta, Ga., at the age of 70. He began railway work in April, 1873, as a machinist and draftsman on the Pennsylvania Railroad, and since January, 1912, was consulting engineer floating equipment of the Pennsylvania Lines east of Pittsburgh. Mr. Hayward's entire service of over 40 years had been with the Pennsylvania Railroad.

William D. Cantillon, formerly general manager of the Chicago & North Western, died at his home in Chicago on December 13. Mr. Cantillon was born on August 5, 1861, at Janesville, Wis., and was connected with the North Western continuously for 36 years, resigning last May on account of ill health. He began railway work with that road as brakeman in 1878. He was afterwards conductor, and from 1891 to 1893 was trainmaster at Milwaukee, Wis. He was then for four years assistant superintendent at Milwaukee, and was made division superintendent at Winona, Minn., in 1901. In July, 1902, he was promoted to assistant general superintendent, and in January, 1906, was appointed assistant general manager. Mr. Cantillon became general manager in November, 1910, which position he held at the time of his retirement last spring.

W. D. Cantillon

Colonel Edward D. Meier, formerly president of the American Society of Mechanical Engineers, died on December 15 in New York City at the age of 73. He was born in St. Louis, Mo., and graduated from Washington University in 1858. He subsequently spent four years in Germany at the Royal Polytechnic College in Hanover, and later became an apprentice at the Mason Locomotive Works, Taunton, Mass. After serving in the United States army during the civil war he entered the service of the Rogers Locomotive Works at Paterson, N. J. He subsequently was superintendent of machinery of the Kansas Pacific, now a part of the Union Pacific. In 1870 he became chief engineer of the Illinois Patent Coke Company, and two years later was secretary and construction engineer of the Meier Iron Company, and in 1884 organized the Heine Safety Boiler Company, of which he was president at the time of his death. Previous to 1908 he was president of the American Diesel Engine Company and introduced the Diesel motor into this country. He was president of the American Boiler Manufacturers' Association in 1898; president of the American Society of Mechanical Engineers in 1910, and in 1913 represented that society in Munich, at a joint meeting with the German Engineering Society.

Equipment and Supplies

LOCOMOTIVE BUILDING

The London & Port Stanley, London, Ont., has ordered 3 electric locomotives from the Canadian General Electric Company.

CAR BUILDING

The Chicago Great Western is in the market for 2 60-ft. postal cars.

Pennsylvania Railroad.—The item in the *Railway Age Gazette* of last week that this company had ordered 1,050 all-steel box cars from the Altoona shops was in error, in that this was not a new order, but merely the authority to proceed with an old order which had been held in abeyance.

Railway Construction in the Brazilian State of Rio Grande do Sul.—There are now in operation in the Brazilian state of Rio Grande do Sul 1,489 miles of railway and about 200 miles more will be opened to traffic before the end of the present year. In April last the president of the state published a decree setting forth the plans for the extension of the government lines, on which work will commence soon. These lines, as proposed, will open up some of the wealthiest lands in the state.

The Sierra Leone Government Railways.—The Sierra Leone Government Railways are in the unusual position among African railways of having a 2 ft. 6 in. gage. The main line runs from the port of Freetown to Pendembu; and an extension of 30 miles from Yonni Banna to Makump was opened for traffic in February, 1913. There is also a mountain railway from Freetown up the Lion Rock, a distance of 6 miles, which is worked by adhesion and has a general grade up the mountain of 3.33 per cent. With the extension, the total length of line is now 300 miles. The recently published report of the general manager for the year 1913 shows satisfactory results. Gross receipts, $818,511, showed an increase of $127,677, and the net earnings, $380,358, were $57,460 better, giving a return of 5.78 per cent on capital expenditure. The percentage of operating expenses to receipts was 53.53. As usual, the principal item of outbound freight traffic was palm kernels, of which 25,820 tons were carried, earning $327,545 in 1913, as compared with 22,016 tons and $283,050 in 1912. The highest rated inbound traffic was spirits, of which 2,746 tons were carried, earning $66,412. A revised tariff with certain reductions in passenger fares and alterations in freight rates is in course of preparation.

Some Notes About Armored Trains.—It would be an interesting problem for military historians to determine when the idea originated of using the railway trains as weapons of offence. The British have been familiar with the armored train since the campaign in South Africa. In fact, it was in connection with a little affair at Estcourt, in which an armored train figured so prominently, that some of the first shots of the war were fired. As a weapon of offence, the armored train possesses two very remarkable and outstanding advantages. It has remarkable mobility, and is easy to construct, the sole requirements being suitable light guns and metal plates or sheets for the protection of the locomotives and rolling stock employed. Public attention has lately been more focussed on the more spectacular armored motor car, which has really done remarkable execution, but this weapon is not of much use save for very effective scouting and in roadside skirmishes. The armored train, on the other hand, is really a mobile fort, capable of traveling at a speed far in excess of that attainable by any army, and able, like a man-of-war, to discharge a broadside when in motion. Accounts would seem to indicate that the problem of taking up the recoil has not yet been solved entirely, but the difficulties experienced in that respect appear neither serious nor insuperable.

Supply Trade News

The Concrete Mixing & Placing Company, 123 W. Madison street, Chicago, which has formerly handled the pneumatic mixer and conveyor in western territory, now has extended its business to cover the entire country.

The Mesta Machine Company, Pittsburgh, Pa., has recently acquired the rights from the Stumpf Una-Flow Engine Company, Syracuse, N. Y., to build the Stumpf Una-Flow type of engine in the United States. The agreement not only gives the Mesta Machine Company the patent rights of Professor Stumpf, but includes the use of the knowledge gained by the practical experience of European builders of Stumpf engines.

Arthur E. Jackman has been appointed manager of the machinery department of the Walter A. Zelnicker Supply Company, St. Louis, Mo., succeeding J. J. Hilpirt, who has resigned to become storekeeper of Cia. Mexicana De Petroleo, "El Aguila" S. A. at Tampico, Mex. Mr. Jackman was at one time general manager of the Sea View Railroad and the Narragansett Pier Electric Light & Power Company. He was also for years in the railway and lighting department of the Westinghouse Electric & Manufacturing Company, and left the position of superintendent of the East St. Louis, Columbia & Waterloo Railway to assume his present duties.

H. C. Hequembourg, whose election to the vice-presidency of the Standard Chemical Company, Pittsburgh, Pa., has been announced in these columns, was born in St. Louis, Mo. He received his education at Dunkirk, N. Y., and spent the first 21 years of his business life with the Brooks Locomotive Works of that city in the positions, respectively, of bookkeeper, cashier and assistant secretary. When the American Locomotive Company was incorporated in June, 1901, he was made its general purchasing agent, and has remained in that position up to the acceptance of his new appointment. The Standard Chemical Company is a refiner of carnotite ores and produces radium, uranium and vanadium. Mr. Hequembourg as vice-president of the company will be its representative in the east and will have headquarters at 30 Church street, New York. He will also represent the American Vanadium Company in the east. Mr. Hequembourg during his many years with the American Locomotive Company has made many friends in New York, and it is with pleasure that they learn that he will continue to have his offices in that city.

H. C. Hequembourg

The fire that destroyed part of the Edison Phonograph Works at Orange, N. J., on December 9 did not in any way affect the Edison Storage Battery Company. One end of the large concrete buildings of the battery works is across the street from Mr. Edison's private laboratory, which was saved, and this as well as the rest of the plant escaped unscorched. The fire started about 5:20 in the afternoon and was under control by 10 o'clock. The telephone exchange was in one of the burned buildings, but through the prompt action of the New York Telephone Company a temporary switchboard was working in the battery office before business hours the next morning and the Public Service Electric Company had emergency lines furnishing power nearly as soon. The business of the Edison Storage Battery Company, therefore, suffered no interruption whatever.

Railway Construction

Atlanta, Birmingham & Atlantic.—A contract has been given to Thomas Worthington, Birmingham, Ala., to build a freight line to serve coal mines from Roebuck, Ala., to Coalmont, 1.5 miles.

Canadian Pacific.—An officer of the Esquimalt & Nanaimo writes that surveys have been made and the right of way partly cleared for an extension from Courtenay on Vancouver Island, B. C., to Campbell River, 30 miles.

Charles City Western.—Plans are being prepared for the extension of this line from Charles City, Iowa, in a northeasterly direction, a distance of 18 miles. This work is to be done next spring in connection with the electrification of the present line. E. R. Ernsberger, Charles City, Iowa, is general manager.

Chartiers Southern.—An officer writes that grading work is about finished and the bridge masonry and tunnel work have been completed on the line from a point near Eighty Four, Pa., south to a point near Marianna, 10.27 miles, but further work has been indefinitely postponed. Contracts were let in 1913 to the Brocklehurst & Potter Company, New York, to build the line. E. V. Braden is engineer, Pittsburgh, Pa.

Chicago, Milwaukee & St. Paul.—Extended improvements are being planned by this company at Mason City, Iowa, but work will not be started until next spring.

Eastern Maine.—An officer writes that this company is making surveys from the line from Bangor, Me., to Houlton, about 112 miles, and has just completed the location of the section from Bancroft to Houlton, 32 miles. G. W. Maxfield, president, Bangor. (October 9, p. 670.)

Erie.—An officer writes that this company and subsidiary lines will carry out double tracking work as follows: Between Allegany, N. Y., and Carrolton, 5.6 miles; Chicago & Erie between Lomax, Ind., and Griffith, 36 miles; Sharon Railway, between Ferrona, Pa., and West Middlesex, and between New Castle Waterworks and New Castle Junction, 12 miles; Nypano Railroad from Steamburg, N. Y., to Waterboro, 9 miles, and Cleveland & Mahoning Valley, on the Canal branch, from Youngstown Ohio, to Girard, 5 miles.

Esquimalt & Nanaimo.—See Canadian Pacific.

Fresno Interurban (Electric).—A line is being built from Fresno, Cal., to Las Palmas, 5 miles, and from thence to Centerville, 16 miles. There will also be a branch running from Las Palmas to Clovis, 5 miles. Grading will amount to about 6,000 cu. yd. a mile. The line will cross seven main irrigation canals on framed trestles, each about 60 ft. long. Work is about 30 per cent completed.. Mahoney Brothers, San Francisco, are the general contractors. John B. Rogers, San Francisco, is president of the railway company.

Gulf, Florida & Alabama.—An officer writes that in addition to the extension now being built from Broughton, Ala., north to Kimbrough, 52 miles, on which work is now under way by the Eastern Construction Company, Pensacola, Fla., the company has located 145 miles from Kimbrough to Tuscaloosa. The company now operates a 90-mile line from Pensacola, Fla., north to Broughton, Ala., and a 11-mile branch line.

Illinois Central.—An officer writes that the improvements now under way include grade reduction and second track work between Princeton, Ky., and Dulaney on 11.10 miles; relocation of 5.25 miles at Iron Hill, and grade reduction at Grand Rivers on 0.60 miles. The contractors are H. C. Hodges, Birmingham, Ala.; Winston Brothers Company, Minneapolis, Minn., and the Walsh Construction Company, Davenport, Iowa. Grade separation work is also under way on 1.37 miles at Matoon, Ill. J. D. Lynch, Monmouth, Ill., is the contractor.

Midland Continental.—An officer writes that surveys are now being made for an extension from Wimbledon, N. D., to Grand Forks, 94.5 miles.

Nevada Short Line.—We are told that this company is building a 3-ft. gage line to be 12 miles long, from Oreana, Nev., or Nenzel on the Southern Pacific to the new mining camp of Rochester. About nine miles has been completed. A. A. Codd, president and general manager, Reno, and R. E. Tilden, chief engineer, Winnemucca, Nev.

Ottawa & St. Lawrence Electric.—A grading contract is reported let to Eastman, Kenny & Stearns, Russell, Ont., to build the section between Russell and Metcalfe. The company made plans about two years ago to build 275 miles of railway out of Ottawa, and to use gas-electric cars for operating the line. H. W. Pearson, Confederation Life building, Toronto, is secretary.

Salt Lake & Ogden (Electric).—An officer writes that 1.06 miles of new line will be built from the present terminal at Salt Lake City, Utah, to the new terminal, to be used jointly with the Salt Lake & Utah, and 0.33 miles will be built at Ogden to connect with the new terminal to be used jointly with the Ogden, Logan & Idaho.

Seattle, Port Angeles & Lake Crescent.—The grading, bridge work, etc., are being completed on the new line from Port Angeles, Wash., eastward to the line of the Port Townsend Southern, 37 miles. C. J. Erickson, Seattle, Wash., is the general contractor. The track will be laid by company forces. This stretch of new road is part of the original proposed line which extends from a point 25 miles west of Port Angeles through Port Angeles eastward via Sequim to a connection with the Port Townsend Southern at the head of Discovery Bay, 37 miles, and then to a terminus on Puget Sound, not yet selected. Work on this last section, which is 12 to 15 miles long, has not yet been begun. E. O. Reeder, Seattle, Wash., is chief engineer.

South Dakota Central.—An officer of this company, which operates a line from Sioux Falls, S. D., north to Watertown, 102.8 miles, writes that a contract has been given to P. E. Shugart, Nevada, Iowa, to build an extension from Watertown north to the Chicago, Milwaukee & St. Paul, 28 miles.

RAILWAY STRUCTURES

Boone, Iowa.—The Ft. Dodge, Des Moines & Southern has started the work of replacing the wood bridge spanning the Des Moines river between Boone and Fraser, with steel deck girders placed on concrete abutments and piers. There will be six spans. The concrete work on the south abutment and three piers has just been completed, and the deck girders for these spans have been ordered, and when in place will replace all of the pile trestle work up to the old Howe truss. This will constitute all the work that is contemplated at the present time, but it is stated that if financial conditions permit the bridge will be completed in 1915. The concrete work is being done by company forces.

Chicago, Ill.—The Illinois Central has commenced the construction of a hospital and power house to be located on Stony Island avenue, between Fifty-seventh and Fifty-ninth streets, Chicago. The main building will be 266 ft. long, 47 ft. wide and four stories high, with a rear wing 59 ft. by 47 ft. in area two stories high. The power house, which includes the laundry, will be 89 ft. by 48 ft. in area and two stories high. Both buildings will be of brick and stone construction and strictly fireproof. The estimated cost is $300,000. Schmidt, Garden & Martin, Chicago, are architects, and James Stewart & Co., are the general contractors. The foundations are already in place and the entire work is to be completed by October, 1915.

Parsons, Kan.—Work is to begin at once on the construction of a brick office building of the Missouri, Kansas & Texas, at Parsons, Kan. The building will be 51 ft. by 179 ft. in area and three stories high. The estimated cost is $50,000. The Wimmer Contracting Company, St. Louis, Mo., has the general contract.

St. Paul, Minn.—The directors of the St. Paul Union Depot Company have reached an agreement on plans for the construction of the proposed new union depot to cost between $12,000,000 and $15,000,000, and have announced that the final plans will be ready to be submitted to the city authorities in about two weeks.

Railway Financial News

Buffalo, Rochester & Pittsburgh.—The New York Public Service Commission, Second district, has approved of an issue of $1,020,000 4½ per cent consolidated mortgage bonds of the Buffalo, Rochester & Pittsburgh at a price to be fixed later.

Chicago & North Western.—Kuhn, Loeb & Co., New York, bought from the Chicago & North Western and resold to the public $10,000,000 general mortgage 5 per cent bonds due November 1, 1987. The offering price to the public was 102½, the yield on this basis being about 4⅞ per cent.

Illinois Central.—Kuhn, Loeb & Company have bought from the Illinois Central and resold $5,000,000 Chicago, St. Louis & New Orleans 5 per cent equipment trust notes guaranteed by the Illinois Central. The notes were offered by the bankers at par and were oversubscribed.

Michigan Central.—A semi-annual dividend of 1 per cent has been declared, payable January 29. This reduces the annual rate from 6 per cent to 2 per cent, in 1914 a total of 4 per cent having been declared. The annual rate has been 6 per cent since 1907.

Pennsylvania Railroad.—See Vandalia.

St. Louis & San Francisco.—The receivers are making arrangements to sell $3,000,000 6 per cent receivers' certificates to refund the $3,000,000 receivers' certificates which mature on January 1.

Southern Railway.—Holders of the outstanding $4,722,000 Richmond & Danville consolidated mortgage 6 per cent bonds which mature on January 1, 1915, are offered the privilege of exchanging these bonds for Southern Railway first consolidated 5's at 98½.

Vandalia.—The regular annual dividend of 4 per cent, which is This price is $1,500,000 less than the price fixed for the former usually declared at this time of the year, has been passed. The Pennsylvania owns $12,114,000 of the total $14,614,000 stock of the Vandalia.

Wheeling & Lake Erie.—Judge Clarke, in the federal district court, has fixed the upset price for the sale of the Wheeling & Lake Erie at $18,500,000, the road to be sold before April, 1915, sale, at which there were no bidders.

Turks Seize a British Railway.—A Constantinople message states that the Turkish government has confiscated the Ottoman (Smyrna to Aidin) Railway.

New Railways Constructed in Germany.—According to the *Nieuwe Rotterdamsche Courant*, the Germans have been amazingly busy creating a network of strategic railways. It is stated that between Berlin and Cologne no fewer than eight sets of railway lines have been laid down.

Strategic Railway in South Africa.—The construction work on the railway from Prieska to Upington, on the northwest border of the Cape Province, has now been completed, and the first train went through on November 18. The line, 142 miles in length, follows approximately the course of the Orange river, and is of considerable military and strategic importance.

Railway Construction in French Congo.—In order to avoid the present necessity of using the Belgian railway (Matadi-Leopoldville) for transporting passengers and freight to Middle Kongo and the Ubangi-Tchad colonies, France has resolved to construct a railway from Pointe-Noir on the Atlantic coast inland to Brazzaville, in the neighborhood of Stanley Pool on the Congo river, and an appropriation amounting to about $18,000,000 has been voted toward the project by the French Chamber. This will probably have little effect upon the transport of merchandise for Belgian Congo, but the Matadi-Leopoldville line will lose the French traffic and possibly a considerable portion of that for the southern part of German Kamerun.

Railway Age Gazette

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WE GUARANTEE, that of this issue 8,750 copies were printed; that of these 8,750 copies 7,410 were mailed to regular paid subscribers to the weekly edition, 250 were provided for counter and news companies' sales, 1,056 were mailed to advertisors, exchanges and correspondents, and 34 were provided for samples and office use; that the total copies printed this year to date were 486,300, an average of 9,352 copies a week.

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VOLUME 57 DECEMBER 25, 1914 NUMBER 26

Contents

*Illustrated.

An Inefficient Efficiency Engineer

"What is the old nuisance about now?" is a query propounded to us by a railroad officer, also a member of the American Society of Mechanical Engineers, who recently received a circular from a much-advertised efficiency engineer criticizing the lack of facilities provided by the society. Our answer is that, like Clifford Thorne, he is bound to seek notoriety, particularly now that the public at large is forgetting his attacks on the railways and is getting so used to seeing his flamboyant efficiency correspondence school advertisements that they have grown tired of them. The editor of the American Machinist, who has carefully investigated the claims made in the circular and discusses them in detail in this week's issue of his publication, shows that practically all of the facilities, the lack of which is deprecated, are already provided, and makes this significant statement: "The circular shows that he knows nothing about the society's work. The first principle of efficiency is a knowledge and proper use of facts. Judged by this standard and in this case the author of the circular is amazingly inefficient."

A Substitute for the Full Crew Law

A newspaper item received recently stated that it is proposed to introduce in the Illinois legislature a bill to limit to 50 the number of cars in a freight train "to avoid the obstruction of street crossings by long trains." Another newspaper received the same day mentioned such a bill as a part of the legislative program of the Brotherhood of Railroad Trainmen. Evidently the overwhelming defeat of the full crew law in Missouri by a referendum vote of the people at the recent election has taught the labor leaders that legislation to create jobs must be sugar-coated in another form, for, of course, the purpose of the two laws is the same. The brotherhood has been able to secure the passage of full crew laws in a number of states by reinforcing the votes of those legislators who are always willing to jump at the call of the labor leader with those of the class of politicians who have kept themselves in office by always opposing the railroads, and probably with those of a few who were deceived by the argument that more men on a train would promote safety. In the same way it is doubtless believed that to the votes of those who will always vote for labor against the railroads may be added some of those who may remember the exasperating delays sometimes caused by waiting for a long freight "drag" to pass a crossing. One of the chief methods by which the railroads have been able partially to offset the rising tendency of wages and expenses of all kinds has been by increasing the trainload. The public is gradually learning one salient fact of railroad economics, and that it is the public that pays the railroad's expenses, and it should not be especially difficult to convince the people that hauling shorter trains will not help the railroads to give better service, reduce rates or pay higher wages to their employees. By increasing expenses it will tend to increase rates. A law to limit the length of trains has one advantage over the "full crew" law. Both mean the employment of more men, but the latest plan to legislate men into jobs would make it necessary for them to work for their pay.

Apportioning Grade Separation Costs

In a decision handed down a few days ago involving the separation of grades between the Chicago & Alton, and an important highway near Independence, Mo., the Public Service Commission allotted 60 per cent of the cost to the railroad and 40 per cent to the county. At Tower Grove, St. Louis, this commission made a similar division between the Missouri Pacific, the Frisco and the city a few months ago. In a hearing involving the extension of an electric line along a public highway to reach a proposed state institution near Alton, Ill., the Public Utilities Commission has just rendered a decision establishing a division of cost for the separation of the grades of this line with the Chicago & Alton and the Chicago, Burlington & Quincy. The Alton and the Burlington are ordered to pay 33⅓ per cent of the cost of their respective crossings, the state 31⅔ per cent, the electric line 25 per cent, and the city and township the remaining 10 per cent. While these are by no means the first instances in which the cost of such work has been thus divided, this practice has not been sufficiently common, especially in the west. In Chicago, for instance, where over $70,000,000 already has been spent for track elevation, the roads have been required to pay the entire cost of the work with the exception of the incidental damages which

the city assumes. These recent rulings indicate a desire on the part of the commissions to apportion the cost of the improvements on the basis of the benefits secured and the rights of the parties at interest. Such a practice not only effects a more equitable distribution of the cost, but it also serves as a check on the demands of the public, for the people are naturally conservative when they know they will be called on to pay their share of the cost. This was illustrated at Milwaukee where in a hearing before the railroad commission some time ago regarding the separation of grades for a considerable distance the city originally demanded the construction of subways at a large number of streets, but the statement of the commission of its intention to assess the city for a portion of the cost resulted in a very material modification of its demands. There is no railway improvement the benefits of which the public shares with the railroad more directly than the separation of street and railway grades, and it is refreshing to see a more general realization of this on the part of the commissions.

THE DECISION A VICTORY FOR REGULATION BY COMMISSION

THE original decision of the Interstate Commerce Commission in the five per cent rate case caused it to be severely criticized. There was a strong feeling in many quarters that the decision indicated an indisposition on the part of the commission to recognize the conditions which had arisen in the railway business, and to deal with rates accordingly. Many of the best friends of regulation by commission began to grow sceptical regarding its success.

The decision rendered by the commission last week, in the rehearing of the five per cent rate case, puts both the commission and the policy of regulation by commission in a different light. The commission acted very promptly in giving the eastern roads a re-hearing; it conducted the taking of testimony expeditiously; it rendered a decision as speedily as it could be expected to, and it granted the railways most of the advances for which they asked. It refused to grant some of them, but on the other hand it had already permitted some advances in passenger rates for which the railroads had not originally asked, and it had suggested to them various reforms in their service and rates the adoption of which would increase their net revenues.

On the whole, the outcome reflects credit on the commission and on the policy of regulation by commission. The commission rose to its responsibility and dealt with the question as a big question of public policy. Important as is its action in granting a horizontal advance in rates, of hardly less importance is its further action in directing attention to the need for reforms to remove the inconsistencies and discriminations in service and rates which every student of the subject knows exist. Not only is it the function of regulation by commission to enable the railways to earn a return which will be just alike to them and the public, but it is also its function to see that the services rendered and the charges made by them are not unfairly discriminatory; and the commission is to be commended for trying to perform both of these functions in the same case.

While the final outcome is good, it cannot be said that either the time taken or the means used in arriving at it have been satisfactory. While the re-hearing was conducted and the final decision reached with commendable promptness, there is a general feeling among railway and business men which is not without justification, that there are too many suspensions of proposed advances in rates, and that it usually takes the commission too long to dispose of important rate cases. The trouble is not so much with the commission as it is now constituted, as it is with the laws which have created it and under which it acts. The laws have piled burden after burden on the commission without providing it with the organization and facilities needed to enable it properly to do its work.

Therefore, while satisfaction is being expressed with the outcome of this particular case, the need for permanent and fundamental reforms in the present policy and system of regulation must not be allowed to be forgotten. This is a problem to which the best minds in public life and in business life should devote themselves. It is futile and unjust to criticise the commission as now constituted for not doing what no body of seven men, with no better organization and facilities than the commission has, could do. The commission is doing its best. The railway men, business men and public men of the country should unite with it in helping it to do better.

THE EFFECT ON BUSINESS

THE decision of the Interstate Commerce Commission in the eastern rate advance case seems bound to have a good effect on business. The effect may not become immediately manifest, but it is only a matter of time until it will be felt. It is probable that on the basis of the normal movement of traffic the advance in both freight and passenger rates which the commission has now authorized will increase the earnings of the eastern roads by from $30,000,000 to $40,000,000 a year. The traffic moving at present is light, and so long as it continues to be so light the eastern roads will probably have to feel their way somewhat carefully, but manifestly an increase of $30,000,000 in their annual earnings will make it practicable for them greatly to increase their total expenditures. This amount of money, if used entirely for the purpose of paying a return on new capital, would yield six per cent per annum on $500,000,000. No further statement is necessary to show how important the direct effects of this advance in rates may be in helping the railways to get needed new capital.

More important, however, than the direct effects of the decision will be its indirect effects. The securities of American railways were beginning to be regarded with suspicion by investors all over the world. A feeling had begun to develop that regulation of rates in this country meant merely preventing advances or causing reductions in them. It was obvious that if expenses continued to increase and rates continued to stand still or go down it was but a matter of time until American railway securities would become a very bad investment. By its decision the Interstate Commerce Commission has shown in the most conclusive manner its recognition of the fact that it is as much its function to protect and help the railways when they need and deserve it as to restrain and punish them when they deserve these things.

The increases granted in the east may probably be regarded as the forerunner of advances which will be granted to the western trunk lines. On the whole, therefore, the decision should cause a vast improvement in the sentiment of the investing public regarding our railway securities and improve the market for them. Whatever enables the railways to raise more money will enable them to spend more, and whatever enables the railways to spend more will enable them to employ more labor and buy more supplies, and should exert a stimulating effect on business of all kinds.

The greatest danger with which the railways are confronted is one on which there has been little public comment as yet. This is that the advances in rates which have been granted, and others which may be granted, will be absorbed by advances in labor costs. Railway labor has been steadily increasing its demands ever since 1907, and it shows no disposition to desist from doing so. Railway labor, like other labor, should be paid reasonable wages, but it should not be allowed to secure unreasonable and wasteful conditions of employment or excessive wages. If every advance in rates is to be offset or more than offset by increases in the cost of labor there will be no increase in railway net earnings. The future demands of railway labor should be scrutinized by the public in the most careful manner, for upon the concessions made to labor will largely depend the most important future developments in the railway business.

IT IS NOW UP TO THE EASTERN RAILROADS

THE decision of the Interstate Commerce Commission in the eastern rate advance case is important, not only because it will increase the revenues of the railways directly affected, but also because it indicates a disposition on the part of the commission to vigorously help the railways of the country generally to get whatever increases in earnings they may need. In one way this reduces the burdens and responsibilities of railway managers. Their inability to increase their revenues in proportion to the advances in their expenses was rapidly bringing them face to face with an impossible situation. In another way the decision greatly increases the responsibility of railway managers. It is most important that this point should be emphasized.

The managers of the railways went before the commission and said that they needed an advance in freight rates. This advance, they said, was essential in order that they might increase their net earnings. The increase in their net earnings was essential in order that they might raise and maintain their credit, and make the increases and improvements in their facilities which the interests of the public demanded that they should make. This was the argument the railway managers presented in 1910; it was their argument in 1913; it was their argument in 1914.

In the original rate advance cases the commission held that the railways did not need larger net earnings. In the 1913 case, which was decided in July, 1914, it held that the eastern lines did need larger net earnings, but found that it would be best that they should secure most of them by means other than a horizontal advance in their freight rates. The railways returned to the attack. Developments, they said, had shown that the need for an increase in their net earnings was important and pressing, while the working out of the various reforms in their ratemaking and service, which the commission had suggested, would take much time. Therefore the commission ought to give the eastern lines at once the horizontal increase in freight rates for which they asked and let the working out of the reforms which it had suggested follow after. The commission in its latest decision has in the main acquiesced in this policy. It has given the roads most of the increases in freight rates for which they originally asked. It has allowed them to make advances in passenger rates for which they did not originally ask.

The railways, by the line of argument which they have adopted in order to get the advances in rates which they have now secured, have given hostages to fortune. They have committed themselves beyond recall. Not merely by implication, but in the most express terms they have bound themselves in honor to do certain things. They have pledged themselves to the commission and they have pledged themselves to the public. It is now strictly up to them to make good. If they do not make good they will deservedly sacrifice the confidence of the commission and the public.

In the first place the roads have morally obligated themselves loyally to cooperate with the commission in eliminating the inconsistencies and unfair discriminations in their present services and rates. Chairman Harlan was amply justified in saying in his dissenting opinion that many such inconsistencies and discriminations exist. It is to the interest of the railways and the public that these things shall be remedied. They cannot be remedied without one railway sacrificing something here, and another sacrificing something there. They cannot be remedied without taking from some shippers improper favors of which they have been the recipients, and imposing on other shippers burdens from which they have escaped in the past, but which in fairness they should be made to bear.

Already there has been manifested a disposition on the part of some railway managers to refuse to do some of the things that ought to be done. The big shippers are always on the job and, unfortunately, there are many railway men who lack the strength of character or the brains to resist them and act squarely and intelligently. The entire railway situation ought not to be allowed to be compromised and imperiled by the weak or unscrupulous few. The commission has done the square thing by the railways. It is now up to the railways to do the square thing by the commission, the public and themselves.

To be specific it is up to them to eliminate from their tariffs the discriminations which every one knows they contain, whether taking the form of services or rates. It is up to them, for example, to eliminate such rates as the one the Wabash and the Chicago & Alton are now making on packing house products between Kansas City and Chicago. How can the managements of these roads face the commission with positions for any advance in rates when they voluntarily keep in effect such a rate?

Again, the eastern roads are in honor bound, in view of the testimony and arguments presented on their behalf in this case, to use the additional resources which the decision will give them in the most careful and efficient way for the improvement and enlargement of their facilities. In other words, they are bound to use them for railroad rather than for financial purposes; and when we say "financial purposes" we have in mind such use of railway earnings and credit as was made by Mr. Mellen in New England. The public and the commission expect, in view of what the spokesmen of the railways said in the hearings in the rate advance case, that the additional earnings of the railways and the additional funds which these additional earnings will enable them to raise, will be spent upon the physical properties, and that these expenditures will be made, and that the properties will be operated, as economically and efficiently as human frailty and human ability will permit. The public and commission have shown a willingness to permit the railways to increase their net earnings by increasing their rates, but this has been on condition that the best use possible would be made of the additional revenue, and if the railways are to keep and deserve the confidence of the public and the commission they must meet this condition.

The railway managers have, in effect, conceded that they are quasi-public officials performing a quasi-public duty. To their stockholders they owe the duty of earning for them reasonable returns, by which are meant returns sufficient to get adequate capital invested in the railway business. To the public they owe, and have admitted that they owe, the duty of not only operating the properties as efficiently and economically as possible, but of raising capital as economically and spending it as efficiently as possible, and, since they have voluntarily recognized that they owe this duty to the public, it is strictly up to them to perform it.

Most of the managers of the railways feel, concede and are fully prepared to live up to, their duties and responsibilities in respect to the matters mentioned, and this, not merely as a matter of policy, but also as a matter of principle. Others, we fear, admit their public duties and responsibilities less as a matter of principle than as a matter of policy. Some do not admit them either as a matter of expediency or as a matter of principle. The future of the railways of this country depends chiefly on whether the first-named class of railway managers—and under this heading we include railway financiers—will or will not prevail in the counsels of the railways.

UNION PACIFIC

THE Union Pacific finished the fiscal year, ended June 30, 1914, with a surplus available for dividends of $33,094,000, or about 10 per cent less than the surplus available for dividends in the previous year. Revenue amounted to $92,115,000, 1.6 per cent less than in 1913, and the decrease is accounted for entirely by a shorter average haul. Expenses amounted to $55,410,000, an increase of 2.6 per cent, accounted for entirely by increased charges for maintenance of equipment and increased traffic and general expenses. The increase in traffic and general expenses was the direct result of the separation of the Southern Pacific and Union Pacific, which necessitated the establishment of separate traffic agencies and general offices.

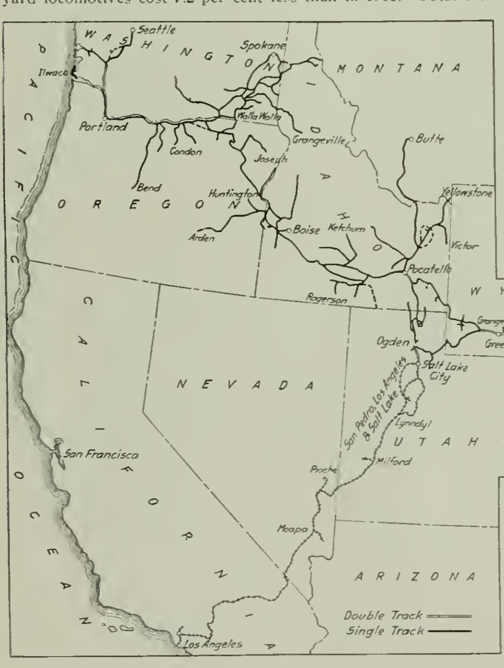
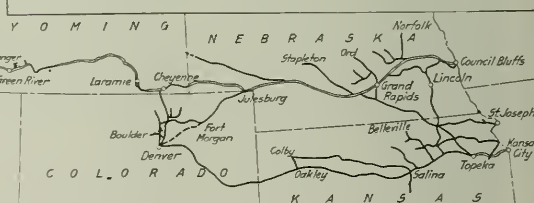
Transportation expenses in the fiscal year 1914 amounted to $25,326,000, a decrease of 2.9 per cent as compared with the previous year. This decrease in transportation expenses is de-

spite an increase in mileage operated of 248 miles, the average in 1914 being 7,597 miles, and despite also a shorter average haul, which, of course, may or may not have affected transportation expenses, and despite a smaller average trainload, the trainload in 1914 being 431 tons, as against 437 tons in the previous year.

The Union Pacific's operating statistics illustrate how deceptive an average revenue trainload may be as a sole test of operating efficiency under certain circumstances. Whereas the revenue trainload decreased by 1½ per cent, and the trainload, including company freight, by 1 per cent, the average gross tons per freight-train mile, including cars and contents, were 1,242 in 1914 as against 1,203 in 1913, an increase of 3.2 per cent, and the gross tons per freight-locomotive mile were 1,092 in 1914, an increase of 3.8 per cent.

This gain in tonnage handled behind the drawbar by freight locomotives is particularly interesting, since by far the greater part of the saving made in transportation expenses was in the cost of fuel. Fuel for road locomotives in 1914 cost $6,856,000, which is less by 8 per cent than the cost in 1913, and fuel for yard locomotives cost 7.2 per cent less than in 1913. Total locomotive mileage in 1914 was 39,618,000, or 1.9 per cent greater than in 1913. Fuel coal cost $2.04 per ton in 1914 as against $2.11 in 1913. This is a saving of 7 cents; but far more important is the increase in miles run per ton of coal. In 1914 miles run per ton of coal was 10.52; in 1913, 9.75, an increase in miles run per ton of coal of nearly 8 per cent.

Of the total tonnage carried in 1914, amounting to 24,812,000 tons, 7,656,000 was inter-system freight, which is the materials and supplies carried by one line for another and materials and supplies used in construction of extensions, etc. Of the remaining 17,155,000 tons, 29.83 per cent was products of mines, 29.45 per cent products of agriculture, 16.76 per cent products of forests, 11.10 per cent manufactures, 5.82 per cent products of animals and 5.13 per cent merchandise. As has already been mentioned, the tonnage carried increased by 3.72 per cent, the principal changes being a decrease of 9.12 per cent in the tonnage of manufactures and 3.93 per cent in livestock and animal products, with an increase of 10.76 per cent in forest products, of 9.66 per cent in products of agriculture and of 2.56 per cent in merchandise.

The Union Pacific owns a half interest in the Salt Lake Route.

The Union Pacific

The Union Pacific's annual report presents maintenance of way figures in an exceptionally clear and comprehensive manner. On the same page in which the primary accounts under maintenance of way are shown for 1914 and 1913 there are also shown average miles of first and additional track operated, and amounts of material used in maintenance and the mileage of each class of weight of rail in track at the end of the year. The average cost of maintenance per track-mile, excluding sidings, was $1,251 in 1914, a decrease of 3.4 per cent. In 1914 2.34 per cent of all rails in the main track was renewed as against 2.95 per cent in the previous year, and 7.46 per cent of all ties, including ties in side-tracks, was renewed in 1914 as against 7.78 per cent in 1913. It is interesting to note that in 1914 $376,000 was spent for maintenance of signals, telegraph and power lines, an increase over 1913 of $150,000, or over 66 per cent.

Maintenance of equipment amounted to $12,123,000, an increase over 1913 of 13.4 per cent. The following table shows the amount spent per unit of equipment for repairs, renewals and depreciation in 1914 and 1913:

	1914	1913
Locomotives	$3,926	$4,052
Passenger-train cars	1,046	926
Freight-train cars	113	92

In 1914 the Union Pacific spent a total of $5,131,000 for additions and betterments, $12,601,000 for equipment, exclusive of renewals, and $5,138,000 for extensions and branches. Of the additions and betterments the largest expenditures were $1,161,000 for second main track and $633,000 for sidings and spur tracks. Of the charge for equipment $7,510,000 is accounted for by the Union Pacific's taking over equipment previously leased from the Union Pacific Equipment Association; but of the new equipment added to that available the most important item was the purchase of 3,949 freight-train cars at a cost of $4,588,000. The largest expenditure on extensions was $1,414,000 on the line from Spokane, Wash., to Ayre.

No securities were sold during the year and $5,658,000 stock was issued in exchange for convertible bonds, the stock being issued at 175, thus retiring $9,901,000 4 per cent bonds. At the end of the year the company had on hand $10,862,000 cash as against $11,855,000 at the beginning of the year. Total working liabilities amounted to $20,772,000.

The transactions growing out of the disposal of Southern Pacific stock were quite fully described and commented on in these columns at the time the events took place, but a very brief résumé of what was done properly belongs with the comments on this year's annual report. It will be recalled that the Pennsylvania took a part of this Southern Pacific stock, paying for it in Baltimore & Ohio common and preferred stock. An extra dividend was declared on Union Pacific common stock, consisting of $12 Baltimore & Ohio preferred, $22.50 Baltimore & Ohio common and $3 cash on each share of Union Pacific common. The stockholder who kept his Baltimore & Ohio and invested his cash at 6 per cent would get a yield of $2.01 on the dividend that came to him with each share of Union Pacific com-

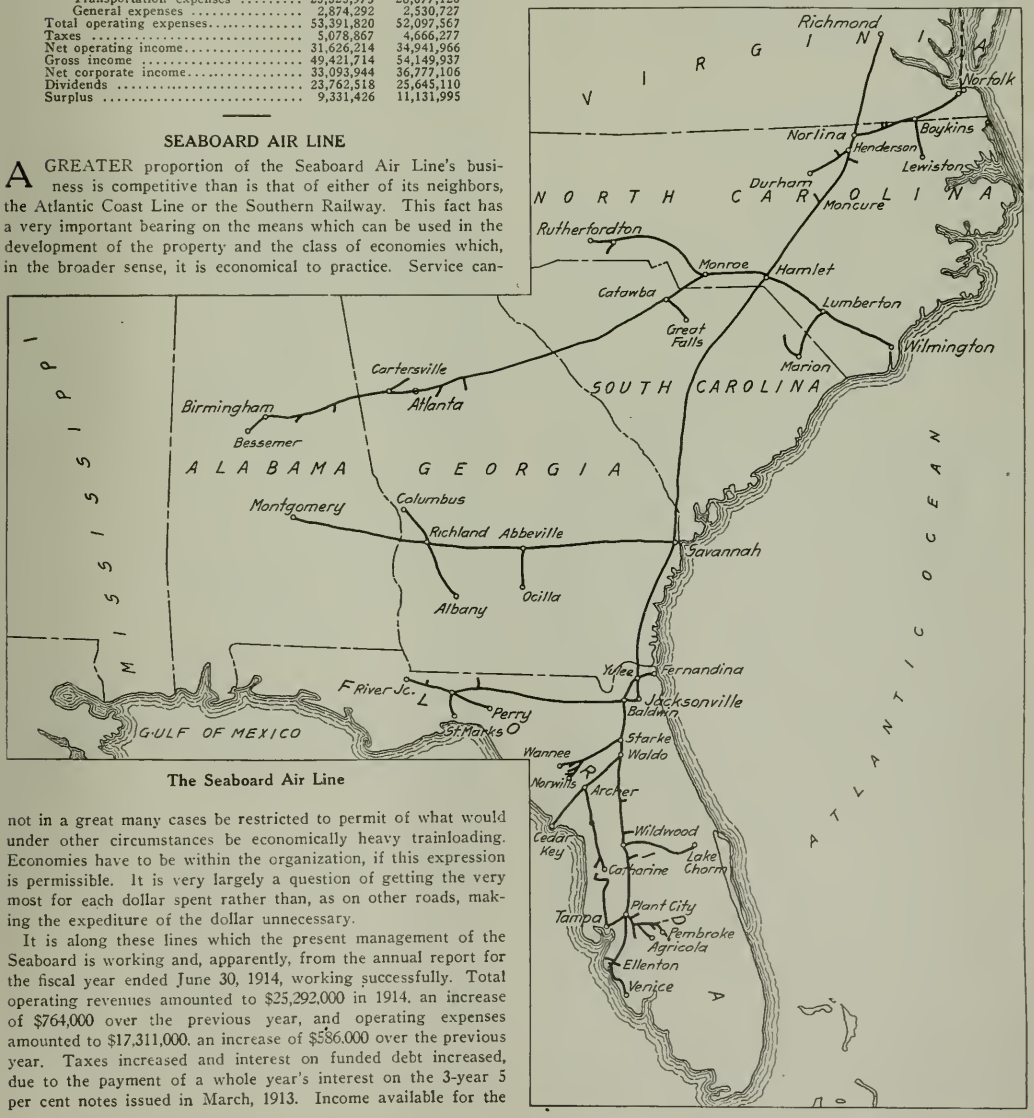
mon; in other words, the yield on what he got would be equivalent to 2 per cent on his holdings of Union Pacific common. The Union Pacific common dividend, which had been at the rate of 10 per cent, was reduced to 8 per cent. The extra dividend was, of course, charged to surplus and resulted in a writing down of profit and loss of $74,020,000. At the end of 1914 there was $90,586,000 credit to profit and loss after the transactions mentioned above.

The following table shows the principal figures for operation in 1914 as compared with 1913:

	1914	1913
Average mileage operated	7,597	7,349
Freight revenue	$62,434,292	$63,773,804
Passenger revenue	20,525,234	20,582,427
Total operating revenue	90,308,752	91,810,307
Maint. of way and structures	10,785,783	10,688,564
Maint. of equipment	12,123,174	10,694,011
Traffic expenses	2,282,596	2,107,146
Transportation expenses	25,325,975	26,077,120
General expenses	2,874,292	2,530,727
Total operating expenses	53,391,820	52,097,567
Taxes	5,078,867	4,666,277
Net operating income	31,626,214	34,941,966
Gross income	49,421,714	54,149,937
Net corporate income	33,093,944	36,777,106
Dividends	23,762,518	25,645,110
Surplus	9,331,426	11,131,995

SEABOARD AIR LINE

A GREATER proportion of the Seaboard Air Line's business is competitive than is that of either of its neighbors, the Atlantic Coast Line or the Southern Railway. This fact has a very important bearing on the means which can be used in the development of the property and the class of economies which, in the broader sense, it is economical to practice. Service can-



The Seaboard Air Line

not in a great many cases be restricted to permit of what would under other circumstances be economically heavy trainloading. Economies have to be within the organization, if this expression is permissible. It is very largely a question of getting the very most for each dollar spent rather than, as on other roads, making the expediture of the dollar unnecessary.

It is along these lines which the present management of the Seaboard is working and, apparently, from the annual report for the fiscal year ended June 30, 1914, working successfully. Total operating revenues amounted to $25,292,000 in 1914, an increase of $764,000 over the previous year, and operating expenses amounted to $17,311,000, an increase of $586,000 over the previous year. Taxes increased and interest on funded debt increased, due to the payment of a whole year's interest on the 3-year 5 per cent notes issued in March, 1913. Income available for the interest payment on the adjustment mortgage bonds amounted to $2,924,000, or about $60,000 less than the amount available the previous year. The adjustment bond interest calls for $1,250,000, so that the company had in 1914 $1,674,000 available for dividends on its preferred stock. A total of 3 per cent was paid in 1914, calling for $717,000.

The Seaboard Air Line operates 3,098 miles of line, of which 16 miles was added during the 1914 fiscal year. Its revenue freight density in 1914 was 511,000 tons one mile per mile of road, and its passenger density was 80,000 passenger miles per mile of road. The average receipts from freight per ton per mile were 1.099 cents, and per passenger per mile, 2.192 cents. Of the total 10,411,000 revenue tons carried in 1914, 33.37 per cent was furnished by manufactures and miscellaneous, 26.35 per cent by products of mines, 24.79 per cent by products of

forests—nearly a third of this tonnage is logs—and 14.30 per cent by products of agriculture, leaving 1.19 per cent furnished by products of animals. Phosphates and fertilizer form a very important part of the Seaboard Air Line's freight business. The tonnage of both these products showed a good gain in 1914 over 1913—phosphate, 1,027,000 tons as against 978,000 tons, and fertilizer, 994,000 tons as against 903,000 tons in the previous year. The only class of traffic in which there was any considerable falling off was in lumber and logs. In 1914 the road carried 1,515,000 tons of lumber as against 1,760,000 tons the year before, and 853,000 tons of logs as against 903,000 tons the year before.

Of course, since the beginning of the war there has been a large falling off in fertilizer traffic, and an almost corresponding falling off in phosphate traffic. This will be more fully discussed later.

As previously mentioned, total operating expenses amounted to $17,311,000. The following table shows the percentage of each class of expense to total operating revenues in 1914 and 1913:

	1914.	1913.
Maint. of way and structures	12.23	12.29
Maint. of equipment	13.46	13.61
Traffic expenses	3.15	3.13
Transportation expenses	36.61	36.28
General expenses	3.00	2.88

An increase of $79,000 in maintenance of way expenses was due principally to more tie renewals; an increase of $66,000 in maintenance of equipment was due to more equipment to maintain and a greater mileage of equipment; an increase of $359,000 in transportation expenses was due to a greater mileage run in passenger service, increases in the rates of pay of station agents and station labor, and larger charges for loss and damage to freight.

Despite the limiting condition of speed and frequency of service, the average freight-trainload was increased from 246 tons in 1913 to 263 tons in 1914; this is of revenue freight. The average freight-trainload of all freight was 299 tons in 1914, an increase of 23 tons over the average the year before. Thus, with an increase in the total ton mileage of 36,562,000, the total in 1914 being 1,575,000,000, there was a decrease in freight locomotive mileage of 184,000, the total in 1914 being 5,940,000.

The trainload on the Seaboard even in 1914 seems low if compared with many eastern or western roads, but is, however, considerably higher than that of the Atlantic Coast line, which was in 1914 225 tons (revenue freight). That it is not larger is in part due to the small proportion of coal tonnage carried and the large proportion of manufactures and of products of agriculture. The fact that manufactures is competitive traffic necessitates a fast schedule in this service; a large part of the products of agriculture is perishable and also demands a fast schedule with comparatively light loading. On the other hand the Seaboard has heavy grades, which are a limiting factor at present in trainloading on certain classes of traffic. This is a condition which can be bettered by the introduction of heavier engines. In 1914 the company received 35 Pacific type freight locomotives and is now receiving some Mikado engines. When these new locomotives are placed in service and a system of establishing points where tonnage rating of trains can be filled out from drag freight is completed, the average trainload of the Seaboard will be very considerably increased. The present year, of course, may not show the effects of this because of other extraordinary conditions. The company is also receiving some Mountain type locomotives for passenger service.

The Seaboard is in shape, in respect to its track and bridges, to handle the heavier engines without any expenditures for betterment. The program of bridge improvement which was completed about June, 1912, provided a minimum bridge capacity of Cooper E 50 loading on the lines north of Florida. In 1914 $1,854,000 was spent for additions and betterments and extensions, the principal expenditures being $415,000 for additional weight of rail, $249,000 for grading, $174,000 for ballasting unballasted track, and $169,000 for station buildings. Previous to 1913 the standard weight of rail in main track was 75-lb. In 1913 130 miles of 85-lb. rail was laid, and in 1914 144 miles. At the end of the year 1,208 miles of track was laid with 75-lb. rail. The present standard is to use 90-lb. rail on lines north of Jacksonville, Fla., and Birmingham, Ala.

The line between Hamlet, N. C., and Norlina is that of greatest density, and eventually this will have to be double-tracked, although with the heavier locomotives now being put in service it has by no means as yet reached the limit of its capacity as a single-track line. The freight density on this line is now in the neighborhood of 1,500,000 ton-miles per mile.

One thing which is being done in the development of the Seaboard, which is of great importance in the long run but is not immediately neglected in the figures in its annual report, is the working out of a more compact organization.

In the organization of most railroads operating from 3,000 to 4,000 miles of line, the officer directly in charge of the operation of the road is either a general manager or a vice-president in charge of operation. In the Seaboard's organization, as now worked out, the president is directly responsible for the operation of the road and the officer directly in charge is the general superintendent. This places a heavy burden on the president, even when, as in the case of the Seaboard Air Line, he is aided by two assistants, one an engineer and the other an operating man. If, however, the president is capable of bearing this burden and has the right kind of general superintendent, this makes a practical and very effective form of organization.

The present year, that is, the 1915 fiscal year, bids fair to be a rather trying one for the Seaboard, with consequent enforced economies; but this fact in itself is being utilized to perfect the organization. As yet the cotton tonnage has not moved to any great extent, and although cotton tonnage is not a large proportion of the Seaboard's traffic, the curtailment in the buying power of the planters has a quite marked effect on manufactures and merchandise. This also affects the fertilizer business.

A falling off in fertilizer traffic would reduce the Seaboard's tonnage of revenue freight to an appreciable amount and even more seriously affect revenue. The nitrate contained in fertilizer comes from South America and the potash from Germany, and there was some fear that the supply of potash might be seriously interfered with. At present, however, the supply of raw materials is thought to be ample, but the real difficulty is to be found in the diminished purchasing power of the cotton planters. If they are not able to buy fertilizer or secure it on credit the Seaboard will, of course, lose profitable tonnage by just that much.

The Seaboard Air Line has no loans and bills payable, and had, as of June 30, $2,700,000 total working liabilities, with $3,089,000 cash. Its only short-term obligations are $6,935,000 outstanding equipment trust certificates, maturing periodically, and the $6,000,000 3-year notes previously mentioned, which mature in March, 1916.

The following table shows the principal figures for operation in 1914 and 1913:

	1914.	1913.
Average mileage operated	3,084	.....
Freight revenue	$17,307,034	$16,788,112
Passenger revenue	5,430,531	5,221,200
Total operating revenue	25,291,758	24,527,865
Maint. of way and structures	3,094,200	3,014,957
Maint. of equipment	3,404,471	3,338,542
Traffic expenses	796,755	765,763
Transportation expenses	9,258,623	8,899,267
General expenses	757,346	707,085
Total operating expenses	17,311,395	16,925,613
Taxes	999,000	956,000
Operating income	6,961,003	6,819,938
Gross income	7,259,999	7,040,002
Net income	2,924,216	2,985,854
Interest on adjustment mortgage bonds	1,250,000	1,250,000
Dividends	716,823	.....
Surplus	649,268	1,467,933

The Decision Granting the Five Per Cent Rate Advance

Full Text of the Majority Opinion and Dissenting Opinions of Chairman Harlan and Commissioner Clements

The following is the opinion of the Interstate Commerce Commission which was handed down on December 18, in the rehearing of the five per cent rate advance case.

By the Commission:

These cases were originally submitted in May, 1914, and decided under date of July 29, 1914, 31 I. C. C., 351. Upon petition of the carriers filed September 15 the commission, on September 19, 1914, ordered—

That further hearing in said cases be, and is hereby, granted; said hearing to be limited to presentation of facts disclosed and occurrences originating subsequently to the date upon which the records previously made in these cases were closed.

Under these limitations hearing was had before the commission continuously for five days, ending October 23, 1914. Evidence was introduced by carriers, investment bankers and various protestants. Some of the exhibits supplemented those offered at the original hearing. The cases were argued before the commission on October 29 and 30, and thereupon submitted.

It is not necessary to make any extended summary of the conclusions contained in the commission's original report. report. Among other things it found that—

In view of a tendency toward a diminishing net operating income, as shown by the facts described, we are of opinion that the net operating income of the railroads in official classification territory, taken as a whole, is smaller than is demanded in the interests of both the general public and the railroads; and it is our duty and our purpose to aid, so far as we legally may, in the solution of the problem as to the course that the carriers may pursue to meet the situation.

The commission did not acquiesce in the carriers' proposal of a general increase as indicated in the tariffs filed by them, but suggested various methods by which they might properly conserve their revenue (pp. 407-414). In central freight association territory, however, by reason of the low general level of rates there found to prevail and also by reason of the financial necessities of the carriers in that territory, intraterritorial increases of approximately five per cent were permitted except on certain articles, mainly heavy low-grade commodities. It was suggested in view of the modifications required in the tariffs that the central freight association lines might find it more desirable to undertake at once the tariff readjustment asserted by them to be necessary. Save as above indicated, the proposed increases were denied and the tariffs carrying them were ordered cancelled.

NEW ELEMENTS

The "facts disclosed and occurrences originating" subsequent to May 29, 1914, as presented at the further hearing may be summarized under three heads—first, completed returns for the fiscal year ending June 30, 1914, and returns for succeeding months; second, the war in Europe, and third, results of the original order.

When these cases were originally submitted, as also when the original report was prepared, the revenue and expenditure account for June, 1914, and the property investment account for that fiscal year, were not available, the war was unforeseen, and the results of our order were, of course, yet to come. Collectively they present a new situation.

The carriers offered further evidence of their financial condition during the fiscal year ending June 30, 1914, including returns for that year completed by addition of the revenue and expenditure account for the month of June and the capital investment account for the year. They also introduced revenue and expenditure accounts for the months of July and August of the current fiscal year. Reports to the commission for the month of September, 1914, have since made possible a similar statistical statement for that month also.

These figures serve to emphasize our previous finding of the need of carriers in official classification territory, taken as a whole, for increased net revenue.

For the fiscal year just ended the net operating revenues as shown by the carriers are lower than was estimated or anticipated when the original report was issued. Not since 1908 have the net operating revenues of the carriers been so low as in the fiscal year ending June last. In 1908, moreover, the property investment account of the carriers was $1,309,000,000 less than in this last fiscal year. The surplus for 1908, after deducting $102,000,000 paid in dividends, was $47,000,000, whereas for the last fiscal year the dividends paid, amounting to $118,000,000, drew on the accrued surplus to the extent of $8,200,000. Of this amount the New England roads contributed over $4,000,000.*

From whatever comparative standpoint viewed, the net operating revenues of the last fiscal year must be regarded as unduly low. Operating costs and operating revenues fail to show the tendency to such concomitant variation as should prevail in the transportation industry. While the gross revenue in that year declined only about 3.4 per cent, the net revenue shrank approximately 17.7 per cent as against the previous fiscal year. The indication is that some important items of cost have become relatively inelastic, and that a fall in gross revenue leaves an increasingly narrow margin of net revenue.

The situation is different when an attempt is made to estimate the decline in the rate of return. The property investment accounts as now standing on the books of the carriers can not be accepted as accurately representing the fair value of their property devoted to serving the public.

MAINTENANCE EXPENDITURES

Objection was raised to the increasing amounts charged in recent years to additions and betterments, particularly because the carriers in presenting a financial review of their operations for a series of years failed to indicate separately the relative effect upon their accounts of outlay for additions and betterments as compared with allowance for depreciation, it being contended that this caused an unwarranted diminution in the resulting net income from operation.

The fact nevertheless remains that if the increase in depreciation and betterment accounts in the last fiscal year over the average of similar allowances for the five-year period were added to their net operating income for the last fiscal year, the results of operation would still fall below a fair return upon the amounts carried upon the books as investment in property.

While there has been recently an enlarged expenditure for maintenance of equipment, it is clear that it has not been sufficient to restrict to proper limits the number of cars and locomotives needing repairs. The carriers in the past have not known how large an expenditure to figure upon for the maintenance of the newer type of steel freight cars, and appear now to have discovered that such expediture must be greater than was anticipated.

The like may be said as to the recent enlargement of expenditure upon roadway. We can not view with favor any attempt to obtain an increase in net revenue through unduly restricted expenditures upon maintenance.

To whatever extent recent increased provision for depreciation or expenditure for maintenance may militate against a fair comparison of supposedly comparable statistical items for various years, we can not say on this record that such charges as at

*NOTE.—It is not to be inferred from these figures that the total surplus in 1913-14 decreased by the amount of $8,200,000. From reports made by the carriers to this commission the appropriated surplus for class I roads, eastern district, was $343,508,201 on June 30, 1914. This was an increase over appropriated surplus existing on June 30, 1913, of $19,378,945. During the same year there was, however, a shrinkage in the excess of credit over debit balances to profit and loss of $53,957,233, indicating for the last fiscal year a shrinkage in total surplus of $34,578,288.

present returned by the carriers are excessive, viewed either from the standpoint of proper accounting or of safety of operation.

The testimony shows that while some maintenance is being deferred, other maintenance deferred during the last fiscal year is now being made, and that the expenditure therefor during the months of July and August measured up to the level of recent years. The testimony also shows that transportation expense is being reduced through the laying off of employees and cancellation of train service.

THE EFFECT OF THE WAR

It was urged on behalf of the carriers and the investment bankers who appeared at the hearing that the war in Europe has created a condition which renders the diminution of the carriers' net income a menace to the prosperity of the country; that the war has placed an added strain upon the credit of carriers; that rates of interest will rise; that a large volume of railroad securities is held abroad; that the denial of the increase in freight rates would, in view of the diminished net income, be followed by a dumping of foreign securities upon the American markets; that our markets would not be able to absorb these securities—at least, without great fall in price; that disaster would result not only to our railroads, but to insurance, banking and industrial concerns; and that for these and other reasons, extending far beyond the direct needs of the carriers themselves, we should now allow the proposed increase in rates.

With some of these considerations we have, as a commission, nothing to do. Our powers and functions are those, and only those, conferred by congress. As was said in Advances in Rates, Western Case, 20 I. C. C. 307, at page 317:

We must not regard too seriously, however, the effort of railroad counsel to establish this commission *in loco parentis* toward the railroads. We must be conscious in our consideration of these rate questions of their effect upon the policy of the railroads and, ultimately, upon the welfare of the state. This country can not afford to have poor railroads, insufficiently equipped, unsubstantially built, carelessly operated. We need the best of service. Our railroad management should be the most progressive. It should have wide latitude for experiment. It should have such encouragement as would attract the imagination of both the engineer and the investor. Nevertheless, it is likewise to be remembered that the government has not undertaken to become the directing mind in railroad management. We are not the managers of the railroads. And no matter what the revenue they may receive there can be no control placed by us upon its expenditure, no improvements directed, no economies enforced.

The conflict in Europe will doubtless create an unusual demand upon the world's loan fund of free capital, and may be expected to check the flow of foreign investment funds to American railroads. It appears that our railroads represent the bulk of European investment in this country. The rate of interest—the hire of capital—has risen during the last decade, and may rise still further. It is computed that in the years 1915, 1916 and 1917 the carriers in official classification territory must arrange for the payment or refunding of securities aggregating over $500,000,000. True, the representations of the carriers in the 1910 cases, that without the increases then sought their credit must totally vanish, proved strangely at variance with their subsequent experience in the borrowing of many hundreds of millions. But we do not doubt that the financial problems of the carriers have been made much more acute by reason of the war, and if we are to set rates that will afford reasonable remuneration to these carriers, we must give consideration to the increased hire of capital as well as to other increased costs.

The suggestions made in our original report of methods whereby to increase net revenue were not susceptible of being put into immediate operation or calculated to produce immediate financial results. This was recognized in our original report. The period which has since elapsed has, of course, been entirely too short for either purpose. Some testimony was offered at the further hearing bearing on what had been done or undertaken in line with these suggestions, and estimates were made by the traffic officials of several carriers as to the annual yield to be expected. These estimates were not based on any accounting computation and can afford little guide as to what the results will prove to be.

THE CONCLUSION

While we differ as to the relative importance to be attached to the various considerations presented, we agree in the conclusion that, by virtue of the conditions obtaining at present, it is necessary that the carriers' revenues be supplemented by increases throughout official classification territory. Whatever the consequences of the war may prove to be, we must recognize the fact that it exists, the fact that it is a calamity without precedent, and the fact that by it the commerce of the world has been disarranged and thrown into confusion. The means of transportation are fundamental and indispensable agencies in our industrial life and for the common weal should be kept abreast of public requirements.

The original report, besides approving a rate increase in central freight association territory, suggested 10 sources of additional revenue for all carriers throughout official classification territory; the present report, recognizing the existence of a new situation since July 29, acquiesces in a territorial extension of the relief granted to the central freight association lines by permitting the carriers to file tariffs providing, with certain exceptions specified herein, for horizontal rate increases in official classification territory. It is expected that the constructive work suggested in the original report for the purpose of conserving and augmenting the net revenues of the carriers generally will be carried forward without interruption.

Carriers will be required to keep an account of the additions to their revenues from increases in rates subsequent to July 29, 1914, and from new charges, and to report separately thereon

Sykes in the Philadelphia Ledger

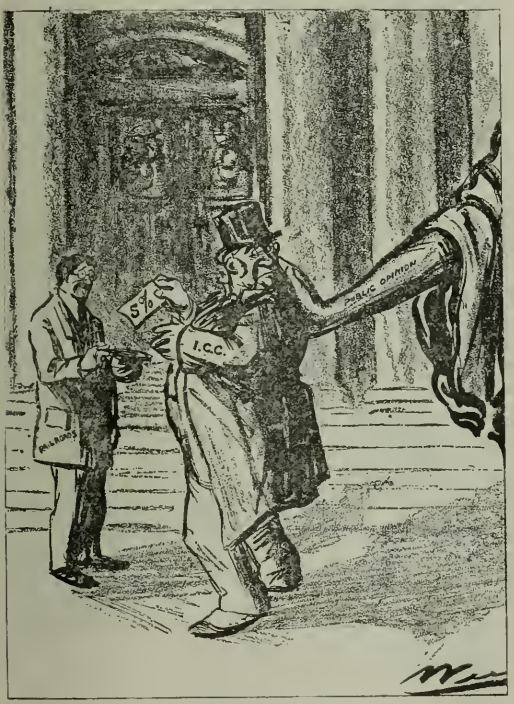
To Him Who Hath——

to the commission at the end of 12 and 24 months, respectively.

For various reasons we shall except from the proposed increase the following rates:

1. Rail-lake-and-rail, lake-and-rail and rail-and-lake rates. It is shown on the record that since the rail carriers acquired ownership and control of the lake lines successive increases have been made in the rates via lake tending to lessen the differences between them and the all-rail rates.

2. Rates on bituminous coal and coke. Not long since these rates were investigated and maximum rates were prescribed by the Commission. The key rates upon bituminous coal—the rate from the Pittsburgh district to Youngstown, and the rate on lake cargo coal to Ashtabula—have been fixed in the light of the various factors which enter into the transportation of such coal. The prevailing rates are remunerative, and the financial condition of the principal bituminous coal carriers is in marked contrast with that of many of the other carriers in official classification territory. Twice in the not distant past the rates on bituminous coal have been increased 5 cents a ton, and would seem now to be as high as may fairly be allowed. It must be remembered also that the carriers are not seeking general increases in rates on anthracite coal, and both kinds of coal are used in competitive markets. As to coke, the rates controlling the greater volume of traffic now moving in official classification territory have recently been set by the Commission upon a basis which was specifically designed to guard against shrinking the carrier's revenue therefrom, and which really resulted in substantial additions to their earnings on that traffic.



Weed in the New York Tribune

The Lord Loveth a Cheerful Giver

3. Rates on anthracite coal and iron ore, largely because they are before us for review in other proceedings.

4. Rates held by unexpired orders of the Commission.

In our original report we declined, for reasons there stated, to allow increased rates in central freight association territory on cement, starch, brick, tile, clay and plaster. On further consideration, in the light of the existing situation, these rates may be increased throughout official classification territory under the limitations herein set forth.

Joint rates between official classification territory on the one hand, and southeastern territory, the southwest and points on or east of the Missouri river on the other, may be increased not to exceed 5 per cent of the division of the rate accruing to the carriers in official classification territory. If these increases involve a change in the relationship under the long-and-short-haul rule between intermediate points and more distant points outside of official classification territory, relief from the fourth section of the act must first be secured on regular application.

Interstate rates to and from New England from and to points in trunk line or central freight association territory, where necessary to preserve established relationships between points or ports in New England and points or ports in trunk line territory, may be increased not to exceed 5 per cent.

Subject to the maintenance of the established Atlantic port differentials, rates to and from New York may be increased not to exceed 5 per cent, and rates to and from Portland, Boston, Philadelphia and Baltimore may be increased to the extent necessary to maintain said differentials.

Except as otherwise above specified rates in official classification territory may be increased by not more than 5 per cent; but rates increased since July 29, 1914, may not now be again increased so as to exceed those then in effect by an aggregate of more than 5 per cent of the intraterritorial rate, or of the portion or division of the interterritorial rate accruing to the road or roads in official classification territory, as the case may be.

If fractions in excess of one-half a mill are rounded upward, fractions less than one-half a mill are to be discarded.

In some instances, and in part because of the pendency of this proceeding, we have recently suspended proposed increased rates in this territory. Carriers may, if they so elect, now cancel such tariffs so suspended and file in lieu thereof tariffs which conform to the limitations above specified. If that is done such suspensions will be vacated.

To the extent above indicated we now modify our previous finding, and carriers affected may file, effective on not less than 10 days' notice, such tariffs as do not offend against the restrictions above stated.

DISSENTING OPINIONS

Chairman Harlan:

The further hearing of this case added nothing substantial to the relevant facts before us when the original report was handed down. It served only to confirm the soundness of the finding then made that the railroads in official classification territory, taken as a whole, ought to have additional net income. My own view of the record has been and is that the carriers in that territory, considered collectively, are in need of more additional net income than the amount, $50,000,000, which they estimated the proposed 5 per cent increase in rates would yield. I can readily agree, therefore, to the reiteration in the supplemental report of the finding of the original report that those railroads need additional revenues; and to that extent what is here said may be regarded as a concurrence. I wholly dissent, however, from the course now approved by the Commission for permitting the carriers to augment their revenues.

The original record contained evidence that the general rate basis in central freight association territory was unduly low and that the proposed increased rates would be just and reasonable. We therefore allowed the higher rates, with certain exceptions, to go into effect. The original record contained no evidence tending to prove that any of the proposed increased rates affecting trunk line or New England territories were just and reasonable, and this deficiency in proof was not supplied upon the further hearing. For example, the 75-cent rate on first class traffic moving between New York and Chicago is the rate yardstick of this country, the standard by which, after making due allowances for differences in conditions, density, etc., all other

rates may ultimately be measured. That scale of rates has been in effect for more than a generation. Nevertheless, no effort was made on the part of any of the lines in official classification territory to show by what may be denominated rate testimony that this scale of through rates is unduly low or that higher through rates would be just and reasonable. Since the act of Congress imposes the burden of proof upon the carriers to establish that proposed increased rates are just and reasonable, we were compelled to withhold on the original hearing and are, in my opinion, now bound to withhold approval of any of these rate increases affecting trunk line and New England territories. Moreover, the record shows the financial condition of the trunk line carriers generally to be much more favorable.

We pointed out, however, in our original report the sources from which the needed additional net income could and should be obtained—namely, by a revision of rates and an abandonment of practices found to be unremunerative or wasteful. The beneficent effect of an intelligent revision of rates is shown by the results obtained in New England while this proceeding was pending. The New England carriers sought approval in this case of an increase only in the rates on traffic moving between that territory and other parts of official classification territory; they did not propose a general 5 per cent increase in their freight rates. Those carriers undertook instead a general rate revision, which has since been largely effected through friendly conferences with state commissions and with shippers and is now, by common consent of the shipping public and state officials, being brought to a conclusion on a basis that will afford those lines much larger additional net income than they could have secured through a 5 per cent increase in their freight rates. In other words, the New England lines have voluntarily pursued the only rational and reasonable course to augment their revenues, this being the course urged upon the central freight association lines in our original report, and the course that those lines at the hearing admitted to be necessary in order to meet their real requirements. As a matter of fact, as pointed out in the original report, the central freight association lines joined in the application for a horizontal 5 per cent increase in their rates only because of the desire of other and more powerful lines operating in trunk line territory to present to us in this proceeding one general plan of relief.

The record shows that there are many unremunerative rates and unremunerative practices now in effect throughout the official classification territory; that a very substantial amount of service is performed without any charge whatever; and that undue burdens are cast upon the carriers through various influences. We have had in this proceeding an opportunity to learn also to what extent and with what effect on their revenues abuses exist among the railroads because of the treatment of one by the other in competing for traffic. The abandonment of remunerative and wasteful practices involves among other things the elimination of the free services and excessively low rates which represent, in very many instances, the price a carrier pays for the large tonnage of influential shippers and result in making the carrier bear the geographic disadvantages of individual shippers and expenses properly a part of their manufacturing costs. The elimination of the preferences created by these means would give to the carriers very largely increased earnings and at the same time properly distribute the necessary burdens of transportation, so that those who get the service shall pay for it. By following the suggestions made in the original report the carriers could undoubtedly secure more additional net income than the amount estimated to accrue under the proposed horizontal rate increase, and far more than can accrue to them under the relief now accorded in the supplemental report.

HOW THE COMMISSION CAN HELP

At the further hearing the carriers earnestly contended that their necessities were so urgent that they could not await an increase of revenues from those sources. Relief, however, could be had immediately if the Commission would refrain from a too free use of its power to suspend increases in rates pending investigation. This power is exercised, in my judgment, with unnecessary frequency, in view of the opportunity that shippers have of testing the reasonableness of increased rates upon formal complaint filed with the Commission; and, in my judgment, the Congress never intended so free a use of it when the power to suspend was granted to us. It was pointed out also by the carriers that the states were interfering, both by restricting rates and by imposing heavy burdens upon interstate carriers in the form of full-crew and other similar laws. To overcome these various influences that deplete the revenues of the carriers and interfere so largely with their prosperity, the mere statement of the facts by the Commission is not enough. In times of financial strain and stress other industries must, by introspection and self-examination, see how their methods may be improved. The original report requires a similar course on the part of the carriers; and what is needed is the most persistent affirmative course of action on the part of the Commission, not only in requiring,

Nelson Harding in the Brooklyn Eagle

Better Late Than Never

but in aiding the carriers to eliminate such abuses from their rate structures and practices.

The supplemental report, in seemingly relieving the carriers' distress, removes the spur of obvious necessity which would have been the most potent factor in eliminating the abuses which the record shows are the real cause of the existing inadequacy of revenue. The inevitable result of the Commission's action will be to remove the pressure which otherwise would exist upon the state authorities to apply the right remedies. The supplemental report unlawfully shifts the burden of the carriers' troubles upon the interstate shipper. This should frankly be recognized as one of the results that will follow the action now approved by the majority of the Commission. An endeavor to stimulate commerce and to bolster up the credit of the carriers, as contended at the further hearing, by an increase in rates, will simply result in a perpetuation or recurrence of the financial distress of the carriers.

CONCLUSIONS

I cannot but think that a general increase in the standard rates of this country, while the rate structures of these carriers remain full of inconsistencies, discriminations and wrongful practices that deplete their revenues, is morally wrong; that the placing of additional burdens on interstate commerce that is not also placed upon state commerce, is also wrong; and that the course approved in the supplemental report will ultimately be as disastrous to the carriers themselves as it will be harmful to the general interests.

The original report was announced on July 29, 1914. Two days later the great European powers were suddenly thrown into a state of war. The immediate effect upon the commerce of the world and upon the commerce of this country is known to all and need not be described here. The results of that conflict, which is unparalleled in recorded history, are accepted in part by the Commission as the basis for the action it proposes in the supplemental report. Just how long the war may continue no one can conjecture. To what extent it may impair and impede our general prosperity and commerce cannot be predicted. Both undoubtedly are seriously menaced by its further continuance; and on these grounds we were urged at the further hearing to grant immediate relief. The objection was made that in deciding the general rate questions before us, we have no right to be governed by conditions presumably temporary in their nature, like those incident to the war, nor to consider the attending effects on general business and prosperity in this country of the allowance or denial of the proposed rate increases.

Aside from this objection to our legal right and power, which perhaps should be regarded as conclusive, there are grave doubts whether the facts assumed by the carriers, bankers and others at the further hearing are being verified by the progress of events. The apprehension of the bankers and others, most strenuously urged at the further hearing as a reason for granting increased rates at once, was that otherwise our railroad securities held abroad would, in consequence of the war, be dumped upon our markets with disastrous results, not only to the railroads, but to business interests generally. This apprehension the bankers apparently have concluded to have been so clearly unfounded that, in advance of any decision by the Commission upon the carriers' contentions at the further hearing, the great financial interests in control of such matters have not only caused the stock exchanges, which were closed at the beginning of the war, to be reopened, but have now caused the removal of all restrictions upon trading in such securities, the minimum-price limitation having been withdrawn. It also appears from public sources that since the further hearing interest rates, instead of increasing, as confidently predicted by the experts who then testified, have shown a downward tendency, and since the date of the original report the average operating ratios of the lines in official classification territory have shown a marked improvement. If at any time hereafter it should definitely appear that the carriers require immediate temporary relief by reason of the war and its effects, it could be obtained by a refiling of the tariffs heretofore disapproved, and in that event I should have no difficulty in regarding it as a proper exercise of our discretion under the act to decline to suspend them pending investigation.

LIMITATIONS OF THE POWER OF THE COMMISSION

Commissioner Clements, dissenting:

I can but regard the action now taken by the Commission as out of harmony with the spirit and purpose of the law, and as taking a step that leads away from the sound principles necessary to conserve the ends of justice.

Carriers have a right to earn all they can on the business which they can secure at just and reasonable rates. The right of the shipper to protection against the exaction of rates unreasonably high for the service performed is equally sacred.

Upon our order of suspension and investigation of these rates, in my view, there is but one question lawfully before us for ultimate determination, and that is, are they "just and reasonable"? Upon this question the burden of proof is placed upon the carriers by the statute. Have they met the issue and discharged this burden? If they have done so, they are of right clearly entitled to have them go into effect. If they have not, it is with equal clearness the duty of the commission under the law to prevent their establishment.

As shown by our report of July 29, 1914, in this proceeding, we found upon comparison of the rates proposed in central freight association territory with rates in other territories, including trunk line territory, as well as by other ordinary tests of reasonableness, that the carriers had as to the former territory, with certain specified exceptions, met the burden and justified the proposed increases. In my view the foregoing report and decision constitute a new and radical departure and a most serious and portentous step, in that by this step the commission is shown to deem itself justified in sanctioning these increased rates in the latter territory upon consideration of general financial and operating results, without resorting to other ordinary tests or factors heretofore deemed pertinent and necessary to the determination of the reasonableness of rates. I am not aware of any prior case in which this commission or any court has held that the need by a carrier of money was of itself proof of the reasonableness of a specific rate, or body of rates, increased to meet such need. The commission has repeatedly held that the commercial necessities or interstate of a particular shipper, community, or kind of industry, considered alone, afford no basis for the reduction of rates, and that it cannot in any case reduce the same except upon an affirmative showing of unreasonableness, after full hearing. In any considerable group of carriers there are probably always some that are in need of more money than they earn, when such need is tested by their obligations without regard to the extent or manner of creating such obligations, or the disposition of the proceeds thereof. If the basis of the conclusions of the majority of the commission sanctioning these rates in trunk line territory is sound, and points to the rule of action for the future, the burden placed by the law upon the carriers to justify increases in rates is indeed made light and easy to carry, especially when by concerted action a group of carriers, some strong and some weak, simultaneously propose to increase the great body of their rates.

As I understand it, justification of the rates permitted by this decision to be increased rests largely upon the need of greater net revenue to enable the carriers to afford adequate service to the public, to meet their financial obligations, and maintain dividends in such manner as to encourage further investments in railways and their securities. If these considerations constitute a sufficient basis for wholesale approval of a body of increased rates agreed upon by all carriers in a given territory, competing or connecting, weak or strong, the same must be equally true if every road in the country, as well as every rate, were included in a proceeding before us.

If the legislative authority of the commission is as broad and unrestricted as this, then I must confess that I have gravely misunderstood the limitations upon our statutory authority, as well as the constitutional power of Congress to delegate its legislative power.

It may be said that the commission was not obliged by the law to suspend these rates when filed, and that those who must bear these increased burdens are in no worse situation, now that the rates once suspended are permitted to become effective, than if they had never been suspended. Such a suggestion, however, appears to ignore the true and important intent of that provision of the act of 1910, investing the commission with authority, when instituting an investigation as to the reasonableness and propriety of a proposed new schedule of rates, to suspend the operation thereof pending such investigation. As shown in the excerpt from our last annual report, hereinafter quoted, this act was passed in the face of the initial steps then being taken by these and other carriers for a general increase of rates. The steps taken by the President of the United States and the attorney-general at that time, as outlined, point with singular clearness to the intent and purpose of this provision for suspension. This purpose is made the more manifest, if possible, when considered in connection with the two other distinctly remedial provisions of the same act that go hand in hand with

it; these are the authority for the commission on its own motion to institute an inquiry to the same effect as in the case of complaint, and the definite rule of law placing the burden of proof upon carriers as to increases made, or proposed to be made, subsequent to January 1, 1910. The commission, in its annual report for the year 1912 indicated its understanding of the purposes of this suspension provision, and the manner of administering the same, as follows:

"In the exercise of its authority to suspend the operation of new tariff schedules the commission has not understood that it was the purpose of the provision of section 15 of the act of 1910 that, as a matter of course, all advances in rates should be suspended; but upon the contrary has proceeded upon the idea that it was the purpose of this provision that it should exercise sound discretion in these matters. Therefore, upon such preliminary consideration as it has been practicable to give, the commission has undertaken to distinguish between current changes in rates which might be regarded as natural and normal readjustments occurring in the ordinary course of business, and distinct and material advances for the definite purpose of increasing rates; and in the latter class of cases it has undertaken to scrutinize the apparent reasons therefor and has acted in the light of another provision of amended section 15, which casts upon the carriers the burden of justifying rates advanced after January 1, 1910." (Page 18.)

COURT POWER TO REVIEW

It may be true as a matter of fact that the commission could altogether refuse to suspend or, having suspended a body of proposed increased rates, however extensive in scope and large in amount, could subsequently vacate its order of suspension and permit them to go into effect, without such action being subject to judicial review. If so, is there not greater need for constantly keeping in mind the definite object of these provisions, because the shipper is without remedy elsewhere, if he should suffer by our failure to act properly in the administration thereof? Upon the other hand, if the commission makes an order against carriers which is shown to result either in confiscation or is beyond its statutory authority, not resting upon due process and full hearing with supporting testimony, the carriers may go to court and have it set aside.

If by modification of our former order in this proceeding, increased rates heretofore condemned are now permitted, what is the legal justification for this action unless based on ascertained reasonableness of these rates, according to the ordinary tests? Will the legal interpretation of this supplemental report and order be to the effect that these rates have been found reasonable by the commission? If so, whatever standard of reasonableness has been applied, is not the shipper bound by our action if hereafter he desires to challenge the reasonableness of these rates? Upon whom will the burden of proof then rest? Of what avail will these remedial provisions of the act of 1910 be to the shipper if this procedure, these grounds of action, and the results thereof are compatible with the requirements of the law as a whole?

Anyone familiar with the procedure necessary to be observed in making and enforcing a lawful order against a common carrier for the reduction of a particular rate, and what would be required as a proper record of full hearing and testimoney supporting an order requiring the reduction of the general body of the rates of each or all of the carriers in a large group or territory, must be struck with the facility with which rates may be increased as indicated by this decision.

Surely the fact that the commission's negative action is not ordinarily reviewable in court affords no justification for a different basis or test of the reasonableness of rates, in a situation like the present one, than would apply when the same question is before us on a complaint made by shippers seeking reductions in rates, unless the commission has been vested with broad legislative authority to inaugurate and shape public policy. While I do not mean to say that such authority is claimed by the commission, I can see no other basis for the action taken by it in this matter.

OVER CAPITALIZATION

The financial results of the carriers' operations, appearing and so much stressed in this case, are figured with important relation to the carriers' so-called "book value," or account of both actual and alleged investment, which accounts have long and generally been recognized as largely untrustworthy. These financial results are of course affected directly and materially by the bonds and other obligations, however and for whatever purpose issued. There is and has been no adequate control of the issuance of stocks and bonds, and they have been put out largely by those holding the theory that there exists no relationship between the securities of a carrier and the reasonableness of its rates. Now, we see these securities calling for increased rates to make them good.

If, now, to strengthen and maintain the credit of the carriers, regardless of the causes of its exhaustion or impairment, and without the application of the usual tests of reasonableness, these increases are justified, then, it seems to me that we are only at the beginning of what I fear will be a train of demoralizing results, disappointing and embarrassing to all concerned. It is by no means certain that it would not, in the long run, be cheaper to the public to guarantee the bonds of the weak roads unable to meet their obligations, rather than to try to take care of them by increased rates, which inure to the strong roads as well as the weak.

Up to the beginning of these efforts for increased rates there had for many years been a steady and constantly increasing percentage of carriers paying dividends, as well as in the rate of dividends paid. It appears evident that carriers are suffering more just now for want of freight to carry than for want of higher rates. It is just as safe to prophesy that this is a temporary condition as to prophesy concerning future rates of interest and the dumping of foreign-held American railway securities on our investment markets. It would not seem to be out of line with ordinary prudence and conservatism, prevailing in other lines of industry, if the carriers had undertaken to meet this apparently temporary situation as have others. Such a course, it seems to me, would have contributed to their credit, rather than the course they have pursued.

Pertinent at this point is the language of Commissioner Lane, in continuation of that in the foregoing report of the majority in this case, quoted from him in the 1910 Western advanced rate case. There, in quoting from the brief of the Atchison, Topeka & Santa Fe Railway Company, he said (20 I. C. C., 317):

"The full significance of the opening sentence quoted, 'that American railway rates never have been high enough and the public has never paid adequately for the service which it has received,' cannot be appreciated until one stops to think that for nearly seventy-five years after the first railroad was built the American Government did not choose to exercise the power of regulating the charges of interstate railroads. These carriers, charged with a public trust, were given a free hand in the institution of their own rates until within the last four years, and they now appear asking the protection of the law to increase their rates, which under the play of economic forces they say never have been high enough. Throughout this record it appears that a literary campaign has been conducted by the use of railroad money with the manifest purpose of establishing both at home and abroad the impression that the effect of railway regulation in the United States is injurious to the American railroad. Widespread circulation has been given to the pessimistic utterances of railroad financiers who sought to fix the idea that injustice was being done our railroads by restrictive and oppressive legislation. Yet it is apparent that the carriers at present in this and similar cases are relying upon the restrictive provisions of the law which declare concessions from the published rate to be criminal and thus give stability to rates—at least as between carriers—to permit the elevation of rates to a standard which under the force of competition the carriers were unable to reach and maintain."

This decision of the commission is the culmination of the concerted efforts of the respondent, and other carriers, for a general increase in freight rates, beginning in 1910.

AUTOMATIC SIGNALS ON THE LEHIGH & HUDSON RIVER

The Lehigh & Hudson River has installed automatic signals on 72 miles of its main line from Maybrook, N. Y., to Belvidere, N. J., practically the entire line. The track is fitted for high speeds and traffic is heavy, averaging 42 trains a day, of which 12 are scheduled passenger, 8 scheduled freight and 22 extra freight. The maximum traffic has run as high as 53 trains a day. When putting in automatic signals, train-order signals were changed from three to two-position, and now display but two indications, stop and proceed. The first automatic signal in the rear is controlled by a circuit running through a circuit breaker on the train order-signal and so serves as a distant for the train-order signal, indicating caution when the train-order signal is at stop.

The installation of automatic signals made it possible to

Fig. 1—Two-Arm Signal at Turnout

reduce the force of telegraph operators; five night offices were closed and seven operators were transferred to other duties. A further reduction in this force could have been made, but was not necessary, as the agents at regular stations serve as operators. Following the installation of automatic signals, Form "31" was discontinued and train orders are now given on Form 19 in all cases, and there is no stopping of trains for orders.

A typical arrangement of signals at and between passing sidings is shown in Fig. 3. These sidings, of which there are 22, are 3,000 to 3,300 ft. in length; they average 2½ miles apart. There is one lap siding, the signal arrangement for this location being shown in Fig. 4.

The signals and apparatus were installed by the General Railway Signal Company, arranged according to the "absolute-permissive" system; absolute blocking between passing sidings for opposing movements, and "stop-and-proceed" or standard double-track blocking, for following movements.

In Fig. 3 the thin lines indicate the control of each signal. Each passing siding has an entering and a leaving signal at each end for each direction, as shown in Figs. 1 and 3. Between passing sidings there are two or more intermediate signals for movements in the same direction, and the average distance between signals governing movements in the same direction is about 4,400 ft.

Ordinarily, entering signals are permissive or stop-and-proceed signals, of which 1 and 4 at siding A, Fig. 3, are typical. The control of signal 1 extends to the farther end of the first track circuit beyond signal 3, and likewise the control of signal 4 includes the first track circuit beyond signal 2. This arrangement insures that two trains approaching a meeting point will encounter stop-signals at the entrance to the sidings, in which case the inferior train prepares to enter the siding.

Each entering signal has a lower arm controlled by the position of the passing-siding switch. When this switch is set for main track, the lower arm is horizontal, but when set for the siding, the lower arm is at 45 deg. This arrangement eliminates unnecessary stops at meeting points. In all cases the outgoing signals are "stop-and-stay" signals. The control of a leaving signal extends to its respective opposing leaving signal at the siding in advance; for example, signal 10, Fig. 3, is controlled by the same track circuit as signal 3. Intermediate signals between sidings are stop-and-proceed, as before stated. For opposing movements, the control of these signals is lapped the same as their respective leaving signals, and for following movements the control is from signal to signal.

In the case of stop-and-proceed signals when they are located on ascending grades, where heavy trains would have diffi-

Fig. 2—At Lap Sidings

culty in starting, a full stop is not required. Two-arm signals, called "tonnage signals," are used; these permit a following train to enter an occupied block on a cautionary indication without coming to a stop. Since the speed of trains accepting this indication is necessarily slow, there is practically no sacrifice of safety and a considerable advantage in facility. At a "tonnage signal," when the upper arm is in the proceed position, the lower is horizontal. When the upper arm is at stop, the lower arm moves to the 45 deg. position, indicating "block is occupied, proceed with caution."

Prior to the signal installation the railway company com-

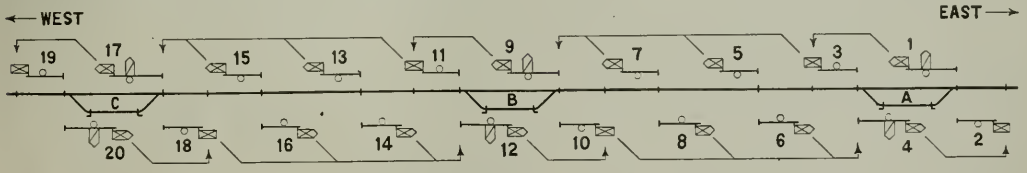


Fig. 3—Typical Signal Arrangement

pleted on the greater part of the road a new pole line consisting of 26 ft. chestnut poles, 7-in. top, 40 to the mile, with Washington fir cross-arms, ½-in. steel pins on single arms, ⅝-in. steel pins on double arms, single groove d. p. glass insulators and R. S. A. cross-arm braces and lag screws. The lower cross-arm supports the signal wires.

Line wires for the signaling circuits are No. 10 B. & S. gage, double-braid, weatherproof, 30 per cent copper clad. They are fastened to the insulators by the figure 8 tie. Ordinarily there are five wires extending from siding to siding and seven wires through sidings. Connection between line and signals is made by No. 14 rubber-covered wires, which are wrapped together with marline, forming a cable which is supported by messenger wire and marline. Brach vacuum lightning arresters are used.

The signals are G. R. S. model 2A. For the high speed signals the mechanism is at the bottom of the post, but for the lower arm of the two-arm signals a top-mast mechanism is used, clamped to the post.

The night color indications are green for clear, red for stop and yellow for caution. The lamps are Dressel, with long-time burners. The signals are operated by Gordon potash batteries, 16 cells, 400 ampere hours capacity. The battery vaults are Potter-Winslow, 60 cells capacity.

At Burnside where this road connects with the New York, Ontario & Western the existing home signals were converted into power signals by clamping top-post mechanisms to the wooden posts. At the same time calling-on arms were fitted to these posts, and a number of outlying switches were fitted with electric locks.

Each of the four maintainer's sections has 47 automatic signals, except that on one, where there are three interlockings, there are only 31 automatics. Each maintainer has a gasoline motor car, and for each car there is a car house 10 ft. x 12 ft.

The work of installation, done by the General Railway Signal Company, was carried out under the supervision of the signal supervisor, who reports to the maintenance of way officers. H. W. Lewis, signal engineer of the Lehigh Valley, was engaged to act as consulting signal engineer and had general supervision of the installation. The signal company did all of the work, with the exception of installing insulated joints and switch rods and rearranging track and switch ties. The material was delivered by work trains, and gasoline motor cars were used by the signal company in transporting men and tools.

Before the signals were put in service, a book of signal rules was prepared and frequent teaching classes were held. All employees whose duties required them to be familiar with the operation of the signals were thoroughly instructed, and no delays or difficulties were experienced in putting the signals into service.

Track and signal maintenance employees all report to the same head, the superintendent of track, bridges and buildings, and he, in turn, reports to the superintendent. This organization provides satisfactorily for co-operation between employees of the track and signal departments. The signal department consists of a supervisor of signals, four maintainers and four batterymen. Signal lights are maintained by trackwalkers, reporting to the section foreman. The signal supervisor also has charge of the installation and maintenance of telegraph and telephone wires and apparatus.

The company has adopted a thorough system of records of performance and reports for four months indicate that the maintenance cost will average $95 per year per signal.

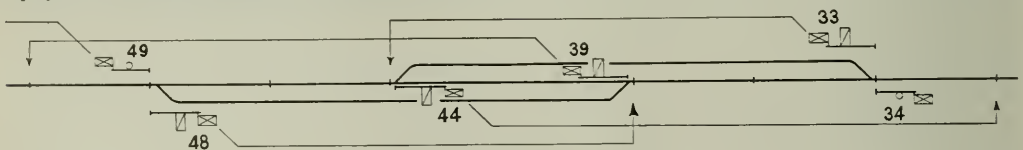


Fig. 4—Signal Arrangement at Lap Siding

GRADE CROSSINGS IN CANADA

The Railway Commissioners of Canada, who have authority to draw on a fund of $200,000 a year for abolition or amelioration of grade-crossing dangers, are asking Parliament for a modification of the law, so as more effectually to carry out its policy of making permanent separation of grades at crossings as fast as is practicable.

This Canadian law is more liberal than those of Massachusetts and New York (which have been the most notable examples of state aid in this country) in that the commissioners have wider discretion, and may make appropriations for the installation of gates or bells, and for the construction of bridges or subways.

The Canadian railway grade crossing fund was set apart by act of Parliament in 1909 to be used as directed by the railway board in aiding the work of protecting or obliterating level crossings. The fund was to amount to $200,000 yearly, and was to be available for a period of five years. The fund can only be utilized in the case of a crossing in existence prior to 1909. Secondly, the contribution to any given work must not exceed twenty per cent of the estimated total cost. Thirdly, the maximum contribution in any instance could not go beyond $5,000. Fourthly, the board could not order a payment from the fund in more than three cases in any municipality within a year.

Assuming that the maximum twenty per cent was contributed by the railway board in every instance, the total cost of the protective work would have to be at least one million dollars a year to absorb the entire amount invested in the fund each year. But the circumstance that not more than three crossings in any municipality can benefit from the fund within the twelve months, coupled with the fact that most of the costly grade separation work, involving the handling of numerous crossings, is done within the limits of a single municipality, has limited expenditures, and the $200,000 has never been fully spent in any year.

The majority of the orders for crossing protection, involving a draft on the grade crossing fund, call for the installation of electric bells, with illuminated danger signs. The second most numerous class are for gates; the third, for the entire separation of grades. For the five years that the fund has been in existence 306 orders have been made, of which 161 have been for bells, 68 for gates, 60 for subways and bridges, 14 for highway diversion and two for highway closing. The railway board, through its staff of inspectors, investigates every crossing accident, and if thought advisable orders protection at such crossing.

The five-year period having expired last spring, the legislation was renewed for a sixth year, but after that it is hoped Parliament will permit a much more generous use of the fund. The twenty per cent limit is satisfactory enough, but the $5,000 maximum is regarded as too small to be of much real value. The installation of bells and gates would not be affected as their cost is comparatively small, but in the building of subways and the erection of bridges, the $5,000 usually represents much less than twenty per cent of the outlay. To increase this limit and encourage the permanent separation of grades is the aim of the proposed legislation.

Methods of Handling L. C. L. Outbound Freight*

A Discussion of the Relative Merits of Two-Wheel, Four-Wheel and Motor Trucks With Cost Statistics

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The handling of L. C. L. freight through freight and transfer houses, excluding inbound houses, involves a sequence of operations which may be divided into:

	Average distribution of house costs at six outbound houses
1. Unloading or checking	32.5 per cent
2. Trucking	43.7 per cent
3. Stowing	13.1 per cent
4. Supervision and miscellaneous	10.7 per cent
	100.0 per cent

In searching for means for increasing economy, the reduction of trucking cost is the item in which the great saving is to be expected, and in order to secure maximum economy the co-operation of the management with the agent and foreman is required. The reduction of trucking cost may seem an insignificant matter to one not closely in touch with freight house work. Allowing for the double handling required under present practice, about 24,000 tons of L. C L. freight is handled per day through freight and transfer houses in Chicago alone, and taking the country as a whole, the L. C. L. tonnage going through freight houses and transfer stations probably approximates 400,000 tons per day. Therefore, it is apparent that if the conclusions reached herein are sound, the possible saving amounts to a large sum,

Almost without exception the handling of material of any kind is based on a few broad principles, although in a given case their application is sometimes difficult to recognize. Ton-mile cost is frequently a useful standard for measuring efficiency in handling materials transported by other means than railroad cars. The means and methods involved in the economical handling of cars that in turn influence ton-mile cost, nearly all have a counterpart in the proper handling of trucks through a freight house. In either case it is essential to the best results that a smooth track or running surface be provided; that adverse grades be reduced or eliminated; that fouling points and causes of interference be avoided; that re-handling be reduced to the lowest terms; that full loading be provided for each carrying unit, and that these be transported over the shortest and most direct line or path at the highest safe speed, so far as is practicable in each item. In either case suitable appliances and equipment are required. Finally, if by good management and proper classification in the one case a larger loading on each carrying unit or car can be assembled with other units into larger trains to be hauled the greatest practicable distance before breaking up, with a favorable effect upon cost, it is fair to presume that the same general practice may have a like favorable effect in the other.

That the four-wheel truck should be generally substituted for the two-wheel truck in all except the smaller houses, and that in outbound freight and transfer houses having sufficient size and business, the use of motor trucks and trailers will save money, are thought to be the general conclusions reached by almost everyone who will analyze the facts. Man power is one of the most expensive forms of power. One authority maintains that its cost per unit of power developed is from 10 to 12 times that of the next less expensive form. Evidently, therefore, where conditions warrant, the substitution of mechanical power offers an effective means of reducing cost.

THE TWO-WHEEL TRUCK

The two-wheel truck has been standard for freight house use for years, and it is still almost universally used. It is suited for economical hauling over short distances, and is convenient and well adapted for use in cramped and narrow runways; but a careful examination shows many defects in its use. Its average load varies from about 200 lb. to approximately 400 lb., a rack being required in the latter case. Roughly, therefore, from five to ten trips are required in transporting a ton of freight through the house. The length of the trucking distance under load probably averages 200 ft. and upward in city freight houses, and thus the two-wheel truck travels from 1,000 to 3,000 ft. per ton. If the gang system of trucking is used, under which from 40 per cent to 50 per cent of the movement is with empty trucks, the distance traveled per ton handled is nearly doubled.

The very general use of the two-wheel truck is responsible for the relatively high trucking cost per ton for handling freight in freight houses. This average cost in over 50 observed cases approximates 10.3 cents per ton per 100 ft., or $5.33 per ton-mile. This cost was determined as follows: In the course of an investigation the writer secured the costs of operation in a large number of houses, and plotted them against the length of house. It was found that the average cost of operation increased about 1 cent for every increase of 35 ft. in the length of the house, the cost of trucking being practically the only cost to increase. Observations of truckers were made in different houses of different lengths, by men working for three different railroads, and with different purposes in view, and it was found that the average round trip trucking distance increased 55.6 ft. per 100 ft. increase in the length of the house. The actual distance the freight moves, of course, is only one-half of this, or 27.8 ft. per 100 ft. of house. The theoretical distance would be 33.3 ft. for every 100 ft. length of house, assuming that all doors receive equal amounts of freight, and that the freight received at every door is evenly distributed among the cars. As the end doors are usually closed, and as teamsters with large shipments for a certain car are often sent to the door nearest that car, the actual is less than the theoretical trucking distance.

If the average cost of operation of a large number of freight houses, in which two-wheel trucks are used, increases 1 cent for every 35 ft. of house, or 2.86 cents per 100 ft., and the average trucking distance that the freight is actually moved is 27.8 ft. for every 100 ft. of house, then the cost of trucking is 10.3 cents per ton per 100 ft. ($2.86 \times \frac{100}{27.8} = \$0.103$), or $5.33 per ton-mile. Accurate observations will show that each of the factors in any specific case will vary from the average to some extent, and of course this cost per ton-mile is not applicable in the case of an outbound house, where freight is received only at the door nearest the proper car. But that the cost per ton-mile is correct, as derived above, may be shown by the assumptions, which are thought to be reasonable, and computation which follow:

Assumed:

Average speed of travel for truckers, 1½ mi. per hour.

Average loading of two-wheel truck, 250 lb., or ⅛ ton.

The trucker travels only half the time, the other half being lost at terminals, or the ends of trip. Only ½ the travel time of trucker, or ¼ of his total time, is employed moving with load.

Trucker's rate of pay, 22c. per hour.

Then:

$$\text{Ton miles per trucker} = \text{ave. speed} \times \text{ave. load} \times \frac{\text{Time moving load}}{\text{Total time}}$$

*Abstracted from Bulletin 171 of the American Railway Engineering Association.

Substituting assumed values for one hour:

$$\text{Ton-miles per trucker per hour} = \frac{3}{2} \times \frac{1}{8} \times \frac{1}{4} = \frac{3}{64},$$

$$\text{Cost per ton-mile} = \frac{\text{Wages per hour}}{\text{Ton-miles per hour}}$$

Substituting assumed values:

$$\text{Cost per ton-mile} = \$0.22 \div \frac{3}{64} = \$4.69$$

It therefore seems conservative to say that ton-mile cost for two-wheel trucking will fall somewhere between $4 and $6 in any given case.

The effect of this ton-mile cost on the cost of freight house operation is apparent. Indeed it becomes startling when compared with ¾ cent per ton-mile, the average freight revenue of the railroads of the country.

THE FOUR-WHEEL TRUCK

The four-wheel truck has now been so far perfected that one man can handle from three to six times the tonnage per trip as compared with the average load on a two-wheel truck, and with no greater fatigue, because the trucker is relieved from carrying any portion of the load on the four-wheel truck, and simply applies the horizontal force required for traction. With the use of the truck carrying the heavier load, a smooth trucking surface is of importance, and commodious truckways greatly facilitate the work. The four-wheel truck has already been adopted in some existing freight houses to the exclusion of the two-wheel truck, except for use in the shortest hauls; and the average loading is at least three times the loading of the two-wheel truck. For special purposes six-wheel trucks and dollies are found convenient.

Some of the objections offered to the use of the four-wheel truck are as follows:

"Their loading involves extra expense."—The observer will note a partial answer to this objection in the fact that two men are often required in loading a two-wheel truck. He will also note that in any trip of a trucker there is a certain amount of lost time at the terminals or ends of each trip. The number of trips made by the four-wheel truck in handling a ton of freight being much less than with the two-wheel truck, the time lost at the terminals per ton handled is also reduced in proportion.

"It is necessary to mix freight on the truck to procure full loading."—This, while true, is not a vital objection. The freight on a "peddler" truck can be classified for the cars in a certain rank or for ranks opposite a certain section of the house, the freight being loaded on the truck in proper sequence so that it may be convenient for unloading. To make such a classification most advantageously, an ample number of trucks is needed.

In loading cars for the way-freight train on the road, many are given a mixed loading. During the time such mixed freight is being handled at the way station, the expense for locomotive and crew is a dead loss, and in most cases the main track is blocked. Moreover, at most way stations the facilities for handling L. C. L. freight are so poor that the actual expense of handling is excessive. For these reasons some relatively light setout cars are run, yet it would not be considered good practice to run cars with only 25 or 30 per cent of their average loading merely to avoid mixing freight in them. With a proper system of classification, mixing freight on the four-wheel truck is free from the objections that apply to the practice with the freight car on the road; therefore all the greater is the disadvantage and loss caused by multiplying the distance required to handle the truck by three or four, merely to avoid a relatively small loss required by the classification described.

"The use of the four-wheel truck increases the cost of stowing."—This may well be doubted. The use of stowers is required by the "drop truck," or "no gang" system, and this system probably saves money, although in this respect some difference of opinion may exist. The use of the four-wheel truck is particularly well adapted to the drop-truck system. Actual practice with the use of the four-wheel truck has shown that mixing freight on the "peddler" truck has actually made a substantial reduction instead of tending to increase the overs and shorts in the freight car. Moreover, it cannot be doubted that any extra expense involved in careful and proper stowing of L. C. L. freight in cars reduces the damage in transit and the placing of freight in the wrong car sufficiently to more than offset the extra stowing expense.

"Four-wheel trucks are not adapted for passing into and through cars."—This objection, so far as it applies to the improved trucks now manufactured, is without foundation.

If the loading on the four-wheel truck is three times that on a two-wheel truck, it might seem that by the use of the former trucking, cost should be reduced 66 per cent, but this is somewhat too much to expect. In the opinion of the writer, some additional labor is to be expected in sorting the freight onto trucks, as several shipments are required to make a truck load, the average shipment being only about 400 lb., to the best of our information. In certain cases additional expense for stowers is involved, but this is a positive advantage for the reasons already given.

The trucker can hardly be expected to travel so rapidly with the larger load, although an improvement in the floor or trucking surface will frequently offset this difference. It may be said here that a smooth trucking surface is a profitable investment in almost any house. Officers who would promptly authorize the repair of rough main tracks, sometimes fail to appreciate that a rough trucking surface, although not involving the same elements of danger as a rough track, probably has a relatively greater effect upon the cost of transportation over it.

MOTOR TRUCKS

In the fall of 1912 an investigation into facilities for handling L. C. L. freight was made by the writer for his company. This covered appliances and methods, as well as the general arrangement of houses and tracks. At that time the Chicago & Eastern Illinois had one motor truck in service in its outbound freight house in Chicago. The results of the operation of this truck strongly attracted the attention of the writer. Accurate observations and a one-day's record of the performance of this truck were made in November, 1912. On that day it hauled 88 tons, with an operator and one assistant. On the same day the men with two-wheel trucks handled from 10 to 15 tons. The motor truck reduced the cost of trucking 9.3 cents per ton for the freight it handled. These results were so satisfactory that shortly afterward two additional motor trucks were purchased and put in service.

The Chicago and Eastern Illinois has further perfected its system of motor trucking in the two years since 1912. To obtain further information, observations and records of the performance of each of these three similar motor trucks were made on September 4, 1914. In the last case three motor trucks each handled an average of 172 tons over an average distance of 393 ft. at a cost of 3.6 cents per ton. Each motor, therefore, carried 12.8 tons one mile at a cost of 48 cents per ton-mile. The average time per loaded trip was 5 min. and 18 sec. An average of 3,070 lb. was carried per loaded trip on 2.71 trailers, or 1,130 lb. per trailer. The three motors handled 515 tons, or 65.1 per cent of the total tonnage. The average weight per shipment on that day was 398 lb., and as the average trailer load was 1,130 lb., it was evidently necessary to mix the loading on a considerable percentage of the trailer trucks. These "peddler" trucks were hauled by the motor to the proper section of the house, and there distributed into cars, as previously described. Two truck switchmen made up trailers into trains for the motor trucks, one working in each half of the house. Trailers were made up into station order, the last in the train being the first dropped. Hand trucking was used for distances of about 100 ft. or less. In this house motor trucks and trailers are considered to be better adapted for handling long pipe, sheet iron, lumber, machinery, pianos and other awkward and bulky freight than two-wheel trucks. One should note that much of the improvement made in the tonnage handled by mo-

tor trucks in the two years was due to the elimination of all loading from the motor truck, its use being confined strictly to the development of power.

On September 10, 1914, similar observations were made of the use of motor trucks in the Chicago, Burlington & Quincy Harrison St. freight house, Chicago, where five motor trucks to handle trailers had been installed in July, 1913. These observations at both the C. & E. I. and C., B. & Q. houses are believed to represent general conditions accurately because they were all made upon days when business and conditions were normal.

The system of operation at the C., B. & Q. house is similar to that at the C. & E. I. house. Six motor trucks were used, a seventh being added in the afternoon only. The motors averaged 88 tons each per day, hauling on an average two trailers per loaded trip, with 1,111 lb. of freight each, or 2,222 lb. per loaded trip of the motor truck. The average distance hauled was 642 ft. The motors, therefore, average 10.7 ton-miles per day. The cost of motor trucking was 4.8 cents per ton, or 39.2 cents per ton-mile. It will be noted that the average haul in the Burlington house is greater than in the C. & E. I. house, due largely to the design of the house. A substantial saving in the cost of operation has been made in this house during the last ten months, due mainly to the use of motor trucks with trailers.

In the investigation made in 1912, the use of motor trucks on several piers in New York City and at various transfer stations in the east was observed. At some of these points the use of these trucks was considered satisfactory, although in none was the same efficiency obtained as in the cases cited in Chicago. The reason is plain. The motor truck was used for carrying freight, instead of hauling it. A large part of the motor's time was therefore lost in loading and unloading, and the average load was relatively smaller. For the same reason automobile trucks for general road and street use have proved economical for the handling of miscellaneous material, only when their running time is largely in excess of their standing time, and therefore their use for handling materials whose loading requires too much time has been limited, and in some cases entirely abandoned.

In designing plans for new house and track layouts, changes from present standards are required if motor trucks are to be used, in order to secure maximum efficiency. In substituting four-wheel trucks for two-wheel trucks, and in determining where motor trucks are warranted, how large the installation shall be, and what changes, if any, shall be made in existing houses and track layouts, a careful investigation is needed.

The comparative merits of the methods mentioned herein of trucking as compared with hand trucking with two-wheel trucks, may be shown by the following mathematical statement, bearing in mind that the comparison is only applicable to the truck while actually traveling:

Letter a = Average loading per truck.
b = Number of trucks handled as unit or train.
c = Relative speed of travel.
d = Relative average length of truck haul, or distance.
e = Relative average cost per unit of time.

For the purpose of comparison all these various factors may be assumed as unity in the case of the two-wheel truck. For the four-wheel truck handled by hand the value of (a) is increased to 3 or more, and (c) should probably be some fraction of unity, say, 70 to 80 per cent, which may, however, be increased in some cases by improving local conditions.

For motor trucks and trailers, the various factors may be assumed as follows:

a = 3 to 4
b = 3 to 6
c = 2 to 4
d = X, except that for a given house where two-wheel trucks are in use it equals 1.
e = 2 to 3

1. For hand trucking with two-wheel trucks the expression becomes:

$$\frac{a \times b \times c}{d \times e} = \frac{1 \times 1 \times 1}{1 \times 1} = 1$$

2. For hand trucking with four-wheel trucks it becomes:

$$\frac{a \times b \times c}{d \times e} = \frac{3 \times 1 \times 0.7}{\cdot 1 \times 1} = 2.1$$

3. For motor trucking with four-wheel trailers it becomes:

$$\text{Minimum } \frac{a \times b \times c}{d \times e} = \frac{3 \times 3 \times 2}{1 \times 2} = 9$$

$$\text{Maximum } \frac{a \times b \times c}{d \times e} = \frac{4 \times 6 \times 4}{1 \times 3} = 32$$

That is to say, if the values assumed in case 3 meet the conditions correctly in the assumed minimum, the same tonnage will be handled by motor truck for 1/9 the cost, or nine times the tonnage will be handled for the same cost. In the assumed maximum the corresponding values are 1/32 or 32, as compared with hand trucking by two-wheel trucks.

The actual efficiency of the motor truck with trailers is somewhat less than this theoretical efficiency, because among other reasons, loads must be mixed, in order to obtain the best results, as already described, and then be "peddled out" to several cars in one section of the house. The results found at the two houses investigated do not show as great an increase in efficiency per ton handled through the house as the formula would indicate, the actual cost per ton of hand and motor trucking being in the ratio of 4 to 1 in one case, and 6 to 1 in the other. The cost per ton-mile, however, is in the ratio of 12 to 1 and 14 to 1, respectively. In these houses the short hauls are made by hand and the long hauls by motor. There are two additional reasons for the efficiency being below the theoretical. First, neither house was designed for motor truck operation, having been built several years ago, and there is not sufficient space available for their use to best advantage. Moreover, the traffic has outgrown the facilities in each case. Second, as both two-wheel and four-wheel trucks are used in hand operation, an actual comparison between motor trucks and two-wheel or four-wheel trucks is difficult. It is believed that under more favorable conditions, motor trucks would show still lower costs.

GENERAL CONCLUSIONS

1. Motor trucks, when used without trailers, tend to decrease the cost of trucking freight, because they form single units of higher capacity and greater speed than do men with two-wheel trucks; but as their cost of operation per day is greater than the cost of a man and a two-wheel truck, the saving is not large, and unless conditions are favorable (long haul, heavy packages, etc.), no saving is made. When compared with a man and a four-wheel (platform) truck, there is no saving, for the two have about the same carrying capacity, and the higher speed of the motor is more than offset by its greater cost of operation.

2. Motor trucks, when used as power for hauling loaded four-wheel trucks as trailers, show favorable results and greatly decrease the costs per ton. They can pull six times the load at twice the speed of a man with a four-wheel truck, at about twice the expense. Motor trucks should, therefore, be used to haul and not to carry freight. Under such a system they form an efficient, reliable and economical means of trucking freight.

3. To insure full train loads, an ample supply of four-wheel or six-wheel trucks and dollies is necessary.

4. Motor trucks, when used as tractors, can handle practically all kinds of L. C. L. freight.

5. Motor trucks need wide station platforms, and open runways wide enough to permit two motor-truck trains to pass each other, in order to secure the best results.

6. "Fouling points" or "interferences" should be reduced or eliminated entirely.

7. In motor truck operation, distance is a relatively unimportant factor, for once a train is made up and in motion, the cost per ton per 100 ft. is low.

8. Under fair conditions, on an ordinary freight platform, where the motor must operate largely as a way-freight, it can

handle from 150 to 200 tons per day per motor, and do from 10 to 15 ton-miles of trucking.

9. Under ideal conditions, where the motor can operate as a "through freight," i. e., pull a solid train of five or more trailers from origin to destination without stop and with few or no delays, a motor can probably be expected to handle from 250 to 500 tons per day, or do from 30 to 60 ton-miles of trucking.

10. Finally, while the substitution of the four-wheel truck for the two-wheel truck saves money, if conditions warrant, its use is particularly valuable because it may be a preliminary step to the use of one or more motor trucks, if the volume of tonnage and local conditions indicate the need of a tractor. This method of procedure also eliminates the danger of installing motor trucks at a heavy investment expense, to perform work which the four-wheel truck used as a trailer will do more economically.

Operation of Motor Trucks at the C. & E. I. Outbound Freight House, Chicago, September 4, 1914

Total tons handled	791
Tons handled by motors	515, or 65.1 per cent of total
Cost of 3 motor trucks for one day	$18.57
(Wages of motormen, electricians, truck switchmen, current, interest, depreciation and repairs included.)	
Cost per ton of trucking by motor	3.6 cents

Distribution of Motor Truck Time per Average Loaded Trip

	Time	Per Cent
Moving, loaded	2 hr. 20 min.	44.4 per cent
Moving, empty	1 hr. 00 min.	18.7 per cent
Delayed	0 hr. 41 min.	12.6 per cent
Loading and unloading	1 hr. 17 min.	24.3 per cent
Total time	5 hr. 18 min.	100.0 per cent

Average per Motor

Tons carried	172
Miles, loaded	11.0
Miles, empty	4.2
Tons carried one mile	12.8
Average haul	393 ft.
Average weight per trailer	1,130 lb.
Average trailers per loaded trip	2.71
Average weight per loaded trip	3,050 lb.
Average loaded trips	113
Average loaded trip per hour	11.3

Note.—As but one motor is permitted on the transfer platform in this house, because of its width (11 ft.), part of the freight is handled twice by motor, once in the house and once on the platform. This reduces the figure of 515 total tons handled by motor to about 450 tons (net) handled by motor. This also reduces the average haul by 33 per cent, and consequently a larger number of trips were made.

Operation of Motor Trucks at the C. B. & Q. Outbound Freight House, Chicago, September 10, 1914

Total tons handled	1,045
Tons handled by motor trucks	571, or 54.7 per cent of total
Cost of motor trucks per day (current, interest, motormen, depreciation and care included)	$27.17
Cost per ton for motor trucking	4.76 cents
Cost per ton-mile for motor trucking	39.2 cents*

Distribution of Motor Truck Time per Average Loaded Trip

	Time	Per Cent
Moving, loaded	3 hr. 20 min.	44.5 per cent
Moving, empty	1 hr. 24 min.	18.6 per cent
Delayed	0 hr. 53 min.	11.8 per cent
Loaded or unloaded	1 hr. 53 min.	25.1 per cent
Total	7 hr. 30 min.	100.0 per cent

Average per Motor

Tons carried	88
Miles, loaded	17.5
Miles, empty	5.0
Tons carried one mile	10.7
Average haul	642 ft.
Average weight per trailer	1,111 lb.
Average trailers per loaded trip	2.0
Average weight per loaded trip	2,270 lb.
Average trips, loaded	77.4
Average loaded trips per hour	7.7

*Note.—In comparing this cost of motor trucking, 39.2 cents per ton-mile, with the average hand trucking cost of some 58 freight houses using two-wheel trucks, of $5.33 per ton-mile, the motor trucks show an efficiency 14 times greater than that of two-wheel hand trucking, or in other words the cost of motor trucking per ton-mile is only one-fourteenth that of hand trucking.

RAILWAY AFFAIRS IN OTHER COUNTRIES

A recent despatch from Sir John French, commanding the British forces in France, reveals a railway feat by the French railways and the Chemin de Fer du Nord, in particular, which deserves notice. It was nothing less than the transport of the entire British force from the region of the river Aisne to its present field of operations in northeast France and western Belgium. The withdrawal commenced on October 3, the entraining station being apparently Compiègne, a town situated near the junction of the Aisne with the Oise. The detraining station for all, or the bulk of the forces, was St. Omer, a town 97 miles almost due north of Compiègne. But the troops had to be brought through Amiens, Abbeville, along the coast to Boulogne and Calais and thence southeast to St. Omer, a total railway journey of about 180 miles. The operation was completed in 16 days. The cavalry went first, and was actually in contact with the enemy some distance south of St. Omer on October 11. On the evening of the same day the Second Army Corps had completed the journey and had taken up its position beside the cavalry. Simultaneously, the Third Army Corps was completing its detrainment at St. Omer. The First Army Corps arrived and was detrained at St. Omer by the 19th. According to one military correspondent this movement required all told something like 609 trains, comprising about 16,800 cars, an average of 32 trains a day, or one every three-quarters of an hour throughout the day and night. Men, horses, guns, kit and transport were all included, and the whole operation had to be conducted almost under the nose of the enemy.

* * *

One of our friends who has recently gone to England and obtained work in a running shed (engine house) there writes an interesting letter concerning conditions in that country as follows: "As everyone knows, a great many railwaymen have enlisted, but now no one is allowed to enlist without permission of his superior officer, which at present and according to government instructions, is not being given. But before long more will have to go and the services will consequently have to be curtailed. Conditions, however, are surprisingly normal. Practically the usual winter schedules are in force. Occasionally the services may be reduced or suspended for a day on account of troop movements. Various precautionary measures are in evidence. Stations, bridges, tunnels and the right of way are, of course, carefully patrolled. In the London district the shades of all windows on coaches are required to be pulled down at night because it is supposed that should a Zeppelin be about, one of its chief objects would be to destroy railway lines and hence interfere with mobilization and supplies. At a very little distance the trains with shades pulled down are scarcely distinguishable, and I suppose at an elevation of half a mile they would be invisible. At stations and yards, of course, the illumination is greatly reduced. The London Tube railways state and truly, too, on their advertising posters that 'It's bomb-proof down below.'"

* * *

The question of strategic railways has recently assumed a great practical importance in both Australia and South Africa. The Australian War Railway Council, which is composed of the state railway commissioners and representatives of the Defense Force, is reported to have in contemplation a strategic railway between Adelaide and Brisbane. As these cities are already linked up by the trunk line running via Melbourne and Sydney, it is quite possible that the government may not be inclined to consider the expenditure just now, even though the advantages of the project combine the reduction of the distance between Adelaide and Brisbane by one-half with the strategic possibilities of the scheme. In South Africa an important section of strategic railway has just been constructed. This is the Prieska-Upington Railway, over which the first train was run on November 18. The line has been laid with remarkable rapidity. Construction was begun in the early part of September, and as the line is 142 miles in length, the rate of track laying averaged over two miles a day. The earthworks were light, however, the line following the Orange river almost its entire length; and only three small watercourses had to be bridged. Construction was determined upon in order to facilitate the conduct of military operations in German South-West Africa, and it is expected that the line will be extended to Kalkfontein, the German railhead, for strategic reasons. The present terminus, Upington, is about 80 miles as the crow flies from the southeastern extremity of German Southwest Africa, and about twice that distance from the German railhead.

Two Pacific Type Locomotives of High Power

Chesapeake & Ohio Engine Develops Tractive Effort of 46,600 lb.; First of This Type for Delaware & Hudson

The American Locomotive Company has recently delivered to the Chesapeake & Ohio six Pacific type locomotives and ten of the same type to the Delaware & Hudson Company.

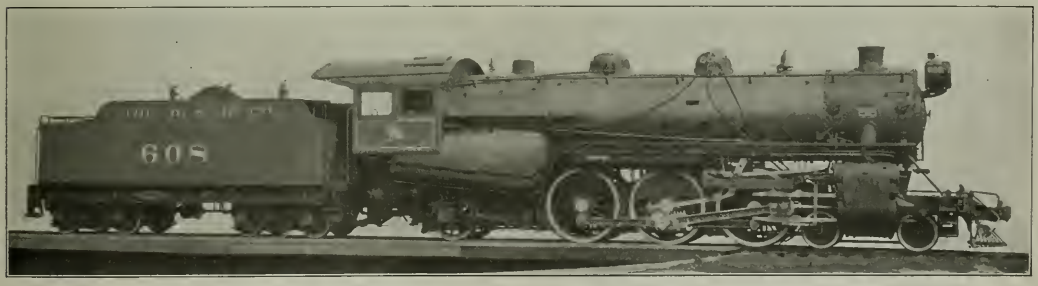
The Chesapeake & Ohio engines have a maximum tractive effort of 46,600 lb., the highest tractive effort for locomotives of this type of which we have record. They have been put in service between Charlottesville, Va., and Hinton, W. Va., a distance of 175 miles. This part of the line crosses three mountain summits: the Blue Ridge, North Mountain and the Alleghanies. To economically handle the through passenger service is a difficult problem. The mountain resorts, among which are the Virginia Hot Springs and the White Sulphur Springs of West Virginia, demand the best of service and equipment. Trains of ten all-steel cars, weighing 674 tons, are a regular daily problem, and this has heretofore required frequent double heading.

Chesapeake & Ohio Pacific Type Locomotive Which Has a Maximum Tractive Effort of 46,600 lb.

The requirements that must be met in order to make the schedule time on the Clifton Forge division are extremely difficult. Westbound from Mechums River to the summit of the Blue Ridge is a continuous uncompensated grade of 75 ft. to the mile, with curves of 10 deg., and extending a distance of 14 miles. One train of ten steel cars, weighing 674 tons, is scheduled at 22½ miles an hour on this grade, while another train of eight steel cars, weighing 551 tons, is scheduled at 29 miles an hour. From Staunton to the summit of North Mountain, a distance of 13 miles, the conditions are still more difficult. The first 6½ miles contain 4½ miles of up-grade, varying from 75 to 80 ft. to the mile, and the last 6½ miles is a continuous grade of 80 ft. to the mile. The scheduled speed for the first mentioned train is 25½ miles an hour, and for the second, 35 miles an hour for this 13 miles. The schedule over the remaining part of the division permits but little time to be made up. These new engines, while as yet in service but a short time, are satisfactorily handling these trains.

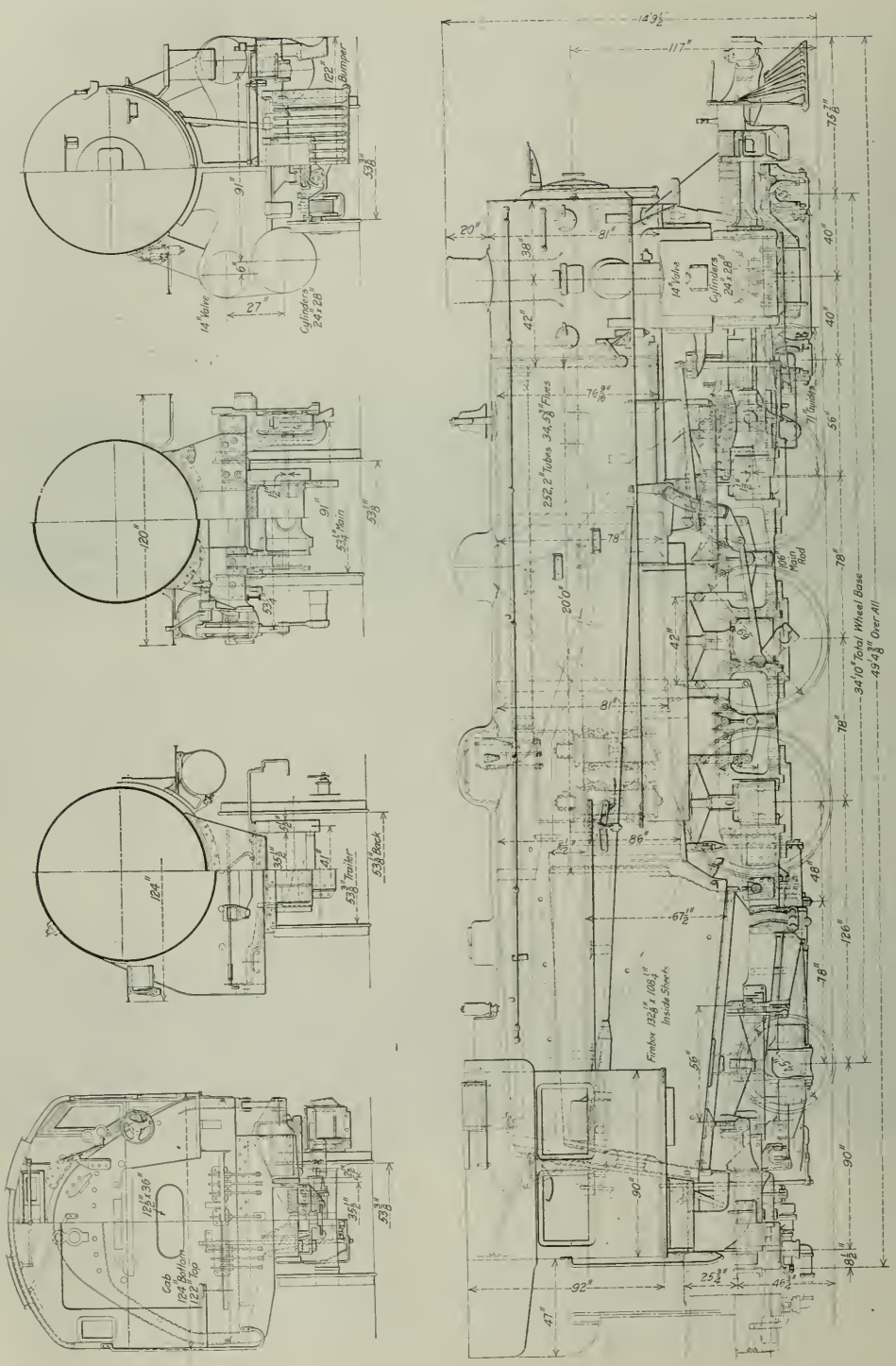
No innovations were attempted in the construction of these locomotives, but the different factors were combined to give as powerful a machine as possible within the clearances. The boiler is of exceptional capacity. It is of the extended wagon top type, and at the first course the barrel is 83 11/16 in. in diameter outside, while the outer diameter of the largest course is 90 in. The barrel is fitted with 244 tubes, 2¼ in. in diameter, and 43 flues, 5¼ in. in diameter and 20 ft. 6 in. long. The firebox is 120⅛ in. long and 96¼ in. wide, having a total depth of 82¼ in. The depth from the center of the lowest tube to the top of the grate is 25⅛ in. To insure a constant supply of fuel to this firebox burning bituminous coal and having a grate area of 80.4 sq. ft., a mechanical stoker had to be applied. This is a type C, Street machine, manufactured by the Locomotive Stoker Company, New York.

The large boiler and wide firebox and the application of the stoker made the arrangement of the cab a difficult matter, but this was improved considerably by the use of non-lifting inspirators, Ragonnet reverse gear and the placing of the steam turret outside of and in front of the cab. Clearance restrictions made it necessary to place the bell off the center of the boiler and the headlight dynamo in front of the smokebox.

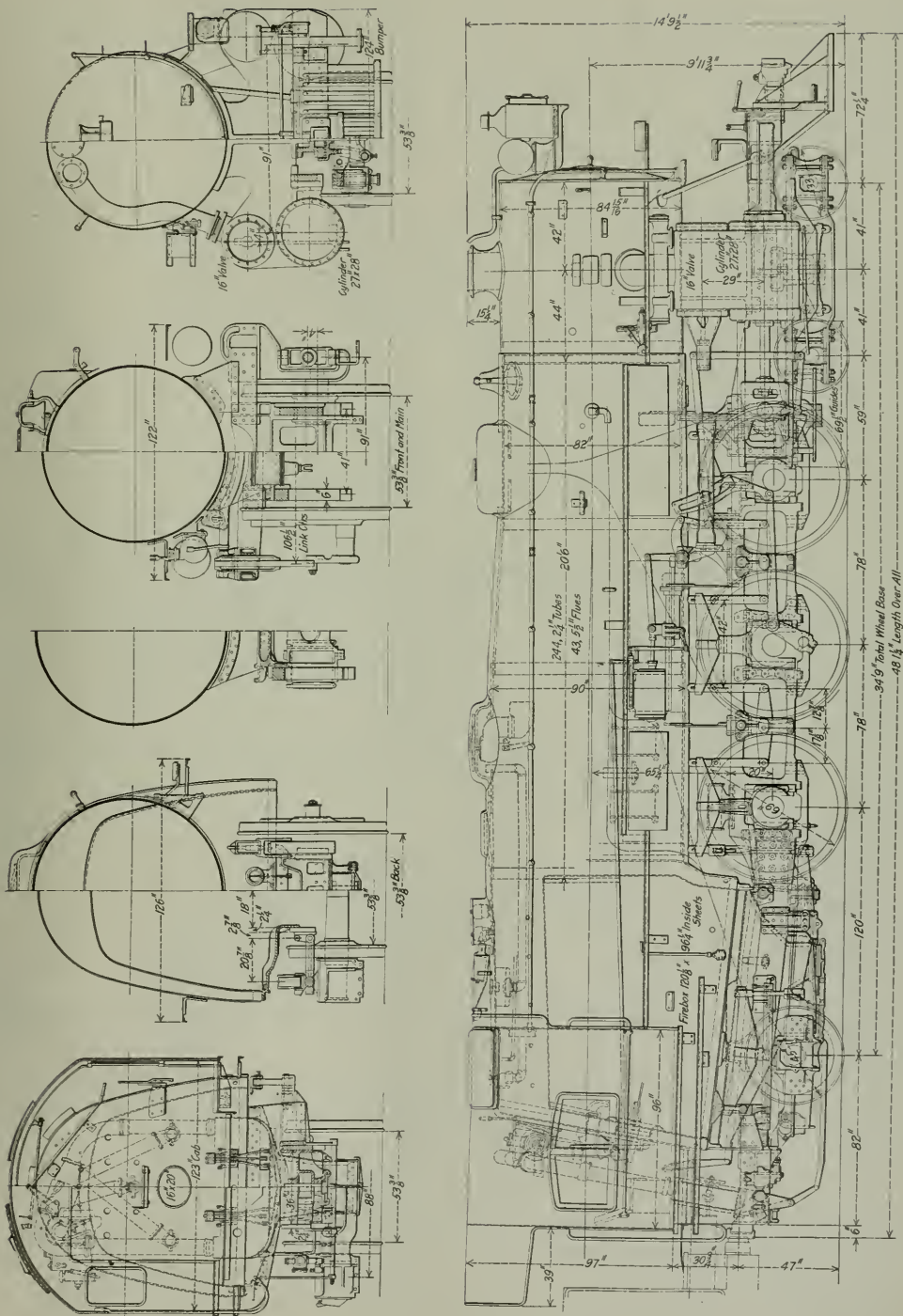


Anthracite Coal Burning Pacific Type Locomotive for the Delaware & Hudson Company

The frames are 6 in. wide and braced by box castings. The piston rod extension is the American self-centering type. Wal-



General Arrangement of the Delaware & Hudson Pacific Type Locomotive



Elevation and Cross Sections of the Chesapeake & Ohio Pacific Type Locomotive

schaert valve gear is used with the valve stem guide integral with the steam chest cover; the piston valves are 16 in. in diameter.

The special equipment includes the Schmidt superheater, Cole outside journal trailing truck, radial buffing device, Security brick arch, Franklin pneumatic grate shaker, Cole long main driving box, Trojan packing, vanadium steel frames and rods, Mellin by-pass valve, Hancock 5,500 gallon capacity non-lifting inspirators, Watters sanders, Nathan lubricators, Westinghouse-American driver brakes and Westinghouse-Farlow draft gear.

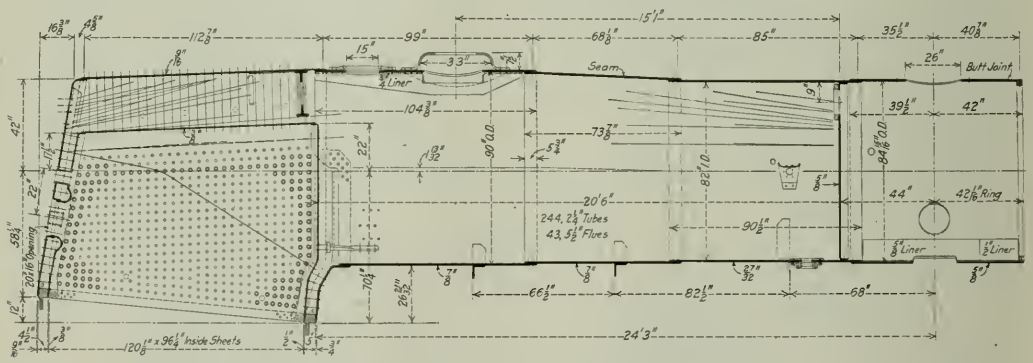
THE DELAWARE & HUDSON LOCOMOTIVES

The ten anthracite-burning Pacific type locomotives for the Delaware & Hudson Company are the first of this type to be used on that road, the heavy passenger service having up till now been handled by Ten-wheelers.

The Ten-wheel locomotives have a total weight, including the tender, of 313,900 lb., the tenders having a capacity of 7,000 gal. of water and 12 tons of coal. With driving wheels 69 in. in diameter, 200 lb. steam pressure and cylinders 21 in. by 26 in., they develop a tractive effort of 28,300 lb. The new Pacific type engines have a total weight, engine and tender, of 460,100 lb., the tender having a capacity of 8,000 gal. of water and 14 tons of coal. They have driving wheels 69 in. in diameter, 205 lb. steam pressure and cylinders 24 in. by 28 in., and develop a tractive effort of 40,730 lb. This is an increase of 46.6 per cent in total weight and 44 per cent in tractive effort. The engines are equipped with the Schmidt superheater, brick arch, screw reverse gear, extended piston rods, long main driving box, Economy engine and tender trucks, Economy pipe clamps, Economy radial buffer, and speed recorders. Vanadium steel was used in the main frames, driving elliptic springs, engine truck elliptic springs and the tender truck elliptic springs.

The following table gives the principal dimensions and ratios of both the Chesapeake & Ohio and the Delaware & Hudson locomotives:

	C. & O.	D. & H.
General Data		
Gage	4 ft. 8½ in.	4 ft. 8½ in.
Service	Passenger	Passenger
Fuel	Soft coal	Hard coal
Tractive effort	46,600 lb.	40,730 lb.
Weight in working order	312,605 lb.	293,500 lb.
Weight on drivers	191,455 lb.	191,000 lb.
Weight on leading truck	56,675 lb.	47,500 lb.
Weight on trailing truck	64,475 lb.	55,000 lb.
Weight of engine and tender in working order	497,100 lb.	460,100 lb.
Wheel base, driving	13 ft. 0 in.	13 ft. 0 in.
Wheel base, total	34 ft. 9 in.	34 ft. 10 in.
Wheel base, engine and tender	71 ft. 11½ in.	70 ft. 4¼ in.
Ratios		
Weight on drivers ÷ tractive effort	4.12	4.79
Total weight ÷ tractive effort	6.72	7.20
Tractive effort × diam. drivers ÷ equivalent heating surface*	538.00	553.00
Evaporative heating surface ÷ grate area	55.80	39.20
Equivalent heating surface* ÷ grate area	74.30	51.30
Firebox, heating surface ÷ equivalent heating surface,* per cent	4.74	5.45



Boiler for the Chesapeake & Ohio Pacific Type Locomotive

weigh 293,500 lb. in working order, of which 191,000 lb. is on the drivers.

The advantage of the Pacific type over the Ten-wheel locomotives in sustained capacity is demonstrated by a comparison of the boilers.

	Pacific	Ten-wheel
Grate area	99.3 sq. ft.	84.9 sq. ft.
Heating surface, tubes	2,627.0 sq. ft.	2,406 sq. ft.
Heating surface, flues	952 sq. ft.	.....
Heating surface, fire brick tubes	40 sq. ft.	78 sq. ft.
Heating surface, firehox	277 sq. ft.	178 sq. ft.
Heating surface, total	3,896 sq. ft.	2,662 sq. ft.
Superheating surface	796 sq. ft.	.....

Comparing the equivalent heating surface, which includes 1½ times the superheating surface, we have 5,090 sq. ft. for the Pacific as against 2,662 sq. ft. for the Ten-wheeler, or an increase of 91.3 per cent.

According to the method of boiler proportioning used by the American Locomotive Company, these Pacific type engines have 111 per cent boilers. In a general way, a boiler will have ample steam making capacity if proportioned by this method for 100 per cent, but for passenger service, it is advantageous to make the boiler over 100 per cent when possible.

The design of these locomotives was developed by the mechanical department of the Delaware & Hudson Company in co-operation with the American Locomotive Company. The engines

Weight on drivers ÷ equivalent heating surface*	32.25	37.60
Total weight ÷ equivalent heating surface*	52.30	57.70
Volume both cylinders, cu. ft.	18.55	14.66
Equivalent heating surface* ÷ vol. cylinders	322.00	348.00
Grate area ÷ vol. cylinders	4.33	6.77
Cylinders		
Kind	Simple	Simple
Diameter and stroke	27 in. by 28 in.	24 in. by 28 in.
Valves		
Kind	Piston	Piston
Diameter	16 in.	14 in.
Greatest travel	6 in.	6½ in.
Outside lap	1 in.	1⅛ in.
Inside clearance	⅛ in.	3/16 in.
Lead in full gear	3/16 in.	Line and line
Wheels		
Driving, diameter over tires	69 in.	69 in.
Driving, thickness of tires	3½ in.	3½ in.
Driving journals, main, diameter and length	11½ in. by 23 in.	11 in. by 22 in.
Driving journals, others, diameter and length	10½ in. by 14 in.	11 in. by 13 in.
Engine truck wheels, diameter	33 in.	33 in.
Engine truck, journals, diameter and length	7 in. by 12 in.	6½ in. by 12 in.
Trailing truck wheels, diameter	45 in.	45 in.
Trailing truck journals, diameter and length	9½ in. x 16 in.	9½ in. by 16 in.
Boiler		
Style	Wagon top	Straight top
Working pressure	185 lb.	205 lb.

Outside diameter of first ring	83 11/16 in.	78 in.
Firebox, length and width	120⅛ in. by 96¼ in.	132⅛ in. by 108¼ in.
Firebox plates, thickness	⅜ in. and ½ in.	⅜ in. and ½ in.
Firebox, water space	4½ in. sides and back; 5 in. front	4½ in. sides and back; 5 in. front
Tubes, number and outside diameter	244—2¼ in.	252—2 in.
Tubes, material and thickness	Seamless steel, 0.125 in.	Seamless steel, No. 11, B. W. G.
Flues, number and diameter	43—5½ in.	34—5¾ in.
Flues, material and thickness	Seamless steel, 0.15 in.	Seamless steel, No. 9 B. W. G.
Tubes and flues, length	20 ft. 6 in.	20 ft. 0 in.
Heating surface, tubes and flues	4,196 sq. ft.	3,579 sq. ft.
Heating surface, firebox	255.4 sq. ft.	277 sq. ft.
Heating surface, arch tubes	27.4 sq. ft.	40 sq. ft.
Heating surface, total	4,478.8 sq. ft.	3,896 sq. ft.
Equivalent heating surface*	5,965.3 sq. ft.	5,090 sq. ft.
Superheater heating surface	991.0 sq. ft.	796 sq. ft.
Grate area	80.33 sq. ft.	99.3 sq. ft.
Smokestack, diameter	20 in.	19 in.
Smokestack, height above rail	14 ft. 9½ in.	14 ft. 9½ in.
Center of boiler above rail	9 ft. 11¾ in.	9 ft. 9 in.
Tender		
Tank	Water bottom	Water bottom
Frame	13 in. steel channels	15 in. steel channels
Wheels, diameter	36 in. forged steel	33 in. rolled steel
Journals, diameter and length	6 in. by 11 in.	6 in. by 11 in.
Water capacity	9,500 gal.	8,000 gal.
Coal capacity	14 tons	14 tons

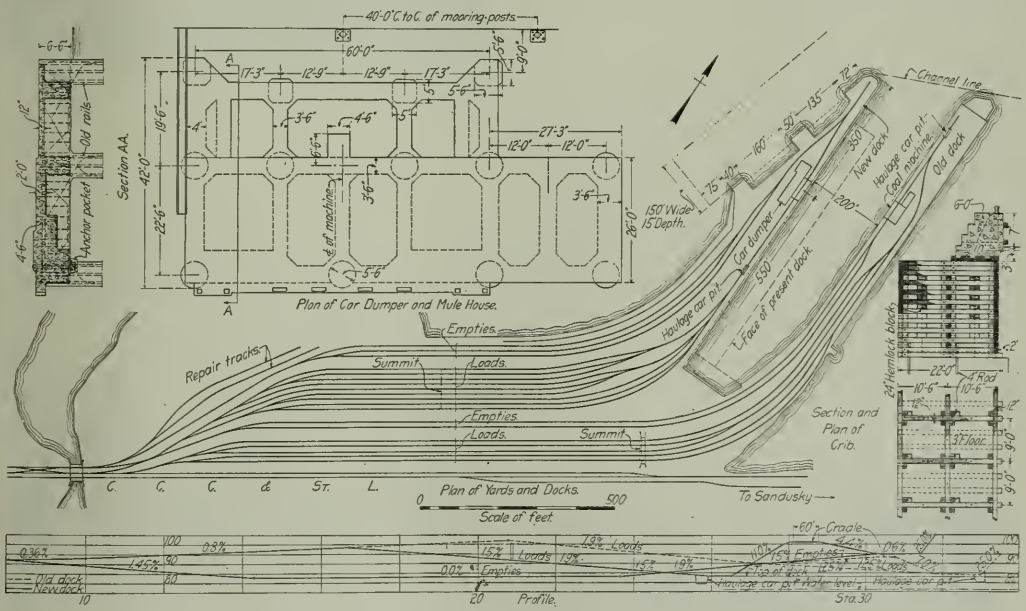
*Equivalent heating surface = total evaporative heating surface + 1.5 times the superheating surface.

PENNSYLVANIA COAL DOCK AT SANDUSKY

The capacity of the single car dumper which has been in service on the Pennsylvania coal dock at Sandusky (Ohio) has been insufficient to handle the amount of coal which it was desired to load on lake boats at that point. This dock is operated by the Lower Lakes Company, which buys coal principally in the West Virginia fields, shipping it over the Norfolk & Western to Columbus, and thence over the Pennsylvania to Sandusky. In order to provide the desired increase in capacity at this point, a second dock with a car dumper having a number of improved features has been built. Preliminary work was started in the fall of 1913 and, beginning last spring it was pushed as rapidly as possible, with the result that the plant was ready to load the first boat on July 15. The dumper is designed to handle 100-ton cars at a rate of 40 per hour in continuous operation. The work has involved the placing of 5,000 cu. yd. of concrete, the dredging of 15,000 cu. yd. of rock, and 125,000 cu. yd. of mud, the placing of 2,000,000 ft. B. M. of hemlock lumber in the crib work under the new dock and 190,000 cu. yd. of filling material in the new dock, and the embankment for the new yard serving the dock.

The old plant consisted of the coal pier, small yards for loaded and empty cars, and an abandoned timber-crib ore dock. It was necessary to remove the old ore dock before beginning construction on the new coal dock which occupies a similar position, about 66 ft. further away from the old coal pier. This provides a slip 900 ft. long, 200 ft. wide and 22 ft. deep between the two coal docks, which is ample to allow two of the largest boats used in this service to be loaded simultaneously, and ordinarily one other boat will be able to anchor along each dock face while awaiting a cargo. Additional anchorage for empty boats is provided on the rear of the new dock, where a slip 15 ft. deep, 150 ft. wide and about 540 ft. long, has been dredged.

The old yards, containing five tracks and two tracks respectively, have been enlarged to a capacity of 200 loaded cars and 100 empty cars. A similar capacity is provided in the yards serving the new dock, which have nine tracks and three tracks respectively. The grade in the new load yard rises to a summit about midway of its length and then descends at the rate of 1.5 per cent compensated to the haulage car pit. This pit, as shown in the plan, is located between the load yard and the dumper so that the loaded cars are pulled up the 11 per cent grade to the cradle of the car dumper without reversing their direction. After the cars have been dumped they run down the 4.4 per cent grade to the switchback on the end of the pier, reverse and run down the 1.5 per cent compensated grade to the empty yard. Riders control the speed of the cars throughout these movements. This system of handling cars is commonly termed "direct" in distinction to the track layout known as "indirect" which is used on the old dock and in which the loaded cars move from the load yard down an inclined track past the car dumper to the switchback, and then over the mule pit, from which they are pushed up to the dumping machine. The empty cars run by

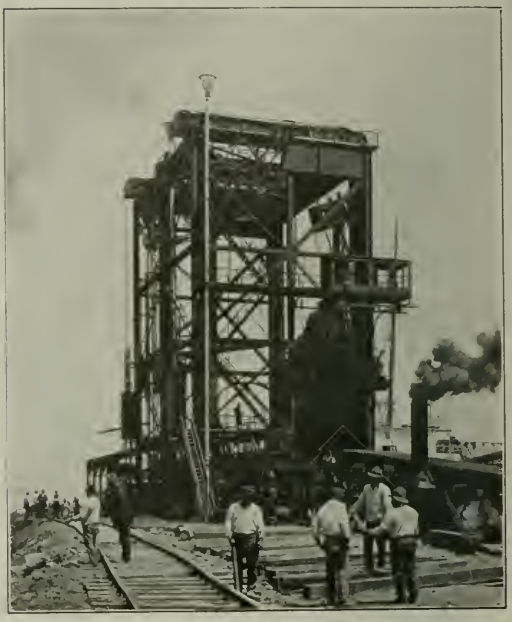


Plan, Profile and Details of New Pennsylvania Coal Dock at Sandusky, Ohio

gravity from the machine directly into the empty car yard. The principal advantage of the direct system in this case is that the length of the trestle on the dock, which is required to carry loaded cars, is less than in the other system. The approach and run-off on either side of the dumper are Pennsylvania standard wooden trestle.

An increase in the working capacity of the dumper has been secured by raising the rail on the cradle to an elevation 25 ft. above water level, which is 8 ft. above the corresponding point on the old dumper and somewhat higher than is usually adopted for such machines. The obvious advantage of this change is that the cradle need not be lifted through so great a height, and in consequence, the complete movement can be made in a shorter time. However, this change requires the mule engine to raise the loaded car through a greater distance, and if this operation cannot be made rapidly enough to place a loaded car on the cradle as fast as it can be returned to position, the theoretical advantage will be lost. The capacity of the "mule" has been increased over ordinary practice in two ways, first by increasing the size of the engine used, and second, by attaching a tail rope to the "mule," which allows the same engine to pull it rapidly down, the grade into the pit. It is usually found that even though the mule engine can pull the car up the grade at a satisfactory rate, some time is lost in waiting for the "mule" to run down again by gravity, and occasionally a loaded car coming down from the load yard passes over the pit before the "mule" has reached it, causing additional delay.

The concrete dock wall is supported by 1,045 ft. of timber crib 21 ft. wide and 15 to 22 ft. high. In addition to this, some cribs were built across the closed end of the slip and under an extension of the old dock. The post cribs which were used for these foundations were built up of 12-in. by 12-in. hemlock timbers, with a center wall and cross tie walls 9 ft. center to center, with eight 12-in. by 12-in. posts at each tie wall. The typical pockets have interior dimensions of 9 ft. by 8 ft., and are floored with 3-in. plank. All timbers are securely tied together by 1⅛-in. drift and staybolts. The cribs are anchored to bed rock by 4-in. car axles extending through the floor of the crib into holes drilled about 3½ ft. into the rock at intervals of 9 ft. The outer half of the crib is covered by a solid floor on which the forms for the concrete dock wall were built. This wall has a bottom width of 10 ft. and a height of 10 ft. above the top course of the crib timbers. The face of the wall is vertical, with two waling strips for protection against damage by boats landing along the dock, and the back is stepped into a top width of 6 ft. Cast iron mooring posts are anchored in the surface of the wall at intervals of 40 ft.



The New Coal Dumping Machine Just Before Its Completion

The car dumper machine and the mule house are carried on

General View of New Dock with Old Dock at the Right

reinforced concrete columns extending down to rock. The four columns under the front of the dumper are within the limits of the crib, and in these cases the crib walls were so located as to bring the columns in the crib pockets, enabling them to be built by framing off a portion of the pocket to be filled with concrete. The remaining 9 columns are 5 ft. 6 in. cylinders. All of the columns are reinforced with old rails and spiral bar reinforcement. The boiler house is carried on a fill inside wooden piling which is driven to rock, and the coal bunkers alongside the boiler house are of concrete. Three 200-h. p. boilers are provided with a coal bunker for each under the load track. A 126-ft. steel stack furnishes draft for the boilers. The boiler house, car dumper machine and mule house are covered with asbestos protected metal, and have windows of Fenestra steel sash. The car dumper is of the Hulett type, furnished by The Wellman-Seaver Morgan Company, Cleveland, Ohio. It has a cradle 60 ft. 8 in. long, which is operated by an engine with two 22-in. by 24-in. cylinders, operating two drums. A similar engine is provided for the mule hoist.

One of the first steps in the construction of the new dock was the preparation of the foundation surface by divers working under the ice during the winter. All material overlying the solid rock was cleaned away and the surface of the rock was leveled by drilling off high portions and building up low ones. The bottom grillage, the four lower courses of wall timbers and all posts in the cribs were framed together at a dock about one-half mile away, and these sections of the cribs were towed to the site by tugs. They were launched into the proper position and sunk by building up the remaining timbers and filling the pockets. The concrete in the dock walls was placed from mixer plants located on scows.

The old slip was widened from 134 ft. to 200 ft., and dredged to a depth of 22 ft., requiring the removal of from 1 to 12 ft. of rock. A hydraulic dredge was also used to handle some of the pier filling and a small portion of the filling under the new yards when it became necessary to rush this portion of the work shortly before its completion. This dredging and the construction of the foundation crib and the dock wall was contracted to the Great Lakes Dredge & Dock Company, Cleveland, Ohio. H. E. Culberson & Sons, Cleveland, had the contract for making the fill under the new yards. They used two steam shovels and standard gage equipment to place about 200,000 yd. of quarry strippings. The work was handled under the direction of R. Trimble, chief engineer maintenance of way, and H. W. Petersen, engineer in charge.

SIGNALS FOR NEW BROOKLYN SUBWAYS

The New York Municipal Railway Corporation—the organization which is building the new subways, tunnels and elevated lines which are to be operated by the Brooklyn Rapid Transit Company in Manhattan and Brooklyn boroughs, New York City—has contracted with the General Railway Signal Company, Rochester, N. Y., for a complete equipment of automatic block signals, interlocking switches and signals, and automatic train stops and cab signals, the latter to have "speed control." The contract covers all of the lines forming this company's portion of the "dual rapid transit system" as laid out by the authorities of the state and city when plans were adopted last year for the additions to the present intramural railroad system. The length of road covered by the present contract is about 103 miles, and the length of main track signaled will be about 178 miles.

The first line to be equipped will be the Broadway-Fourth Avenue line in Brooklyn, a subway which has been under construction for several years past and which is nearing completion. This line will be operated in connection with the Centre street loop, in Manhattan, which is already in partial operation, with signals installed by the Federal Signal Company. Other lines will be signaled as completed, the whole contract taking two or three years.

The company first asked for bids on a system similar to that in use on the Interborough Rapid Transit, which includes an automatic train stop; but about the time the bids were opened, the General Railway Signal Company proposed for consideration a scheme making use of the speed control feature for the automatic stopping apparatus, and electrical (instead of mechanical) apparatus to perform the special functions of this system. This alternative plan was finally favored both by the railroad company and by the Public Service Commission, which acts for the city, the owner of the lines in question; and a new contract was drawn providing for the introduction of the new system. The automatic stop, cab signal and speed control system will be at once installed on a short section, to demonstrate its reliability; and its final acceptance will depend upon its giving service satisfactory to the road and to the Public Service Commission; but in the meantime, the other signaling work will go on, and apparatus will be installed as the tracks are made ready for operation.

With the complete system of automatic stops and cab signals, it is proposed to do without fixed roadbed signals, except at interlockings; and if any lines are ready for operation before the cab signal system shall have been perfected, the roadside signals can be put in, and used, and later taken out. "Light signals" will be used throughout, so that the disturbance or cost of making a change of this kind need not be great.

The General Railway Signal Company has not yet perfected its plans for the stops and the cab signals, but it is understood that it has acquired the patents of P. J. Simmen, of the Northey-Simmen Company, which has installed cab signals and kindred apparatus on electric lines in Canada, in Indiana, and in Tennessee.

In general, the speed control arrangement will be so operated as to give the motorman two warnings before reaching a spot where the brakes will be automatically applied; first a yellow light (in place of the green, or all-right light, which glows in the cab under normal conditions); this at a ramp fixed on the track far enough back to allow for bringing a train to a stop from full speed; next an audible signal from another ramp, giving time for the application of the brakes. If this second warning is disregarded the brakes will soon be applied and the propulsion current will be cut off. The speed indicator on the engine or car actuates a control apparatus which is constantly self-adjusting, throwing the brake-setting apparatus into condition to be operated whenever the speed exceeds the prescribed limit and throwing it again when the speed has been properly reduced. It is designed to make use of the system not only at the approach to switches and stations, but also approaching sharp curves.

With speed control apparatus in operation, the overlap, as employed on the Interborough subway lines will not be necessary; and with this improvement the capacity of a track can be increased from 15 to 20 per cent; or, where track capacity is limited by the time consumed at station platforms, the block signal sections can be made correspondingly longer and less expensive.

The Public Service Commission of the state, in announcing its approval of this contract, gives the total amount as $1,413,000. This, however, apparently includes a contingent sum for the installation of apparatus on the cars, the number of which is to be 1,600. The total amount of the contract for roadway apparatus, which includes automatic block signaling, interlocking, and the necessary stopping apparatus on the track is $1,293,000.

The bid of the General Railway Signal Company under the first specifications was $1,808,676, while that of the Federal Signal Company was $1,392,833. When the new bids were opened the Federal Company, whose bid was higher than that of the General, protested that the action of the company and of the Public Service Commission was irregular and unwarranted. There was long discussion and delay on the part of the Public Service Commission and the approval of the contract finally was carried in the commission by a vote of three to two. The protest of the Federal Company has been renewed before the commission, but so far without result.

The chief engineer of the New York Municipal Railways is W. S. Menden, and the signal engineer is R. C. Johnson, formerly in the signal department of the New York Central.

ASSOCIATION OF TRANSPORTATION AND CAR ACCOUNTING OFFICERS

The winter meeting of the Association of Transportation and Car Accounting Officers was held at Richmond, Va., December 8 and 9, with 102 members in attendance, and President J. M. O'Day in the chair.

Mayor Ainslie welcomed the association to Richmond, and, speaking of what he had read in the newspapers about railroad men, said he was surprised to see such an aggregation of sincere and honest looking men.

The executive committee recommended that it be authorized, in conjunction with any standing committee, and in its discretion, to meet the representatives of the American Railway Association and recommend uniform practice under existing rules. This was approved.

A recommendation of the executive committee that the committee on conducting passenger transportation, committee on conducting freight transportation, and committee on joint interchange and inspection bureaus be combined, temporarily, was approved.

The association concurred in a recommendation of the committee on car service sustaining the practice of requiring the delivering carrier to show the date of original receipt of cars offered in interchange when the record of delivery is one year or more old.

The association concurred in the action of the committee in disapproving the proposed amendment to car service Rule 10, which reads:

> When on account of bunching in transit upon a carrier line a switching line must cancel or refund demurrage, it may reclaim on the carrier line a number of days at the current per diem rate equal to the number of days for which such demurrage has been canceled or refunded.

As bunching is not considered under the average agreement, which applies to a large percentage of cars handled in terminals, the cancellation or refund of demurrage would not be a material factor. It would be difficult to determine responsibility for such reclaims, if allowed.

The recommendation of the committee on car service against the inclusion of an amendment to Rule 10, code of car service rules, providing "that where there is a demurrage item involved that the date the papers are taken up with any department of the erring line be accepted as the opening date of the per diem claim," was concurred in by the association. The committee on car service in reporting against this proposed amendment to Rule 10, advised that in its opinion the protection of per diem reclaim where demurrage is involved as a result of carriers' error is within the power of each transportation department.

The recommendation of the committee on car service that unless special arrangements are made by owners, empty railroad-owned tank cars will be handled under car service rules 1 to 4, inclusive, was concurred in.

By recommendation of the committee, action was taken rescinding the amendment to car service rule 15, which was approved in June, 1913. This amendment provided that the delivering road shall pay the cost of transfer or rearrangement when transfer is necessary for the protection of perishable freight against weather conditions. The present action maintains the integrity of the rule in its present form.

The recommendation of the committee that car service rule 3, paragraph f, be amended was adopted by the association for submission to the American Railway Association. The rule as it stands at present requires the consent of the owner in order to short-route a car at the reciprocal rate named therein. The amendment makes the consent of the owner unnecessary.

The findings of the committee on car service with regard to the establishment of committees on conference and co-operation were concurred in by the association, and ordered sent to the American Railway Association. This plan was proposed by Texas roads, and was the subject of a conference at which all parts of the country were represented. At this conference the Texas men made it clear that advantages have already accrued from such co-operation as is proposed. Instances were related of short routing of empty cars, in some cases reciprocal, and in other cases the service being performed by one carrier for another at the reciprocal rate provided for in car service rule 3f. The Sunset Central Lines and the International & Great Northern have made an agreement, under which the cars of the two roads are to be used in common. By establishing these conference committees in the several territories, opportunity will be afforded to discuss in an informal way their problems and perplexities with a view to securing co-operative effort. The committee recommends that the personnel of these committees consist of those directly responsible for the handling of cars; that during the first three months there will be no attempt to inaugurate a method of general authoritative supervision over cars, and that the committees be formed so far as possible along the natural territorial lines, such as will correspond to present traffic organization territories.

The committee on continuous home route cards made a report embodying answers which have been made to inquiries received concerning the handling of cars under a continuous home route card. The loading and forwarding road is responsible for putting on a card. A car loaded with perishable freight should always be accompanied by an owner's universal home route card. Any foreign car offered should always be accompanied by an owner's universal home route card. In the event of the loss of owner's home route card, the offering road must deliver a home route card of its own issue, and the offering line is responsible for obtaining and forwarding a duplicate owner's home route card to the agent at billed destination. To make the use of the owner's universal home route card mandatory it will be necessary to amend service rule 5. The principles embodied in these suggested answers were concurred in by the association.

The list of accepted assignments of reporting marks to cars of railroad ownership, presented by the committee on office methods and accounting, was adopted for submission to the American Railway Association.. Approximately 400 railroads have accepted assignments of reporting marks and are using them. A list of accepted assignments of reporting marks for cars of private ownership was adopted for submission to the American Railway Association. Approximately 350 owners of private cars have accepted marks assigned.

The recommendation of the committee that all car owners indicate in their respective registrations the reporting marks which are applied to the equipment so registered, and that if consistent The Official Railway Equipment Register set forth this information in the indexes, was concurred in by the association.

The association approved a proposed amendment to Rule 1, code of per diem rules, so as to provide that the penalty rate of five cents per car per day be applied to all delayed per diem settlements, even though the per diem has been reported in error to another road.

The report of the committee on office methods and accounting, opposing the adoption of a form for correction of interchange report, embodying the self-transcribing or cut-up principle was concurred in by the association.

The recommendation of the committee on handling railroad business mail that all mail, whether forwarded via United States post or by railroad business mail, include the name of the department, name of railroad in full, city, state, full information as to local street address, title of officer, name of officer, etc., as each particular case may warrant, was concurred in by the association.

The recommendation of the committee on conducting passenger transportation that all railroads be called upon to show in The Official Railway Equipment Register information in every respect relating to passenger equipment cars, was adopted by the association for submission to The American Railway Association.

It was decided to hold the next meeting of the association at Niagara Falls, June 22-23, 1915.

One Year's Electrical Operation of the B. A. & P.*

Train Loading Was Increased 33 Per Cent, Savings in Operating Expenses Equaled 20 P. C. on Investment

By J. B. Cox

The Butte, Anaconda & Pacific was built in 1892 principally for the purpose of conveying ore from the mines at Butte to the Washoe smelter at Anaconda, 26 miles west of Butte. The tracks connecting Butte and Anaconda constitute the main line, which is approximately 25.7 miles in length. As the mines are mostly around the top of Butte Hill and the shafts through which the ore is hoisted to the surface are scattered over a considerable area, yards were built at a convenient point on Butte Hill for the concentration of the cars containing the ore from these shafts, as well as to serve as a distribution point for the supplies to the mines; a branch locally known as the Missoula Gulch line was built from these yards to connect with the main line at Rocker, where yards were also established.

Since the concentrator at the smelter is also on a hill at an elevation of approximately 340 ft. above the main line, it was advisable to establish another yard at East Anaconda from which to distribute the ore and other supplies to the different centers on Smelter Hill. The lines from these yards at East Anaconda to the smelter are known as the Smelter Hill lines, the longest branch of which is that leading to the concentrator, which is about 7¼ miles in length. Two spurs lead from this main track, one to the stock bin yards and the other to the copper tracks.

From the Butte Hill yards spur tracks radiate about Butte Hill to the shafts of the various mines and other points where supplies are to be delivered. The ore is loaded into hopper-bottom steel ore cars of 50 tons capacity, which are delivered to the Butte Hill yard, where they are made up into trains and taken down to the Rocker yard, where they are made up into still larger trains and taken over the main line to the East Anaconda yard. Here the trains are broken up to be transported in smaller units up Smelter Hill to the concentrator yards. Thus practically all of the ore cars are handled by five different engine crews between the ore bins at the mines and the receiving bins at the concentrator.

A total of 27 steam locomotives was owned by the railway company, classified as follows: Switching, 7; Consolidation, 8; Mastodon, 10, and passenger, 2.

The coal used on the steam locomotives was obtained from the mines at Diamondville, Wyo., and had to be transported approximately 395 miles for delivery to the bins of the railway company, at which point its average cost was approximately $4.25 per ton.

Most of the machinery at the mines and the smelter had been electrified, and the results had been so satisfactory that the railway company made a study of conditions for the purpose of investigating the advantages that might be expected from the electrification of its lines, the result of which was the placing of a contract in December, 1911, for the electrical equipment of the main line, with spurs and yards between Butte and Anaconda, the Missoula Gulch line between Rocker and Butte Hill yards and the Smelter Hill lines. Owing to local conditions on the spur tracks leading to the various mines from Butte Hill yards, it was thought advisable not to electrify these until a later date. The tracks recommended to be electrified totaled approximately 90.5 miles.

Seventeen 80-ton electric locomotive units were purchased, originally, 15 of which are being operated in freight service and two in the passenger service. These units are practically interchangeable with the exception of the gearing, the passenger locomotives being geared to operate normally at 40 or 50 miles per hour, while the freight locomotives are geared to operate at from 15 to 25 miles per hour, the maximum free running speed being approximately 35 miles per hour. The continuous tractive effort of the freight units is 25,000 lb., at 15 miles per hour, but they are capable of exerting a maximum tractive effort of 48,000 lb. for five-minute intervals, based on a coefficient of adhesion of 30 per cent.

All the locomotive units are of the articulated, double-truck type with twin gears mounted on projections provided on the wheel centers for the purpose, and in general mechanical design are similar to the electric locomotives in operation on the Great Northern, the Detroit River Tunnel and the Baltimore & Ohio.

Work on the electrification began in the spring of 1912, and the first electric locomotive was run in Anaconda on May 14, 1913, about a year later. On May 27, two ore trains were hauled up Smelter Hill on trial trips with electric locomotives and on the following day a double-unit electric locomotive took over the regular day service of hauling the ore from East Anaconda yards to the concentrator yards, a distance of approximately seven miles, with a ruling gradient of 1.1 per cent compensated, and the grade fairly uniform through the entire distance. The steam locomotives used in this service were of the Mastodon type, weighing 108 tons, 83 tons of which was on the drivers. The weight of the tender loaded was approximately 55 tons, making the total weight of locomotive and tender about 163 tons, which would average close to the weight of the double-unit electric locomotive superseding it. The steam locomotive ordinarily made six round trips per shift, hauling 16 loaded ore cars per trip, or 96 cars per shift.

The average time required by the steam locomotive for the trip from East Anaconda to the concentrator yards with 16 loaded cars was about 45 minutes. The double-unit electric locomotive began taking 16 cars per trip but made 8 trips per shift, delivering 128 cars per shift. The average time for the up-hill trip with the electric locomotive was about 22 minutes or approximately half the time required by the steam locomotive for the same number of cars. Empty cars were taken to East Anaconda on the return trip, which, being all down grade, gave the electric locomotive no decided advantage, as the speed in either case was limited to about 25 miles per hour for safety. The number of cars hauled per trip was kept the same with the electric locomotives in the beginning as it had been with steam, as it had been decided to make the change-over by gradually replacing one steam locomotive at a time with an electric, taking the engine crew off the one and placing it on the other, thus breaking them in on the electric locomotives in regular service. One of the regular steam engineers had been given special instructions on the electric locomotives during the experimental running in order that he might become competent to act as instructor to the other engineers until they were sufficiently familiar with the electric locomotives to be left alone.

The load per trip in this service was gradually increased from 16 cars to 25 cars, which is to be the standard for the present. The average time for the up-hill trip with 25 cars is about 26 minutes, so that eight trips per shift are made easily, making a delivery of 200 cars possible or an increase of slightly more than 108 per cent over what had been possible for the same crew with steam locomotives. These loaded ore cars average from 70 to 72 tons each, making the

*Abstract of a paper presented before the Pacific Coast section of the American Institute of Electrical Engineers.

trailing load for a 25-car train from 1,750 to 1,800 tons.

On arrival at the concentrator yards the ore trains are taken by a switching engine called the "spotter," which places one car at a time over the weighing scales, after which they are rearranged for placement over the concentrator bins. On June 20 this spotting service was taken over by a single-unit electric locomotive and on July 2 the night service up Smelter Hill was taken over by the double-unit electric locomotive. The steam locomotive used for the spotting service was of the Consolidation type and weighed 93 tons, 83 of which was on drivers, the tender weighing loaded 62 tons, making the total weight of engine and tender 155 tons. The steam locomotive used in the night service on Smelter Hill was similar to that used in the day service. When the electric engines were put on the night service all the handling of ore between East Anaconda and the concentrators was done electrically, and the hauling capacity per crew was so much greater that it was no longer necessary to have a "spotter" crew on the night shift so that this crew was eliminated, and the night crew hauling the ore up Smelter Hill did the spotting on arrival at the concentrator yards, it being no longer necessary to make the regular number of trips. Thus where formerly four engine and train crews had been required during steam operation three similar crews were able to do the same work with electric locomotives in less time.

On October 1 regular passenger service between Butte and Anaconda was taken over for electrical operation. The steam locomotives used in the passenger service weighed approximately 80 tons, 60 tons of which was on the drivers, while the tender loaded weighed 52 tons, making the total weight of engine and tender 132 tons. The distance between Anaconda and Butte is 25.7 miles, and the schedule time for the trip, one hour. No change has been made in this time, though a reduction of 20 per cent would be possible with the electric locomotives were such desired. It may be of interest to note that on the day shift, averaging four trips per day, during the first five months the passenger train did not come in late a single time on account of engine trouble.

On October 10 a double-unit electric locomotive was put in the day freight service on the main line between East Anaconda and Rocker, a distance of 20.1 miles. The steam locomotive replaced in this instance was of the Mastodon type, weighing 103 tons, 77 of which was on the drivers, while the tender loaded weighed 55 tons, making the total weight of locomotive with tender 158 tons. The standard train hauled on the trip west was 50 to 55 loaded ore cars weighing approximately 3,500 to 4,000 tons gross and the average running time of such trains where no stops were made was about 1½ hours, corresponding to an average speed of approximately 13.4 miles per hour. In the beginning the electric locomotive took only the standard train, but made the trip without stop in about one hour, corresponding to an average speed of 20 miles per hour. The ruling gradient on the westward trip is 0.3 per cent and about half the distance is down grade. On the 0.3 per cent grade with a 55-car train, the steam locomotive made about 7 miles per hour. The electric locomotives with similar train now make about 16 miles per hour on the same grade.

The weight of the trains hauled by the electric locomotives on this run has been gradually increased up to 65 loaded ore cars averaging about 71 tons each, making the gross weight trailing about 4,620 tons. Adding 160 tons for the weight of the double-unit electric locomotives and 20 tons for the caboose makes a gross train weight of approximately 4,800 tons.

The remainder of this main line freight service was gradually taken on during the months of October and November. As many as 76 ordinary freight cars loaded with coal, coke and general merchandise have been taken in a single train on the westbound trip and 85 empties are frequently taken from East Anaconda to Rocker eastbound, the ruling grade being 1 per cent.

Comparative results of the month of June, 1913, with steam operation and for the same month of 1914 with electrical operation of this main line service, show that with a slight increase in the total tons of ore hauled the average tons per train was increased from 1,761 to 2,378, or 35 per cent, thus decreasing the average number of trains per day from 12.5 to 9.3, or 25.6 per cent. The average time per trip during steam operation was approximately 2 hr. and 25 min., while with the electric locomotive it was approximately 1 hr. and 45 min., showing a decrease of 40 min., or 27.5 per cent. The overtime in this service has been decreased 73.5 per cent and the total time 42 per cent, resulting not only in greater economy to the railway, but in shorter and easier hours for the crews.

The service on the Missoula Gulch line running between Rocker and Butte Hill yards was taken over for electrical operation on October 20. This line is 4.5 miles in length and the ruling gradient 2.5 per cent. The steam locomotives used on this line were of the Mastodon type, weighing 106 tons, 87 tons of which was on the drivers, the tender loaded weighing 56 tons, thus making the total weight of engine and tender 162 tons. Two complete crews had been required to handle this service during steam operation, averaging six trips per day each. A single crew with a double-unit electric locomotive has been doing this work successfully. Thirty-five to 45 loaded ore cars are taken down from Butte Hill yard to Rocker, and about an equal number of empties taken up. In addition to the empties, large quantities of timber and supplies for the mines are delivered over this line.

On November 25 the last of the electric locomotive units went into service, thus completing the electrification originally intended. The full electrical service has, therefore, now been in operation more than nine months and that on Smelter Hill more than 15 months.

This was the first installation of 2,400-volt direct-current apparatus for the operation of a railway in this country, 1,500 volts being the highest heretofore installed for such a purpose.

The total saving from locomotive performance alone is at the rate of $237,581 per year, to which should be added the credit of handling an increase of traffic at the rate of 13,938,136 ton-miles per year or 8.77 per cent more than was handled by the steam locomotives during the period compared. To this saving from locomotive performance should be added the saving from trainmen's wages, which is at the rate of $31,146 per year, or a decrease of approximately 21 per cent, due largely to the elimination of overtime, making the total saving from these two items $268,728 per year. From this should be deducted $10,839 for maintenance of the distribution system, leaving $257,889 as the net operating saving per year due to electrical operation.

The roadmaster states that it is quite evident that the electric locomotives are much easier on the track at curves, but that there is no noticeable difference on tangent track, and that while sufficient time has not yet elapsed to form definite conclusions, present indications lead him to expect that any difference relative to his work will be favorable to the electric locomotives.

Arranging the items of expense in the order of usual appearance in the summary of a standard locomotive performance sheet, and placing them on a yearly basis, results as follows:

Item of operating expenses	Steam, 1913	Electric, 1914	Decrease, 1914	Per ct. dec.
Fuel and power	$315,235.74	$164,508.70	$150,727.04	47.81
Repairs	124,787.90	92,278.08	32,509.82	26.05
Enginemen's wages	104,461.18	71,225.88	33,335.30	31.81
Enginehouse expenses	29,907.80	18,638.38	11,269.42	37.68
Water	4,953.66	1,193.70	3,759.96	75.90
Lubricants	9,751.44	4,942.32	4,809.12	49.30
Other supplies	5,823.52	4,552.36	1,271.16	21.83
Total locomotive performance	$594,921.24	$357,339.42	$237,581.82	39.93
Trainmen's wages	147,632.30	116,486.00	31,146.30	21.10
Grand total	$742,553.54	$473,825.42	$268,728.12	36.19
Ton miles hauled	158,917,720	172,855,856	13,938,136*	8.77*

*Increase.

The total cost of the electrification, including a change of signal system on Smelter Hill, an extra motor-generator set recently installed at Anaconda, interest during construction and all incidentals due in any way to the electrification, was in round numbers $1,201,000. This does not include the step-down transformers, which are the property of the power company, but on the other hand no deduction has been made for the salvage due to the elimination of 20 steam locomotives.

ANTHRACITE COAL RATES REDUCED IN PENNSYLVANIA

The Pennsylvania Public Service Commission, in a decision issued December 21, announces that it will order a sweeping reduction in the rates for the transportation of coal from the Schuylkill, Lehigh and Wyoming regions to Philadelphia, all rates being reduced substantially to the basis on which the railroads carry coal to Philadelphia for shipment by water to New England and other points; in most, or all, cases 40 cents a ton. The order reduces the rates on all sizes of coal except those smaller than pea, the rate for these smaller sizes to be the same as that for pea. The roads affected are the Philadelphia & Reading and the Pennsylvania; and, in a lesser degree, the Lackawanna, the Central of New Jersey and the Lehigh Valley. The complainants were numerous organizations of citizens and business men in Philadelphia.

The date when the order is to take effect is not given.

The present rates for prepared sizes of coal per ton of 2,240 lb. by the Reading are, from the Schuylkill district, $1.70; from the Lehigh district, $1.86, and from the Wyoming district, $2.10. The rates for pea coal and smaller sizes are considerably less; and the average reduction is estimated at 25 to 30 per cent.

The report recounts the history of the coal traffic from the year 1825, when it began to be recorded, moving at first by canal. The Reading, the largest carrier, transported in 1912 a total of 11,224,945 tons altogether; and the change now ordered is said to affect about 40 per cent of this total. The average distance over which the Schuylkill coal travels to Philadelphia is 121 miles. The average of all shipments over the Pennsylvania Railroad is 189 miles.

The commission finds that the Reading owns or controls 44 per cent of the unmined anthracite coal; the Lehigh Valley 17 per cent; the Lackawanna 7 per cent, and the Central of New Jersey 19 per cent. Other particulars concerning ownership, etc., are recounted.

At the outset, says the commission, there is a presumption against the propriety of the continuance of the existing rates. All of them have stood unchanged for 17 years, and some of them for 40 years, during which time the cost of transportation has been affected by great changes, such as the increase in the size of cars and of engines, the volume of traffic, etc. ..

Accountants engaged by the commission examined the books of the railroad companies and found that the cost of transportation, not including any return on bonds or stock, in the year ending May, 1913, over the Reading road, for 123 miles, was 45 cents a gross ton; over the Pennsylvania, for 187 miles, 61 cents; and various rates from 49 cents to 77 cents over other routes.

Comparisons also are made with the rates charged for carrying bituminous coal over these and other roads, all of which are much lower. Counsel for the Reading gave figures showing that in 1912 that road's rate per ton per mile on anthracite coal was 8.599 mills, this being a little less than the average for the preceding five years; while the rate per ton per mile on all freight was a little over 7 mills.

The railroads admitted that the rates for the transportation of coal to be sent out from Philadelphia by water, much lower than the Philadelphia rates, were not unprofitable. The final conclusion of the commission is based mainly on the fact that the rates charged for coal going beyond Philadelphia are profitable. This decision, says the report, will put Philadelphia "on an equality with the other cities and ports of the country." The prescribed rates from the Schuylkill district are, for prepared sizes, $1.30; pea coal $1; smaller sizes $1; from the Lehigh region, prepared sizes $1.46; pea coal and smaller $1.16; from the Wyoming region, prepared sizes $1.70; others $1.33. Other rates are named for combination routes. Coal delivered by the railroads to barges on the Delaware and Schuylkill rivers, to be taken by them to Philadelphia docks, on which traffic the barges receive usually 25 cents a ton, must be carried through for the same rate.

LEHIGH VALLEY MONOPOLY SUIT DISMISSED

Judge Hough in the United States District Court at New York, December 21, dismissed the suit of the government, brought last March, against the Lehigh Valley Railroad, the Lehigh Valley Coal Company, the Lehigh Valley Coal Sales Company and others, in which it was charged that the commodities clause of the Interstate Commerce law and also the Sherman anti-trust law had been violated. Judge Hough holds, in substance that "No monopoly of interstate commerce is shown nor any attempt to monopolize. It is impossible to find any of the normal results of monopoly without also finding violations of the commodities clause—and none is discovered. As to restraint of trade in coal transportation—there can be no restraint without control, and since the railroad does not control the coal it carries it has no means of restraint."

Concerning the charge of the government that the coal sales company had acquired land and other property from the coal company at ridiculously low prices, the judge says:

"What should or could be done with the lands and the coal on hand? And how could the concern retiring from the selling business insure the creation of a strong and pushing successor? Certainly not by hostility. Who would or could occupy and use the storage plants except the coal sales company?

"The assertion that the prices were ridiculously low is untrue. It was praiseworthy and lawful at first to sacrifice much in price when the object was to save from further assault the business of selling coal for interstate transportation. . . . The Lehigh Valley Railroad has not, since the filing of this bill or for some time before, been engaged at all in the selling of coal to the consumer. Union of such companies through stock ownership is not unlawful, provided there is a dissociation in good faith between the bona fide corporations. Dissociation in good faith requires no more than honest conduct of honest men. . . ."

The government had contended that the railroad and the other defendants had a monopoly of the coal industry in the territory tributary to the lines of the road; but the acreage thus controlled by the coal sales company, the court points out, is only a very small proportion of the entire anthracite acreage tributary to Lehigh Valley lines.

"This doctrine of territorial units is a novelty which I do not think bears investigation," says the judge, "for all that it does or can amount to is this, the coal lands are lawfully owned; the coal therefrom is lawfully carried; there is an actual and honest dissociation of interests between coal owners and carriers. The relations which are complained of have therefore no influence upon interstate commerce, for said relations begin, exist and end within the limits of the state.

"As to the commodities clause I shall dismiss the point with the statement that there is no great difference between what the Lackawanna did and was upheld in doing by the entire Circuit Court of the Third Circuit and what the Lehigh Valley has been doing as shown in this case. . . . The Lackawanna owned outright much if not most of the coal transported over its lines, whereas the Lehigh Valley owned the stock of other corporations which under the laws of Pennsylvania had good right to sell the coal, the transportation of which has given rise to so much litigation."

The government will appeal the case to the Supreme Court.

THE INFLUENCE OF CARBON ON THE PROPERTIES OF RAILS

An investigation of the influence of carbon on the properties of rails, such as ductility, stiffness, tensile strength, and the resistance of the rail head to flow of metal under rolling wheel loads, has been made under the direction of M. H. Wickhorst, engineer of tests, Rail Committee, American Railway Engineering Association, and published as Appendix A of the report of that committee in bulletin No. 170. The following is an abstract of this report:

A series of open-hearth rails was made with carbon varying from 0.32 per cent to 0.97 per cent, and they were tested by means of drop tests, tension tests, slow bending tests, transverse tests of the base and rolling tests under a loaded wheel. The material and all the facilities for this investigation were furnished by the Carnegie and Maryland Steel Companies. The material and rails were made by the Carnegie Steel Company at Homestead and Braddock, Pa., and the tests, except the rolling tests, were made by the Carnegie Steel Company. The rolling tests in a "reciprocating" machine were made at Sparrows Point, Md., by the Maryland Steel Company.

According to these tests the shrinkage of the hot rail after sawing increased an average amount of about 0.013 in. for an increase of carbon of 0.01 per cent, in the standard length of 33 ft. There were, however, some uncertainties and more data is needed with special reference to the relationship of carbon and shrinkage. The deflection of the rails in the drop test under the first blow decreased as the carbon increased up to about 0.85 per cent carbon, after which its decrease was at a slower rate. The rails were 80-lb. A. R. A. type-A section, and with 0.50 per cent carbon the deflection of the side that was below in testing was about 1.70 in. under a drop of 15 ft. With these conditions, the deflection decreased an average of 0.0188 in. for each 0.01 per cent increase of carbon. The relation found between carbon and elongation in the drop test is shown by the following formula:

$$E_{bt} = 35 - .30\ C$$

where E_{bt} equals the per cent elongation when the base is in tension, and C equals the carbon in 0.01 per cent.

The rails were tested as beams in the test-machine with a span of 3 ft. The breaking load increased as the carbon increased. The elastic limit increased with increase of carbon up to about 0.85 per cent carbon and then remained about the same. The elongation in this slow bending test decreased as the carbon increased and averaged a little less than in the drop or impact test. The yield point and tensile strength in the tensile tests increased with increase of carbon up to about 0.80 or 0.85 per cent carbon after which they remained about the same. The elongation and reduction of area decreased as the carbon increased and fell off to zero at about 1.00 per cent carbon or a little above. The average tensile strength developed in these tests may be expressed by the following formula for carbon between 0.30 and 0.80 per cent:

$$T = 40{,}500 + 1{,}250\ C$$

where T = tensile strength in lb. per sq. in. and C = amount of carbon in 0.01 per cent. The average yield point developed may be expressed by this formula, for carbon between 0.30 and 0.85 per cent:

$$Y = 30{,}000 + 400\ C$$

where Y = yield point in lb. per sq. in. and C = carbon expressed in 0.01 per cent.

The average elongation found in tensile test specimens with a ½-in. diameter and 2-in. gage lengths was about as shown by the following formula, for carbon from 0.30 to 1.00 per cent:

$$E = 40 - .38\ C$$

where E = elongation in per cent and C = carbon in 0.01 per cent. The average elongation found in the tensile test as related to the tensile strength, may be expressed by the following formula, for tensile strengths between 80,000 and 130,000 lb. per sq. in.:

$$E = 52 - \frac{T}{3{,}300}$$

where E = elongation in per cent and T = tensile strength in lb. per sq. in. The several formulas given above apply to open-hearth steel with about 0.03 per cent phosphorus and about 0.70 per cent manganese. They represent the average of the results obtained and individual results may vary above or below these averages.

In transverse tests of the base, the breaking load increased with increase of carbon up to about 0.80 per cent carbon and then remained about the same. The transverse elongation and the sag of flange decreased as the carbon increased. Tests were made to determine the resistance of the rails to flow or side spread of the head under rolling wheel loads. The tests were made in a "reciprocating" machine in which a piece of rail is made to move to and fro under a wheel that may be loaded as desired by means of a lever arrangement. The resistance to spread of head increased with increase of carbon up to about 0.80 per cent carbon and then remained about the same. In conclusion it may be said that in this series of rails varying in carbon from 0.32 to 0.97 per cent, the strength and resistance of the steel in the several tests, including the rolling tests, increased with increase of carbon up to about 0.80 or 0.85 per cent, and then remained about the same. The ductility decreased continuously with increase of carbon.

FEDERAL GOVERNMENT BOILER INSPECTION REPORT

The third annual report of the chief inspector of locomotive boilers of the Interstate Commerce Commission has recently been made public. This report is for the fiscal year ended June 30, 1914, and is signed by Frank McManamy, chief inspector of locomotive boilers. There were 92,716 locomotives inspected in 1914, 90,346 in 1913 and 74,234 in 1912. Of those inspected 49,137 or 52.9 per cent were found defective in 1914; 54,522 or 60.3 per cent were defective in 1913 and 48,768 or 65.7 per cent in 1912. In 1914 there were 3,365 locomotives ordered out of service, in 1913 there were 4,676 ordered out of service, while in 1912 there were 3,377 ordered out of service. The report states, however, that this does not fully show the improved condition resulting from the operation of the law, as when the law first went into effect the attention of the department was concentrated on the more serious defects so that the number of fatalities might be reduced. The improvement is more accurately indicated, therefore, by the reduction in the number of casualties as shown in the accompanying table:

	1914	1913	1912
Number of accidents	555	820	856
Decrease from previous year..per cent	32.3	4.2	...
Decrease from 1912.....per cent	35.1	...	...
Number killed	23	36	91
Decrease from previous year..per cent	36.1	60.4	...
Decrease from 1912.....per cent	74.7	...	...
Number injured	614	911	1,005
Decrease from previous year..per cent	32.6	9.3	...
Decrease from 1912.....per cent	38.9	...	...

Of the total number of killed and injured, 86 per cent were engine and train men, these accidents being caused by failure of some part of the boiler or appurtenances while in service; 13 per cent of these casualties were caused by failures due to low water where no contributory cause could be shown to exist. Of the total number killed and injured 3 per cent were boilermakers who were engaged in making repairs to boilers under pressure; about 50 per cent of these casualties were due to plugs, studs, or rivets blowing out or being driven into the boiler while being calked with pressure on the boiler. To reduce the number of accidents from this source, it is now being required that all plugs more than 1¼ in. in diameter in firebox sheets, excepting fusible plugs, be secured by a staybolt. Ap-

proximately 16 per cent of the injuries to boilermakers occurred while trying to tighten washout or arch-tube plugs while there was pressure on the boiler. The remaining 11 per cent of the total number killed and injured were from the various classes of employees engaged in the work of caring for and repairing locomotives at terminals.

Two formal appeals from the decision of inspectors, as provided in section 6 of the law, were filed during the year, in both of which a subsequent investigation resulted in the decision of the inspector being sustained.

No prosecutions for violations have been filed during the year, most railroad officers showing a disposition to comply with the requirements and to co-operate with the inspectors in bringing about improved conditions.

There were filed 406 applications for extension of time for removal of flues, in accordance with the provisions of rule 10, of which number 67 were withdrawn by the railroad companies before an investigation was made. An investigation was made in each of the remaining 339 cases, in 264 of which the full extension asked for was granted, in 21 an extension for a portion of the time asked for was allowed, and 54 applications, or 16 per cent of the total number, were refused after an investigation.

In accordance with rule 2 of the law, a careful investigation, extending over the two-year period allowed for filing specification cards was conducted and showed that 11,153 locomotives, or about 17 per cent of the total number for which specification cards were filed, had a factor of safety below 4, being divided as follows:

4,407 with a factor between 3¾ and 4.
2,531 with a factor between 3½ and 3¾.
2,039 with a factor between 3¼ and 3½.
1,082 with a factor between 3 and 3¼.
1,094 with a factor below 3, on some of which the factor was found to be below 2.

This matter was carefully considered at a conference held at the office of the chief inspector of locomotive boilers on April 28 and 29, 1914, at which the railroad companies and their employees were represented; and suitable amendments to the rules, providing for improved methods of construction and increased safety of operation, were agreed upon, to be submitted to the commission for its approval. It was also found that there were many locomotives in service with excessive stresses on stays and braces; therefore a maximum allowable stress for stays and braces was included in the amendments to the rules.

During the year, 2,141 defects to locomotives for which the present laws do not provide a remedy, 1,155 of which were defective wheels, were reported to this division by inspectors and directed to the attention of the proper railroad officers. In most instances locomotives with defects of this character were held for repairs by the local officers when their attention was directed to the defective conditions. In some cases it has been necessary to wire the president of the road in order to get the repairs made, and even that has not always brought about the desired result.

In one instance inspectors objected to the use of a locomotive in passenger service which had sharp flanges on both engine truck wheels, three driving wheels, and one trailer wheel, and also one loose driving wheel tire, and were assured by the local officers that the locomotive would not again be used until repaired. Instead of holding the locomotive for repairs, however, the local officers sent it light to a point a few miles from the terminal, sent a passenger train out to that point with another locomotive, and changed locomotives, sending the defective one through with the passenger train.

If a freight car with similar defects were offered to this carrier in interchange by a connecting line, it would be refused under its own rules as unsafe to handle; yet this defective locomotive was sent out on a passenger train by the officers after their attention had been directed to its condition, and existing laws provide no remedy.

The records contain other instances of a similar character; therefore, the recommendation made in the report for the year 1913, that the provisions of the boiler inspection law be extended to cover the entire locomotive is renewed.

In this connection it is stated that the inspectors now in the service are men of wide experience in railroad work, who were selected after passing a competitive civil service examination; and their three years' training as inspectors, in addition to their previous experience and training, has eminently fitted them to perform the additional duties that such a law would impose in as satisfactory a manner as they do their present ones.

THE WEIGHING OF LESS THAN CARLOAD FREIGHT

By E. A. O'Donnell
Traveling Agent, Sunset-Central Lines.

The time-worn adage: "What is everybody's business is nobody's business" is strikingly applicable to the past and present-day methods of l. c. l. freight weighing. In other words, a system permitting of optional performance, as relates to weighing, between carriers' representatives at originating and destination points, has resulted in a division of responsibility and consequent inability to control or assign individual responsibility. Owing to innumerable emergencies, the common carriers undoubtedly have been foremost in quest of efficiency. One channel, however, that of preventing duplication of work, apparently has escaped detection, as evidenced by the common manner of handling that portion of the transportation business with which this article deals.

The benefits to be derived by weighing less than carload freight at point of origin, as well as promptly upon its receipt, may be enumerated as follows:

As shipments at point of origin are necessarily complete as receipted for, weights then taken afford a substantial basis on which to determine the merits of claims for alleged subsequent loss from whatever source.

Weighing at point of origin insures a more detailed check as to the number of packages constituting the entire shipment, the handling of which in the course of weighing should materially assist in bringing to light cases of illegible or duplicate marking, improperly prepared or improperly described packages, etc.

It precludes the possibility of failure to promptly weigh packages subject to natural shrinkage.

It provides for actual rather than estimated weights for original insertion in revenue billing, eliminating the necessity for extension corrections at destination based on weight variation.

It permits of more expeditious delivery at destination.

It provides for more prompt and effective accomplishment of supervision.

In case weights are not taken at point of origin, and the physical movement of a shipment is followed by a claim for loss, the carrier is thrown into a state of perplexity, neither knowing nor being in position to determine the authenticity of the claim; whereas, had the shipment been weighed when originally tendered, such weight would immediately establish the extent of the carrier's liability for loss, and the claim might be more quickly and satisfactorily disposed of.

Another advantage which weighing at initial point will gain is the discovery of improperly prepared, described or addressed packages. This is the time when the discovery may be used to greatest advantage in the education of the shipper, who, either inadvertently or deliberately, tenders a shipment in such condition. And it will be granted that the continued and persistent educating of shippers by those who, because of business relations are best acquainted with such shippers, and at the time when they are virtually caught "with the goods," must result beneficially to the carriers through the medium of a reduction of claims made possible by the existence of such conditions.

The billing and revising clerks, however, have possibly been the heaviest contributors to lost motion under the present system

of permitting destination weighing of freight. While in many cases no attempt has been made by the forwarding station to obtain correct weights, the billing clerks have nevertheless been obliged to compute extensions on whatever fictitious weights might be inserted in the shipping order, and such computations, based on erroneous weights and being, as a natural result, inaccurate, are of necessity wholly discountenanced at destination in order to establish proper charges based on correct weights, the consequence being that the time and talent devoted to the primary computations represent time and talent unquestionably wasted, with the inevitable monetary loss to the interested carrier. It is safe to believe that the unnecessary expense involved in the operation of such a system, if universally adhered to by carriers, would be nothing short of astonishing.

Again, at the larger distributing centers, where by far the major portion of less than carload freight originates, carriers are, as a general rule, better equipped, both as regards labor and other facilities, than are they at outlying stations of lesser importance, where quite frequently agents are without assistance. Hence, again the advisability of weighing at forwarding point. In this connection very helpful assistance may be rendered the agent at the outlying point who may be without an assistant by placing him in a position to dispose rapidly of inbound less carload shipments at the time of arrival rather than subject them to the delay incident to weighing, with probable increased operating cost for additional assistance to perform such work.

And, lastly, the plan of weighing freight at point of origin affords a most simple method of supervision, as well as a prompt and reliable one, for those assigned to the work of guarding against failure to properly weigh less than carload freight.

In view, therefore, of the many advantages to be obtained, might it not be most beneficial, financially and otherwise, for all common carriers to adopt the system of weighing freight, for either local or interline movement, immediately when tendered for shipment, and by so doing to relieve each other of the now ever-present burden of doubt as to accuracy of weights indicated on billing, and of possible duplication of work with its resultant tendency toward inefficiency?

TO GET THE BEST MEN FOR COMMISSIONERS

George W. Anderson, who recently resigned as a member of the Massachusetts Public Service Commission, wrote to Governor Walsh a letter in which he discussed some principles that are of interest outside of the Bay State. He said in part:

". . . For this office I never was a candidate. I accepted it reluctantly and at substantial personal sacrifice. Chapter 616 of Acts of 1914, promoted and approved by you, requires the members of this commission to 'devote the whole of their time to the business of the commission.' This legislation marks a radical change in the policy of the commonwealth as to obtaining service on our numerous commissions. My duty to my family, to myself, to my office associates and employees, as well as to certain clients, absolutely prohibits me from retaining office under this new policy. This I told you last winter.

"This act became effective on July 1; I should then have resigned except for the fact that the New Haven Railroad declined to accept the act passed by our legislature . . . and that the public interest absolutely required that same common ground should be found upon which the federal government and the New Haven could not meet . . . As it has fortunately turned out, I have been able to be of some use in that matter; but there is now no sufficient reason for my remaining longer in the service of the commonwealth under existing conditions.

"Very likely my retirement may be in the public interest, as it is clearly in my own interest, but this new policy is so unsound, so undemocratic, that I take this occasion to signify my protest against it.

"The inevitable tendency of this legislation is to limit the commonwealth to filling places upon such commissions with men drawn from two classes:

"1. From those who by virtue of inherited or acquired wealth are financially independent. From this class some very excellent public servants have in the past been obtained; doubtless it will be so in the future. But democrats and progressives would not look with equanimity upon a public service commission—charged with the duty of regulating great corporations—dominated by men living easily upon inherited or acquired wealth.

"2. The commonwealth may draw in abundant numbers from men whose demonstrated earning capacity is less than the salary now paid public service commissioners. From this class also excellent service has been and will be obtained.

"But men dependent entirely upon the emoluments of office for the livelihood of themselves and of their families are almost certain to be constant, conscious (or unconscious) candidates for reappointment; they cannot live and act in an atmosphere of independence and freedom. They are, almost necessarily, continuously measuring the forces which make for or against their own continuance in office.

"The mere fact that the salary paid public service commissioners is as much as that paid to superior court judges, makes the situation no better. Appointments to judgeships are for life, with pensions provided for disability and old age. But the bench is a great career, and many of our ablest lawyers prefer it—with its honor, dignity, freedom from strife and from either poverty or riches—to the struggle and possibly larger prizes of the bar. But these short-lived appointments on commissions must necessarily be but episodes in the careers of men of real force and ambition.

"The importance of permitting this class of public servants to retain some outside business or professional work is not that such servants may have, during office, a larger income—it is that they may be independent—not anxious for reappointment—ready on any necessary and proper occasion to risk their official lives in defense of their convictions of what public duty requires.

"I cannot qualify in the class of men living easily on inherited or acquired wealth; I will not qualify in the class entirely dependent for livelihood, present and future, upon the emoluments of public office. . . .

"To get a strong public service commission, the state must either appoint for life or for long terms—as judges are appointed—or the field must be kept open, as it has hitherto been kept open, for those who retain outside business in order not to be overanxious for reappointment.

"Your new policy magnifies the importance of clerkly observance of office hours and minimizes the importance of vision, of sense of public need and public right, of independence of control of financial interests. It disregards the vital distinction between places in which mediocre administrative fidelity is the essential and places which call for the best there is in our best men. It would be far better to reduce the salaries one-half and keep the field open to men of genuine public spirit and independent earning capacity, rather than, by making the salary substantial, to increase the avidity and number of the job-hunters. . . ."

Transportation of Freight via Siberia.—The Moscow Exchange is trying to secure a reduction in freight rates to points reached via Vladivostok, which, after December 1, is likely to be the only open Russian port. According to information received by the exchange from the Far East, the Ussuriisk Railway, controlled by the Chinese Eastern, has sufficient transportation facilities, especially from Vladivostok to Kharbin and Chitz, but its rates are considerably higher than those of most Russian railways. Since it is impossible to determine the time when normal conditions will be re-established, it is thought that it would also be advisable to propose similar reductions in the rates via Nikolaiefsk, the Amur river, and the new Amur Railway, on which freight traffic will begin with the opening of navigation.

General News Department

The two-story brick station of the Michigan Central at Michigan City, Ind., was destroyed by fire December 16.

The shops of the New Haven road were ordered closed until January 4, but now it is said that work will be resumed December 28.

Interstate Commerce Commission engineering parties have just begun their work on the valuation of the Atchison, Topeka & Santa Fe Coast Lines. They started at Williams, Ariz., and are working in both directions.

The forty or more railroad employees arrested last week at Pinner's Point (Norfolk) Va., for working at the freight station on Sunday, were fined five dollars apiece. The Southern Railway, acting in behalf of its employees, appealed the case to the Norfolk County Circuit Court.

The Interborough Rapid Transit Company, New York City, is distributing $43,000 to its employees in the shape of Christmas gifts of $5 each. It is said that these gifts will go to substantially all employees whose regular pay is less than $115 a month. This is the third time that such a distribution has been made.

W. A. Frick, fourth vice-president of the United States Steel Railway Tie Company, and John Maxey, also connected with the concern, were arrested in Pittsburgh last week on charges of fraudulent advertising, made by Attorney A. C. Stein. It is charged that "The United States Steel Railway Tie Company" exists only on paper, and is used to defraud victims. The Pittsburgh Publicity Association is back of the prosecution.

In the yard of the Boston & Maine at Somerville (Boston) Mass., about 2 o'clock on the morning of December 17, the police took into custody 118 tramps, who were found in passenger cars, where they had expected to spend the night in the comfortable atmosphere of the cars which was being kept warm preparatory to the use of the cars early the next morning; and on being searched at the police station, not one cent of money was found among the whole crowd.

Mr. Van Brunt, a safety-first lecturer of the Public Service Corporation, operating extensive electric car lines in New Jersey, says that practically all of the school children in that state, 400,000 of them, have listened to lectures on safety-first; and in the city of Newark the number of casualties to children in the streets has been decreased 47 per cent. Mr. Van Brunt says that in conducting the safety-first propaganda oral lectures have decided advantages over printed matter.

William G. Lee, president of the Brotherhood of Railroad Trainmen, has announced the program of legislation which the brotherhood is preparing to advocate in Congress and in the state legislatures. Mr. Lee says it is proposed to ask the state legislatures to pass a car limit law, to fix the maximum length of freight trains at one-half mile, a clearance law, a law providing that all freight trains shall be equipped with standard two-truck cabooses, an election franchise law providing that railway men may vote while away from home, a semi-monthly pay law and a law to prohibit the operations of "loan sharks." Among the national laws to be urged are more restrictive immigration laws and national legislation to strengthen the proposed state laws wherever practicable. Mr. Lee also says that further efforts will be made to secure the enactment of full crew laws.

W. L. Chambers and G. W. W. Hanger, of the United States board of mediation and conciliation, went to St. Louis last week at the request of the St. Louis Southwestern to adjust the controversy growing out of the discharge of Conductor J. R. Tillman last May for intoxication. Announcement was made on Monday of this week that an agreement had been reached by which Conductor Tillman will withdraw all claims for reinstatement, and the officers of the road agree to take no disciplinary action toward employees who took part in the strike vote following the refusal of the road to reinstate Mr. Tillman. After the first strike vote the members of the Order of Railway Conductors were enjoined by a state court, at St. Louis, from striking, the court holding that the statement of facts in the case, on which statement the men were asked to vote, did not give a true view of the situation. A second strike vote has since been taken, and it has been reported that two-thirds of the men voted to strike.

Research Fellowships at University of Illinois

The engineering experiment station of the University of Illinois announces that four vacancies will be filled at the close of the current academic year in the research fellowships, ten of which have been maintained since 1907. These fellowships, each of which carries an annual stipend of $500, are open to graduates of approved universities and technical schools, appointment being made for two consecutive collegiate years. Not more than half the time of a research fellow is required for the work to which he is assigned, the remainder being available for graduate study, and at the end of the two years, if all requirements have been met, the master's degree is granted. The subjects covered in this research work include architecture, chemistry, civil engineering, electrical engineering, mechanical engineering, mining engineering, municipal and sanitary engineering, physics, railway engineering and theoretical and applied mechanics. Nominations to these fellowships are based on character, scholastic attainment and promise of success, preference being given to applicants who have had some practical engineering experience since completing their undergraduate work. Applications for nomination must be received by the Director, Engineering Experiment Station, University of Illinois, Urbana, Ill., not later than February 1.

Railroad Money Cures Paralysis

The Yazoo (Miss.) Sentinel, which has been publishing a number of articles on fraudulent personal injury claims against railroads, in its issue of December 3 describes a case in which Earle D. Christian sued the Yazoo & Mississippi Valley in the circuit court of Bolivar county, Mississippi, in May, 1909. He secured a verdict against the railroad company for $25,000 as damages for an injury in which he claimed to have been totally and permanently paralyzed from the waist line down; but after collecting the money he speedily recovered. The article states that there was but one eye witness to the accident, Christian's family physician, "who proved to be his star witness both on the cause of the accident and the extent of the injury." At the trial Christian was carried into court in the arms of two men who placed him in a wheel chair; and he appeared to be in a hopeless and helpless condition. After collecting his damages, however, "he entered upon the road to complete recovery within a short time. In a few months after the trial he was getting about on crutches. A little later on he paid a visit to Hot Springs and took a course of baths, and after that was able to walk about without his crutches. In December, 1913, when the temperature was freezing, he swam across a river, a distance of about 300 ft., on a bet, and won it. The performance was witnessed by a large number of people."

Mail Service in 1914

The second assistant postmaster general, in his annual report, says that in the fiscal year ending June 30, 1914, a total of 69,673 tons, or 4,963 carloads, of periodical mail matter was carried on fast freight trains, the cost for which was $706,154, whereas had the old practice of carrying such mail matter in regular mail trains been pursued the cost to the government would have been $2,133,586. During the fiscal year $4,627,200 was paid for railway post office car service. The appropriation for the next

fiscal year (ending June 30 next) is placed at $5,412,000, and for 1916 at $4,760,000.

The weight of paid-by-the-pound rate second-class mail received from publishers during the fiscal year was 513,450 tons, an increase of 14,677 tons, or 2.94 per cent over the previous year.

The total expenditure of the government for the transportation of mail by the railways in the last fiscal year was $50,853,360. The department's estimate for the year beginning next June is $58,229,000, being only 3.63 per cent more than the appropriation for the current fiscal year.

Summary of Revenues and Expenses of Large Steam Roads in October

The following figures were compiled by the Interstate Commerce Commission from monthly reports of operating revenues and expenses of large steam roads for the month of October, 1914. No reports are included for roads whose operating revenues for the year ended June 30, 1914, did not reach $1,000,000.

Report on Kansas City Southern Derailment Near Air Line Junction, Mo.

The Interstate Commerce Commission has just issued the report of H. W. Belnap, chief of the division of safety, on the investigation of a derailment on the Kansas City Southern near Air Line Junction, Mo., on October 19, 1914. A passenger train on a branch line extending from Kansas City to Independence, Mo., was derailed, resulting in the death of the engineman and the injury of the fireman.

The accident occurred about 100 ft. beyond the beginning of a 5 deg. 16 min. curve on a 1 per cent ascending grade. The testimony of the train employees showed that the speed was not high, probably not over 15 miles an hour; but an examination of the track showed very bad conditions, and the derailment was due to this defective track. In some places the gage varied from 4 ft. 8 in. at the joints, to 4 ft. 9¼ in. at the centers of the rails. The report says that within a distance of a half mile on each side of the point of accident about 50 joints were found with only one or two bolts in them, owing to the fact that the ends of some of the rails had no bolt holes drilled in them, while others were so badly matched with the angle bars that it was

FOR THE MONTH OF OCTOBER

Item	United States			Eastern District			Southern District			Western District		
	Amount	Per mile of road operated		Amount	Per mile of road operated		Amount	Per mile of road operated		Amount	Per mile of road operated	
	1914	1914	1913	1914	1914	1913	1914	1914	1913	1914	1914	1913
Average number of miles operated	228,252.70	...	...	58,667.61	...	...	42,286.18	...	...	127,278.91	...	...
Revenues:												
Freight	$189,014,588	$828	$931	$80,413,457	$1,371	$1,535	$26,521,802	$627	$768	$82,079,329	$644	$703
Passenger	53,809,333	236	268	23,298,172	397	433	7,134,588	169	201	23,376,573	184	214
Mail	4,936,500	22	20	1,732,064	30	30	627,767	15	15	2,576,669	20	17
Express	5,954,031	26	31	2,693,062	46	55	828,826	20	22	2,432,143	19	23
All other transportation	7,629,337	33	36	4,232,401	72	75	642,180	15	18	2,754,756	22	24
Incidental	5,236,615	23	25	2,715,752	46	47	621,400	14	17	1,899,463	15	16
Joint Facility—Cr.	332,150	1	1	145,531	2	2	58,383	1	1	128,236	1	1
Joint Facility—Dr.	*118,690*	...	...	*74,429*	*1*	*1*	*16,242*	...	...	*28,019*	...	...
Railway operating revenues	$266,793,864	$1,169	*$1,314	$115,156,010	$1,963	†$2,184	$36,414,704	$861	$1,042	$115,219,150	$905	$998
Expenses:												
Maint. of way and structures	$33,506,868	$147	$169	$13,930,976	$238	$291	$5,009,623	$118	$133	$14,566,269	$115	$123
Maintenance of equipment	43,977,419	193	219	20,372,232	347	411	7,320,232	173	191	16,284,954	128	139
Traffic	4,981,448	22	25	1,895,340	32	40	943,894	22	23	2,142,214	17	19
Transportation	89,519,294	392	442	41,580,832	709	801	12,518,579	296	336	35,419,883	278	310
Miscellaneous operations	1,949,867	8	11	896,763	15	21	195,222	5	5	857,882	7	8
General	6,180,109	27	27	2,609,601	45	43	1,003,431	24	24	2,567,077	20	21
Transportat'n for Investm't—Cr.	*683,596*	*3*	*2*	*67,004*	*1*	...	*138,726*	*3*	*1*	*477,866*	*4*	*3*
Railway operating expenses	$179,431,409	$786	$891	$81,218,740	$1,385	$1,607	$26,852,256	$635	$711	$71,360,413	$561	$617
Net revenue from railway operations	$87,362,455	$383	$423	$33,937,270	$578	$577	$9,566,448	$226	$331	$43,858,737	$344	$381
Railway tax accruals	$11,522,028	$51	$51	$4,735,433	$81	$84	$1,550,558	$37	$37	$5,236,037	$41	$41
Uncollectible railway revenues	61,791	...	...	23,447	...	...	6,886	...	...	31,458	...	...
Railway operating income	$75,776,636	$332	$372	$29,178,390	$497	$493	$8,009,004	$189	$294	$38,591,242	$303	$340

FOR THE FOUR MONTHS ENDING WITH OCTOBER

	1914	1914	1913	1914	1914	1913	1914	1914	1913	1914	1914	1913
Average number of miles operated	227,968.91	...	...	58,670.36	...	...	42,260.15	...	...	127,038.40	...	...
Revenues:												
Freight	$719,675,244	$3,157	$3,374	$312,436,068	$5,325	$5,752	$104,641,293	$2,746	$2,668	$302,597,883	$2,382	$2,496
Passenger	245,452,997	1,077	1,181	109,449,871	1,866	2,012	32,110,904	760	832	103,892,222	818	909
Mail	19,036,125	83	79	6,931,716	118	115	2,508,921	59	58	9,595,488	75	68
Express	23,188,990	102	114	10,367,061	177	202	3,379,622	80	82	9,442,307	74	83
All other transportation	30,311,245	133	139	16,978,329	289	292	2,384,609	56	62	10,948,307	86	93
Incidental	21,095,936	92	98	11,038,960	188	193	2,352,356	56	62	7,704,620	61	66
Joint Facility—Cr.	1,256,188	6	5	566,762	10	9	239,058	6	6	450,368	4	4
Joint Facility—Dr.	*437,854*	*2*	*2*	*285,293*	*5*	*4*	*53,167*	*1*	*1*	*99,394*	*1*	*1*
Railway operating revenues	$1,059,578,871	$4,648	‡4,995	$467,483,474	$7,968	§$8,598	$147,563,596	$3,492	$3,769	$444,531,801	$3,499	$3,718
Expenses:												
Maint. of way and structures	$138,352,057	$607	$689	$57,134,132	$974	$1,169	$21,480,285	$508	$531	$59,737,640	$470	$517
Maintenance of equipment	175,943,125	772	828	81,105,130	1,382	1,527	29,741,836	704	717	65,096,159	512	537
Traffic	19,777,574	87	97	7,454,873	127	151	3,757,630	89	87	8,565,071	67	74
Transportation	351,377,179	1,541	1,674	163,513,734	2,787	3,068	50,602,625	1,197	1,272	137,260,820	1,081	1,156
Miscellaneous operations	8,231,613	36	45	3,843,507	66	86	734,386	17	19	3,653,720	29	35
General	24,331,381	107	108	10,251,274	175	174	3,962,255	94	94	10,117,852	80	82
Transportat'n for Investm't—Cr.	*2,444,897*	*11*	*6*	*211,557*	*4*	...	*439,507*	*10*	*1*	*1,793,833*	*14*	*10*
Railway operating expenses	$715,568,032	$3,139	$3,435	$323,091,093	$5,507	$6,175	$109,839,510	$2,599	$2,719	$282,637,429	$2,225	$2,391
Net revenue from railway operations	$344,010,839	$1,509	$1,560	$144,392,381	$2,461	$2,423	$37,724,086	$893	$1,050	$161,894,372	$1,274	$1,327
Railway tax accruals	$45,635,916	$200	$198	$18,742,117	$319	$317	$6,254,141	$148	$145	$20,639,658	$162	$160
Uncollectible railway revenues	166,963	1	...	63,063	1	...	24,669	1	...	79,231	1	...
Railway operating income	$298,207,960	$1,308	$1,362	$125,587,201	$2,141	$2,106	$31,445,276	$744	$905	$141,175,483	$1,111	$1,167

* Includes $2 unclassified. † Includes $8 unclassified. ‡ Includes $7 unclassified. § Includes $27 unclassified.

impossible to insert bolts. The ties were also in very poor condition. The immediate cause of the accident was the spreading and turning over of three rails on the inside of the curve.

The report contains a half dozen half tone engravings showing track, near the point of derailment, evidently unfit for any speed, but the very lowest; and the inspector concludes that "in this accident the question of speed is not involved, there being no doubt that the track conditions existing in the vicinity of this derailment were such that trains could not be operated with safety even at low speed."

Postal Surplus Result of Unfair Railway Mail Pay

"Had payments to the railroads for hauling the mails increased only half as fast in the past two years as did the volume of mail carried, the $3,569,545 surplus just reported by Postmaster General Burleson in his annual report for the last fiscal year would have vanished," says the Bureau of Railway News and Statistics in a bulletin. "To test the postmaster's jubilant announcement that 'for the first time since Benjamin Franklin organized the postal service the post office department has been securely placed on a self-sustaining basis,' the bureau has analyzed the post office reports of the last three years. So-called surpluses for 1913 and 1914 are shown to be wholly the product of phenomenal growth in mail under the new parcel post, accompanied by almost total failure to pay the greater expense of transportation, subjecting the railways to extortion through forcing on them enlarged business at unfair rates. The contrast follows:

	1914.	1913.	1912.
P. O. revenue	$287,934,565	$266,619,526	$246,744,016
Increase over 1912	16.7 per cent	8.0 per cent	.....
P. O. expense	283,558,102	262,108,875	248,529,539
Increase over 1912	14.1 per cent	5.4 per cent	.....
Excess revenue	$4,376,463	$4,510,651	*$1,785,523
Surplus	3,569,545	3,841,907	.....
Railway mail pay	53,000,000	51,959,387	51,691,301
Inc. over 1912	2.5 per cent	0.5 per cent	.....

*Deficit.

"Against a 16.7 per cent two-year gain in business, pay to the railways for service which must have expanded in like proportion was enlarged but 2.5 per cent. With quadrennial weighings roads whose mail tonnage was weighed in 1912 must wait till 1916 to enjoy added revenue from the fast mounting tonnage. By similar repudiation of vital expenses even the most tottering enterprise might of course be put on paying basis."

Mail Pay Discussions in Congress

Ralph Peters, Chairman of the Committee on Railway Mail Pay, representing 264 leading railroads, operating nearly 90 per cent of the total railroad mileage of the United States, has issued a statement calling attention to the fact that the House of Representatives has adopted a special rule declaring in order the railway-mail-pay rider in the post office appropriation bill. "The true purpose of this bill, as revealed in debate," says Mr. Peters, "is to reduce railway mail pay by many millions a year. . . ." Chairman Moon openly advanced this proposal despite the injustice manifest on its face. . . . The Bourne Committee found that the railroads were entitled to an advance of at least $3.000,000 a year for carrying the mails, with relief from certain incidental services now rendered without payment. Chairman Moon's committee recommended to the House an increase of more than $2,000,000 in next year's appropriation for railway mail pay, but this apparent promise of the bill and its real object are vastly different things. Chairman Moon, on December 19, said before the House: 'It does not show a saving upon its face . . . but you have changed from the quadrennial weighing of the mails on a weight basis, on which the pay is to be computed, to the space provision, and *you will have enough space under the contract to carry all your parcel post probably without any additional compensation and save many millions annually.* . . .' Again Chairman Moon said, more specifically: 'Does not the gentleman know that the main feature of this bill, the only great feature in it, is the railroad pay proposition, and does he not know that when he voted as he did he voted against the consideration of that railroad proposition, that would save this country eight millions of dollars every year, if carried?'

"So the chairman of the House Committee which recommended an increase of $2,000,000 in the appropriation to pay the railroads for carrying the mails, stated on the floor of the House that the bill would save the government $8,000,000 annually.

"The railway mail pay rider in the post office appropriation bill was not conceived in the 'spirit of candor and justice,' which President Wilson has set forth as the proper spirit. It is a bald attempt to create a specious show of economy in the operations of one department of the government by depriving the railroads of a large part of the compensation they fully and fairly earn in the performance of an indispensable public service."

Arbitration of Enginemen's Demands

The hearing before the board of arbitration at Chicago on the demands of the engineers, firemen and hostlers of the western roads for increases in pay and changes in working conditions, was taken up last week with the testimony of a large number of engineers and firemen who went into details regarding the conditions of their work and described experiences to show the hardships which some of them encounter, and the long hours which some of them work, together with statements to show their increased cost of living. One of the principal items in the latter mentioned was the increased cost of meals and lodging when they are away from home.

Most of the witnesses dwelt on the increased size and capacity of the locomotives and the increased length or weight of trains, which they said has increased their labor and responsibility, and also the "productive efficiency" of their work. A large number of the witnesses described the dangers, hardships or difficulties of running through tunnels or over heavy grades in the western mountains, the difficult weather conditions encountered in the Northwest, especially in Canada, and the dangers of working on electric locomotives. An engineman who runs through the Cascade tunnel told of four men being injured from burns while operating electric locomotives. Several witnesses described surprise tests in which they said the signals had been changed to indicate stop when they were so near that it was impossible to stop the train in time; and in one case both engineman and fireman, fearing derailment or collision, had jumped and were injured. A Canadian Pacific engineman said he had frequently encountered temperatures of 45 or 50 deg. below zero, and he described a snow slide which overturned his engine and killed six people. Some complaint was made also of unfair disciplinary measures by officials. Warren S. Stone, grand chief of the Brotherhood of Locomotive Engineers, complained of blacklisting methods, saying that he could offer evidence that when an employee loses his position on one road and goes to another his previous record is "flashed upon him in the most minute detail."

The firemen said their chances of promotion had been greatly decreased in recent years, partly by reductions in force, due to the falling off of business at various times, and partly because of the introduction of larger engines which reduced the number of men required, and which had caused a number of enginemen who had been promoted from firemen to be set back to firing again. Others gave figures showing the large amount of coal shoveled. An engineman employed on the Minneapolis, St. Paul & Sault Ste. Marie told of a case where a division terminal of the road was changed, which required the employees to move their homes and, he said, compelled a large number of the men to lose money by selling their houses at forced sale. A number of men spoke of averaging 14 to 15 hours a day at work, which gave them practically no time at home with their families; but they said that they were able to "lay off" for several days during the month.

The board on Tuesday adjourned to January 4.

Second National Foreign Trade Convention

The second National Foreign Trade Convention will be held at St. Louis, Mo., on January 21 and 22, 1915. Three thousand commercial and industrial organizations, corporations, firms and individuals engaged in foreign trade, have been invited to send delegates. The meeting will be opened by the Hon. W. C. Redfield, secretary of commerce, and among the papers will be one by John Bassett Moore, formerly counselor of the state department and the leading American authority on international law, the subject of the paper being "Problems Arising in War and Commerce."

The Traffic Club of New York

At the regular monthly meeting of the Traffic Club of New York at the Hotel Astor, New York, on December 29, August Thomas will address the club on current events. It is also announced that a concert will be rendered by the orchestra of the American Express Employees' Association. The annual dinner of the club will be held at the Hotel Astor on Saturday evening, February 13.

MEETINGS AND CONVENTIONS

The following list gives the names of secretaries, dates of next or regular meetings, and places of meeting of those associations which will meet during the next three months. Hereafter the full list of meetings and conventions will be published only in the first issue of the Railway Age Gazette for each month.

American Society of Civil Engineers.—Chas. W. Hunt, 220 W. 57th St., New York. Regular meetings, 1st and 3d Wednesday in month, except June, July and August, 220 W. 57th St., New York.

American Society of Engineering Contractors.—J. R. Wemlinger, 11 Broadway, New York. Regular meetings, 2d Thursday in month, at 2 P. M., 11 Broadway, New York.

American Wood Preservers' Association.—F. J. Angier, B. & O., Mt. Royal Sta., Baltimore, Md. Next convention, January 19-21, 1915, Chicago.

Association of Transportation and Car Accounting Officers.—G. P. Conard, 75 Church St., New York.

Canadian Railway Club.—James Powell, Grand Trunk, P. O. Box 7, St. Lambert (near Montreal), Que. Regular meetings, 2d Tuesday in month, except June, July and August, Windsor Hotel, Montreal, Que.

Canadian Society of Civil Engineers.—Clement H. McLeod, 176 Mansfield St., Montreal, Que. Regular meetings, 1st Thursday in October, November, December, February, March and April. Annual meeting, January, Montreal.

Car Foremen's Association of Chicago.—Aaron Kline, 841 Lawler Ave., Chicago. Regular meetings, 2d Monday in month, except July and August, Lytton Bldg., Chicago.

Central Railway Club.—H. D. Vought, 95 Liberty St., New York. Regular meetings, 2d Friday in January, May, September and November. Annual meetings, 2d Thursday in March, Hotel Statler, Buffalo, N. Y.

Engineers' Society of Western Pennsylvania.—Elmer K. Hiles, 2511 Oliver Bldg., Pittsburgh, Pa. Regular meetings, 1st and 3d Tuesday, Pittsburgh.

General Superintendents' Association of Chicago.—A. M. Hunter, 321 Grand Central Station, Chicago. Regular meetings, Wednesday, preceding 3d Thursday in month, Room 1836, Transportation Bldg., Chicago.

New England Railroad Club.—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass. Regular meetings, 2d Tuesday in month, except June, July, August and September, Boston.

New York Railroad Club.—Harry D. Vought, 95 Liberty St., New York. Regular meetings, 3d Friday in month, except June, July and August, 29 W. 39th St., New York.

Niagara Frontier Car Men's Association.—E. Frankenberger, 623 Brisbane Bldg., Buffalo, N. Y. Meetings monthly.

Peoria Association of Railroad Officers.—M. W. Rotchford, Union Station, Peoria, Ill. Regular meetings, 2d Thursday in month, Jefferson Hotel, Peoria.

Railroad Club of Kansas City.—C. Manlove, 1008 Walnut St., Kansas City, Mo. Regular meetings, 3d Friday in month, Kansas City.

Railway Business Association.—Frank W. Noxon, 30 Church St., New York.

Railway Club of Pittsburgh.—J. B. Anderson, Room 207, P. R. R. Sta., Pittsburgh, Pa. Regular meetings, 4th Friday in month, except June, July and August, Monongahela House, Pittsburgh.

Richmond Railroad Club.—F. O. Robinson, C. & O., Richmond, Va. Regular meetings, 2d Monday in month, except June, July and August.

St. Louis Railway Club.—B. W. Frauenthal, Union Station, St. Louis, Mo. Regular meetings, 2d Friday in month, except June, July and August, St. Louis.

Salt Lake Transportation Club.—R. E. Rowland, Hotel Utah Bldg., Salt Lake City, Utah. Regular meetings, 1st Saturday of each month, Salt Lake City.

Southern Association of Car Service Officers.—E. W. Sandwich, A. & W. P. R. R., Atlanta, Ga. Next regular meeting, January 21, 1915, Atlanta, Ga.

Southern & Southwestern Railway Club.—A. J. Merrill, Grant Bldg., Atlanta, Ga. Regular meetings, 3d Thursday, January, March, May, July, September, November, 10 A. M., Candler Bldg., Atlanta.

Toledo Transportation Club.—Harry S. Fox, Toledo, Ohio. Regular meetings, 1st Saturday in month, Boody House, Toledo.

Traffic Club of Chicago.—W. H. Wharton, La Salle Hotel, Chicago.

Traffic Club of Newark.—John J. Kantzmann, P. O. Box 238, Newark, N. J. Regular meetings, 1st Monday in month, except July and August, The Washington, Newark.

Traffic Club of New York.—C. A. Swope, 291 Broadway, New York. Regular meetings, last Tuesday in montb except June, July and August, Waldorf-Astoria, New York.

Traffic Club of Pittsburgh.—D. L. Wells, Erie R. R., Pittsburgh, Pa. Meetings bimonthly, Pittsburgh. Annual meeting, 2d Monday in June.

Traffic Club of St. Louis.—A. F. Versen, Mercantile Library Bldg., St. Louis, Mo. Annual meeting in November. Noonday meetings October to May.

Transportation Club of Detroit.—W. R. Hurley, Superintendent's office, L. S. & M. S., Detroit, Mich. Meetings monthly, Normandie Hotel, Detroit.

Western Canada Railway Club.—W. H. Rosevear, P. O. Box 1707, Winnipeg, Man. Regular meetings, 2d Monday, except June, July and August, Winnipeg.

Western Railway Club.—J. W. Taylor, 1112 Karpen Bldg., Chicago. Regular meetings, 3d Tuesday in month, except June, July and August, Karpen Bldg., Chicago.

Western Society of Engineers.—J. H. Warder, 1735 Monadnock Block, Chicago. Regular meetings, 1st Monday in month, except January, July and August, Chicago. Extra meetings, except in July and August, generally on other Monday evenings.

Traffic News

E. N. Hurley, president of the Illinois Manufacturers' Association, addressed the Traffic Club of Chicago on Friday, December 18, on "Opportunities for South American Trade."

Passenger traffic officers of roads in Ohio and Indiana have this week held a conference with the Ohio Public Utilities Commission concerning their desire to have action taken looking to the repeal of state two-cent fare laws; and on another day they held a similar conference with the governor of Indiana.

The Mississippi Electric Navigation Company of St. Louis, has announced its intention of letting contracts for steel freight barges to be ready for service on May 1. They are to be operated between St. Louis and upper and lower Mississippi river points. It is said the boats will have a capacity of 1,000 tons each.

Suburban passenger fares to and from Baltimore, which were raised at the same time as those at Philadelphia, heretofore noticed, have also been the subject of litigation, an injunction having been issued by the Baltimore county court. This injunction, it is said, will have the effect of continuing the former rates in force until the Public Service Commission shall have made a report on the new tariffs, or until the railroad company can secure the removal of the injunction.

The Pennsylvania Railroad, beginning January 1, will resume the issuance of permits granting reduced passenger rates to clergymen; but not in the state of Pennsylvania, where the constitution and laws forbid reductions in passenger fares, except to employees of the railroad. The Public Service Commission of the state in March last ruled that the clause of the Public Service Company law, 1913, forbidding discrimination by carriers between persons, forbade making a discount to clergymen.

It is reported that since the passenger fare from Chicago to St. Louis was increased from $5.80 to $7.50 on December 15, a large number of passengers have been buying tickets from Chicago to East St. Louis, Ill., or Granite City in order to take advantage of the two-cents a mile intrastate fare in Illinois, and then paying separate fares across the Mississippi river to St. Louis—10 cents by trolley across the bridge or 25 cents on the steam passenger trains. As the fare from Chicago to East St. Louis is $5.62 this makes a considerable saving.

The spokesman of the suburban passengers aggrieved by the recent decision of the Pennsylvania Public Service Commission, allowing an increase in the prices of certain suburban tickets, has filed charges with the governor of the state calling on him to remove the members of the commission because of their "inefficiency, neglect of duty and misconduct in office." The commissioners named in the complaint are former Gov. Samuel Pennypacker, Emory Johnson, Milton Brecht, S. Larue Tone, Charles Wright and Frank Wallace. Mr. Pennypacker's comment, as reported, was, "Let 'em file 'em and be hanged."

On November 17, in accordance with a notice issued on August 15, the Panama Railroad Company ceased to act as a co-carrier in connection with steamship lines running to and from the isthmus. In order, however, to take care of through freight coming to the isthmus in vessels that do not use the canal, the Panama Railroad Steamship Line has established a fortnightly service between New York and Balboa, which is expected to take care of all freight of this nature arriving at Balboa northbound, or at Cristobal southbound. In case the volume of business warrants, other vessels of the Panama Railroad Steamship Line will be put in service.

L. J. Spence, director of traffic of the Southern Pacific, has issued a statement saying that if President Wilson desires to afford the railroads an immediate measure of relief it is within his power to send a recommendation to Congress to repeal that provision in the law which empowers the commission to suspend advanced rates before they come effective. "Under existing practice," he says, "the railroads are considered guilty of extortion until they prove their innocence, and may suffer starva-

tion while awaiting the sustenance to which they are eventually found to be entitled. My suggestion affords adequate protection to all interests."

The attorney-general of New York, who is investigating the egg trade in New York City, has brought out additional information concerning the frauds perpetrated on the trunk line railroads during the past three or four years in connection with claims for eggs broken in transportation. Out of thirteen inspectors formerly employed by trunk line roads, it is said that ten had accepted bribes from egg dealers, to approve unfounded claims for damages. The bribes are said to have run from $25, for a single report, to a regular salary of $85 a week for approving claims. The man who had investigated the records testified that in one week the receipts of eggs at seven stations in New York amounted in value to $28,650, while the claims for damages on the same shipments amounted to $21,687.

Checking Baggage on "Split Tickets"

Among the new tariff announcements issued last week by the New York State Public Service Commission, second district, were abstracts of notices from certain roads relative to changes in baggage regulations. A sample notice says:

In checking on composite transportation no tickets or ticket orders issued by foreign lines will be honored as forming a part of through transportation for the checking of baggage, the sale of parlor car or sleeping car tickets, or the making of reservation in parlor cars or sleeping cars, to points beyond Buffalo, Niagara Falls, Suspension Bridge, Lewiston, Salamanca, or Dunkirk. Effective January 15.

Another road announces a new regulation providing that through checks will be issued on presentation of tickets, mileage books, or passes provided they form complete and valid transportation from starting point to destination; but checks will not be issued on such combined transportation when a wagon transfer is necessary at a junction point on which transportation is split, unless the passenger purchases a transfer tag for each piece of baggage checked.

GERMAN EXPLOSIVE TRAINS BLOWN TO PIECES.—An English contemporary states that news has been received in Petrograd of a terrible collision between two German military trains loaded with pyroxilin and shells in the government of Kielce. Both trains were utterly destroyed and not a soul of those in charge of them survived. The explosion was so terrific that it was heard for a distance of over 30 miles.

FRENCH RAILWAYS RESTORED BY GERMANS.—It is reported from Amsterdam that the Germans have restored the railways from Charleville, in the Department of the Ardennes, to Rheims, and from Hirson, in the Department of the Aisne, to Montmedy, in the Department of the Meuse, twenty-five miles north of Verdun. These railways were destroyed by the French in their retreat before the first German advance on Paris. It is also stated that the railways at Givet, on the Belgian border, will be opened soon; that the bridges over the Meuse near Lumes, Flize and Donchery, to the southeast of Mezieres, are ready for service again and the blocked tunnels near Montmedy and Mohon (just south of Mezieres) have been opened.

AERIAL RAILWAYS IN SWITZERLAND.—It is generally admitted that mountain railways of the aerial cable type cost less to construct than the funicular, and in Switzerland there are several under construction. L'Electricien of Paris describes a new ropeway recently constructed near Bozen, where there is a rise of 2,750 ft. in 5,400 ft., and an average inclination of 43 deg. The two cars, one of which ascends while the other descends, are connected by a cable in duplicate. The up and down lines are 20 ft. apart, and each consists of two steel cables 20 in. apart, on which runs a four-wheel trolley, to which the car is attached. The double cables which draw the cars are operated by an electric motor fixed at the highest station. The supply of current, which is taken from a central station, is supplemented by a battery for emergency use. Hand gear on the car is also provided. All cables are in duplicate, and a large factor of safety has been allowed. The ropeway is supported on steel lattice towers, 56 ft. being the maximum height, and the longest span 1,300 ft. The cars take eight passengers inside and eight outside.—*The Engineer.*

Commission and Court News

INTERSTATE COMMERCE COMMISSION

Rates on Cotton to Mobile

Mobile Chamber of Commerce et al. v. Mobile & Ohio et al. Opinion by Commissioner McChord:

The commission finds that the rates on export cotton from all points in the southeast on the lines of defendants to Mobile are reasonable, but it is held that certain practices of the carriers serving that city should be corrected. A system of rates referred to as "penalty rates" is condemned, the idea of the rates being that a rate higher than a normal local is exacted for the movement from the point of origin to the compress point and, if the shipment then moves to a port of the line of the originating carrier, such higher rate so assessed is applied on the through rate from point of origin to the port. This, in addition to the refusal of the Atlantic Coast Line, Central of Georgia and the Seaboard Air Line to join in through routes or joint rates from certain points to Mobile is held to be discriminatory to that city. Certain rates are found prejudicial to Mobile as compared with Savannah, and defendants are required to readjust them.

At the present time several of the carriers refuse to grant through bills of lading except in the case of shipments which will move via certain docks in which they have a special interest. It is found that these through export rates should also apply on shipments going to other docks. It is proposed that the carriers establish a uniform terminal charge of 3 cents per 100 lb., which shall apply under a system of universal switching so that any of the docks located at Mobile shall be available to shippers located on any of the lines serving Mobile. This charge of three cents is understood to be for an additional service to that rendered at the present time. The export cotton rates to Mobile should be quoted as for station delivery or for delivery at point of interchange at Mobile and the terminal charge for ship-side delivery should be stated as an additional charge; but nothing herein is to be taken as authorizing an increase in the present through rates to ship side.

The commission states that the "through bill of lading" issued on export cotton shipments, entails no responsibility on the part of the rail carrier as a common carrier after it delivers the shipment at the dock or after it is delivered to the connecting carrier at its interchange track in Mobile. The agent of the carrier at the point of origin should, therefore, issue through bills of lading when the shipper simply designates the wharf or dock in Mobile at which he wishes delivery made.

"City cotton" when delivered to a carrier at its station proper in Mobile, or at its interchange track, is to be delivered to the dock or wharf served by it at the uniform terminal charge, and should be subject to the same provisions as to free time and demurrage as other export cotton.

Cotton shipped into Mobile as local, when later declared to be export, must take the export cotton rate to Mobile proper plus the terminal charge. (32 I. C. C., 272.)

Rates from Houston to Points in Louisiana

Chamber of Commerce, Houston, Tex., v. International & Great Northern et al. Opinion by Commissioner Daniels:

The commission finds that it is not unreasonable or discriminatory that carriers should apply a rate scale of $1.37 from Houston, Tex., to points in Louisiana. The rate of 80 cents from Houston to New Orleans is necessitated by water competition and should not be established on traffic upon which water competition does not apply. It is held, however, that certain combination rates, via the gateways, Shreveport, Alexandria, Baton Rogue, Crowley, Oakdale and Napoleonville which may be lower than $1.37 should be published as through rates so that shippers may know that they exist and be put in a condition to make use of them.

Carriers, in the tariffs in issue, proposed to restore to $1.37 the rates from Houston, Tex., to all points on the Vicksburg, Shreveport & Pacific, a rate of 80 cents having been published

in error. The commission finds that there was no reason why the rates to these points should not equal the combination of locals with $1.37 as a maximum and that the carriers are justified in permitting the 80-cent scale to be applicable from Houston to Vicksburg only on traffic consigned to southeastern points.

The commission also finds that the carriers are not justified in making increases on the first and second class rates between Houston and points on Morgan's Louisiana & Texas from Alexandria to Torian.

It is also held that the carriers have not justified an increase from a 60 cent scale to an 80 cent scale in the rates from Houston to stations on the main line of the Louisiana & Western from Maignaud to Rupert, and from points on its branch including Morse, Gueydan, Kaplan, Lastie and intermediate points; a scale of 70 cents is prescribed.

The commission also finds that the carriers have not justified increases in the rates on soap and washing compounds from Houston to New Orleans, and group 4 points from 29 cents to 30 cents. On the other hand an increase in rates on the same products from Houston to Lake Charles and West Lake from 15 cents to 26 cents is allowed. An increase in the rates on scrap iron in carloads from New Orleans and New Iberia to Houston, from $2.50 per ton of 2,000 lb. to 16 cents per 100 lb., is likewise found to be not justified, and it is ordered that the rate be not in excess of 16 cents. (32 I. C. C., 247.)

STATE COMMISSIONS

See Oklahoma decision in Court News.

At a hearing before the Massachusetts Public Service Commission in Boston, December 17, numerous remonstrances were presented against the proposed increases in passenger rates which have been filed by the Boston & Maine. The commission called upon the road to present, from its financial records, the evidence relied on to prove that an increase in rates is necessary.

The Pennsylvania Public Service Commission announces that at Harrisburg, January 8, it will give a rehearing on the advances in Philadelphia suburban passenger rates which were the subject of a decision issued last week. Representatives of the passengers who made the original complaint declare that they are not satisfied with the decision of the commission, which allowed an increase of about 50 per cent in the rate on one hundred-ride tickets good for six months.

At Richmond, December 17, the Virginia state corporation commission imposed a fine of $1,000 on the General Railway Signal Company, Rochester, N. Y., as a penalty for doing business in Virginia without having obtained a certificate of authority from the commission. The signal company will appeal to the courts. The complaint before the commission is based on work done for the Southern Railway, in the construction of automatic block signals, on 147 miles of road, for a total consideration of $214,040.

The railroad commission of Louisiana has authorized the Vicksburg, Shreveport & Pacific to discontinue passenger trains No. 5 and No. 6. These are way trains running the whole length of the road, 172 miles, and the report of the commission, explaining at length the reasons for its action, says that the trains were put on in November, 1912, as an experiment. Receipts are now low on all passenger trains. With these trains off there will be two trains each way, daily, throughout the length of the road, and one additional each way between Monroe and Shreveport, 96 miles.

F. G. Jonah, chief engineer of the St. Louis & San Francisco, was the principal witness at a hearing before the Missouri Public Service Commission on December 15, on the application of the Missouri roads for general increases in freight and passenger rates in the state. Mr. Jonah testified that it would cost $68,527 a mile to reproduce the 1,773 miles of track of the St. Louis & San Francisco in Missouri, including equipment and terminals. He estimates that the value of the terminal facilities of the Frisco in Kansas City alone is $15,000,000. As an example of the heavy increase in railroad expenses, he cited the cost of eliminating grade crossings. Recently $80,000 was spent by his road in Kansas City for that purpose, and $220,000 in St. Louis, and the road may have to expend $300,000 more in St. Louis. Alexander Hilton, passenger traffic manager of the St. Louis & San Francisco, testified before the commission on December 16. He described the reduction in earnings on passenger business resulting from the enforcement of the two-cent fare law in Missouri, which he said was general to all of the roads, and said that the two-cent rate had not had the effect of stimulating traffic, and that if it is to be continued there must be further and radical reductions in passenger train service. He said that while the Frisco's passenger mileage had increased during 1914, its revenues had decreased $88,000. A. L. Conrad, assistant general auditor of the Atchison, Topeka & Santa Fe, told the commission that over 19 per cent of the total number of passengers carried by the Santa Fe in Missouri for a period of five months, including, July, August, September, October and December, 1913, paid no fares. He said this was due largely to the fact that during the months in question the employees of the roads were taking their vacations.

Discrimination to Please the State

The Massachusetts Public Service Commission has issued a report holding that the Boston & Maine's freight rates to and from the pier of the National Dock & Storage Warehouse Company in East Boston, are discriminatory, as compared with the rates to and from the Commonwealth dock in South Boston. But the situation is so complicated that the parties directly interested in it are called upon to get together and try to make a readjustment that shall not unduly disturb business conditions. Ninety days are given within which to make such readjustment.

The discriminatory rates came into existence by reason of the state's development of the pier property in South Boston and the agreement obtained by the Port Directors from the New York, New Haven & Hartford that it should not make any switching charge on goods passing through the Commonwealth Pier. Thus the state obtained special privileges for those who used the Commonwealth dock, not granted to those using the private docks in East Boston. Interstate Commerce Commission reports and court decisions are quoted in support of the contention that unjustly discriminatory rates cannot be maintained, even for the purpose of developing public property.

"The attitude of the Directors of the Port in this matter," says the report, "is clear, but they had no jurisdiction or authority to force the railroad companies to absorb the switching charges from piers in the harbor. It is, however, within the power of the railroad companies to do so, and it would seem that those companies having voluntarily executed this contract with the Port Directors, must take such steps as are necessary to carry out the contract in accordance with the law, and are bound, so long as this contract remains in force, to apply similar rates for similar service to other piers on the water front."

PERSONNEL OF COMMISSIONS

William H. Fisher, of Brownsville, Pa., has been appointed an inspector for the Pennsylvania Public Service Commission.

COURT NEWS

The Supreme Court of the United States has decided in favor of the Erie Railroad in a suit against the Berwind-White Coal Company for demurrage on cars of coal which had been stopped en route to await reconsignment orders.

The Missouri Pacific on December 18, applied to the Supreme Court of Nebraska for a writ of mandamus to compel the state railway commission to accept its application made some time ago for a hearing on a proposed advance in the passenger fares throughout the state from 2 cents to 3 cents a mile. The commission declined to grant the hearing requested on the ground that it has no jurisdiction to change the passenger fares, which are fixed by law.

In a decision rendered by the Supreme Court of Oklahoma, granting to the Atchison, Topeka & Santa Fe a writ of prohibition against an order of the state corporation commission, ordering the Santa Fe to build a viaduct across a street in Guthrie, Justice Riddle differentiates between the power of the commission to order viaducts constructed for the safety of passengers or freight, and the power of the commission to order viaducts constructed as a preventive of accidents to pedestrians. Where the safety of pedestrians alone is involved only the municipal authorities can compel the construction of viaducts or grade crossings, says the opinion.

Railway Officers

Executive, Financial, Legal and Accounting

Francis T. A. Junkin, general attorney of the Atchison, Topeka & Santa Fe system, has resigned.

T. F. Darden, special accountant of the Atlantic Coast Line at Wilmington, N. C., has been appointed assistant to the president.

Robert Dunlap, general attorney of the Atchison, Topeka & Santa Fe system at Chicago, has been appointed western solicitor, with headquarters at Chicago, effective January 1. He will have special charge of corporate and contract matters, and of litigation outside of the states through which the lines of the system run, give counsel to state solicitors in matters arising in their respective jurisdictions, continue to act as solicitor for Illinois, and perform such other duties as may be assigned to him. Mr. Dunlap was born October 4, 1853, at Cincinnati, Ohio, and was educated at the Cincinnati University. He began railway work in 1883 as assistant attorney for the Atchison, Topeka & Santa Fe, with which road he has remained ever since. In 1895 he was appointed assistant to the general solicitor for the receivers, and in 1897, upon the reorganization of the company, he was made general attorney at Chicago, from which position he will be promoted on January 1 to western solicitor, as above noted.

R. Dunlap

S. T. Bledsoe, general attorney of the Atchison, Topeka & Santa Fe at Oklahoma City, Okla., has been appointed assistant general solicitor, with headquarters at Chicago, effective on January 1. In addition to his general duties he will have special charge of valuation and tax matters, supervision of proceedings before state commissions and of litigation resulting from their orders and from legislative acts, and perform such other duties as may be assigned to him. Mr. Bledsoe was born May 12, 1868, in Clinton County, Kentucky. He was educated at the Southern Normal School and Business College at Bowling Green, Ky., and the University of Texas. He entered railway service in 1893 as local attorney for the Gulf, Colorado & Santa Fe at Ardmore, I. T., and in 1907 was appointed attorney for Indian Territory for the same road. From 1908 to July, 1912, Mr. Bledsoe was a member of the firm of Cottingham & Bledsoe, solicitors for Oklahoma for the Atchison, Topeka & Santa Fe. On the latter date he became general attorney for the Santa Fe at Oklahoma City, Okla., retaining his connection with the firm of Cottingham & Bledsoe. On January 1 he will become assistant general solicitor at Chicago, as above noted.

S. T. Bledsoe

Henry L. Waldo, solicitor of the Atchison, Topeka & Santa Fe for New Mexico at East Las Vegas, N. M., has resigned, effective December 31. W. C. Reid, assistant attorney at Roswell, N. M., succeeds Mr. Waldo as solicitor for New Mexico, with headquarters at Albuquerque, N. M. The headquarters of R. E. Twitchell, assistant solicitor for New Mexico, have been removed from East Las Vegas, N. M., to Santa Fe.

Operating

H. Wheeler, superintendent of the White Pass & Yukon, has been appointed general manager.

J. J. Cogan has been appointed general superintendent of the Florence & Cripple Creek and leased lines, also of the Midland Terminal Railway, with headquarters at Colorado Springs, Col. Effective January 1, 1915.

C. L. Brevoort, superintendent of the Cincinnati Terminal division of the Cincinnati, Hamilton & Dayton, has been granted leave of absence, and the position has been abolished. R. B. Mann, general agent at Toledo, Ohio, has been appointed assistant superintendent of the Toledo division at Cincinnati, Ohio, with jurisdiction over the territory from Cincinnati to New River. E. W. Hoffman has been appointed assistant superintendent of the Toledo division, with headquarters at Toledo, with jurisdiction over the district from Toledo to Bates. C. W. Havens, assistant trainmaster at Dayton, Ohio, has been appointed trainmaster, succeeding G. F. Reel, assigned to other duties.

Traffic

A. F. Zipf has been appointed traffic manager of the White Pass & Yukon, with headquarters at Seattle, Wash., succeeding J. E. Dempsey.

Eugene Duval, assistant general western agent of the Chicago, Milwaukee & St. Paul at Omaha, Neb., has been appointed general western agent at that place, succeeding F. A. Nash, deceased.

W. G. MacEdward, general passenger agent of the Detroit & Mackinac, has been appointed also general freight agent, with headquarters at Bay City, Mich., succeeding J. K. Hudson, resigned.

Engineering and Rolling Stock

C. E. Stone has been appointed general car foreman of the Missouri & North Arkansas, with headquarters at Harrison, Ark.

G. M. Lang has been appointed roadmaster of the Canadian Pacific, in charge of Coronation subdivision, with office at Coronation, Alta., in place of W. E. Lissiman.

H. H. Harsh, division engineer of the Baltimore & Ohio, at Cleveland, Ohio, has been transferred as division engineer to Garrett, Ind., succeeding F. D. Nauman, resigned.

Joseph Kowol has been appointed roadmaster of the Northern Pacific at Sedro Woolley, Wash. This name was incorrectly given as Joseph Korvol in our issue of December 18.

OBITUARY

James Wallace Cunningham, land and tax commissioner for the International & Great Northern, died on December 10 at his home in Houston, Tex., aged 54 years.

William Reed Hancock, formerly treasurer of the Wisconsin Central, died on December 16, at his home in Milwaukee, Wis., as a result of injuries received in an automobile accident about three weeks ago. He was born at Ashtabula, Ohio, on February 8, 1841, and began railway work in 1872 as treasurer of the Green Bay & Minnesota. He was subsequently cashier and accountant for the receiver of the same road; assistant treasurer and accountant of the Green Bay, Winona & St. Paul, and from January, 1887, to October, 1893, auditor of the Milwaukee, Lake Shore & Western. Mr. Hancock then went to the Wisconsin Central, of which road he was cashier and paymaster

until July, 1899, assistant treasurer from the latter date to November, 1900, and then treasurer until about four years ago.

Eugene Zimmerman, formerly president of the Cincinnati, Hamilton & Dayton, died suddenly in Cincinnati, Ohio, on December 20, of hemorrhage of the lungs. Mr. Zimmerman was born December 17, 1845, at Vicksburg, Miss. He attended school at Gambier and Farmers College, and was educated as a civil engineer. He began railway work in 1878 as assistant engineer on construction of the Cincinnati & Green River. In 1881 he was chief engineer of the Kentucky & South Atlantic; in 1883 he was president and chief engineer of the Chesapeake & Nashville, and in 1888 he became president of the Dayton, Fort Wayne & Chicago. Mr. Zimmerman was made vice-president of the Cincinnati, Hamilton & Dayton, in June, 1892 and became president of that road in July, 1904, which position he held until October, 1905. He was also chairman of the board of the Pere Marquette from May to October, 1905. He also was for a time president of the Detroit, Toledo & Ironton and the Ann Arbor. He has been president of the Dayton, Lebanon & Cincinnati for several years.

E. Zimmerman

Henry S. Hayward, consulting engineer of floating equipment of the Pennsylvania Railroad Lines East of Pittsburgh, Pa., with headquarters at Jersey City, N. J., whose death on December 14, at Augusta, Ga., was noted in these columns last week, was born on September 19, 1845, at Brooklyn, N. Y. He served a four-years' apprenticeship in marine construction work and engineering, and then to 1873, was in continuous sea service, first as junior engineer, and later was promoted until he became chief engineer on the steamships of the Pacific Mail Steamship Company. In April, 1873, he entered the service of the Pennsylvania Railroad as a machinist in the Altoona shops. The following year he was assigned to special duties on the New Jersey division as assistant road foreman of engines, and in April, 1875, he was appointed assistant superintendent of motive power of the New Jersey division. He was promoted in October, 1882, to superintendent of motive power of the same division, also of the West Jersey & Seashore and the Camden & Atlantic, including ferries and floating equipment on the Delaware river. From January 1, 1912, until the time of his death he was consulting engineer of floating equipment of the Pennsylvania Lines East of Pittsburgh and Erie, Pa. Mr. Hayward was a member of the American Society of Mechanical Engineers, the Society of Naval Architects and Marine Engineers, also of the Engineers' Club of New York and the New York Railroad Club. He was also a member of the committee of the American Railway Master Mechanics' Association, which had charge of the 1912 edition of the Locomotive Dictionary.

H. S. Hayward

Equipment and Supplies

LOCOMOTIVE BUILDING

The Illinois Central is in the market for 25 switching and 25 Mikado type locomotives.

The Philadelphia & Reading has ordered 4 passenger locomotives to be built in its own shops.

Greece.—The American Locomotive Company is reported to have received an order for 20 locomotives for export to Greece.

The Carolina, Atlantic & Western has ordered 3 ten-wheel and 1 six-wheel switching locomotives from the Baldwin Locomotive Works.

CAR BUILDING

The Philadelphia & Reading has ordered 200 hopper car bodies.

The Illinois Central is in the market for 1,000 50-ton refrigerator cars.

The Union Tank Line has ordered 500 tank cars from the Standard Steel Car Company.

The Westmoreland Coal Company has ordered 100 gondola and 100 hopper cars from the Cambria Steel Company.

The Jane Oil & Gas Company, St. Louis, Mo., has ordered 100 tank cars from the Pennsylvania Tank Car Company and 50 from the American Car & Foundry Company.

A War of Railways.—M. Segers, Belgian Minister of Marine, Railways, Posts and Telegraphs, recently visited the head office of the state railways in Paris, where 1,200 Belgians, belonging to his departments, had been drawn up to receive him. In the course of his speech M. Segers said that the present war was a war of railways, and stated that the Germans had offered as much as $10 a day to Belgian railway foremen, and $2.40 a day to ordinary employees, provided that they would return and work the Belgian railways, but these offers had been absolutely rejected. He also noted that the personnel of the Belgian railways, who had been forced to leave their country, would not be forgotten. Those who had found work, but with smaller wages than they usually earned, would be paid the difference, while those who could find no work would be paid as if they were temporarily unemployed. Pay offices had been established in Amsterdam, London and Havre.

Russian Railway Projects.—The acquirement from China by Russia of the right to construct a railway from Blagoveshchensk, on the left bank of the Amur river, to Aigun, Mergen and Harbin, with a connection between Mergen and Tsitsihar, is of great importance politically to Russia and commercially to North Manchuria. Commercially it taps large and rich tracts of territory and gives immediate access to the Amur river and to the New Amur Railway now being opened on the left of the river, and with which Blagoveshchensk is connected. Politically it binds this region to Russia, and gives her at least railway dominance over the whole of North Manchuria. She now has the railway from Vladivostok through Manchuria to Russia, and has nearing completion the railway traversing her own territory from Vladivostok north of the Amur to Karimska, where it junctions with the Siberian Railway. The railways she has now secured the right to build will permit her to place the important center of Harbin, with its direct connection southwards, in immediate touch with trade avenues which will tap the large territory of the Amur. Above all it places in the hands of Russia what is the northern section of the projected railway from Chinchow to Aigun. Americans hold the right from China to build the Chinchow-Aigun Railway, but in recent times the southern half of it has been granted to Japan by China, and now Russia has obtained the right to cover the northern section.

Supply Trade News

The Carbo Steel Post Company, Chicago, has increased its capital stock from $15,000 to $150,000.

The Union Railway Equipment Company, Chicago, has received an order for 1,000 Pries brine tank valves, to be used on 250 beef cars for Morris & Co.

The name of the Jones Safety Train Control System Company has been changed to the American Train Control Company. The offices will be retained at the same address, 608 American building, Baltimore, Md.

H. R. Sheene has been appointed sales engineer of the Union Switch & Signal Company, with headquarters in room 2039 Railway Exchange building, St. Louis, Mo. Mr. Sheene will report to the resident manager at Chicago.

Because of unsettled conditions, it has been decided not to offer United States Steel Corporation stock to employees for subscription in 1915. This will be the first year since the profit-sharing plan became operative, in which employees will not have the privilege of subscribing to stock.

The Jacobs-Shupert U. S. Firebox Company, Coatesville, Pa., has received an order for two Jacobs-Shupert fireboxes from the Royal Hungarian State Railways, following certain investigations by the motive power department of these railways. Delivery will probably not be made until peace has been declared.

Because of the death of the late Quimby N. Evans, the copartnership heretofore existing between Q. N. Evans, J. A. Almirall and W. C. Adams has been dissolved and been succeeded by the corporation of Almirall & Co., Inc. The new company will remain at the same address, 1 Dominick street, New York, and with the same personnel as the former company will continue to engage in the business of heating, ventilating and sprinkler systems and power plants.

On December 10, 1914, Judge Hazel, of the Western District of New York, handed down a decision in the suit of the Safety Car Heating & Lighting Company vs. the United States Light & Heating Company, holding patent No. 747,686, issued to J. L. Creveling, and owned by the former company, valid and infringed by the apparatus of the latter company. There were eight claims in the suit and all were sustained. The patent covers regulating devices for regulating the output of a variable speed generator and means for controlling the regulating devices to determine the output.

TRADE PUBLICATIONS

AIR COMPRESSORS.—The Chicago Pneumatic Tool Compa Chicago, has recently issued bulletin No. 34-S descripti the company's line of small power driven compressors.

PORTABLE ELECTRIC DRILLS.—The Independent P amatic Tool Company, Aurora, Ill., has recently issued cir lar E-2, descriptive of the company's line of Thor portable e tric drills.

HEAT TREATING FURNACES.—The Quigley Furn e & Foundry Company, Springfield, Mass., has issued bulleti No. 6, descriptive of the company's Overfired Accurate mperature Heat-treating furnaces, using gas or oil fuel.

VALVES.—The Golden-Anderson Valv Specialty Company, Pittsburgh, Pa., has issued a circular d scriptive of the Golden-Anderson double cushioned triple-act g non-return valves and various other valves which are mad by the company.

SCALES.—The Buffalo Scale Company, Buffalo, N. Y., has issued a booklet describing its new heavy-duty suspension-bearing center-connected railroad track scale. The essential features of this scale are the suspension bearing, the details of this bearing consisting of five parts and affording simplicity of construction, accuracy and durability. The booklet is illustrated with drawings and photographs of the scale parts and photographs of several installations already in service.

Railway Construction

CAIRO-TRUMAN & SOUTHERN.—We are told that this company which operates a line connecting Truman, Ark., with Judd Hill and Weona, has projected an extension from Weona south to Earle, 20 miles.

COLUSA & HAMILTON.—See Southern Pacific.

DEATH VALLEY.—See Tonopah & Tidewater.

DETROIT, ALMONT & NORTHERN (Electric).—An officer writes that a contract has been given to Frank Bishop, Almont, Mich., to build an extension from Almont north to Imlay City, 8.5 miles. The company has completed work on 9.35 miles of first track, and 0.92 miles of second track between Romeo and Almont. (June 19, p. 1565.)

HERSHEY TRANSIT COMPANY (Electric).—An officer write this company has completed the first section of five miles n-Hershey, Pa., of the line building from Hershey to F om-town, 10 miles; the remaining five miles are expected rshey. pleted early in 1915. H. N. Herr, chief engine (June 12, p. 1356.) any, which

HUDSON BAY RAILWAY.—We are told that thi t Nelson, on is building from The Pas, Man., northeast t on the section Hudson Bay, about 420 miles, is now at Winnipeg, Man., from mile 214 to mile 293. J. D. McAr vey has been com-is the contractor. The final location ar ance of 131 miles. pleted from mile 273 to Port Nelson, This company has ap-

INTERNATIONAL RAILWAY (Electr Commission, Second dis-plied to the New York Public See and necessity to build a trict, for a certificate of conve; N. Y., and Niagara Falls. new electric line between Buideration for over a year, and The project has been underght real estate for the right of the company has alreadye necessary franchises. The com-way, and has been give railways in Buffalo, Niagara Falls, pany now operates std North Tonawanda. E. G. Connett, Lockport, Tonawand president, Buffalo. & TEXAS OF TEXAS.—Work of replacing

MISSOURI, KA ucture carrying the company's tracks across the old timbe treet, Denison, Tex., by a concrete subway is East Crawfo ent completed. The subway will require about about 50 concrete and will cost approximately $31,500. 1,600 yd. & BAKERSFIELD.—See Southern Pacific.

MOJ DOCHES & SOUTHEASTERN.—An officer of this company, N operates a line from Nacogdoches, Tex., southeast to erda, 23 miles, writes that grading work is about finished an extension from LaCerda, southeast six miles.

NEW YORK, CHICAGO & ST. LOUIS.—Grade separation work, which will eliminate 13 highway grade crossings, is being planned by this company at Cleveland, Ohio. The tracks will be depressed and the highways will be carried over the tracks on reinforced concrete bridges. Work is to be begun early next spring and the ordinance requires that it be completed in two years. The approximate cost is estimated at $2,900,000. All work will be done by railroad company forces.

NEZPERCE & IDAHO.—An officer of this company, which operates a line from Nezperce, Idaho, west to Vollmer, 13.8 miles, writes that work is now under way on an extension from Vollmer to Tammany, 49 miles.

NORTHWESTERN PACIFIC.—An officer writes that this company has made surveys for a branch line from Healdsburg, Cal., northwest to Christine, 61 miles. Connection will be made at Christine with the existing line to Albion.

OREGON ROADS.—A committee has been formed for the purpose of securing estimates of cost, route, plans, etc., for a short proposed railroad extending from German Hall to Cold Springs on Columbia river in Oregon, a distance of about 16 miles. The Farmers' Union Grain Agency, Pendleton, Ore., is interested.

PUGET SOUND & WILLAPA HARBOR.—Work on this road, which is a 66-mile line running east from Raymond, Wash., through

Dryad to Chehalis, and then in a northerly direction until it connects with the Grays Harbor branch of the Chicago, Milwaukee & St. Paul, is nearing completion, and though it will not be finished by January 1, 1915, the specified time, it is expected to be completed during the earlier part of the year.

Rolla, Ozark & Southern.—An officer writes that this company, which was incorporated in Missouri early this year with $200,000 capital, to build an 18-mile line from Rolla, Mo., south to Anutt, has most of the right of way secured and about nine miles of grading finished, one mile of track has been laid. J. E. Walker, secretary and general manager, Rolla.

Southern Pacific.—An officer writes that construction work is now under way on the Colusa & Hamilton, from north of Glenn, Cal., to Hamilton, on 12.1 miles, and on the Willamette-Pacific, from a point near Acme, Ore., to North Bend, on 49.1 miles. In addition the Mojave & Bakersfield is projected from Cameron, Cal., to Mojave, and from Tehachapi to Treves.

Stockton, Terminal & Eastern.—An officer of this company which operates a line out of Stockton, Cal., writes that an extension has been projected from Bellota, northeast to Jenny Lind, [illegible] miles. In addition to the use of steam as the motive power gasoline motor cars will be used on the line.

Tennessee & Alabama.—An officer writes that surveys are now being made for the line projected early in 1914 from Fayetteville, Tenn., south to Huntsville, Ala., 34 miles. J. E. Hurd, chief engineer, Fayetteville, Tenn. (February 13, p. 346.)

Tonopah & Tidewater.—We are told that the Death Valley is building a 3-ft. gage line from Death Valley Junction, Cal., to Devar, 20 miles.

Willamette-Pacific.—See Southern Pacific.

RAILWAY STRUCTURES

Ashland, Wis.—The Minneapolis, St. Paul & Sault Ste. Marie will repair its ore docks at Ashland, Wis., in the near future. All work will be done by company forces.

Burlington, Vt.—We are told that a contract has been given to W. Shelton Swallow, Burlington, Vt., to build a union passenger station on Maine street in Burlington, to be used jointly by the Central Vermont and the Rutland Railroad. The new building is to be of brick construction, with stone trimmings, and will be fireproof. The cost of the work will be about $150,000.

Chicago, Ill.—The Chicago & North Western is preparing plans for replacing the old two-track swing bridge across the north channel of the Chicago river near Deering station, by a three-track Strauss bascule single leaf lift span 180 ft. long supported on cylindrical caissons. The approaches will consist of plate girders, that on the tower side being 35 ft. long, the length of the north approach not yet decided. The contract for the superstructure has been awarded to the American Bridge Company, and will require approximately 1,800 tons of steel. The contract for the substructure has not yet been awarded. Work in addition to this improvement will consist of the construction of a new all-electric interlocking plant for the protection of the bridge.

East Des Moines, Iowa.—The Chicago, Rock Island & Pacific is building a foot and highway bridge across its tracks at Thirtieth street, in East Des Moines. This bridge will be 1,084 ft. long, with a roadway 20 ft. wide and a 5 ft. walk on each side. Work on the concrete foundation has been begun and will be done by company forces. This company is also building a foot bridge 6 ft. wide and 974 ft. long across the same tracks at Twenty-sixth street.

Kansas City, Kan.—The Union Pacific is contemplating the building of a small brick freight house at Kansas City, Kan., to be constructed by company forces.

Keokuk, Iowa.—The Keokuk & Hamilton Bridge Company has awarded a contract for the erection of an 11-span bridge across the Mississippi river between Keokuk, Iowa, and Hamilton, Ill., to the Strobel Steel Construction Company, Chicago. The estimated cost is $325,000. Modjeski & Angier, Chicago, are the engineers in charge.

Railway Financial News

Atlantic Coast Line.—This company has declared a "cash" dividend of 2½ per cent on the common stock. The regular semi-annual dividends since November, 1909, have been 3½ per cent, or at the annual rate of 7 per cent. The present declaration will make 6 per cent declared in 1914.

Chicago, Rock Island & Pacific.—The $71,353,000 stock of the Chicago, Rock Island & Pacific Railway Company, the owning and operating company, which is incorporated in Illinois, was sold on December 22 under foreclosure of the collateral mortgage of the Chicago, Rock Island & Pacific Railroad, the Iowa holding company. The stock of the railway company was bid in by the bondholders' protective committee, of which James N. Wallace is chairman, the price, which is purely nominal, being $10 per share. The protective committee will now, under the agreement, distribute the stock pro rata to the railroad bondholders. The expenses of the committee and two committees of which the present is a consolidation total 44½ cents a share of stock; in other words, a little less than half of 1 per cent.

Grand Trunk.—A press despatch from London says that this company is to issue £1,000,000 ($5,000,000) 5½ per cent 3-year notes at 98½.

Lake Shore & Michigan Southern.—See New York Central & Hudson River.

Lehigh & New England.—The New Jersey Public Utility Commission has approved an issue of $1,364,000 stock.

Louisville & Nashville.—This company has declared a "cash" dividend of 2½ per cent on the common stock. The regular semi-annual dividends since November, 1909, have been 3½ per cent, or at the annual rate of 7 per cent. The present declaration will make 6 per cent declared in 1914.

New York Central & Hudson River.—Stockholders of the Lake Shore & Michigan Southern have voted to approve of the merger of this company with the New York Central & Hudson River, the merger having been approved by the stockholders of the New York Central on July 20, 1914, and the permission of the various state commissions having been obtained and the injunctions sought in the courts against the merger having been refused. The articles of consolidation of the two roads have been filed at the state capitals, where such action is necessary.

On December 23 the first meeting of the directors of the new company, the New York Central Railroad, was held and a quarterly dividend of 1¼ per cent was declared, which is the regular New York Central & Hudson River quarterly dividend. The board of directors was increased from 13 to 15 by the election of Leonard J. Hackney, of Cincinnati, Ohio, and Frank J. Jerome, of Cleveland, both of whom were directors of the Lake Shore & Michigan Southern.

Pennsylvania Company.—This company, which is the operating company of the Pennsylvania Lines West, Northwest and Central Systems has declared a dividend of 1 per cent, making a total of 4 per cent declared in 1914 as against a total of 7 per cent declared in 1913. The Pennsylvania Railroad owns all of the $80,000,000 stock of the Pennsylvania Company. This reduction of dividend, therefore, is a loss in other income to the Pennsylvania Railroad of approximately $2,400,000.

Pennsylvania Railroad.—On December 1 the Pennsylvania Railroad had 91,159 stockholders. This is an increase of 3,863 over the number on the books on December 1, 1913, and of the increase 386 is an increase in foreign holders, the total number of foreign holders of stock on December 1, 1914, being 11,882.

St. Louis & San Francisco.—The receivers have sold the $3,000,000 one-year 6 per cent certificates mentioned in these columns last week, and the certificates are being offered to the public at par.

ANNUAL REPORT

SEABOARD AIR LINE RAILWAY

REPORT OF THE DIRECTORS FOR THE FISCAL YEAR ENDED JUNE 30, 1914.

PORTSMOUTH, VA., October 22nd, 1914.

To the Stockholders of the Seaboard Air Line Railway:

The Board of Directors submits the following report of the operations of the property for the year ended June 30, 1914:

INCOME ACCOUNT FOR YEAR ENDED JUNE 30, 1914.

	1914.	1913.	Increase.
Gross Revenue	$25,291,757.62	$24,527,864.62	$763,893.00
Operating Expenses and Taxes	18,310,394.54	17,681,612.65	628,781.89
Net Operating Revenue	$ 6,981,363.08	$ 6,846,251.97	$135,111.11
Outside Operations	(Dr.)20,360.37	(Dr.)26,314.12	5,953.75
Operating Income	$ 6,961,002.71	$ 6,819,937.85	$141,064.86
Other Income	298,996.38	220,063.88	78,932.50
Gross Income	$ 7,259,999.09	$ 7,040,001.73	$219,997.36
Rentals and Hire of Equipment	441,847.42	397,589.17	44,258.25
Applicable to Interest	$ 6,818,151.67	$ 6,642,412.56	$175,739.11
Fixed Interest Charges	3,893,935.91	3,656,558.89	237,377.02
Balance	$ 2,924,215.76	$ 2,985,853.67	$ 61,637.91†
Full 5% Interest on Adjustment (Income) Bonds	1,250,000.00	1,250,000.00	
Net Income	$ 1,674,215.76	$ 1,735,853.67	$ 61,637.91†

†Decrease.

The Gross Revenue increased 3.11 per cent., Operating Expenses and Taxes increased 3.56 per cent., and Operating Income increased 2.07 per cent.

The Operating Expenses, exclusive of Taxes were 68.45 per cent. of the Gross Revenue, as compared with 68.19 per cent. the previous year; and including Taxes, 72.40 per cent. of Gross Revenue as compared with 72.09 per cent. for the preceding year.

MILEAGE OPERATED.

The mileage of the Seaboard Air Line Railway in operation on June 30, 1913, was	3,081.98
Extensions, etc., constructed during the year as detailed on page 6	15.57
Mileage in operation June 30, 1914	3,097.55

CAPITAL STOCK.

There has been no change in the capital stock during the year.

MORTGAGE, BONDED AND SECURED DEBT.

During the year $210,000 par value 4% Refunding Bonds issued for additions, extensions, betterments and improvements, were sold, making a total of $24,010,000 par value of 4% Refunding Bonds outstanding on June 30, 1914.

The remaining $1,000,000 of the $6,000,000 par value of Three Year 5% Gold Notes, dated March 1, 1913, payable March 1, 1916, shown in the last annual report as undelivered on June 30th, 1913, were delivered during this year, making the total authorized issue of $6,000,000 outstanding on June 30th, 1914. For further details of the Company's funded debt see Table No. 4.

EQUIPMENT.

Equipment shown in last annual report as having been undelivered on June 30th, 1913, under Equipment Agreement, Series "O," viz:

7 Mail and Baggage Cars,
4 Passenger and Baggage Cars,

were received during this fiscal year.

An Equipment Agreement, Series "P" was entered into on August 15th, 1913, for the purchase of:

5 Pacific Passenger Locomotives,	5 All Steel Dining Cars,
35 Pacific Freight Locomotives,	500 Steel Upper and Under Frame Ventilated Box Cars,
5 Switching Locomotives,	250 Steel Under Frame Flat Ca[illegible]
1 Dummy Locomotive,	250 Steel Hopper Coal Cars,
10 All Steel Passenger Coaches,	
2 All Steel Express Cars,	

for which $473,228.20 was paid in cash and equipment trust o[illegible] aggregating $1,900,000 were issued, payable in twenty consec[illegible] annual instalments of $95,000 each, bearing interest at the rat[illegible] per annum. All of this equipment was received during the fiscal [illegible] replace

There were purchased during the year, and put in serv[illegible]

Trust Equipment destroyed:

2 Passenger Locomotives,
3 All Steel Express Cars.

were purchased:

In addition to the equipment named above, the follo[illegible]

1 Officers' Car,
4 Air Dump Cars,
2 Ballast Spreader Cars.

EXTENSIONS.

were completed during the

Extensions to the Company's line in Flori[illegible] year as follows:

An extension from Bartow to Pembroke, Fla	8.74 Miles
Carpenter-O'Brien Spur, near Jacksonvi[illegible]	1.96 "
Acme Spur south of Archer, Fla	4.87 "
TOTAL	15.57 "

In addition to the above, constru[illegible]on is in progress on an extension easterly from Bartow [illegible]nown as Lake Wales Extension, approximately .... 22.00 Miles

Construction work is also i[illegible]progress on an extension from Pembroke to Jumeau Pho[illegible]phate Plant, approximately .... 3.53 "

MAINTENANCE OF WAY AND STRUCTURES.

ROADWAY, TRACK AND STRUCTURES.

Roadway, track and structures of the railway have been fully maintained at a cost of $3,094,199.97, which represents an expenditure per mile of road of $1,003.24.

SIDE TRACKS.

45.60 miles of new sidings and extensions of existing sidings were constructed, and there were deducted by removal and changes of old sidings 6.35 miles, making a net increase over previous year of 39.25 miles.

There were also constructed 0.79 mile of new sidings on leased lines.

TIE RENEWALS.

The tie renewals were 1,373,362 cross ties and 590 sets of switch ties, and the cost, $592,991.32, was charged to Operating Expenses.

NEW RAIL.*

144.02 miles of new 85-pound and 10.91 miles of new 90-pound steel rail, making a total of 154.93 miles, were laid in the main line, releasing therefrom 68, 70, 75 and 80-pound worn rail. There was charged net to Operating Expenses therefor, $197,219.77, and to Capital Account, $109,774.14.

In addition, 152.38 miles of released rail was laid on branch lines, releasing 60-pound and lighter rail, and there was charged to Operating Expenses therefor, $86,755.57, and to Capital Account, $153,849.45.

BALLAST.

264,101 cubic yards of gravel and slag ballast were put under main l[illegible] track at a cost of $253,185.39, of which $222,516.96 was charged to C[illegible] Account and $30,668.43 to Operating Expenses.

TRESTLES FILLED.

5,892 lineal feet of wooden trestles were filled in, and of th[illegible] thereof, including culverts, $35,317.41 was charged to Operati[illegible]lineal therof,

TRESTLES REBUILT AND BALLAST DECKED.

There were built during the year out of creosoted ti[illegible] feet of ballast deck trestles, replacing open deck trestles, $69,053.55, was charged to Operating Expenses. [illegible] year on the [illegible]e cost of which, [illegible]at.

TRESTLES STRENGTHENED.

Additional stringers were put in 126 trestles Georgia Division to provide for the use of heavi[illegible] amounting to $17,123.60, was charged to Ca[illegible]pairing, adding signals, heavier power. Of this

BRIDGES.

Work has been done on twenty-eight during this year and six of replacing with steel or strengthening number, twenty-three have been com[illegible]ies are:

Nine of the above bridges were [illegible] the nine have been completed. [illegible]ugh truss draw span 250

Of the bridges completed the [illegible] spans, each 125 feet long,

....	500 feet
Savannah River, near Clyo, Ga [illegible] C., trestle elimination deck feet long, and two through [illegible]	343 "
total .... highway overpass, truss span	150 "
Fishing Creek, near Great [illegible], reinforced concrete overpass	105 "
lattice girders ...... Ga., reinforced concrete overpass	109 "
Boylan Avenue, Raleig[illegible] Charlotte, N. C., half through girder	
Hillsboro Street, Rale[illegible]	89 "
Peachtree Road, nea[illegible]or	150 "
Trade Street und[illegible]cKenny, Va., through truss span	158 "
spans, solid co[illegible]ear Turkey Creek, Fla., through truss span	100 "
Nottoway River [illegible]ar Turkey Creek, Fla., through girder span	

Little Manate[illegible]tures for bridge renewals during the year were $100,- Big Alafia R[illegible] $80,094.76 was charged to Capital Account and $19,931.34 The tota[illegible]kpenses. 026.10, of [illegible] to Oper[illegible]

RAIL IN MAIN LINE.

[illegible] total operated main line single track mileage of the system, [illegible]miles are laid with steel rails of the following weights:

[illegible]	Weight.	Miles.	Weight.	
3,[illegible]92	90 lb. rail.	60.48	63.5 lb. rail.	
[illegible].11	85 "	5.72	60.5 "	
75.25	80 "	496.47	60 "	
[illegible],207.65	75 "	35.41	60 "	(resawed)
166.23	70 "	205.61	58 "	
210.49	68 "	258.11	56 "	and lighter.
18.87	65 "			

The above does not include:

SECOND TRACK.

Northward from Hamlet, N. C.:	
9.09 Miles	90 lb. rail
.52 "	75 "
At Birmingham, Ala.:	
1.43 Miles	75 "
1.62 "	60 "

LEASED LINES.

Silver Springs Branch:	
1.20 Miles	60 "
.70 "	56 "
Amelia Beach Branch:	
2.00 Miles	50 "

MAINTENANCE OF EQUIPMENT.

The equipment of the Railway was fully maintained during the year at a cost of $3,404,470.88.

Included in the cost of maintenance is $82,505.79, representing value of equipment destroyed or retired from service during the year, and credited to the Cost of Equipment.

The cost of maintenance per article owned was as follows:

Average cost per annum per Locomotive owned	$2,506.03
Average cost per annum per Passenger car owned	766.11
Average cost per annum per Freight car owned	60.91

*Due to a typographical error, it was stated in last year's annual report that 130.05 miles of the new rail which was laid in the main track for the fiscal year was 75-pound rail; it should have stated 85-pound rail.

GENERAL REMARKS.

Extensive additions and improvements have been made during the year to the Union Passenger Station at Cordele, Ga., together with revision of track layout to serve same.

A Union Passenger Station is now under construction at Hurtshoro, Ala.

Passenger stations have been built at Littleton, N. C., McBee, S. C., Lawrenceville, Ga., Palmetto, Fla., Bradentown, Fla., and extensive additions and improvements have been made to the Passenger station at Quincy, Fla., and are now being made to the passenger station at Rockingham, N. C.

At Tallahassee, Fla., an umbrella shed with granolithic walks has been provided in connection with the present passenger facilities, and a passenger shelter shed with granolithic walks is inow under construction at Portsmouth, Va.

Combination Passenger and Freight Stations have been constructed during the year at Lee, Fla., and Thalman, Ga.

A brick freight depot has been built at Greenwood, S. C., and the one at Charlotte, N. C., mentioned in last year's report, has been completed. Extensive additions and improvements have been made to the freight depot at Lawrenceville, Ga.

At Norfolk, Va., there has been built during the year a receiving and delivery freight warehouse.

A brick storage warehouse has been built during the year at Raleigh, N. C.

Extensions have been made during the year to the yards at Monroe, N. C., and Portsmouth, Va., and the yard extensions at Richmond, Va., Raleigh, N. C., Hamlet, N. C., and Hutchinson Island, Ga., mentioned in last year's report, have been completed and put in operation.

During the year, an important industrial track was built in the City of Columbia, S. C., to serve present and future development.

The change in the location of the compress belonging to the Atlantic Compress Company at Hutchinson Island, Savannah, Ga., which was mentioned in last year's report, has been completed, thus making available the 130,000 square feet of additional shed room therein mentioned. Additional tracks to serve the new location have also been completed.

The second track work and grade revision, beginning at Hamlet, N. C., and running 9.61 miles northward thereof, mentioned in last year's report, has been completed, giving a five-tenths per cent compensated grade line which will fit in with the plan for the ultimate development of the line between Norlina and Hamlet, N. C.

A large amount of dredging has been done at Tampa, Fla., and Savannah, Ga., during the year to maintain proper depth of water.

The water station and pumping facilities including reservoir at Apex, N. C., mentioned in last year's report, have been completed and put in operation.

Adequate water supply and pumping facilities were provided for Denmark, S. C., water station during the year.

The mechanical coal elevator at Richland, Ga., mentioned in last year's report, has been completed. There is now nearing completion a reinforced concrete coal elevator at Savannah, Ga.

The fifteen thousand ton capacity coal storage plant at Savannah, Ga., and the extension of the Jacksonville storage plant to give a capacity of fifteen thousand tons, both mentioned in last year's report, have been completed and put into operation.

At Seddon Island, Tampa, Fla., the steel phosphate elevator, with two conveyors, together with necessary tracks, wharves and dredging, mentioned in last year's report, has been completed and put in operation.

The eighty-five foot turntable at Hamlet, N. C., mentioned in last year's report, has been completed.

Additional fire protection facilities have been provided at Seddon Island, Tampa, Fla., and there is now being constructed at Hutchinson's Island, Savannah, Ga., a one-hundred thousand gallon capacity steel tank with pipe lines for auxiliary fire protection.

A modern interlocking plant is now in course of installation at Pembroke, N. C.

5 sets of track scales were rebuilt with concrete foundations and steel I beams, replacing wood.

243 industrial sidings and extensions to industrial sidings already existing have been constructed or are in process of construction.

89 depots and freight stations have been constructed or substantially added to during the year.

47 passing tracks have been constructed or extended, or are in process of construction.

8 old water tanks have been replaced with modern 50,000 gallon tanks during the year and suitable pumping facilities provided.

The use of creosoted piling has been continued in maintenance work on docks, wharves and trestles.

During the year there have been constructed and placed in operation additional telephone dispatching circuits between Monroe, N. C., and Atlanta, Ga., 272 miles, and between Bartow and Pembroke, Fla., 9.00 miles This aggregates 1655 miles in operation on June 30, 1914.

In order to insure a proper valuation of the Company's property, under Section 19-A of the Federal Act to Regulate Commerce, it became necessary to organize a special force to do this work. A Valuation Committee was created and they have made much progress in the preparation of maps, research work and the assembling of cost data, etc. The cost during the year, amounting to $14,983.29, has been charged to Operating Expenses.

The Directors acknowledge with appreciation the faithful and efficient services of the officers and employees of your company during the year.

By order of the Board:

W. J. Harahan,
President.

TABLE No. 9.

EXPENDITURES FOR IMPROVEMENTS, BETTERMENTS AND EXTENSIONS CHARGED TO CAPITAL ACCOUNT.

Year Ended June 30, 1914.

SUMMARY OF EXPENDITURES:

Additions and Betterments on Existing Mileage	$1,767,009.85
Equipment Acquired	2,488,165.15
Expenditures for Extensions	86,928.51
Total as Above	$4,342,103.51

TABLE No. 10.

TRAFFIC STATISTICS

Year Ended June 30, 1914, Compared with Year Ended June 30, 1913.

	1914.	1913.	Increase or Decrease.
Average miles operated	3,084.21	3,073.58	10.63
FREIGHT TRAFFIC.			
Revenue Freight.			
Number of tons carried	10,410,986	10,409,242	1,744
Number of tons carried one mile	1,575,008,722	1,538,446,241	36,562,481
Number of tons carried one mile per mile of road	510,668	500,539	10,129
Average distance hauled each ton	151.28	147.80	3.48
Total Freight Train Revenue	$17,307,034.45	$16,788,111.56	$518,922.89
Average amount received from each ton	$1.66.238	$1.61.281	$.04.957
Average receipt per ton per mile	$.01.099	$.01.091	$.00.008
Freight Train Revenue per mile of road	$5,611.50	$5,462.07	$149.43
Freight Train Revenue per train mile	$2.89.127	$2.68.352	$.20.775
Average number of tons per train mile	263.12	245.91	17.21
Average number of tons per loaded car mile	14.96	15.10	—.14
All Freight (Including Company's Material, hauled free).			
Number of tons carried	12,379,847	12,093,055	286,792
Number of tons carried one mile	1,791,417,676	1,729,894,658	61,523,018
Average number of tons per train mile	299.27	276.52	22.75
Average number of tons per loaded car mile	17.00	16.96	.04
PASSENGER TRAFFIC.			
Number of Passengers carried	5,146,791	4,928,125	218,666
Number of Passengers carried one mile	247,690,882	237,424,214	10,266,668
Number of Passengers carried one mile per mile of road	80,309	77,247	3,062
Average distance carried each Passenger	48.13	48.18	—.05
Total Revenue from Passengers	$5,430,531.28	$5,221,199.82	$209,331.46
Average Amount received from each Passenger	$1.05.513	$1.05.947	—$.00.434
Average receipt per Passenger per mile	$.02.192	$.02.199	—$.00.007
Passenger Revenue per train mile	$.88.974	$.91.760	—$.02.786
Total Passenger Train Revenue	$6,866,901.46	$6,654,615.17	$212,286.29
Passenger Train Revenue per mile of road	$2,226.47	$2,165.10	$61.37
Passenger Train Revenue per train mile	$1.12.507	$1.16 951	—$.04.444
Average number of Passengers per train mile	40.58	41.73	—1.15
Average number of Passengers per car mile	7.86	7.93	—.07
REVENUE AND OPERATING EXPENSES.			
Passenger and Freight Train Revenue	$24,173,935.91	$23,442,726.73	$731,209.18
Passenger and Freight Train Revenue per mile of road	$7,837.97	$7,627.17	$210.80
Gross Revenue	$25,291,757.62	$24,527,864.62	$763,893.00
Gross Revenue per mile of road	$8,200.40	$7,980.23	$220.17
Gross Revenue per train mile	$2.09.025	$2.04.995	$.04.030
Operating Expenses	$17,311,394.54	$16,725,612.65	$585,781.89
Operating Expenses per mile of road	$5,612.91	$5,441.74	$171.17
Operating Expenses per train mile	$1.43.071	$1.39.786	$.03.285
Net Operating Revenue	$7,980,363.08	$7,802,251.97	$178,111.11
Net Operating Revenue per mile of road	$2,587.49	$2,538.49	$49.00
Net Operating Revenue per train mile	$.65.954	$.65.209	$.00.745